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September 26, 2024

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The Honourable Steven Guilbeault MP
Minister of Environment and Climate Change
200 Sacré-Coeur Boulevard
Gatineau QC K1A 0H3

Impact Assessment Agency of Canada
22nd Floor, Place Bell
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Ottawa ON K1A 0H3

Dear Minister Guilbeault,

Re: Request for Designation of the Vista Coal Mine Expansions – Increase in Production Capacity

We write on behalf of Keepers of the Water Society and the West Athabasca Watershed Bioregional Society (together "**Keepers**") regarding our August 7, 2024 request for the Vista Coal Mine Phase II Expansion Project ("**Phase II**") and the Vista Underground Mine Project (the "**Underground Mine**") to be designated under s. 9(1) of the *Impact Assessment Act*, SC 2019, c 28, s 1 (the "**IAA**").[1]

On September 11, 2024, we were informed by Eric Landry, Vice-President Operations at the Impact Assessment Agency (the "**Agency**"), that he had determined the Underground Mine had substantially begun and cannot be designated due to the prohibition under s. 9(7)(a) of the IAA.[2]

Unrelated to the Agency's decision, it has come to Keepers' attention that Coalspur now intends to further expand its Underground Mine, including significantly increasing its production capacity. Keepers recently learned of this development through an application filed with the Alberta Energy Regulator ("**AER**") dated August 16, 2024 (the "**Expansion Application**"). The main application for the Expansion Application is attached as Appendix "A", and the appendices are available online on the AER's Integrated Application Registry.[3]

[1] *Impact Assessment Act*, SC 2019, c 28, s 1 [***IAA***].
[2] "Vice President's Response: Vista Underground Mine Project" (11 September 2024), online: https://iaac-aeic.gc.ca/050/evaluations/document/158944
[3] Coalspur Mines (Operations) Ltd., "Vista Test Underground Mine Design Update: To Amend Mine Licence C2022-1A" (16 August 2024), online: https://dds.aer.ca/iar_query/ApplicationAttachments.aspx?AppNumber=1953938 [**Expansion Application**].

Keepers makes three further submissions as a result of this Expansion Application:

1. the Expansion Application contradicts key facts that the Agency relied on when finding that the Underground Mine has substantially begun;
2. Coalspur's Expansion Application demonstrates its incremental approach to mine and production expansion, is new evidence of cumulative effects and further demonstrates the need for designation of Phase II; and
3. the failure of Fisheries and Oceans Canada ("**DFO**") to investigate and enforce the *Fisheries Act* and *Species at Risk Act* demonstrates both the inadequacy of other federal processes and the need for a robust impact assessment of the Vista Coal Mine.

Each of these submissions is set out in further detail below.

1. The Expansion Application contradicts key facts that the Agency relied on when finding that the Underground Mine has substantially begun

The Agency's determination that construction on the Underground Mine had substantially begun cited physical undertakings that had taken place since January 2024, including:

- excavation of the underground mine pit which began in January 2024;
- underground mining which began March 16, 2024, and since then approximately 250,000 bank cubic metres of material has been removed; and
- construction of project infrastructure which has begun on the highwall face portal; power cables that have been installed and powerlines rerouted; and a power center that has been moved and established underground.

However, the description in the Expansion Application Coalspur submitted to the AER on August 16, 2024 indicates that underground mining has not actually started:[4]

> Year 1 development begins in 2024. Construction of the underground mine faceup will occur this year. The overburden from the face up will be handled as described in Section 5.5.
>
> The main infrastructure for the underground mine will be constructed upon final site grading of the faceup area. The proposed composite access tunnels for the return and belt/travelway will be constructed at this time.
>
> Mining underground will begin after the proposed changes are approved and necessary infrastructure has been installed (i.e. as early as this year). The initial equipment will compose one production section, consisting of two continuous miners, three shuttle cars, two roof bolters, and one belt feeder-breaker. Mining during year 1 (if any) will be limited to early development of the 1 North Mains panel.
>
> (emphasis added)

[4] Expansion Application, *supra* note 3 at page 34.

This is further supported by the AER's "Alberta Coal Industry Monthly Statistics", which indicates that Coalspur has produced no bituminous thermal raw coal from underground mining as of June 2024.[5]

There is a clear discrepancy between Coalspur's Expansion Application to the AER, the AER statistics, and the facts the Agency relied on for its substantially begun decision.

If the description in the Expansion Application is accurate, it is possible that the Underground Mine has not "substantially begun" for the purposes of s. 9(7). It may be that the anticipated impacts from the Underground Mine, including on fish and fish habitat, can still be mitigated before they begin.

Keepers requests that the Agency confirm the accuracy of the facts it relied on and either: (1) provide more information on the evidence underlying its recommendation to explain this apparent contradiction, or (2) correct the substantially begun decision.

Further, the Agency's determination that the Underground Mine has substantially begun, and therefore excluding the Underground Mine from the Minister's forthcoming decision under s. 9(1), effectively rewards Coalspur for proceeding without first obtaining *Fisheries Act* and *Species and Risk Act* authorizations from DFO, which DFO has previously said the Underground Mine would require due to effects on fish and fish habitat.[6] These effects on fish and fish habitat are significant; they were central to previous decisions to designate the Underground Mine under s. 9(1).

This perverse result is contrary to the IAA's purpose of preventing or mitigating significant adverse effects within federal jurisdiction; it undermines this protection that the IAA is designed to provide, and the public's confidence in the IAA's ability to provide it. It also risks incentivizing future proponents to block potential designation of their planned activities by proceeding without seeking necessary authorizations.[7] As explained further below, this situation heightens the need for assessment under the IAA, because processes under other federal environmental legislation are not being followed.

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[5] Alberta Energy Regulator, "ST26: Alberta Coal Industries Monthly Statistics" (June 2024), online: https://static.aer.ca/prd/documents/sts/st26/ST26_Current.pdf [**Alberta Coal Statistics**] at page 8.

[6] Impact Assessment Agency, "Analysis Report: Whether to designate the Vista Coal Underground Mine and Vista Mine Phase II Expansion Physical Activities in Alberta" (September 2021), online: https://iaac-aeic.gc.ca/050/documents/p80731/141463E.pdf [**Agency Analysis**] at pages 13 and 21: "DFO indicated that the physical activities would require a *Fisheries Act* authorization and that the VUM and Phase II will be considered in a single review under the *Fisheries Act* and *Species at Risk Act*." See also Impact Assessment Agency, "Memorandum to Minister: Vista Coal Underground Mine and Vista Mine Phase II Expansion Projects – Recommendation on Whether to Designate" (29 September 2021) at page 8, in Keepers of the Water and the West Athabasca Watershed Bioregional Society, "Request for Designation of the Vista Coal Mine Phase II Expansion Project and Vista Underground Mine Project" (7 August 2024), online: https://ecojustice.ca/wp-content/uploads/2024/08/2024-08-07-Designation-Request-Vista-Phase-II-and-Underground-Mine.pdf [**Keepers Designation Request**] at Appendix C, PDF page 133.

[7] *IAA*, *supra* note 1 at s. 6(1).

2. Coalspur's continued expansion is significant new evidence for the Phase II designation

Coalspur's further expansion plans, and incremental expansion approach to the Vista Coal Mine, are new and relevant evidence for the Minister and demonstrate the need for a robust assessment of Phase II before work can begin.

i. *The Expansion Application will add to cumulative adverse federal impacts*

Through the Expansion Application, Coalspur seeks permission to increase total raw production of the Underground Mine from 3,177,344 to 4,345,712 tonnes, representing an increase of "clean" or processed coal from 1,711,000 to 2,612,630 tonnes.[8] In terms of processed coal production, this represents more than a 50% increase in total production. Coalspur is also proposing to increase the underground area of the Underground Mine, from 126.9 ha to 164.1 ha.[9]

For the purposes of the prescribed production threshold for coal mines under the *Physical Activities Regulations*, SOR/2019-285, this would increase the daily coal production from the Underground Mine to 3,969 t/day of raw coal or 2,386 t/day of processed coal, assuming Coalspur still intends to extract this coal over a three-year period.[10] This is a significant increase from the estimated 1,200 t/day of processed coal originally proposed by Coalspur and demonstrates the incremental enlargement of Coalspur's operations.

This would also bring the raw production of the Underground Mine itself over the new production threshold recently proposed by the Agency of 3,000 t/day,[11] and close to the current 5,000 t/day threshold. This suggests that the Underground Mine alone has all the indicia of a major project with the potential for impacts on areas of federal jurisdiction.

This increased production will further exacerbate the adverse federal effects of the Vista Coal Mine, in particular impacts on fish and fish habitat through the additional processing, transportation and wastewater needs. As emphasized in Keepers' original designation request, Coalspur has already struggled to deal with the existing processing needs of Phase I, leading to an application for additional tailings facilities mostly rejected by the AER as a "dilute and pollute-up to strategy … inconsistent with the principle of effective pollution prevention and control".[12] Despite this fact, the total planned production of the Vista Coal Mine continues to increase.

Importantly, the Agency and Minister ought to consider the public's confidence in the integrity of the impact assessment process. The result of Coalspur's incremental expansions of its operations is that the scale of the proposed Vista Coal Mine has far surpassed thresholds at which

[8] Expansion Application, *supra* note 3 at pages 8, 11.
[9] Expansion Application, *supra* note 3 at page 8.
[10] Coalspur suggests in its materials that it will be increasing the life of this project by 6 months, but it is unclear whether it intends to be actively mining for longer than 3 years as previously stated to the Agency: Expansion Application, *supra* note 3 at at page 34.
[11] Impact Assessment Agency of Canada, "Discussion Paper on the Review of the Physical Activities Regulations" (July 2024), online: https://letstalkimpactassessment.ca/discussion-paper-on-the-review-of-the-physical-activities-regulations.
[12] Keepers Designation Request, *supra* note 6 at Appendix E, page 2, PDF page 168.

serious environmental effects within federal jurisdiction are likely. Allowing this incremental expansion and associated impacts to continue without an impact assessment would undermine public confidence in the administration of the IAA.

ii. *The Expansion Application is part of Coalspur's broader expansion plans*

The original open-pit Phase I received provincial approvals in 2014 and became operational in 2019. Phase I was not subject to a federal environmental assessment under the former *Canadian Environmental Assessment Act*.

Coalspur has continued to propose additional increases to the size and production capacity of the Vista Coal Mine since this time. It has sought to increase the size and production capabilities of the Vista Mine through the Phase II expansion, the Underground Mine, and now again through this Expansion Application. The Underground Mine was first proposed in early 2019 through applications to the Alberta Aboriginal Consultation Office in January and to the AER in April to amend existing provincial permits to support the expanded operation. At the same time, the Agency was considering whether the planned Phase II exceeded the regulatory thresholds and/or whether it should be designated for federal assessment. Coalspur failed to inform the Agency of its further expansion plans for the Underground Mine at that time.

Ultimately, both Phase II and the Underground Mine were designated in 2021. Following the Supreme Court of Canada's 2023 reference decision declaring the IAA unconstitutional, this federal designation was removed, and Coalspur immediately began work on the provincially-approved Underground Mine without first seeking required federal authorizations under the *Fisheries Act* and *Species at Risk Act*.

Now, Coalspur is again relying on its existing approvals to pursue an increase in production with the Expansion Application. It is unclear to Keepers whether Coalspur has informed the Agency or DFO of this planned further expansion.

Coalspur has also repeatedly referred to the Underground Mine as a "test" operation, which will be further expanded after underground production methods are provide viable. The Agency ought to be fully aware that this expansion represents the first step in what is likely to become a larger operation.

Coalspur's continuing incremental approach to growing its existing operations further demonstrates the need for an impact assessment of Phase II. There has never been a federal impact assessment of any part of the Vista Coal Mine. Designation of Phase II is a critical first step to understand and mitigate the anticipated impacts, including cumulative effects, of what will be the largest proposed thermal coal mine in Canada.

iii. *The Minister must consider this new evidence of cumulative effects*

The Minister is required by the IAA's purposes to exercise his powers in a manner that considers the cumulative effects of physical activities.[13]

In 2019, the Agency prepared an analysis report to support the Minister's decision about whether to designate Phase II. At the time Phase I had just started operations and there was no evidence

[13] *IAA*, *supra* note 1 at s. 6(2).

about actual production. Relying solely on Coalspur's calculations, the Agency calculated that Phases I and II together would lead to a total processed coal capacity of 36,723 t/day.

Assuming that the Underground Mine has in fact started operations, there are now two coal mines in the vicinity of Phase II. With the Expansion Application, the Underground Mine will produce an additional 4.5 million tonnes of raw coal over the next few years. The cumulative federal impacts from these additional operations must be considered as part of the Minister's designation decision, and differ from those considered by the 2019 Agency analysis report.

Further, there is now data on the real-world production of the Vista Coal Mine which provide a clearer picture of Coalspur's existing operations and allow for a more precise analysis of the cumulative effects of the proposed expansions.

The AER has published Coalspur's actual production from Phase I for January-June 2024, in tonnes:[14]

	January	February	March	April	May	June	**Total**
Raw Coal	842,351	841,155	889,809	835,722	990,807	818,378	**6,088,998**

Extrapolating from this monthly data, Phase I will produce about 12 million tonnes of raw coal this year.

The AER has also published data on Coalspur's preparation plant operations, also in tonnes:[15]

	January	February	March	April	May	June	July	**Total**
Coal Processed	784,108	866,257	863,563	933,267	731,522	861,871	868,997	**5,909,585**
Discard	423,242	390,762	409,641	455,783	303,396	372,322	344,280	**2,699,426**
"Clean" Processed Coal	360,866	475,495	453,922	477,484	428,126	489,549	524,717	**3,210,159**

The Vista Coal Mine appears on track to produce about six million tonnes of processed coal. While the six million tonnes figure is comparable to the Agency's analysis in 2019, the Agency did not consider the total raw production of 12 million tonnes each year. Based on the above figures, about 45% of this raw coal is discarded as part of processing.

The sheer volume of raw and discarded coal from existing operations is relevant information for the cumulative effects analysis. Further, the additional production from the Underground Mine and Expansion Application were not before the Minister in 2019 and must be considered as part of the designation decision, including the resulting federal impacts from additional processing, transportation, and associated infrastructure such as tailings facilities.

[14] Alberta Coal Statistics, *supra* note 6 at page 8.
[15] Alberta Coal Statistics, *supra* note 6 at page 11.

Simply put – Coalspur's current and planned operations are far larger today than they were in 2019 and there are now concrete numbers detailing the scale of these impacts. These larger operations and their impacts on water and fish and other federal impacts mean that the level of disturbance in the environment in which Phase II and the Underground Mine are proposed is both greater and better understood than in 2019. This new information needs to be considered as a part of the Minister's s. 9(1) decision.

3. Coalspur's failure to obtain necessary federal authorizations demonstrates the need for impact assessment

DFO has previously confirmed on multiple occasions that the Underground Mine required federal permits under the *Fisheries Act* and *Species at Risk Act*.[16]

Ever since the designation of Phase II and Underground Mine was rescinded in December 2023, Keepers has repeatedly written to DFO to alert them to Coalspur's likely non-compliance with these federal requirements.

On December 1, 2023, Keepers wrote to DFO regarding representations made by Coalspur indicating that it did not believe it required these federal permits to proceed with the Underground Mine. This letter is attached as Appendix "B". Keepers requested that DFO be proactive, put Coalspur on notice that work could not proceed without required permits, and ensure that federal laws are complied with.

On February 27, 2024, Keepers again wrote to DFO requesting enforcement action after they learned through correspondence with the Alberta Energy Regulator that some work had started on the Underground Mine. This letter is attached as Appendix "C". Again, Keepers requested a full investigation and for DFO to take enforcement action.

Despite being repeatedly informed about potential non-compliance with federal laws, DFO has been unable to subject the Underground Mine to any regulatory enforcement or to the *Fisheries Act* or *Species at Risk Act* permit process.

This new evidence undermines the finding in the initial 2019 decision that designate Phase II of the Vista Coal Mine was not warranted because other federal processes are adequate. In December 2019, then Minister of Environment and Climate Change Jonathan Wilkinson declined to designate Phase II of the Vista Coal Mine primarily due to his belief that adverse effects within federal jurisdiction "are expected to be appropriately managed by comprehensive legislative mechanisms such as the review of any Application for Authorization under the *Fisheries Act* by Fisheries and Oceans Canada, the *Migratory Birds Convention Act* and the provincial environmental assessment and regulatory processes."[17]

Contrary to the Minister's belief at the time, Coalspur has now demonstrated that it will refuse to apply for authorization under the *Fisheries Act* and *Species at Risk Act* before starting work likely to cause harm to fish and fish habitat. Additionally, even where it confirms that authorizations are needed, DFO has demonstrated regulatory oversight and enforcement may not

[16] Agency Analysis, *supra* note 6 at page 13
[17] "Minister's Response: Coalspur Vista Coal Mine Phase II Expansion Project" (20 December 2019), online: https://iaac-aeic.gc.ca/050/evaluations/document/133222

follow . In light of this development, it is highly unlikely that the Minister could reach the conclusion today that the adverse effects of Phase II can be "appropriately managed" by applications under the *Fisheries Act* or other federal legislation and provincial processes.

This new information further supports the need for an impact assessment of the Vista mine.

Conclusion and Requests

Given the new information in the Expansion Application, Keepers requests that:

1. the Agency confirm the accuracy of the facts it relied on for the substantially begun decision and either: (1) provide more information on the evidence underlying its recommendation to explain this apparent contradiction, or (2) correct the substantially begun decision; and
2. take the Expansion Application into consideration as part of the cumulative effects analysis for the Minister's s. 9(1) designation decision.

The Vista Coal Mine and its various expansions have consistently evaded federal assessment. Due to the legal vacuum created by the Supreme Court of Canada's reference decision on the IAA, and inaction by other federal authorities such as DFO, the federal impacts from the mine continue to mount. At the same time Coalspur has steadily increased total production and associated processing needs. Now is the time for a full and robust impact assessment before further federal impacts can occur.

Sincerely,

<Original signed by>

Dyna Tuytel
Barrister & Solicitor

<Original signed by>

Daniel Cheater
Barrister & Solicitor

Encls:

- Appendix A: Coalspur Mines (Operations) Ltd., "Vista Test Underground Mine Design Update: To Amend Mine Licence C2022-1A" (16 August 2024), also available online: https://dds.aer.ca/iar_query/ApplicationAttachments.aspx?AppNumber=1953938
- Appendix B: Letter from Keepers to DFO re Outstanding Permits for Vista Phase II and the Vista Underground Mine (1 December 2023)
- Appendix C: Letter from Keepers to DFO re Outstanding Permits for Vista Underground Mine (27 February 2024)

Coalspur Mines (Operations) Ltd.

August 16, 2024

Corey MacGarva, P. Eng.
Regulatory Applications, Mining
Alberta Energy Regulator
Suite 205, 4999 – 98 Avenue
Edmonton, AB, T6B 2X3

Email: CoalMiningApplications@aer.ca

Coalspur Mining (Operations) Ltd. – Vista Coal Project – Mine No. 1815
Vista Test Underground Mine – C 2022-1A; Application to Amend

Dear Mr. MacGarva,

Please find attached Coalspur Mines (Operations) Ltd.'s application to amend mine licence C 2022-1A.

The amendment application contains updated details and specifications which are applicable under condition 1 of the licence.

If you have any questions or if further discussion would be of benefit, please do not hesitate to contact the undersigned.

Regards,

Cameron McLennan
Underground Mine Engineer
Bighorn Mining Ltd.
M: 902-225-4642
E: cameron.mclennan@bighornmining.com

Cc: Corey MacGarva, AER
Irene Chia, AER
Ian Shaw, Bighorn Mining
Amanada Buchanen, Bighorn Mining

Coalspur Mines (Operations) Ltd.

Vista Mine

Vista Test Underground Mine Design Update

TO AMEND

- Mine Licence C 2022-1A

August 2024

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1 Project Introduction

Coalspur Mines (Operations) Ltd (Coalspur) operates the Vista Coal Mine Project (Vista mine, the mine) as per Conditions of the mine's permits, approvals, and authorizations. The Vista mine is approximately 10 km east of the Hinton town boundary and extends away from Hinton to the southeast for about 12 km up to the McLeod River Valley. It is located approximately 280 km west of Edmonton Alberta.

On May 30, 2022 Coalspur received approval for the construction and operation of the Vista Test Underground Mine (VTUM). The Project is referred to as a "Test" because its primary goal is to determine the feasibility of underground mining by creating a relatively small underground mine which will utilize modern production and safety methods that have been successfully applied by other underground mine operations in Canada and the United States also owned by Coalspur's parent company. The results of this test mine could ultimately provide valuable insight to the mineablilty of the larger Val d'Or coal reserve as well as other seams Coalspur controls under leases that are unsuitable to recover from surface mining methods. The underground mining area proposed in this application will be limited to four years of operation within the approved Vista Project footprint. If Coalspur finds the underground conditions to be satisfactory, an expansion of the underground mining area would be considered.

In this submission, Coalspur is requesting an amendment to licence C 2022-1A to accommodate necessary changes to the portal location and designs resulting from field fitting for specific requirements of the site and improve surface water management. Mine plans and ventilation of the VTUM, will also be modified to match re-designs of the portals and surface layout.

2 Facility identification and Background

2.1 Project Location

The Vista Mine is approximately 10 km east of the Hinton town boundary and extends away from Hinton to the southeast for about 12 km. It is located approximately 280 km west of Edmonton, Alberta. Mine Permit C2014-5I currently encompasses approximately 5,490 hectares (ha) in Townships 50 and 51, Ranges 22, 23 and 24 West of the 5th Meridian. A central latitude and longitude are 53° 23' 28.77" N Latitude and 117° 20' 20.53" W Longitude. The mine location is shown in Figure 1.2 (Appendix A1), and the components of the mine in Figure 4-1 (Appendix A2).

2.2 Project Background

The Vista Project has a regulatory history extending back over 35 years. A provincial Mine Permit and Coal Processing Approval were issued for the eastern portion of the current Vista property in an area that was originally part of Manalta Coal's McLeod River Coal Project. This project received approval from the Government of Alberta in 1983, following the completion of an extensive regulatory process, Environmental Impact Assessment (EIA), technical applications to the Energy Resources Conservation Board (ERCB) (currently Alberta Energy Regulator [AER]) and public hearing. The approved coal project included a coal processing plant approval and a mine permit to produce export thermal coal. The company, at that time, chose not to proceed with the development.

The Mine Permit and Coal Processing Plant Approval were transferred to Coalspur by the Alberta Government in May 2011 as Permit C 2011-5 and Plant Approval C 2011-3. At that time, regulatory agencies directed Coalspur to conduct a comprehensive EIA as part of the regulatory process. The

environmental studies were conducted in the Vista project area from 2010 through 2012. A comprehensive set of environmental and social aspects were assessed, including noise, air quality, hydrology, surface water quality, aquatic systems (e.g. fisheries, benthic invertebrates), groundwater, soils and terrain, vegetation and wetlands, wildlife, human health, socio-economic, land uses, traditional uses and historic resources. These studies included the evaluation of revisions to plant site location and access corridors included in the existing Mine Permit and Coal Processing Plant Approval.

The studies consistently concluded that baseline conditions were similar to those of the general area, and there were no unique environmental sites or values. Further, with effective mitigation and environmental management systems in place, the project would not result in any environmental or social impacts that could materially impact the project's viability. In addition to the environmental impact assessment, the Vista project also initiated extensive public involvement and aboriginal consultation programs.

Coalspur submitted amendment applications to the AER to incorporate several revisions to the mining and coal processing plans. The approved Vista Project includes the following components:

- A surface coal mine including pits, external waste rock and plant rejects dumps, fine refuse disposal areas, and a full range of surface coal mining and support equipment and infrastructure. All rock zones are drilled and blasted, and the coal is dug with hydraulic excavators and loaded into trucks for transport to the run-of-mine (ROM) conveyor.
- A test room and pillar underground mine and associated works. Much of the infrastructure would be shared with surface mine operations.
- Associated infrastructure including raw and clean coal conveyors, coal storage sites, ROM crushers and sizers, a coal processing plant, a freshwater storage pond, and a clean-coal load-out facility. The load-out facility loads coal into rail cars on a siding, providing access to port facilities on the west coast of BC; and
- Access corridors, haul roads, utilities, and mine wastewater management systems.

Preliminary project information and documents for the VTUM were originally submitted to the AER on August 3, 2018 with subsequent information submitted to the AER on August 21, 2018. The AER issued a letter on October 31, 2018 stating that an Environmental Impact Assessment (EIA) report was not required for the VTUM based on the project summary table and details submitted on October 26, 2018. Coalspur submitted the first application for the VTUM to the AER as a draft which was received by the AER on April 16, 2019.

The AER sent a list of deficiencies from an initial review of the application on June 20, 2019. A pre-application meeting was held between members of Coalspur and the AER regarding the VTUM application on July 3, 2019. During this meeting Coalspur provided a presentation and several topics were discussed. The items discussed in this meeting were considered and taken into account in the formal application that was submitted to the AER, dated February 5, 2020 and registered by the AER on February 21, 2020.

The AER and Occupational Health and Safety (OH&S) completed their review of the VTUM application materials and issued Supplemental Information Request (SIR) 1. The SIR#1 response addressed each of AER's deficiencies. Coalspur had also made the operational decision to relocate the portal (face-up) area for the VTUM from the location proposed in the original application. The location of the portal was re-located to the west side of the run of mine (ROM) conveyor belt, as opposed to in an area created as the

surface mine advanced through the approved Val d'Or surface mining. This change was due to several factors. One of the primary reasons for the portal location was changed is due to timing of the application approval. On July 30, 2020, the federal Minister of Environment and Climate Change reversed previous decisions and decided that the VTUM and Phase II warrant designation despite the Impact Assessment Agency's findings that these projects do not result in an increase in the mining area by 50% or more compared to Phase 1, and therefore did not meet the criteria for federal designation. The decision added uncertainty in the approval timelines for the VTUM. As the original location meant the timing of the portal for underground mining meant the underground mine had to be coordinated with the timing of surface operations, the portal was re-located to its currently approved location. Comments from the AER that a portal off of a highwall may be more advantageous than an underground portal was also taken into consideration for this change, as the engineering design for a highwall layout is less complex than tunnels in backfill. These changes were proposed in SIR#1, and information provided in subsequent SIRs were approved. The approved design Figures can be found in Appendix A1. Proposed design figures are provided in Appendix A2.

As of December 21, 2023, the VTUM was no longer designated under the Impact Assessment Agency and earthwork began in the portal location.

2.3 Proposed Changes and Amendments

Based on observed conditions and operational experience between the time of submission and now has resulted in a better understanding of the rock and coal geological conditions through the operation of the surface mine. Based on theses findings, the following changes to the approved design:

- Portal Designs and Locations
    - Face-up relocation to provide space for covered access tunnels
    - Three Portals rather than six.
    - One portal will be a vertical intake airshaft
    - Incorporation of new geotechnical data
- Mine plan
    - Relocated to match face-up relocation
    - Room and Pillar panels expanded from 6 entries to 7 entries
        - Revised coal reserve estimates.
    - Revised pillar designs
    - Updated subsidence zones to match mine plan relocation.
    - Temporary raw coal stockpile is now permanent.

The impacts on components as a result of these changes is described in the following section.

The VTUM, as currently approved is described with proposed revisions in Table 2-1.

Table 2-1: Summary of proposed changes.

Component	Approved Plan	Requested Change
Location	Faceup located within LSDs 3 and 4 of 18-51-23 W5M	Faceup moved approximately 200 m to south east; within LSD 15 of 7-51-23-5
Area (Portal Location)	7.85 ha, disturbed for extent of project	3.2 ha
Components	Power Substation Backup generator 2 x ventilation fans Variable Frequency Drive (VFD) Building Mine water storage tank Access Belt Mine office and yard Temporary coal stockpile Sump Primary electric pump Backup diesel pump Utility boreholes	Power Substation Backup Power 2 x ventilation fans VFD Building Mine water storage tank Access Belt Mine office and yard Permanent raw coal stockpile Utility boreholes Intake shaft and elevator
Area (Underground Works)	126.9 ha	164.1 ha
Faceup Material	Disposed of in pit	Disposed of in pit
Mine Entries	6	6-7
Coal Loading	Initial stages would include temporary stockpile (~20,000 tonne capacity) then fed directly to ROM Belt	Up-to a 60 kt permanent raw coal stockpile with dedicated reclaim belt to feed the main surface ROM belt.
ROM Coal	3,177,344 tonnes	4,345,712 tonnes
Clean Coal	1,711,00 tonnes	2,612,630 tonnes
Water Management Plan	Used existing wastewater ponds and ditches. Included new freshwater diversion ditch, sump in faceup and safety berm	Used existing wastewater ponds and ditches. Included new freshwater diversion ditch. No surface sump required. Mine dewatering pumped to pond R1.
Decommissioning	Infrastructure decommissioned Mine entries sealed Material sourced from surface mine to backfill faceup Reclaim surface disturbance as per requirements of reclamation plan	Infrastructure decommissioned, mine entries sealed and backfilled. No open pit requiring backfill from surface mine. Reclaim surface disturbance as per requirements of reclamation plan

3 Geology and Geotechnical

3.1 Summary of Changes

- Elimination of a permanent highwall removes hazards presented by long term slope-stability.
    - Highwall no longer required after backfilling.
- Updates have been made in accordance with information provided in previous SIR responses.
- Highwall designs (Sec. 3.8) and geometries (Sec. 3.8.1) have changed substantially in response to field fitting the new face-up location to nearby infrastructure and MSL boundary.
- Instrumentation and Management of the highwall has been replaced with inspections by a competent person (Section 3.8.4).
- Slope Stability Analysis (Sec. 3.8.2) has been updated to reflect current information provided in the 2023 Agapito report and the highwall becoming a transient feature in the new face-up strategy.
- Highwall Stabilization (Sec. 3.8.3) has been included to provide details on securing the temporary highwall for face-up construction activities.
- The section covering Kinematic Analysis has been deleted. Current information regarding this topic can be found in the 2023 Agapito report, in Appendix B1.
- The content previously provided under the Differential Settlement section has been replaced by a statement deferring to backfill specifications which will be provided by a professional engineer.

3.2 Regional Conditions

The proposed changes described in this amendment have no impact on previously submitted details regarding regional conditions.

The Coalspur Formation at the Vista Project site is exposed in a subcrop along the erosional eastern margin of the Prairie Creek Anticline. The Pedley Thrust Fault, a major reverse thrust, separates the folded and deformed commencement of the Foothills Belt from the undeformed Alberta Syncline strata. These geologic structures bind the Coalspur Formation to the west and east, respectively. No significant faulting has been identified within the Vista site as reported in the pre-feasibility study conducted by Wardrop Engineering in 2011. Glacial ice deformation has been observed locally along the subcrop margins of the coal zones. The 1982 Environmental Impact Assessment (EIA) conducted by Manalta Coal, Limited (Manalta) describes features such as drumlin and glacial lineations which account for present-day topographic structure and morphology (Manalta 1983).

The Bankable Feasibility Study (BFS) conducted by Coalspur in 2011 previously described the regional tectonic and geologic structures throughout the Vista site. Regional tectonics and structural geology have been discussed in the 2011 Klohn Crippen Berger, Limited (KCB) Geotechnical and Hydrogeological Site Characterization Report (KCB 2012g). The previous study conducted by KCB, as well as correlative stratigraphic data obtained from historic drilling operations by Manalta, corroborate the presence of a gently plunging monocline spanning the Vista Coal Project area. The monocline possesses a 300° northwest/southeast trend with beds dipping gently northeast from 6° in the west to 15° in the east near the McLeod River. A regional stratigraphic column as provided in previous Coalspur applications has been provided as Figure 2.1 (Appendix A1) as well as the Regional Geology for Coalspur leased areas Figure 4-1 (Appendix A2).

3.3 Surficial Geology

The proposed changes described in this amendment have no impact on previously submitted details regarding surficial geology.

The near-surface geology is composed of a ground moraine (till) with local post-glacial alluvial, colluvial, and organic deposits overlying bedrock. The till consists predominantly of sand, silt, with varying proportions of clay and gravel to boulder-size materials.

3.4 Bedrock Geology

The proposed changes described in this amendment have no impact on previously submitted details regarding bedrock geology.

The Coalspur Vista site is located on the eastern margin of the outer foothills of the Rocky Mountains thrust belt. The rocks form part of a sequence of continental sediments from the Saunders Group that overlies the marine Wapiabi Formation of the Alberta Group. The upper Cretaceous-Tertiary Saunders Group can be divided into the Brazeau, Coalspur and Paskapoo Formations. All three units include thin coal seams; however, the Coalspur and Paskapoo formations also contain major coal deposits.

The Paskapoo Formation, which conformably overlies the Coalspur Formation, is a continental alluvial-plain deposit and includes thick successions of poorly indurated mudstones and sandstones. The Paskapoo Formation was deposited in the Tertiary Age in the continental alluvial plain deposits that include thick deposits/successions of poorly indurated mudstones and sandstones. It is suggested that the thick cross-bedded sandstone units conformably overlie the Coalspur Formation throughout the region.

The Coalspur and Brazeau Formations were deposited as a series of five cyclothems (alternating stratigraphic sequences or sediments). Each cyclothem typically consists of a lower and an upper part; the lower part comprises mainly channel sandstone, and the upper part consists primarily of mudstones with coaly shales and/or coal beds. At the base of the Coalspur Formation is the Entrance Conglomerate (Richardson et al. 1990). The coal-bearing upper part of the Coalspur Formation consists of approximately 300 m of interbedded sandstones, siltstones, conglomerates and carbonaceous to bentonitic mudstones and several coal zones.

The Tertiary Paskapoo Formation consists of thick cross-bedded sandstones, which conformably overly the Coalspur Formation throughout the region. The Vista Coal Project Prefeasibility Study (Wardrop 2011) identified six persistent and correlatable coal zones within the Hinton Region. In descending order, they are identified as the Val d'Or, Arbour, McLeod, McPherson, Silkstone, and Mynheer zones. The most significant coal zones at the Coalspur Vista site are the Val D'Or, McLeod and McPherson.

The bedrock in the Coalspur formation consists of interbedded massive sandstones, siltstones, bentonitic to carbonaceous mudstones and coal seams. Sandstone is the dominant lithology with a thickness varying between 10 m to 30 m and up to a maximum of 70 m. The sandstone unit is generally hard and strong except at a shallow depth where it is weathered. The siltstone and mudstone layers are generally weak, discontinuous and thinly bedded.

3.5 Coal Resource and Reserve

The coal seam of interest regarding the proposed Vista Test Underground Mine operation is a split of the Val d'Or seam of Coalspur which they operationally refer to as the V5 seam. The V5 seam is comprised of two upper benches (V5Ub and V5Ua) and one lower bench (V5L). The seam is bound by sandstone, siltstone, and mudstone parting material of variable thickness and contains clastic partings of comparable lithology as well as thin layers of bentonite and carbonaceous mudstone. Corehole log inspection from drilling campaigns sponsored by Coalspur from 2011 to 2017 report an average V5 seam thickness of approximately 5.32 m proximal to the proposed underground exploratory mine.

The current coal reserve model is based on the drilling conducted prior to and including the 2017 field investigations. Drilling completed after 2017 has been used to confirm material properties, coal qualities and elevations. Drilling conducted after 2017 has not shown significant changes to the thickness nor quality of the coal. No drilling or observations while mining since that date support the need for an update to the model. As such, there are no changes to assumptions used in reserves and recovery from the previously approved plans.

3.5.1 Resource

This amendment includes the addition of a 7th entry and revised pillar configuration to the VTUM room & pillar panels, increasing the expected recoverable resources within the designated test mine and the extraction ratio. The revised pillar configuration results in an average extraction ration of 32%. This calculation is covered in more detail in Section 5.9. Calculated in-place reserves for the approved and proposed VTUM are provided in Table 3-1.

Table 3-1: Projected Recoverable Underground Reserves (Val D'Or 5 Seam)

	Coal Seam	Geological reserves (Project Area)	ROM Tonnes within designated test mine	Clean Tonnes within designated test mine	% Clean from geological reserves
Approved	V5	12,226,555	3,177,344	1,711,000	14%
Proposed	V5	13,580,350	4,345,712	2,612,630	19%

3.5.2 Coal Quality

The proposed changes described in this amendment have no impact on previously submitted details regarding coal quality.

Quality estimates for each V5 bench have been calculated by Coalspur specifically for the purposes of the proposed Vista Test Underground Mine operation. Proximate analyses and recovery (float/sink) estimates for each discrete V5 bench are displayed in Table 3-2. Moisture has been calculated on an Air-Dried Basis. Ash, volatile matter, fixed carbon, sulfur, and calorific value have been calculated on a Dry Basis. Results of these coal quality analyses and estimates yield values to classify the V5 seam as a low sulfur (less than 1.0% by weight) thermal coal. The proximate parameters highlighted in green have been calculated on a weighted average based on relative thicknesses of each strata in the V5 seam.

Table 3-2: V5 float/sink recovery estimates

Seam	GT11-04CH Seam Thickness (m)	Raw Volume per lineal meter (20' Entry)	Raw Volume- 3% Mining Loss	SG	Raw Tonnes	Raw Coal Tonnes - 4% Plant Loss	Clean Tonnes	Clean Tonnes @ Moisture Correction	Recovery @1.55 SG	Moisture % (adb)	Ash (db)	Vol% (db)	Fixed Carbon % (db)	Sul (db)	KCAL/KG (db)
V5UA_TOP	0.1	0.61	0.59	2.30	1.36	1.31	0.00	0.00	0.00	-	-	-	-	-	-
V5UB	1.15	7.02	6.80	1.50	10.17	9.77	8.59	9.06	87.95	6.87	11.13	38.31	50.56	0.36	6,554
V5UA_OB	0.25	1.53	1.48	2.30	3.40	3.27	0.00	0.00	0.00	-	-	-	-	-	-
V5UA	1.3	7.93	7.69	1.54	11.87	11.40	8.56	8.95	75.09	7.69	8.84	39.80	51.36	0.39	6,749
V5L_OB	1.15	7.02	6.80	2.30	15.65	15.02	0.00	0.00	0.00	-	-	-	-	-	-
V5L	0.62	3.80	3.69	1.46	5.39	5.18	4.59	4.85	88.67	6.84	9.31	37.97	52.72	0.25	6,679
V5L_BOT	0	0.00	0.00	2.30	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-
Total	4.57				*47.85*		*21.74*	*22.86*	*45.43%*	*7.18*	*9.84*	*38.83*	*51.33*	*0.35*	*6,657*
Moisture Correction	12.08%		RTPM		47.85	CTPM		22.86	47.77%	8.65		34.14	45.13	0.31	5,853
Cutting Height (ft)	15.00		RTPF		16.05	CTPF		7.67						BTU	10,535

3.5.3 Coal Leases

The proposed underground operation will be located entirely within Mine Permit C 2011-5I and coal lease numbers: 1308020345, 1308120624, and 1307050798.

3.6 Geotechnical Conditions

Previously submitted details regarding Geotechnical Conditions remain current and applicable. Updates include information submitted in past SIRs.

Multiple investigations for coal exploration and geotechnical properties have been conducted throughout the Vista Project site over the last four decades. Favorable conditions for open pit excavations have been gleaned from the historic and current geotechnical investigation. The following sections summarize previous investigations and correlative data representative of the proposed Vista Test Underground Mine operation.

3.6.1 Historical Information – McLeod River Block

Manalta Coal Limited (Manalta) conducted an extensive exploration program in the McLeod River North Block in 1980 under Geophysical Licence Number 4104. A total of 82 rotary and 14 core holes were completed in this period. Coal was cored at selected intervals. The prime concern was to provide core material for the initial coal quality test and classification of the potential resources.

The exploration program undertaken for Manalta in 1981 carried out a geotechnical and hydrogeological investigation to include sufficient drilling to develop and obtain a Mine Development Permit for developing a truck/shovel operation production 1 to 4 million tons of coal per year in the McLeod River North Block. The McLeod River feasibility study report completed by Manalta in 1995 investigated and supported a conventional dragline method based on 1.5 million raw tonnes per year or 750 thousand clean tonnes of coal per year.

3.6.2 Supportive Data

Previous investigations produced pertinent data sets required to represent expected conditions for the proposed Vista Test Underground Mine face up location. Geologic models have been constructed from previous data sets. Geotechnical strength properties from point load tests (PLT) and uniaxial compressive strength tests (UCS) were also reviewed to conduct stability analyses for the proposed mine yard area. A brief summary of historical geotechnical investigations has been detailed below as summarized.

3.6.2.1 2011 Field Investigations

The 2011 Coalspur Vista geotechnical site investigation was conducted from July 19, 2011, through November 13, 2011, and comprised three main components:

- Bedrock drilling
- Overburden drilling and test pit excavation
- Field groundwater testing

The investigation was conducted to collect hydrogeological information in support of several detailed design components for the Vista site, including:

- Pit wall design
- Infrastructure
- Pond and dump foundation design
- Pit dewatering
- Water supply

Details on the site investigation were included in the Environmental Impact Assessment (EIA)/ Mine Licence Application Geotechnical Data Report (KCB 2012b). These details include borehole logs, field and laboratory geotechnical test results, water levels, field data and analysis of hydraulic conductivity testing.

Not all planned test holds were drilled during the 2011 site investigation due to access issues at some proposed drilling locations. Details of the cancelled test holes are provided in the EIA/Mine Licence Application Geotechnical Data Report (KCB 2012b). Many of these proposed boreholes that were not drilled were replaced with test pits as access could be more easily gained with a backhoe than a drill rig. Other borehole locations that had been intended to collect foundation information for certain structures became unnecessary when plans for these structures changed. Several important boreholes (e.g. GT11-10-CH and GT11-11-CH) were drilled in 2012 when frozen ground conditions allowed better access to the drilling locations.

The surficial component of the 2011 field investigation comprised the drilling of Sonic and Auger test holes and the excavation of test pits in strategic locations near planned mine infrastructure. The surficial overburden investigation program included:

- Drilling of 16 Auger test holes;
- Drilling of 37 Sonic test holes;
- Excavation of 32 test pits;
- Installation of 35 50 mm diameter and four 25 mm diameter standpipe piezometers; and
- Collection of bagged soil samples for laboratory testing.

The bedrock component of the site investigation comprised the drilling or rock core holes, rotary tricone test holes, in-situ testing during drilling, and the installation of instruments for hydrogeologic assessment. The bedrock drilling investigation comprised the following components:

- Rotary coring of 10 test holes comprising continuous coring through bedrock formations, including detailed logging of rock core for geotechnical and hydrogeological assessment and collection of core samples for laboratory testing.
- Installation of 46 vibrating wire piezometers in various bedrock units.
- Packer testing of bedrock units in select test holes
- Rotary tri-cone drilling of six test holes, including three angled holes and three pumping wells
- Geophysical logging of 14 test holes

- Installation of three pumping wells.

3.6.2.2 2012-2013 Field Investigations

The 2012-2013 geotechnical field investigations focused on critical areas that could not be accessed due to wet conditions during the summer of 2011 or where Coalspur wished to improve the understanding of the geotechnical and hydrogeological conditions through an increased density of corehole data. These field investigation activities were undertaken between February 22, 2012, and January 29, 2013.

The surficial component of the 2012-2013 site investigation comprised sonic drilling and test pitting of overburden materials. Of particular importance to this geotechnical stability report are the sonic boreholes drilled within the footprints of the North Dump, South Dump and Subcrop Dump. Monitoring wells were installed in all sonic holes to observe groundwater levels, and selected monitoring wells were slug tested to estimate hydraulic conductivities in permeable formations.

The surficial overburden investigation program included:

- Excavation of 110 test pits in various areas across the mine, including the CN Rail Siding and loadout area, the south pit wall, the plant site, the freshwater pond, as well as a multitude of scattered locations in search of aggregate;
- Drilling of 49 Sonic test holes;
- Installation of 38 50 mm diameter and 11 25 mm diameter standpipe piezometers;
- Muskeg probing at 28 locations across the mine site; and
- Collection of bagged soil samples for laboratory testing.

The bedrock component of the 2012-2013 field investigations included two coreholes (GT-10-CH and CT11-11-CH) that had been cancelled due to access issues during the 2011 field investigation. Continuous rotary coring was undertaken in these two inclined holes on the highwall side of the proposed pit. Packer testing was successfully completed at two intervals in GT11-10-CH to estimate the hydraulic conductivity of the fractured rock. Downhole geophysical surveys were conducted in both holes. Five vibrating wire piezometer sensors were installed in each hole at target depths to monitor piezometric pressure within coal seams and other fractured rock zones.

The 2012-2013 field investigations also included three rotary coreholes drilled to log the bedrock beneath the North and South Rock Dumps with the following details:

- GT12-522-CH was drilled to a depth of 85.0 m below ground surface on the west side of the South Dump;
- GT12-53-CH was drilled to a depth of 86.0 m below ground surface on the east side of the South Dump;
- GT12-54-CH was drilled to a depth of 85.0 m below ground surface on the west side of the North Dump near the southern toe of the dump where the dump approaches the pit.

3.6.2.3 2017 Field Investigations

The 2017 field investigation focused on drilling four core holes at the back of the final high walls for stability analysis of the initial mining pits and one combination of rotary/core holes for roof and floor material analysis for highwall mining suitability. An experienced geologist logged all holes, and the following information was recorded:

- Rock quality designation (RQD)
- Recovery
- Bedding dips
- Lithology
- Photographs of the core

No discontinuity orientation data was collected because the cores were not oriented. Cores included:

- OX-17-01CH and OC-1721CH were drilled in the final Val d'Or highwall. OX-17-12CH and OX-18-31CH were drilled at the final McPherson pit highwall;
- VUG17-04C was a combination rotary and core hole drilled for strata analysis. VUG1704C was drilled through the Val D'Or, McLeod, and McPherson seams with a core sample obtained from the Val d'Or and McPherson.

Information from the additional drilling was integrated into the existing geological model.

3.6.2.4 2018 Field Investigations

There were 14 drill holes completed in 2018, all within the mineral surface lease. The objectives of this drilling program were to:

- Collected geophysical data
- Identify the initial mining footprint to establish a limit of crop loss where coal quality is lost due to oxidation of the coal;
- Establish locations for source water supply;
- Perform additional coal quality analysis for marketing of Vista Coal; and
- Evaluate the potential for highwall mining based on geotechnical analysis.

3.6.2.5 2019 Field Investigations

Three boreholes were completed to characterize the geotechnical properties with laboratory testing for McPherson Tailings Settling Cell 1 Plug #1.

3.6.2.6 2020 field Investigations

There were 20 drill holes completed in 2020. The drilling of these holes was to confirm our geologic model, obtain additional coal quality information, and obtain samples for geotechnical testing. Drill holes VM-20-01CH through VM-20-04CH were utilized for confirming the geological model, obtaining coal quality results and geotechnical testing of the pit floor. Drill holes VM-20-05CH through VM-20-20CH were utilized to confirm the geological model and obtain coal quality information. Eight boreholes were completed to characterize the geotechnical properties with laboratory testing for McPherson Tailings Settling Cell 1 Plug #1, #2 and #3

3.6.2.7 2021-2022 Field Investigations

There were two coreholes drilled in 2021, they were both drilled in the vicinity of the mining area of the VTUM. These holes were drilled to confirm the properties of the material present in the faceup area. These drillholes did not identify McPherson or McLeod coal. The general ground profile is summarized in Table 3-3 to supplement existing information. A geotechnical analysis utilizing this information can be found in Appendix B1.

These coreholes are very close to the new face-up locations and were used for determining rock strength characteristics and preliminary estimates for design dimensions, support systems, and ventilation simulations in underground workings. Core logs for Drillholes VM-21-01C and VM-21-02C are provided in Appendix C1.

Table 3-3: Ground Profile from 2021-2022 field investigations

Lithology	**Hardness**	**Thickness (m)**	**Elevation (m)**
Glacial till	Not applicable	7.6	1234.7
Sandstone	Soft	1.3	1233.4
Mudstone, carbonaceous	Soft	0.4	1233
Sandstone	Hard	2	1230.9
Siltstone, carbonaceous	Medium to very hard	1.4	1229.5
Mudstone, carbonaceous	Soft	0.2	1229.3
Siltstone	Medium hard	1.3	1228
Mudstone, carbonaceous	Medium hard	0.7	1227.3
Coal (V7 Seam)	Soft to hard	0.8	1226.5
Mudstone, silty	Medium to soft hard	2.2	1224.3
Coal, mudstone and bentonite bands (V6 Seam)	Soft to hard	2.3	1222
Mudstone, silty	Medium soft	0.8	1221.2
Sandstone	Hard	2.7	1218.5
Mudstone, carbonaceous	Soft	0.6	1217.9
Siltstone	Medium hard	0.8	1217.1
Sandstone	Hard	1	1216.1
Coal (V5 upper)	Soft to hard	3.1	1213
Siltstone	Hard	0.3	1212.7
Claystone, bentonite	Soft	0.1	1212.6
Coal (V5 lower)	Hard	1.8	1210.8

There have been 14 coreholes drilled in 2022, nine of the holes targeted the McLeod and McPherson coal seams and five of the holes targeted the Val d'Or seams. The drilling of these holes was to confirm

our geologic model, obtain additional coal quality information, and obtain samples for geotechnical testing. The McPherson pit drilling program was primarily focused on the future McPherson Pits and In-situ plugs. The main objective of the McPherson drilling program was to take samples to determine the material properties in the future tailings cells and in-situ plugs, as well as determining the till/rock interface. Drilling was completed in McPherson pits 4, 5 and 6 as well as in-situ plugs 4, 5 and 6. Coalspur commissioned the production of a new top of rock model incorporating the 2021 and 2022 drilling. Coalspur has updated the maximum tailings deposition elevations in this application based on the results of the new top of rock model.

Figure 4-4 in Appendix A2 provides an update of all geotechnical drilling done to date.

3.6.3 Data Validation

It is expected that the overburden strata in the VTUM, which consists of sandstones, siltstones, and mudstones, will be similar to the strata conditions encountered in the case histories used to develop the Advanced Coal Pillar Stability (ACPS) software database. In order to validate the pillar designs and other geotechnical assumptions, Coalspur will commit to meet or exceed the recommended minimum design safety factors and will perform routine hazard analyses and provide additional mitigation measures as necessary such as geotechnical monitoring during mining for pillar squeeze and convergence. The minimum ACPS recommended stability/safety factor for development mining is 1.3 if the pillar system is less than 425 feet (129.5 m) and the barrier pillar stability factor exceeds 2.0, otherwise a safety factor of 1.5 is acceptable. All mining panels currently proposed in the VTUM are approximately 518 feet (158 m) in width and will exceed 425 feet (129.5 m) in width and, therefore, a minimum safety factor of 1.5 would be the recommended safety factor. The minimum design safety factor for the VTUM Mains has been increased to 1.7 to account for the fact that the coalfield being mined in the VTUM was not previously included in the ACPS database. The minimum design safety factor for the VTUM production panels will remain 1.5. The safety factors of the pillar system in the VTUM are more than acceptable and sufficient for long-term support.

3.7 Design Assumptions

The proposed Vista Test Underground Mine has been designed using historical data obtained during the geotechnical investigations in 2011, 2012-2013, and 2017 and 2023. The rock strength characteristics assessed in the 2014 KCB report and the 2023 Agapito report are assumed to be laterally continuous within the proposed underground exploration mine area given their proximity of these core sampling locations.

In 2018, Coalspur conducted PLT and UCS testing on core samples retrieved from core hole OX-17-01. Comparison of strength properties from this testing to KCB's previous investigation in 2014 reinforces the assumption that the UCS results from OX-17-01 are valid for the application of stability analysis within the proposed underground workings.

Coalspur's summary of geotechnical testing on OX-17-01 are included in Table 3-4, on the following page. The 2014 Geotechnical Assessment of Pit and Dumps produced by KCB on behalf of Coalspur is included in Appendix B2.

Table 3-4: Summary table of geotechnical testing on OX-17-01

Strata Type	Mean UCS (Mpa)	Mean Tensile (MPa)	Mean Diametral PLT Is(50)	Density [kg/m3]
Mudstone w/Bentonite - R2	14.01	0.72	0.51	2,220
Mudstone w/Bentonite - R3	33.54	1.68(2)	1.90	2,219(4)
Boney Coal - R2	19.88	1.99(2)	No data	No data
Boney Coal - R3	31.60	3.16(2)	No data	No data
Carbonaceous Mudstone R1	3.85	0.19(2)	0.12	2,535(5)
Carbonaceous Mudstone R2	16.48	0.31	0.54	2,536
Carbonaceous Mudstone R3	35.21	1.76(2)	0.54(3)	2,535(4)
Coal	6.20(1)	0.62(2)	No data	1,610
Mudstone - R0	1.02	0.05(2)	0.04	2,413
Mudstone - R1	3.38	0.17(2)	0.07	2,413(4)
Mudstone - R2	13.51	0.80	0.53	2,412
Mudstone - R3	38.45	5.04	1.40	2,445
Mudstone - R4	60.08	3.00(2)	2.53	2,469
Sandstone - R1	4.00	0.40(2)	0.16	2,363
Sandstone - R2	15.90	0.85	0.69	2,369
Sandstone - R3	35.67	2.12	1.42	2,464
Sandstone - R4	69.26	4.85	2.52	2,540
Sandstone - R5	116.89	8.05	4.81	2,712
Shale - R2	22.49	1.12(2)	0.91	2,541(5)
Shale - R3	34.09	1.46	1.19	2,542
Shale - R4	59.62	3.51	1.19(3)	2,586
Siltstone - R1	3.00	1.75	0.12	2,406
Siltstone - R2	15.85	1.44	0.62	2,424
Siltstone - R3	36.87	2.40	1.43	2,472
Siltstone - R4	69.82	4.36	2.99	2,519
Siltstone - R5	129.45	8.90	6.95	2,586
Silty Mudstone - R1	4.33	0.22(2)	0.10(4)	2,407(5)
Silty Mudstone - R2	13.50	0.81	0.66	2,408
Silty Mudstone - R3	32.23	1.65	1.42(4)	2,441
Silty Sandstone - R2	19.55	1.96(2)	0.80	2,447(5)
Silty Sandstone - R3	40.70	3.11	1.54	2,448
Silty Sandstone - R4	66.11	5.74	2.32	2,494
Silty Sandstone - R5	114.09	11.49(2)	4.49	2,573

Notes
(1) NIOSH recommended coal strength
(2) Standard rule of thumb estimate. Tensile strength ~= 10% UCS(Brittle Rock), ~=5% UCS for Mudstones and claystones)
(3) Derived from lower rock grade
(4) Average of comparable Siltstone, and Mudstone
(5) Derived from higher rock grade

3.7.1 Rock Strength Designations

Stratigraphic correlations of thickness and rock type have been enhanced by incorporating the OX-17-01 core log. This core log was used to increase the understanding and modeling efforts related to: bedding angle, strata thickness, strata type, and correlation of rock strength. Rock strength grades have been assigned based on point load index and UCS values obtained during strength testing of the OX-17-01 core. The assigned rock strengths correspond to the International Society of Rock Mechanics (ISRM) Intact Rock strength classification system. A table describing the ISRM grades, descriptions, and UCS ranges is included in Table 3-5 below.

Table 3-5: ISRM Intact Rock Strength Classification

Grade	Term	Field Identification	Approx. range of UCS (MPa)
R0	Extremely weak rock	Indented by thumbnail	0.25 – 1
R1	Very weak rock	Crumbles under firm blows with point of geological hammer; can be peeled by a pocket knife	1 – 5
R2	Weak rock	Can be peeled by a pocket knife with difficulty, shallow indentations made by firm blow with point of geological hammer.	5 – 25
R3	Medium strong rock	Cannot be scraped or peeled with a pocket knife; specimen can be fractured with single firm blow of geological hammer	25 – 50
R4	Strong rock	Specimen requires more than one blow of geological hammer to fracture it.	50 – 100
R5	Very strong Rock	Specimen requires many blows of geological hammer to fracture specimen.	100 – 250
R6	Extremely strong rock	Specimen can only be chipped with geological hammer.	<250

Rock types expected to be encountered at the proposed mine entry location have been assigned the average UCS values obtained from the geotechnical testing conducted by Coalspur in 2018. A summary of the UCS values of competent rock used for stability analysis is in Table 3-6**.**

Table 3-6: Summary table - UCS values of competent rock

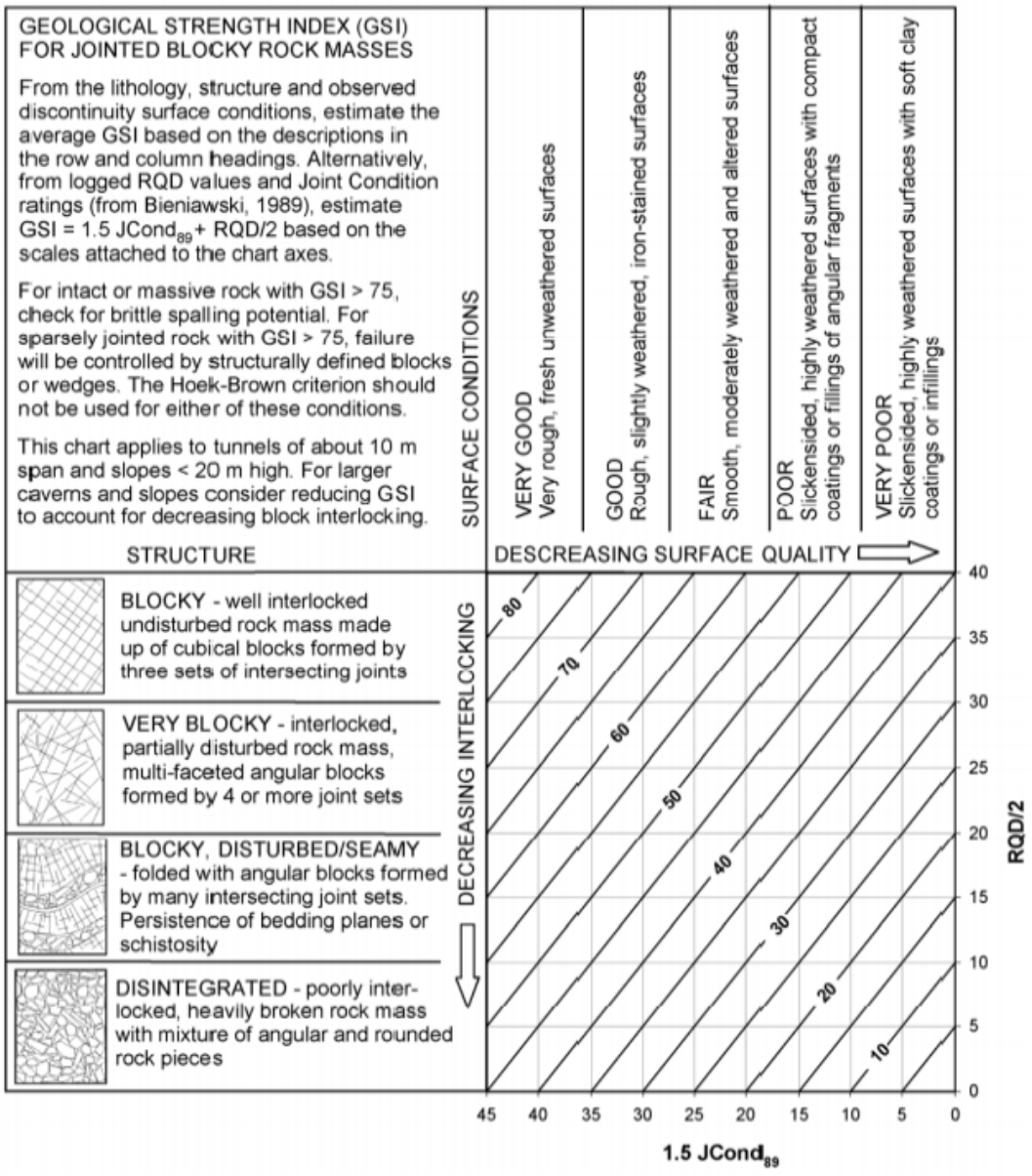
Description	Rock Grade	ISRM Intact Rock Strength Classification	Laboratory UCS Results (MPa)
Sandstone	R3	Medium-Strong	35.67
Sandstone	R4	Strong Rock	69.26
Siltstone	R2	Weak	15.85
Siltstone	R3	Medium-Strong	36.87
Siltstone	R4	Strong Rock	69.82
Mudstone	R2	Weak	13.51
Mudstone	R3	Medium-Strong	38.45
Mudstone	R4	Strong Rock	60.08
Carbonaceous Mudstone	R2	Weak	16.48
Boney Coal	R3	Medium-Strong	31.6

3.7.1.1 Geological Strength Index

The geological strength index (GSI) assigned for stability analyses has been based on the review of historical evidence as well as the OX-17-01 rock core. A GSI value of 60 was applied to the competent rock structures anticipated to be encountered in the proposed face up location. Previous stability analyses produced by KCB and Coalspur also have applied a GSI of 60, which justifies its use for this study. The joint conditions and RQD reported in the OX-17-01 core log, give further validation for the use

of this GSI value. The OX-17-01 core log is included in Appendix C2. A table representing parameters for GSI selection is in Table 3-7 below.

Table 3-7: Geological Strength Index Reference Table



3.7.1.2 Failure Criterion

The stability analysis for the proposed face up location utilizes failure criterion and blasting disturbance methodologies previously described in the KCB Geotechnical Assessment of Pit and Dumps in 2014. These parameters were employed to preserve consistency between the current and previous analyses. A brief summary of the employed failure criterion and disturbance factor is provided below.

The Generalized Hoek-Brown failure criterion was employed for the purposes of rock strength characterization and slope stability analysis. This failure criterion is commonly used to simulate the properties of brittle rock failures in open excavations. Experience in the design of slopes in very large open pit mines has shown that the Hoek-Brown criterion for undisturbed in situ rock masses (D = 0) results in rock mass properties that are too optimistic. The effects of heavy blast damage, as well as stress relief due to the removal of overburden, result in disturbance of the rock mass. It is considered that the "disturbed" rock mass using D = 1 are more appropriate.

Upon completion of mechanical excavation operations, controlled production blasting methods will be employed to achieve the final highwall geometries. Final highwall geometry was based on anticipated blasting methodology, e.g. pre-split drilling of the final highwalls, blasting to a free face, and controlled delays between holes. The selected disturbance factor for use in the Generalized Hoek-Brown failure criterion is disclosed in Appendix B3. The Mohr-Coulomb failure criterion was employed to model the characteristics of unconsolidated, brittle, and more ductile materials (coal, bentonite, glacial till, waste rock) within the proposed mine yard area. Cohesion and internal angle of friction values for glacial till, coal, and bentonite layers were used from previous stability analysis by KCB in 2014 (KCB 2014e).

3.7.2 Face-up and Initial Underground Development

The proposed Vista Test Underground Mine face up excavation and initial underground development has been designed using rock strength parameters provided by the 2023 Agapito report, which can be found in Appendix B1.

A range point load strength index and unconfined compressive strength (UCS) testing was carried out by Agapito on the rock core samples from coreholes VM-21-01C and VM-21-02C. Full results can be found in Appendix B1. Results are summarized in Table 3-8 and Table 3-9. The strength ranges are consistent with previous geotechnical studies undertaken at the mine.

Table 3-8: Summary of Point Load Strength Index Test Results from Boreholes VM-21-01C and VM-21-02C

Lithology	**UCS (MPa)**	**Hardness Description (NEH 631.4)**	**ISRM Strength Description**
Claystone, bentonite	1.3 to 6.1	Soft to moderately soft	Very low
Coal	3.0 to 9.6	Soft to moderately soft	Very low to low
Mudstone, carbonaceous	10.4 to 41.9	Moderately soft to moderately hard	Low to moderate
Mudstone, silty	25.2	Moderately hard	Moderate
Sandstone	20.1 to 44.5	Moderately hard	Moderate
Siltstone	53.0 to 64.5	Hard	Moderate to high

MPa= megapascal; NEH=National Engineering Handbook; ISRM=International Society of Rock Mechanics

Table 3-9: UCS Laboratory Test Results from Boreholes VM-21-01C and VM-21-02C

Borehole	Elevation (m)	Lithology	Hardness Description (NEH 631.4)	ISRM Strength Description
VM-21-01C	1199.7	Mudstone, silty	Moderately hard	Moderate
VM-21-01C	1199.0	Mudstone, silty	Hard	High
VM-21-01C	1197.6	Sandstone	Hard	Moderate
VM-21-01C	1195.5	Sandstone	Moderately hard	Moderate
VM-21-01C	1193.1	Siltstone	Moderately hard	Moderate
VM-21-02C	1220.2	Sandstone	Moderately hard	Moderate
VM-21-02C	1210.1	Sandstone	Hard	Moderate

3.8 Highwall Design

A temporary highwall has been established for the VTUM face-up through the excavation of a decline ramp to the floor of the V5L Coal Seam. Two reinforced access tunnels will be constructed on the ramp, extending from the face of the highwall to the V5 outcrop. When construction of the tunnels is complete, the ramp will be backfilled to eliminate hazards presented by a permanent highwall and minimize necessary disturbance areas required for VTUM surface facilities. This eliminates backfilling an open pit from the VTUM reclamation plan.

3.8.1 Highwall Geometries

The temporary highwall is a single slope where the base will be approximately 36 meters wide, and the overall height will be 26.7 m. Competent rock material within the highwall excavation will be sloped at 65° or a ratio of approximately 1.5:1. Glacial till overburden at the highwall crest will be sloped at 26°, approximately 2:1, or less.

3.8.2 Slope Stability Analysis

Geotechnical and Slope stability in the new VTUM face-up location was assessed by Agapito and provided to AER in May 2023. While a summary of the report is provided below, the full report in provided in Appendix B1.

The report includes a review of the geotechnical environment in the new face-up location and provides an assessment of slope stability using both a Limit Equilibrium Analysis and a Kinematic Analysis.

The results of the Limit Equilibrium Analysis indicate that that assessed slope geometries are adequate for permanent conditions.

The results of the Kinematic Analysis indicate that there is a moderate likelihood of small wedge-type failure along the planes of two intersecting dominant joint sets. These wedges have been controlled by the support system that was installed in the highwall during the excavation process. The analysis also indicates a low likelihood of planar sliding failure along the 65° batters of a third, less dominate joint set. This hazard is controlled by the slope of the highwall and the support system that was installed in the highwall during the excavation process.

3.8.3 Highwall Stabilization

The highwall has been secured with a system of bolts and steel mesh equivalent to the recommendations provided by Agapito in their report titled "Geotechnical Assessment for Portal Highwall Stability at the Vista Test Underground Mine" (submitted May 17th, 2023). The support system was installed as excavation was performed in lifts, to ensure the temporary highwall was secured before any work related initial underground developments began. A report detailing the support system for the highwall, and initial underground cuts was provided to AER in accordance with approval conditions issued by AER on June 22, 2023. This report is provided in Appendix B6.

3.8.4 Monitoring

The highwall will only exist for the duration of face-up and access tunnel construction activities. Once these activities are completed the pit will be backfilled. Given the transient nature of the highwall in the new face-up plan, long-term instrumentation and monitoring are not necessary. The highwall will be inspected weekly by competent personnel until the pit has been backfilled.

3.9 Access Tunnel Design

Two reinforced access tunnels for the underground will be constructed out of the open pit away from the highwall face (see Figure 3.1). Both tunnels will be constructed using square steel sets. The steel sets will be set on 2' centers for deepest half of each tunnel's length, and 4' centers for the remaining sections. Metal lagging and rods installed between the steel sets will tie overall structure together. The steel structure will then be encased in concrete.

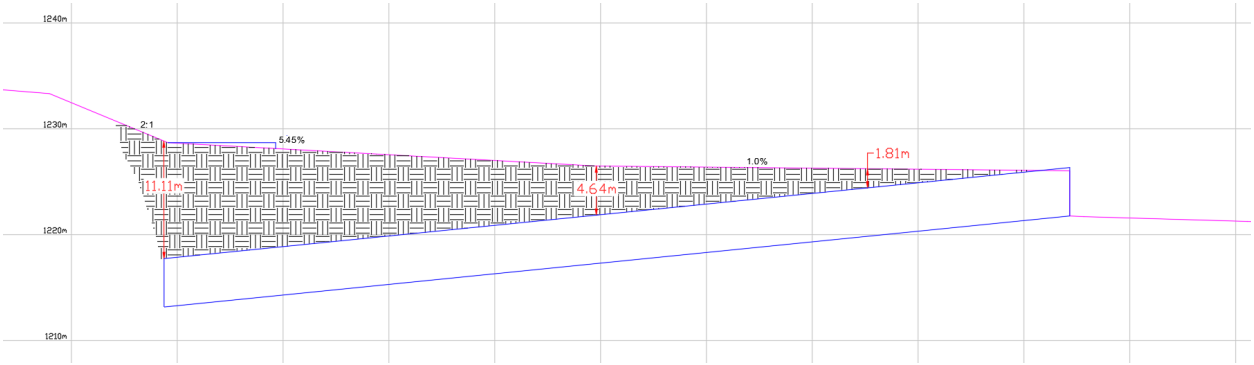


Figure 3.1: Covered access tunnel (cross-sectional view)

The return tunnel will have internal dimensions of 14'H x 14'W. The legs of the steel sets will be anchored into the ground with 1" in diameter x 16" threaded anchors with resin. The return tunnel will act as a second form of egress out of the mine in case of an emergency but will not be a primary travelway.

The travelway and belt tunnel will have a dimension of 15'4" H x 14' W. The belt and travelway will share an entry for approximately 500' into the mine. The conveyor belt will be suspended from the ceiling above the travelway. Suspending the conveyor from the roof will allow the travelway and the conveyor belt to not interfere with each other. An isometric view of the structural components of the planned access tunnels are shown in Figure 3.2.

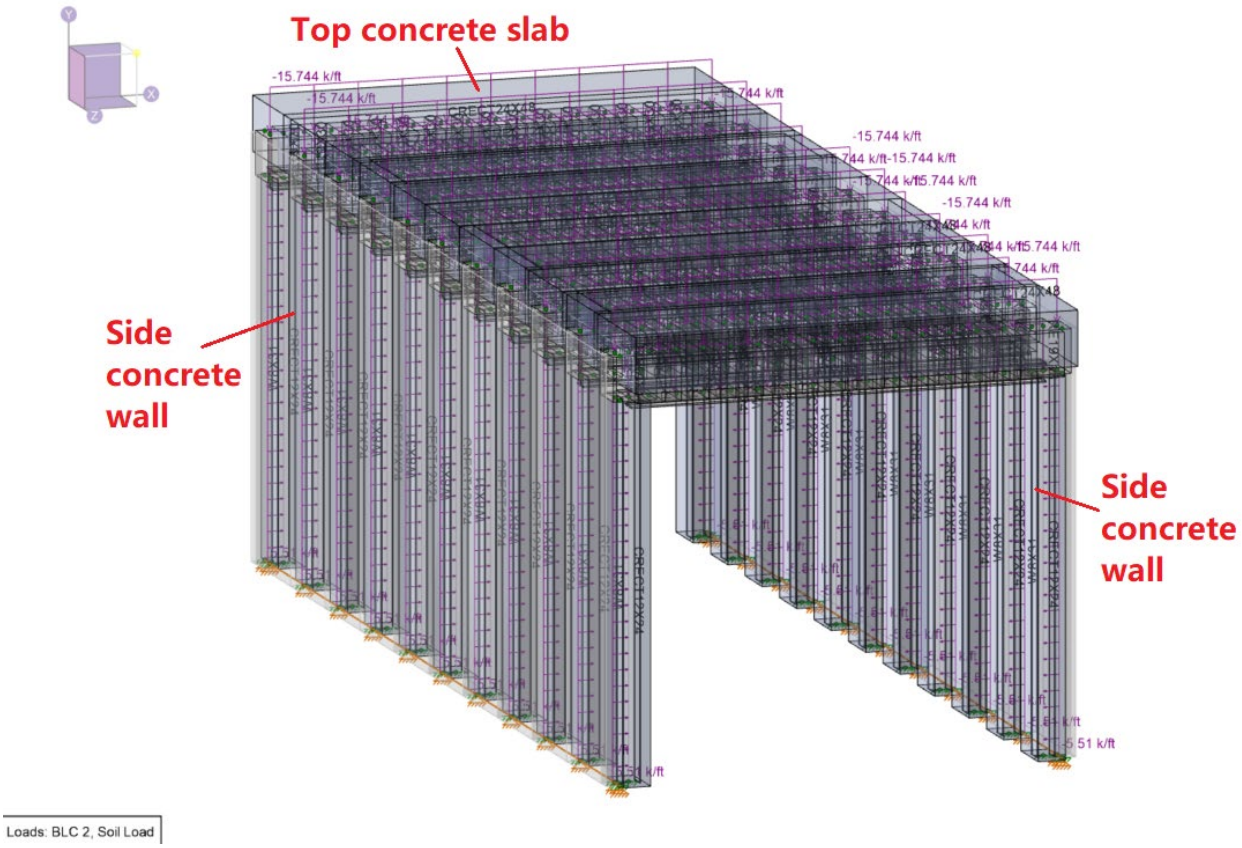


Figure 3.2: Isometric view of access tunnel structural components

Certified specifications and designs are provided in Appendix B8.

As-built details will be provided to AER when they are available.

Coalspur submitted an authorization request to AER on May 4th, 2024 for permission to proceed with designing and construction of the access tunnels. AER issued it's approval of this request on May 22nd, 2024.

The approval and associated authorization request are provided for reference in Appendix F1.

3.10 Subsidence

Agapito Associates Inc. was contracted to perform modelling to determine if subsidence would go outside of the MSL boundary based on the approved design. This is included in Appendix B4. It was determined that the only way for subsidence to go outside the MSL boundary would be if all of the pillars were completely removed. With the current designed pillar safety factor, this is not possible. The only way to remove all of the pillars would be to perform second mining which is not taking place. This is supported by the requirements of AER's own Coal Development Manual (AER Manual 20) where typical designs for sealing portal entries must include backfilling entryways to a depth of cover that is 8 times greater than the height of the entryway.

Despite there being no reasons to suspect subsidence will occur, subsidence monitoring though control points will occur located at key locations. All critical infrastructure at maximum building including C11 pond, the CPP and the North dump were included in this assessment.

A subsidence monitoring plan for an underground mine in which only first mining is not employed is not a normal practice and exceeds industry standards. The locations were selected based on the following location criteria: critical surface infrastructure, pond embankments, stream channels, and maximum overburden. To monitor for potential subsidence, the survey control points will be installed on the surface immediately prior to underground mining occurring beneath the location. This will establish a baseline coordinate and elevation. At a minimum, annual monitoring will occur at each subsidence monitoring station starting at the time underground mining occurs underneath that location. More frequent monitoring may occur if determined necessary or beneficial by a Professional Engineer. Results of the subsidence monitoring program will be provided in the Annual Geotechnical Report of Pits and Dumps.

Based on the updated mine plan, subsidence zones have been reevaluated, incorporating both the worst-case and anticipated scenarios, which are characterized by draw angles of 30° and 24° from the vertical, respectively, as delineated by Agapito. Note that due to the relocation of underground workings, one subsidence monitoring point is no longer located within any subsidence zones and another point rests on the border of the anticipated subsidence zone. This can be seen on Figure 4-4 (Appendix A2).

The Subsidence Monitoring Plan is described in Section 9 of Appendix B5.

4 Oil and Gas Wells

Coalspur has mapped the locations for all oil and gas wells within the mining permit area and in proximity to possible mine workings. Coalspur will monitor for planned oil gas developments nearby. Wellsites are shown in Figure 4-1 and Figure 4-3 (Appendix A2).

5 Mine Plan

5.1 Summary of Changes

Updates have been made to the following topics,

- Portal Arrangements
- Mine Plan Description
- Surface Description
- Underground Development
- Mine and Overburden Disposal Plan
- Raw Coal Storage and Handling
- Development Schedule
- Decommissioning

The location of the faceup has been relocated approximately 200 m East from the currently approved location. The reason for this is to open enough space for the construction of covered access tunnels. This changes the pit and associated highwall to temporary structures which, once backfilled, eliminates the need for regular inspections and prevents surface runoff from entering underground workings (therefor

eliminating the need for a portal area sump. To support this change, there will be a small increase to the coal mined and associated tailings disposal. Because of the decrease in area of the face-up, there will no longer be a yard within the excavation and the number of entries will be reduced from 6 to 3, one of which will be a vertical ventilation shaft. An external yard will be required for infrastructure components. Underground workings must be adjusted to match the new face-up location. Figure 4-3 (Appendix A2) shows the updated VTUM Mine Plan with the proposed adjustments. Figure 4-2 (Appendix A2) shows a detail view of the initial underground development and adjusted pillar configuration required to adapt the typical 7-entry room & pillar panel to the three available portal locations. The entire workings are within the VTUM Licence boundary.

An Updated development schedule is provided in Section 5.12.

Updated details for decommissioning of the portals is provided in Section 5.14.

5.2 Mine Plan Description

The VTUM mine plan uses the conventional Room & Pillar mining method. Production will be sequenced to establish typical seven (7) entry mains panels with typical seven (7) entry production panels branching off the mains to maximize resource recovery. Underground mining will be performed by mechanical continuous miners paired with electric shuttle cars.

5.3 Surface Description

The mine yard will consist of necessary temporary facilities to support the underground test mine including bathhouse, office trailer, supply yard, underground ventilation fans, mine air heaters (if installed), ROM stockpiles, and conveyor belt systems. A series of utility boreholes along the ROM belt will also be used to directly distribute materials, power, and water underground. The boreholes will be sized large enough to install wiring or piping into the underground mine. The utility boreholes will provide water, electricity, compressed air, and stone dust to the mine. Water tanks for fire suppression and use for underground equipment will be located just east of the ROM access road. Water will be piped or hauled to these tanks as needed. Water will be provided to the mine yard buildings and bathhouse from the freshwater ponds. The domestic water will be piped or hauled from the freshwater ponds to storage tanks located near the mine yard. Potable water for the mine staff will be provided with bottled water.

5.4 Underground Development

5.4.1 Pillar Design

The underground mining method will be room and pillar mining with no secondary mining (aka: depillaring) or the removal of pillars while retreating out of the panel.

Room and Pillar Pannels have been expanded from six (6) entries to seven (7) entries, except for the first five (5) crosscuts of the 1 North Mains panel which includes pillar adaptations to expand three (3) portals to six (6) entries. Entryways and crosscuts will have a typical width of 5.5m (18ft).

Updated ACPS models have been evaluated to ensure pillar factors of safety remain at or above industry standards.

Typical pillar dimensions and applicable regions are identified in Table 5-1.

Table 5-1: Typical pillar dimensions by location

Location	Maximum Extraction Height meters (feet)	Maximum Depth of Cover meters (feet)	Center-to-Center Entry Spacing meters (feet)	Center-to-Center Crosscut Spacing meters (feet)
1 North Mains (Portals to 20xc)	5.5 (18)	148 (486)	20.38 (80)	30.48 (100)
1 North Mains (Inby 20xc)	3.5 (11.5)	260 (853)	30.48 (100)	30.48 (100)
1 NM 1 East	4.5 (15)	214 (702)	30.48 (100)	30.48 (100)
1 East Mains (1xc to 47xc)	4.5 (15)	289 (948)	30.48 (100)	30.48 (100)
1 East Mains (Inby 47xc)	5.0 (16.5)	266 (873)	30.48 (100)	36.58 (120)
1 EM 1 North	3.0 (10)	342 (1,122)	30.48 (100)	30.48 (100)
1 EM 2 North	3.5 (11.5)	345 (1,132)	30.48 (100)	30.48 (100)
1 EM 3 North	3.5 (11.5)	352 (1,155)	30.48 (100)	30.48 (100)
1 EM 4 North	4.0 (13)	361 (1,184)	30.48 (100)	30.48 (100)
1 EM 5 North	4.0 (13)	361 (1,184)	30.48 (100)	30.48 (100)
1 EM 6 North	4.5 (15)	359 (1,178)	30.48 (100)	30.48 (100)

Entry heights are estimated in each location by the V5 seam thickness calculated from drilling boreholes. Seam thicknesses used for the revised pillar design criteria are shown on Figure 4-4 in Appendix A2. A list of all previously proposed pillar dimensions at each location in the VTUM is provided in the VTUM Geotechnical Assessment report provided in Appendix B5. The figures in Attachment 1 of the VTUM Geotechnical Assessment show the approximate location that each pillar design will be used in the mine as well as the safety factor for each pillar configuration. The VTUM was divided into 100-meter length sections marked by plus stations for each development panel. A pillar design and corresponding stability analysis was conducted for the maximum overburden and predicted seam thickness at each plus station.

5.4.2 Extraction Height

Mining extraction height will be dictated by the seam thickness. At this time, neither leaving roof or floor coal is proposed. Mining height can be controlled in certain cases by leaving roof (or head) coal. This practice can be evaluated in the VTUM workings but is not currently being considered. While leaving roof coal is advantageous in certain situations and certain coal seams, common problems with this practice during room and pillar mining includes the separation of the coal from the immediate roof strata. Since the immediate roof in the VTUM consists of a sandstone, roof coal will most likely separate from the immediate roof upon mining and prior to bolting and is not currently being considered as a viable option. Extraction height can also be controlled by leaving coal floor. This practice could be utilized depending on the location of the rock parting in the coal seam. An expected minimum height of eight feet will need to be maintained in the underground workings for the currently selected equipment fleet. The practice of leaving coal in the floor may be utilized to increase resource recovery by lowering extraction height and thus reducing pillar sizes as long as a minimum eight feet of height can be maintained above the rock parting in the seam. Longwall systems can more successfully operate on a coal floor than a room and pillar operation. Mobile equipment operating on a coal floor can create issues

with roadway coal dust. It is best for a room and pillar operation to operate with a rock floor and that is the intent of the underground workings in the VTUM at this time. The maximum reach of the CM12-27 proposed to be used in the VTUM is approximately 16 feet. This is also approximately the same as the maximum seam thickness in the VTUM underground workings based on available corehole data. If actual observed seam thickness exceeds 16 feet, some modifications may need to be made such as leaving floor coal or modifying the pillar design to ensure that the minimum factors of safety in the pillar design are maintained.

Initial underground development at the VTUM has shown the true extraction height to be 5.5m (18ft). Planned entry dimensions are illustrated below in Figure 5.1.

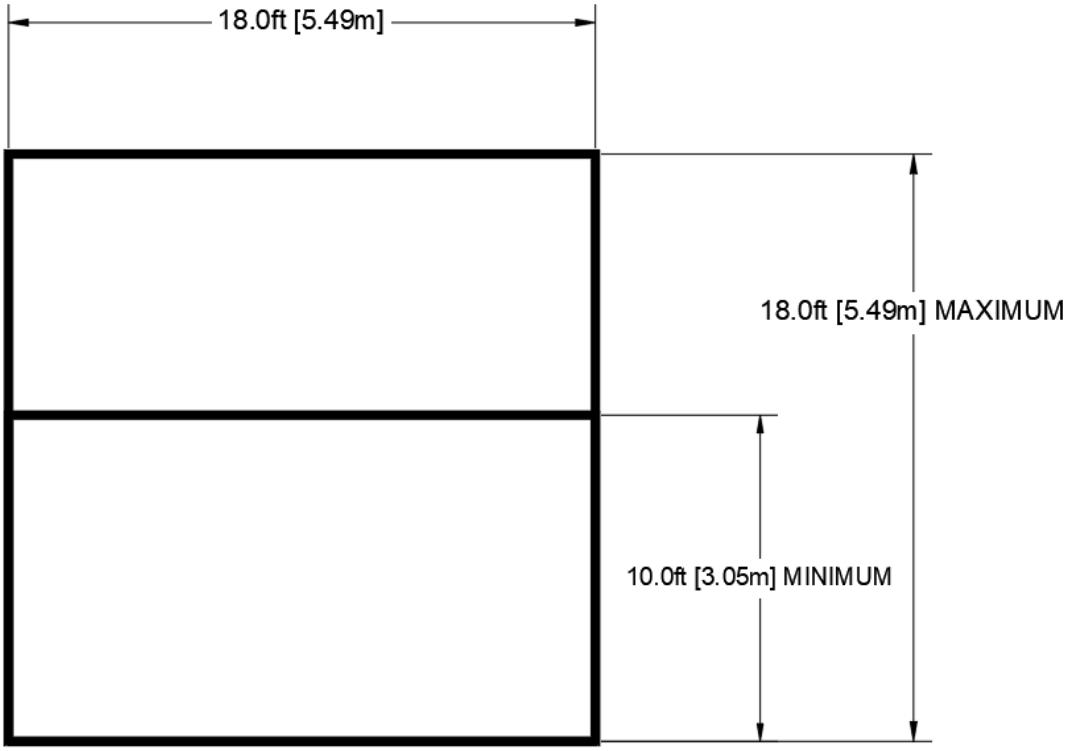


Figure 5.1: Typical VTUM entry dimensions.

5.4.3 Factors of Safety

The updated mine plan is designed with a minimum factor of safety is 1.5 in production panels and 1.7 in mains panels where long-term travel is expected to take place. The updated mine plan has been evaluated using ACPS and the average factor of safety is over 2.0. While the exact pillar dimensions in each specific location may vary slightly. For instance, actual seam thickness observed through mining could exceed the predicted seam heights and pillar sizes may need to be increased as a result. Changes may also be made based on operational decisions which could increase the minimum pillar size and increase the safety factor above a 1.7. Further geotechnical assessments by a professional engineer may be conducted to update the required minimum safety factors.

It is expected that the overburden strata in the VTUM is of similar strength (and stiffness) to strata that is part of the ACPS/ARMPS database. The use of ACPS/ARMPS to calculate pillar stability for development

(first) mining is acceptable for the VTUM. The majority of the underground workings in the VTUM are deeper than they are wide and therefore a pressure arch is assumed to transfer some of the tributary load to the solid coal on either side of the panel. The Pressure Arch Factor was derived from analysis of case history data from the Western and Central Appalachian coalfields in the US. The program calculates the Pressure Arch Factor as Fpa = (1 – 0.28 times the natural log of the depth-to-pillar system- width ratio). An evaluation of the UCS values for the various rock types in the VTUM overburden indicate that the overburden rock strengths would be in line with US coal strata and therefore the Pressure Arch Factor and pillar safety factors are applicable. During mining, Coalspur will perform routine geotechnical monitoring and hazard analyses to determine the risk factors and provide further mitigative measures if warranted. A professional engineer could also assess if the design factor of safety could be decreased below 1.7 but above 1.5.

It is expected that the overburden strata in the VTUM, which consists of sandstones, siltstones, and mudstones, will be similar to the strata conditions encountered in the case histories used to develop the ACPS software database.

5.4.4 Roof Ratings

Coal Mine Roof Ratings (CMRR) were calculated for core holes CPE10-07C, CGT11-04CH, and CO78-02 for which roof rock type and thickness were available. In addition to strata thickness and sequence, CMRR requires various physical property input (RQD, compressive strength, diametral point load strength, and water sensitivity). CMRR were calculated for both dry and “light drip” conditions since it is not known if water observed near the outcrop persists at depth. CMRR were calculated for 6 ft, 8 ft, and 10 ft intervals from the assumed roof line. This was done to study the relationship between roof competence and thickness. Results are summarized in the Table 5-2 below.

Table 5-2 (Table SIR 20.1): Summary of CMRR Calculations Results

	CMRR, 6 ft		CMRR, 8 ft		CMRR, 10 ft	
Corehole	Dry	Light Drip	Dry	Light Drip	Dry	Light Drip
CPE10-07C	48.5	44.5	48.5	44.5	48.5	44.5
CGT11-04CH	43.5	39.2	44.0	39.5	44.5	39.9
CO78-02	48.5	44.5	48.5	44.5	47.1	42.3
Average	46.8	42.7	47.0	42.8	46.7	42.2

5.4.5 Rock Bolt Specifications

The minimum primary support will consist of a 6’ x 0.75”, grade 75, fully encapsulated, low insertion force resin installed on a pattern not to exceed 4’ x 5’. Bolts longer than the minimum can certainly be used in any case that is determined necessary or beneficial. In underground mining, it is not practical, nor is it safe, to commit to a “one size bolt fits all applications” approach. The actual bolt used is determined by many factors. The ground support system is constantly being assessed and evaluated as described in the application.

The minimum primary support may change as more information is gained during development of the VTUM and with supporting documentation from a professional engineer.

The following is an excerpt from the attached VTUM Geotechnical Analysis Report included in Appendix B5 and provides an update to the ARBS analyses and minimum bolt specifications:

The average CMRR value in the immediate 6' of roof is 46.8. The high (dry conditions) is 48.5 and the minimum (light drip conditions) is 39.2. Revised ARBS analyses for each of the specific locations at each borehole with the corresponding minimum CMRR within the bolted horizon is provided and the results are provided in Table 5-3 below. This table shows the minimum support required at each of these locations based on the borehole data. This table is not meant to be used in lieu of the required test hole evaluations, mine examinations, or geotechnical evaluations described in the application. For example, the minimum CMRR value for borehole CGT11-04CH is 39.2 under "light drip" conditions. For this CMRR value, ARBS suggests a 7 ft bolt be used. If the conditions are dry, a 6 ft bolt is sufficient.

Table 5-3 (Table SIR 21.1): ARBS Evaluations Summary

Hole ID	Location	Plus Station	Conditions	Bolt Length (ft)	Bolt Grade (ksi)	Suggested ARBS	Actual ARBS
CPE10-07C	Portal	0+00	Dry	5	75	N/A	N/A
CPE10-07C	Portal	0+00	Light Drip	5	75	4.0	8.7
CGT11-04CH	1 North Mains	12+00	Dry	6	75	9.4	10.5
CGT11-04CH	1 North Mains	12+00	Light Drip	7	75	11.4	12.2
CO78-02	2 East Mains	7+00	Dry	5	75	7.5	8.7
CO78-02	2 East Mains	7+00	Light Drip	6	75	9.6	10.5
Average			Dry	5	75	8.0	8.7
Average			Light Drip	6	75	10.1	10.5

**A bolt diameter of 0.75" was used for all cases.*

5.5 Mine and Overburden Disposal Plan

The only overburden produced by the VTUM is that which was excavated for establishing a highwall for face-up. This material was re-used as much as possible for surface mine operations. Any material not reused or set aside for later use was directed to an already established dump. The quantity of this material is negligible to typical surface mine operating quantities.

5.6 Raw Coal Storage and Handling

Conveyors underground will transport ROM coal from the active mining section through the underground works and up the beltline slope to a surface conveyor. Previously proposed plans included a temporary ROM coal stockpile located in the face-up, that would serve until the beltline structure was fully complete to direct feed coal to the beltline.

This amendment proposes a permanent ROM stockpile will be constructed south of VTUM beltline portal. The approximate size and location of the ROM stockpile is shown in Figure 4-2 in Appendix A2. The ROM stockpile will include a reclaim feeder and beltline to transfer material to the main surface ROM beltline. The arrangement provides essential surge capacity buffering the underground from any operational delays in the Coal Prep Plant and/or surface ROM belt.

The VTUM ROM stockpile is planned to be approximately 18m high, 90m long and 50m wide. With a capacity of up to 60,000 tonnes. Runoff from the ROM stockpile will be captured by the surrounding drainage ditches and handled by the existing surface water management infrastructure.

5.7 Mine Equipment

There are no proposed changes to the proposed mining equipment. Anticipated Equipment and numbers of equipment are provided in Table 5-4. This table will be subject to change as operational needs demand throughout the life of the VTUM.

Only one continuous mining machine is permitted to be physically cutting and mining coal at a time for each ventilating split of air. While one machine is cutting, the other machine is being moved and set up for the next cut. That machine may begin cutting/mining coal once the other machine completes.

Assuming that mining with CM1 is deemed successful, CM2 may be added in a separate panel being ventilated with a separate split of intake air. CM2 will be identical to CM1 and will consist of two continuous mining machines.

Table 5-4: Underground Equipment List

Equipment type	Permissible	Non-permissible
Joy 12 CM 27 D or E continuous miner	4	
Joy 10 SC 32 B or C shuttle cars	6	
Fletcher CHDDR twin boom roof bolter	2	
Fletcher Six boom roof bolter	2	
Valley Longwall International Drift runner	1	
DST man carrier	2	
Dodge 2500 utility vehicle		4
EDV Man Carrier		2
CCV Man Carrier		1
Fletcher tractor		2
DST 35 S LHD	2	
Caterpillar 488 battery scoop	2	
Joy feeder breaker	2	
Belt Drives (Terminal Groups)		3
Road Grader		1
Fletcher DDR-17 high reach bolter		1
Caterpillar skid steer		2
Jeffrey 8HUA-96 forcing axial main fans		2
Mars dust distribution system		1

Equipment type	Permissible	Non-permissible
Trickle duster	2	
Slinger duster	2	
Diesel generator (move box)		1
Komatsu WA 200		1
Scissor lift		1

5.8 Infrastructure

During operation of the VTUM, various support facilities will be constructed in a mine yard near the portal face-up area to support the underground development.

The mine yard will consist of necessary temporary facilities to support the underground test mine including bathhouse, office trailer, supply yard, ventilation fans and vertical shaft, mine air heaters (if installed), ROM stockpiles, and conveyor belt systems. Water tanks for fire suppression and use for underground equipment will be located just east of the ROM access road. Water will be piped or hauled to these tanks as needed.

The locations of Infrastructure components must be modified to accommodate the relocated face-up location and physical constraints of nearby existing surface mine infrastructure. The approved surface infrastructure arrangement in shown in are Figures 1.5 and 1.6 (Appendix A1). The proposed mine yard and related surface infrastructure arrangement is shown in Figure 4-6 (Appendix A2).

5.8.1 Power Distribution System

Power will be supplied to the VTUM via a dedicated substation installed on the surface as shown in Figure 4-6 (Appendix A2). The substation will be the primary distribution hub for all VTUM surface and underground systems. Once underground, power will be distributed via a network of portable switchgear and power-centers. Generally, the underground power distribution system runs parallel to the underground conveyor beltlines.

5.8.2 Mine Yard

The mine yard is set to incorporate essential temporary facilities to facilitate the operations of the VTUM. The proposed amenities include a bathhouse, an office trailer, parking lot, and a supply yard. However, the final layout of the mine yard remains flexible, with the potential for adjustments based on spatial limitations. Consequently, certain elements may be relocated as necessary.

5.8.3 Utility Boreholes

A series of utility boreholes along the underground beltline will also be used to directly distribute materials, power, and water underground. The boreholes will be sized large enough to install wiring or piping into the underground mine. The utility boreholes will provide water, electricity, compressed air, and stone dust to the mine.

5.8.4 Water Supply

Water will be supplied to the underground workings through a utility borehole from a tank on the surface, as shown on Figure 4-6 (Appendix A2). Water will be piped or hauled to these tanks as needed.

Freshwater water will be provided to the mine yard buildings and bathhouse by trucks. Potable water for the mine staff will be provided with bottled water. Septic will also be removed from mine yard building via trucks.

5.9 Underground Water Management

Groundwater that infiltrates into the underground workings during mining activity will be pumped to a storage sump. The water will either be re-used underground for dust suppression or pumped to the surface. Excess groundwater infiltration would be pumped up one of the entries for use as process water for the Coal Preparation Plant or directed to mine wastewater pond R1 which controls the mine yard. A multitude of factors will determine the rate of infiltration such as precipitation, seepage from adjacent the highwall mining and pits and water stored in the Val d'Or aquifer. A calculation of .0047 m3 of water per ha/min was used as a conservative estimate to determine the rate at which water will infiltrate the mined works. This is based on literature from Dr. Parizek (Parizek 1971) which evaluated the infiltration rates of several underground mines in the eastern U.S. which have some geological similarities to the Vista Project such as various clay layers and lenticular sandstones under a relatively flat cover. His research led to a general rule of 0.5 gallons per minute per acre to predict infiltration. The true infiltration rate will be confirmed as the test underground mine is developed. The Table 5-5 summarizes infiltration rates by year based on hectares of disturbance and an average extraction ratio of 32%. The previously approved plan used an extraction ratio of 26% derived by dividing the total anticipated ROM tonnes by the raw tonnes located withing the project footprint. The new extraction ration was calculated by averaging extraction ratios returned by ACPS for each pillar configuration planned in the VTUM.

Table 5-5: Estimated Underground Mine Water Infiltration

Year	Previously Approved Plan			Proposed Plan		
	ha	m^3 per day	m^3 per year	ha	m^3 per day	m^3 per year
*Year 1	39.6	69.6	25,434	-	-	-
Year 2	41.4	72.8	26,572	40.5	87.7	32,000
Year 3	45.9	80.7	29,455	44.8	97.0	35,400
Year 4	-	-	-	46.3	100.3	36,617
Year 5	-	-	-	35.4	76.7	27,998
Total	**126.9**	**223.1**	**81,461**	**167.0**	**285.0**	**104,017**

* Where Year 1 is 2024, and

Where **m^3 per day** is calculated using the following formula.

$$Volume = (Area)(Extraction\ Ratio)(Infiltration\ Rate)(1440)$$

Where, 1440 is the conversion from minutes to days.

An updated Site Water Balance is provided in Figure 4-7 (Appendix A2).

5.10 Water Management Plan

The portal will be at the highest elevation of any point within the underground workings.

Surface water runoff will be collected by ditches around the perimeter of the portal and surface infrastructure area. The ditches will transport the runoff to mine wastewater pond R1 for release. The underground mine water discharge will be directed to Pond R1. Pond R1 will provide sediment treatment for the surface water runoff and underground mine water before being discharged to receiving streams. Water from pond R1 will be available for use in the underground mine and coal processing plant when needed. The structure designs, submitted for authorization under separate cover, are provided in Appendix E.

There are no changes in water use needs or sources.

5.11 Changes to CPP and North Dump

Refuse volumes from the VTUM have been assessed in the application for the McPherson Pit Tailings Settling Cell 4-9 and the North Refuse Dump Design balance submitted in accordance with Condition 6 of Mine Licence C 2014-7E.

The revised VTUM mine plan results in an additional 423,246 cubic meters of tailings to be placed in McPherson Pit Tailings Settling Cell 4-9, and 272,074 cubic meters of refuse to be placed in the North Dump. This increase can be easily absorbed by the currently approved McPherson Pit Tailings Settling Cells and the currently approved footprint and design of the North Dump.

5.12 Development Schedule

The revised mine plan will require approximately 4.5 years to complete (including 2024 face-up and construction work). This is an increase of roughly 6 months over the previously approved mine plan.

5.12.1 Year 1 Development

Year 1 development begins in 2024. Construction of the underground mine faceup will occur this year. The overburden from the face up will be handled as described in Section 5.5.

The main infrastructure for the underground mine will be constructed upon final site grading of the faceup area. The proposed composite access tunnels for the return and belt/travelway will be constructed at this time.

Mining underground will begin after the proposed changes are approved and necessary infrastructure has been installed (i.e. as early as this year). The initial equipment will compose one production section, consisting of two continuous miners, three shuttle cars, two roof bolters, and one belt feeder-breaker. Mining during year 1 (if any) will be limited to early development of the 1 North Mains panel.

5.12.2 Year 2 Development

During this period, the 1 North Mains, 1 NM 1 East, and most of the 1 EM 1 North panels should be developed.

5.12.3 Year 3 Development

During this period the 1 EM 1 North, 1 EM 2 North, and 1 EM 3 North panels should be completed. Development of the 1 East Mains and 1 EM 4 North panels are expected to be in progress at the end of Year 3.

5.12.4 Year 4 Development

During this period, the 1 EM 4 North, 1 EM 5 North, and 1 EM 6 North panels are expected to be completed with development of the 1 East Mians panel continuing into the Eastern region of the MSL.

5.12.5 Year 5 Development

Year 5 will see the completion of the 1 East Mains panel. This level of development will be sufficient to determine the viability of the VTUM as a long-term underground operation for Coalspur.

If underground mining proves to be unsuccessful, underground mining closure operation will start in Year 5. Activities will include removal of all underground infrastructure, belting, and equipment along with all water piping and electrical/communications cable. Once the underground workings have had all materials removed, the deals will be installed.

5.13 Ventilation

Ventilation is a key safety consideration for all underground mining as improper ventilation can create a litany of problems including methane accumulation and exposure to airborne contaminants. A ventilation plan has been prepared to provide enough air flow and velocities in all sections of the proposed mine to effectively dilute methane and mitigate exposure to airborne contaminants.

The proposed fans will push fresh air into the mine through a ventilation shaft. The air flow will be directed to the active mining areas by using curtains and stoppings. The fresh air will carry any gases through the mine and out to the surface. Methane detection equipment will be used by the underground employees to monitor methane levels while they work. When high levels of methane are detected, appropriate measures will be taken to remove the gas from the mine and prevent any type of explosion.

5.13.1 Ventilation Shaft

As shown in Figure 5.2, the shaft will intercept the V5 coal seam in the first crosscut of 5-entry. This entry will remain the intake entry as the mine develops further inby. Once the shaft is excavated and lined the metal ducting will be installed overtop of the shaft opening. The ducting will join the housings for two axial fans. These fans will not run simultaneously but will act as a back up to each other. Ventilation doors will be installed in the surface ducting to prevent ventilation air from backflowing through the fan that is not running.

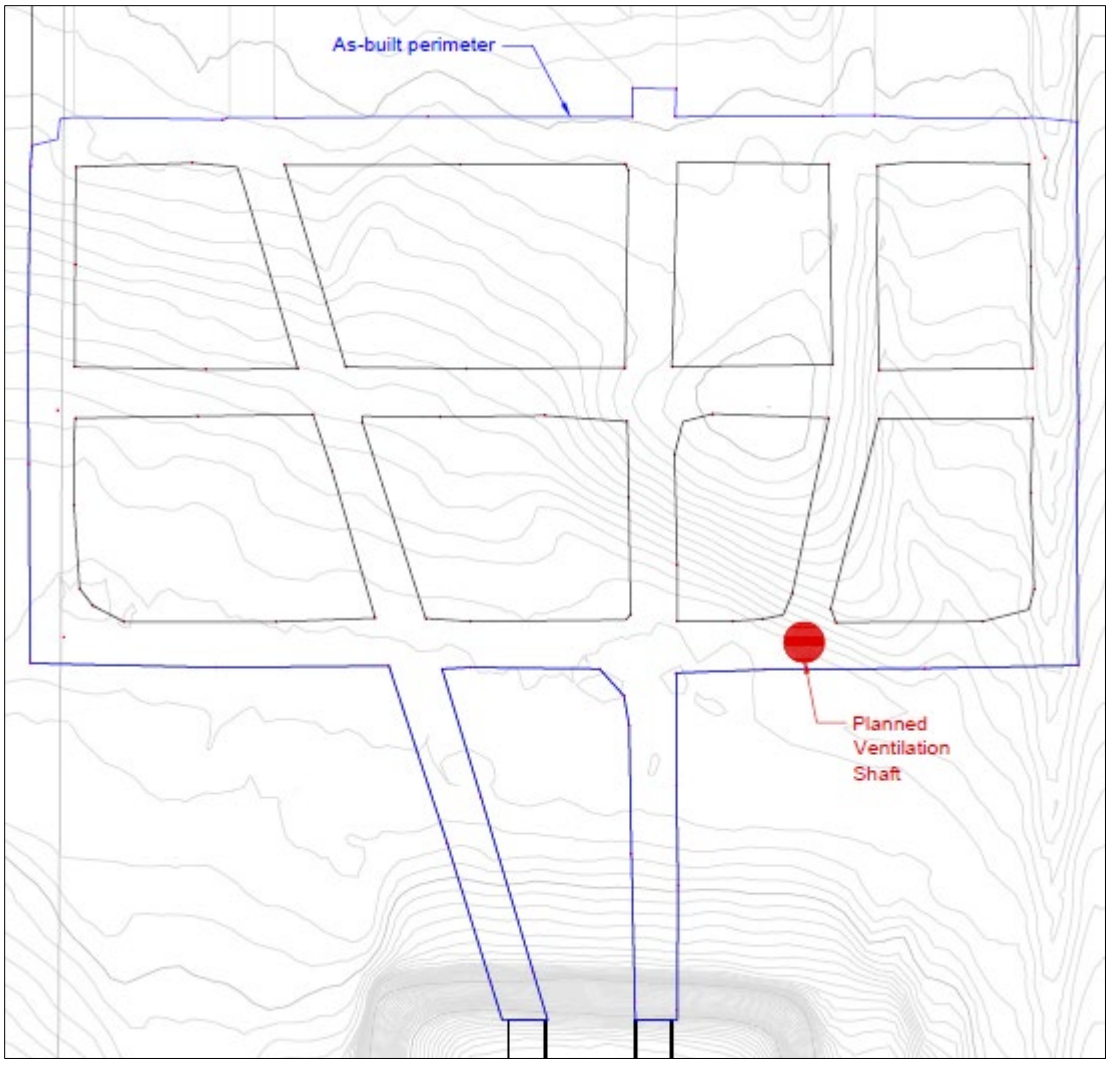


Figure 5.2: Ventilation Shaft Location.

Note that in Figure 5.2, the 3rd and 7th entries does not exist. The only entries which are visible are (from left to right) 1, 2, 4, 5 and 6.

5.13.1.1 Shaft Construction

The shaft will have a finished internal diameter of 16ft and will extend from the top of the V5 coal seam to the surface (Approximately 20m or 65ft deep). The shaft will tie in at the surface with a concrete pad which will act as the collar for the fan housing and surface ducting. The concrete pad will be 24' in diameter. Concrete will line the entire shaft to the bottom and will be 1' in thickness. A cross-section of the shaft is provided in Figure 5.3.

The shaft will be excavated by drilling, blast and mucking the excavation out in lifts. All blasting materials will be obtained through Coalspur's licenses and certified shot fires onsite will oversee the blasting.

The surface area around the shaft will be excavated down to the solid bed rock. This will eliminate having to deal with loose unsecured material on the side walls near the surface of the shaft. After the initial shot the material will be mucked out with an excavator and the concrete pad around the surface of the

shaft opening will be poured. Guarding will be placed around the top of the shaft to eliminate fall hazards from any surrounding personnel.

Once the initial concrete pad is formed in place the shaft will continue to be excavated in lifts. The lifts will be shot in 6-10ft increments. After a lift is shot then it will be mucked out. If it is determined to be advantageous due to the conditions encountered then depth of lifts can be extended or shortened. The initial 30’ will be excavated before concrete is poured. Concrete will be formed and poured in 20’ lifts. The concrete liner will have vertical hanging rods that will tie all the way into the surface collar.

If ground conditions are not favorable, then rib bolts will be installed as needed before the concrete is poured and formed. 1.22m (4’) x 19.5mm (.75), tensioned j-bar (“super twist”) grade 75, full encapsulated rebar bolts or equivalent can be installed using jack legs as needed.

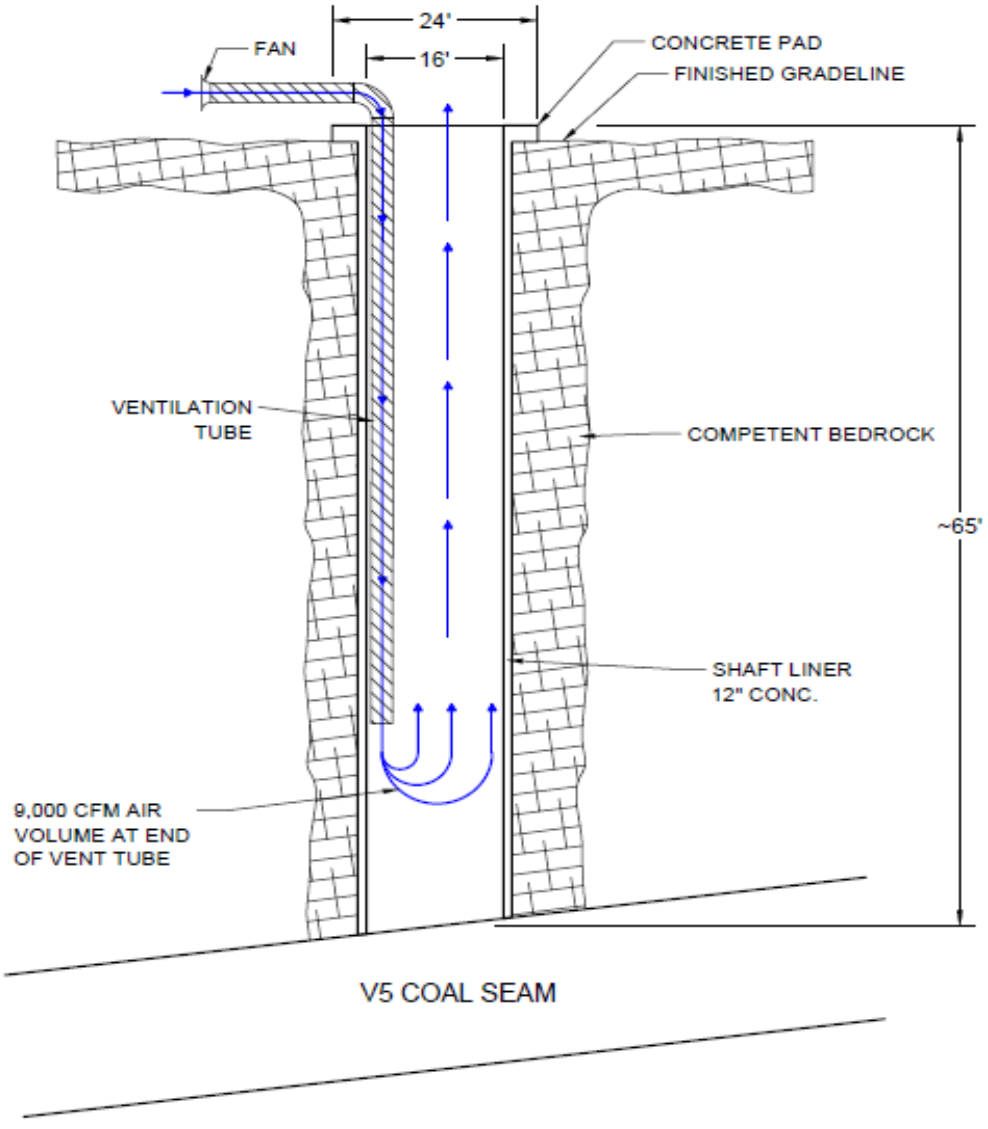


Figure 5.3: Cross-section of ventilation shaft and anticipated ventilation during shaft sinking.

5.13.1.2 Shaft Lining

Some options for lining the shaft would be shotcrete, corrugated metal or concrete lining. Shotcrete would be the least expensive. Shotcrete doesn't have the strength of concrete and would not have a smooth surface once applied. The high air velocity and the sides of the shaft not being smooth could cause deterioration of the shaft side walls in the long term. Corrugated metal would have the strength characteristics but would not have the smooth sides as if the shaft was concrete poured. For the needed longevity, strength and smooth surface a concrete formed liner is the most advantageous.

5.13.1.3 Shaft Stability

When the excavation was completed down to the V5 coal seam at the VTUM, the highwall face exposed all the strata that would be encountered during the shaft excavation. The attached core hole log in appendix A also shows what will be encountered during the excavation.

The top several feet of unconsolidated material is being removed before excavation of the shaft begins. The material below this is competent bedrock and will only be exposed for a short time before being supported by a concrete liner. However, if during the excavation additional support is required before the concrete liner is poured rib bolting with jack legs can be completed on an as needed basis.

5.13.1.4 Surface and Groundwater Controls

Surface water will be controlled by surrounding ditching and grade around the shaft (see Figure 1). The grade will continue downgrade pass the shaft to funnel water away from the shaft. Ditching on the northern and eastern sides of the shaft will control any water coming from upgrade.

When the strata on the highwall face was exposed very little ground water was seen coming from the highwall face. The only layer of strata where ground water was seen was at the bottom of a layer of sandstone 8'-10' above the V5 coal seam. The water was only visible in two locations along the highwall face and was less then 5gpm.

If water is encountered in the above-mentioned zone or any other area through the shaft a water-ring can be installed along the outside edge of the concrete to gather and control any water inflow. A diagram illustrating a typical water-ring design is provided Figure 5.4.

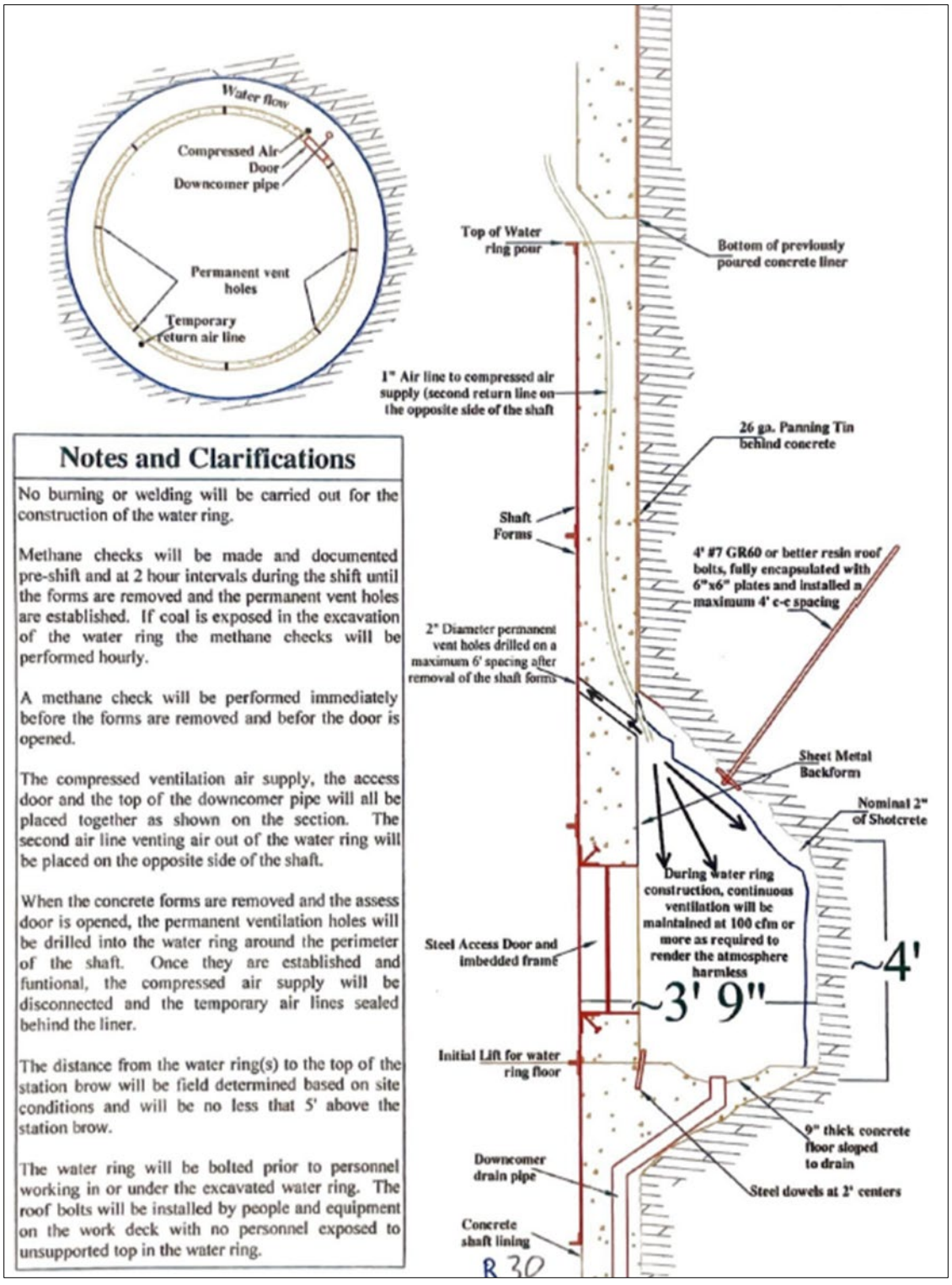


Figure 5.4: Typical water-ring design detail.

5.13.1.5 Shaft Maintenance and Monitoring

All areas of the shaft including the surface area around the shaft which could affect the shaft excavation will be visually examined on a preshift inspection while construction is taking place. An approved multi gas detector will be used to check for oxygen deficiencies during the preshift inspection. Once the two surface fans are installed on the shaft, automatic continuous ventilation pressure devices will be installed and checked daily.

5.13.2 Ventilation System Design

The ventilation system for the VTUM is designed to conserve pressure created by the fans to ensure sufficient volume and velocity is achieved at the furthest reaches of the mine. To do this the, the system makes us of three different air-types; (1) Intake Air, (2) Return Air (aka: Exhaust Air), and (3) Neutral Air.

Intake air is defined as fresh, uncontaminated air that is travelling towards the working face or deeper into the underground mine. This direction is commonly referred to as “inby” in the underground coal mining industry.

Return air is defined as air which has been used to ventilate a working face and/or air which is being exhausted to the surface and may contain a higher concentration of gases than an intake airway.

Neutral air is fresh uncontaminated air which is not used to ventilate a working face and travels outby and eventually exhausted to the surface. This air is used for ventilating beltlines and travelways.

Neutral air is used to ventilate the beltline and travelway/primary-escapeway. These airways are supplied by air which splits from the main intake airways just before reaching the active production section. This would typically be the first crosscut outby the section loading point or belt feeder, as shown in Figure 5.5.

Each working face will be ventilated using exhaust tubes which pull methane and coal dust away from the mine workers and discharge down-wind, in the nearest return airway. This arrangement allows each working face to receive an independent supply of fresh, intake air, while also isolating the working section from airborne contamination in the belt and travelway.

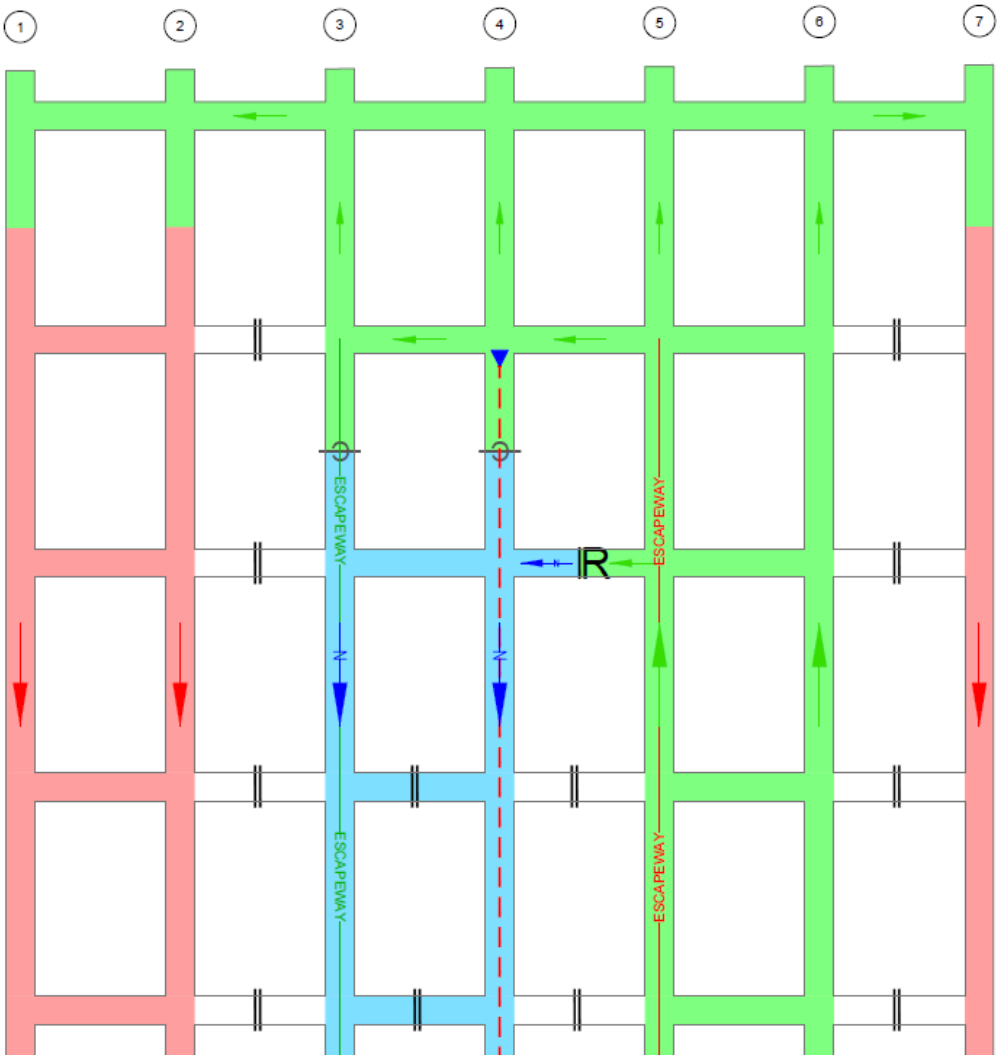


Figure 5.5: Section Ventilation (Typical 7-entry mains)

Features in Figure 5.5 include.

Intake Air | Return Air | Neutral Air
Travelway / Primary Escapeway = Green "Escapeway" line (3rd heading)
Beltline = Red dashed line (4th heading)

Coalspur has modeled this ventilation system using VentSim™ and a report summarizing the model has been provided in Appendix D1.

5.13.3 Airborne Contaminants

There are two primary sources of airborne contaminants in underground coal mines.

1. Coal dust,
2. Diesel exhaust fumes, and
3. Stone dust application.

Exposure to each source of contamination is effectively controlled by the proposed ventilation system based on the locations where the contamination is generated.

5.13.3.1 Coal Dust

Coal dust is primarily generated in three locations

1. The working face where coal is being cut is the primary source of coal dust in an underground mine. Coal dust generation is mitigated using water sprays mounted on the cutterhead of the continuous miner. Exposure to coal dust is controlled with the use of exhaust ventilation driven by auxiliary fans and rigid ducting between the working face and the fans. This pulls coal dust into the ducting, isolating it from the underground workers. The coal dust is discharged into the nearest return airway where it is carried away from the active section, where most underground workers will be located.
2. The second largest producer of coal dust is the beltline, where the mechanical action of coal moving over belt idlers and discharge rollers and passing through belt transfer points causes fragmentation.
   Establishing a neutral airway in the beltline ensures this coal dust is transported away from the active working section from active section, where most underground workers will be located.
3. The last significant source of coal dust, as well as inert fugitive dust, is the travelway, especially where the underlying geology is unsuitable for road building and coal must be left on the floor to facility travel by mobile equipment.
   Establishing a neutral airway in the beltline ensures this coal dust is transported away from the active working section from active section, where most underground workers will be located.

5.13.3.2 Diesel Exhaust Fumes

Diesel powered mobile equipment will primarily be in the travelway, in *neutral* air. This ensures that the bulk of diesel exhaust is transported away from the active section, where most underground workers will be located.

5.13.3.3 Stone Dust Application

Limestone dust (Stone dust for short) must be dispersed in all locations of the VTUM, especially in the locations identified in Section 5.13.3.1. This makes stone dust application a critical task that must be included in the normal operations of the VTUM. By establishing neutral airways in the beltlines and travelways, stone dust may be distributed in these critical airways during a normal shift protects workers on the section from exposure without interrupting the normal production cycle.

5.14 Decommissioning

Upon mine closure, mine infrastructure utilizing service boreholes will be removed. All service boreholes will be grouted off to the surface. All drill casing will be cut at a depth no less than one meter from the final topo grade and removed from the site.

While it is not expected that the underground mining in the VTUM will encounter significant water during mining, after mining ceases, the maintenance and dewatering systems in place will be shut off. Without any dewatering, the closed off mine workings could become flooded with local groundwater. This process could take several months or several years depending on the amount of underground workings developed upon closure and the rate of influx of water into the workings. Dewatering activities,

if necessary, will occur until the mine's infrastructure and equipment is salvaged and the mine is ready for final closure.

Following the activities outlined above, the mine would be allowed to flood to equilibrium. During the end of mining activities, hydrotechnical data will be gathered and used to determine a predictive model for mine flooding.

5.14.1 Shaft Decommissioning

The ventilation shaft will be decommissioned in accordance with Condition 14 of Mine Licence C 2022-1A and the requirements of AER Manual 20. Decommissioning will begin with the removal of the fan housing, ducting, and all other surface infrastructure sitting overtop of the shaft. Coarse rock and debris fill will be used to fill the entire shaft. Near the surface of the shaft material on the sides will be removed to form a wedge shape before a concrete plug is poured. Once the concrete plug is in place, fill and native materials will be backfilled over the plug back to original natural topography.

5.14.2 Sealing Portals

The closure approach for the portals includes construction of concrete seals, the removal of infrastructure, installation of vent pipes, and elimination of subsidence risks.

In accordance with the requirements of AER Manual 20, concrete seals will be installed in each entry where the ratio between depth of cover to extraction height is at least 8:1.

One or more steel vent pipes will be installed inby the concrete seals, through the overlying ground to approximately 2.5 m above surface. Their intent is to allow atmospheric pressure to equalize between the underground workings and the surface until groundwater has filled the mine. Once the groundwater has filled the mine, the vent pipes would be removed.

5.14.2.1 Subsidence Risks

Risk of potential subsidence features to propagate to the surface related to a mine workings collapse are primarily related to three main factors: 1) the quality of the rock/soil strata above the mine workings; 2) the depth of the mine workings below the surface; and 3) the height of the open void. The conceptual closure approach for the mine openings discussed herein is considered to have a low risk of future subsidence to occur. A detailed assessment of potential subsidence risk would be completed at the time of detailed closure design.

Two options for eliminating subsidence risks outby the concrete seals are described below. These options are still being evaluated by Coalspur and a detailed assessment of their feasibility and potential subsidence risks will be completed along with a detailed closure design at a later date.

5.14.2.1.1 Option 1: Backfilling

Underground workings outby the seals will be backfilled with rock fill, and the remainder of the openings backfilled to the final grade elevation with inert fill. Backfilling procedures would include placing the material in lifts to prevent voids and air pockets that could create future subsidence. This option was previously proposed in the Approved VTUM submission.

5.14.2.1.2 Option 2: Caving

It may be more economical for workings outby the concrete seals to be intentionally caved by a drill & blasting program which could be installed and executed using conventional blasting materials equipment

that Coalspur already employs in its surface mining operation. The access tunnels would be collapsed using demolition blasting. This approach would induce surface subsidence which could be corrected on the surface with conventional surface mining or construction equipment while removing the potential for un-mitigated subsidence in the future.

5.15 Geotechnical Monitoring Plans

This amendment proposes no changes to either the Geotechnical Instrumentation and Monitoring Plan, provided in Appendix B7, or the Subsidence Avoidance and Monitoring Plan, as described in Section 9 of Appendix B5.

6 Environmental Assessment

6.1 Air Quality

There is no change to previously estimated emissions as the maximum annual production has not changed. The VTUM was previously assessed to contribute less than 1% of site wide predicted maximum emissions, except for fugitive methane from the coal face.

Emissions on site are quantified and reported annually through the following programs:

- National Pollution Release Inventory;
- Specified Gas Reporting Regulation;
- Greenhouse Gas Reporting Regulation;
- Annual Emissions Inventory Reporting Program; and
- The Annual Air Summary and Evaluation Report required under the EPEA approval.

6.2 Surface Water Quality

There are no proposed changes that would significantly change predicted water quality or management. Surface water quality is monitored at settling pond discharge points and in receiving water bodies**,** as part of the *Ambient Surface Water Monitoring Program*.

6.3 Aquatic Resource

There are no proposed changes that would significantly change aquatic resources. Substrate, benthic invertebrate, and fish populations are surveyed annually as part of the *Ambient Surface Water Monitoring Program* and flow augmentation is preformed following the Flow Augmentation and Source Water Plan.

6.4 Historic Resources

Impacts on historical and archaeological resources are directly linked to the surface disturbance of the Project. The disturbance area has been reduced and within the assessed area. There is no change to impacts on historic resources.

6.5 Hydrogeology

There are no proposed changes that would significantly change the hydrogeology. The groundwater monitoring network includes a well specifically to monitor the VTUM after removal of underground mine infrastructure.

6.6 Hydrology

There are no proposed changes that would significantly change the hydrology. The Flow Augmentation Source Water Plan will capture any changes in the flow that may result of the operation of the VTUM. There is a small increase in water use but will not require a change to the Water Act Licence.

6.7 Soils, Terrain, Vegetation and Wetlands

There are no proposed changes that would significantly change the soils, terrain and vegetation. There is a slight positive impact with the reduction in size of the infrastructure.

6.8 Wildlife

There are no proposed changes that would significantly change impacts to wildlife.

6.9 Noise

There are no changes to the noise levels expected to be produced by the VTUM.

There are no changes to the selected fans, their installation plan, or the sound levels they are expected to produce. Despite the location of the fans changing to match the face-up relocation and the use of a vertical shaft, the installation location remains below grade although not as deep as planned in past submissions.

6.10 Traditional Ecological Knowledge (TEK) and Traditional Land Use (TLU)

Reclaimed terrain conditions are similar to pre-disturbance conditions, and TEK has been incorporated into the reclamation plan. These proposed changes will not change the original assessment's conclusions on impacts.

7 Reporting

Reporting specific to the operation of the VTUM will be done in accordance with Licence C2022-1A, which includes the following conditions:

10) The Licensee shall monitor the performance of the underground mine for stability and shall submit, within 30 days following the end of each quarter, or at such other frequency the AER may stipulate, a report which analyzes the results from the underground geotechnical monitoring programs as well as the performance of the portal-area highwall.

11) After the commencement of the underground mining operations, the Licensee shall submit to the AER, on a monthly basis, an operations report which includes the following as applicable, for the reporting period unless the AER directs otherwise:

a) a summary of any anomalous geological features encountered during mining;
b) any roof, rib or other geotechnical instabilities;
c) significant water or gas inflow;
d) high dust or methane occurrences impacting worker safety or mine production;
e) a summary of stone dusting activities;
f) run of mine (ROM) coal production and, if applicable, temporary stockpile volumes;
g) as-built survey plans of the mine;

h) a ventilation survey and
i) any other information the AER may require.

12) b) submit the first quarter of each calendar year for the preceding year, to the satisfaction of the AER, an annual report that provides and analyzes the results of the subsidence monitoring program.

8 Concordance Tables

8.1 Coal Conservation Rules

CCR SECTION	CONDITION	PLACE IN DOCUMENT
Part 1		
Amendment Application		
10	An application for an amendment of a licence or to otherwise substantially modify a mining operation shall include	
10(a)	A statement setting out the reasons for the proposed extension or modification;	Section 1
10(b)	A description of the proposed extension or modification;	Sections 1, 2.2, 2.3, 3.1, 5.1
10(c)	The applicable information that would be required under section 8, relating to the extended or modified project, and	See below
10(d)	Any further information the Regulator may require.	N/A
Licenced Mines		
8(1)	An application for a licence to commence mining operations at a mine site for which a permit has been granted or that is made simultaneously with an application for a permit for a mine site in respect of which the licence shall apply, shall include	
8(1)(a)	Repealed AR 314/2000 s6;	N/A
8(1)(b)	plans and related cross-sections, showing any previous exploration or experimental work in the area applied for;	Appendix A1 Figure 2.1
8(1)(c)	a statement of any deletions, alterations or additions, resulting from the development program, to any plan, section, statement or description submitted with the application for the permit;	Sections 2.3, 3.1, 5.1
8(1)(d)	where extensive deletions, alterations or additions are indicated, the revised plans, sections, statements or descriptions;	Sections 2.3, 3.1, 5.1
8(1)(e)	Repealed AR 72/84 s2;	N/A
8(1)(f)	a plan showing the location of all oil or gas wells within the licence area;	Appendix A2 Figure 4-1
8(1)(g)	Any further information the Regulator may require;	N/A
Underground Mining		
8(2)	An application under this section for a licence to operate an underground mine shall include, in addition to the requirements of subsection (1)	
8(2)(a)	A plan showing:	
8(2)(a)(i)	The projected ultimate outline of the mine workings,	Appendix A2 Figure 4-3

8(2)(a)(ii)	The relation of the mine workings to discard disposal areas, associated coal processing plant, storage areas and handling and loading facilities, and	Appendix A2 Figure 4-1
8(2)(a)(iii)	The location of all existing and proposed surface openings to underground workings;	Appendix A2 Figure 4-2
8(2)(b)	Cross-sections showing	
8(2)(b)(i)	The dimensions of development openings,	
8(2)(b)(ii)	The coal seams as they are known to occur;	Appendix A2 Figure 4-1
8(2)(b)(iii)	Details of the coal seams that are to be mined and of the strata overlying and underlying them;	
8(2)(b)(iv)	The relation of the underground workings to the surface;	Appendix A2 Figure 4-3
8(2)(c)	a description of the mining method and equipment to be used;	Section 5.7
8(2)(d)	a description of anticipated ground stability and support problems and the proposed methods of ground support;	Sections 3.6 and 5.4
8(2)(e)	a description of the methods to be employed for ensuring stability of discard disposal areas.	N/A
Surface Mining		
8(3)	An application under this section to operate a surface mine shall include, in addition to the requirements of subsection (1),	N/A
Dumps		
8(4)	An application for a licence to construct an external mine discard dump shall be made to the Regulator if	N/A
8(5)	An application under subsection (4) shall include, in addition to the requirements of subsection (1), a design report containing	N/A

9 References

Agapito Associates Inc. (Agapito). 2023. Geotechnical Assessment for Portal Highwall Stability at the Vista Test Underground Mine. Report prepared for Coalspur Mines Ltd. May 2023.

Alberta Energy Regulator (AER). 2020. Manual 020: Coal Development. Accessed January 2024 at: https://www.aer.ca/regulating-development/rules-and-directives/manuals.

Klohn Crippen Berger Ltd. (KCB). 2012b. EIA/Mine License Application Geotechnical Data Report. Report prepared for Coalspur Mines Ltd. April 2012.

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Klohn Crippen Berger Ltd. (KCB). 2014e. Geotechnical Assessment of Pit and Dumps. Prepared by KCB for Coalspur Mines Ltd in November 2014.

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Richardson R.J.H., Langenburg C.W., Chao D.K., Fietz, D. 1990. Alberta Geological Survey and Research Council. 1990 Alberta Geological Survey: Coal Geology. Coal Compilation Project: Entrance NTS 83F/5. Alberta Geological Survey.

Wardrop Engineering Inc. 2001. Vista Coal Project Prefeasibility Study JORC/NI 43-101 Technical Report– Hinton, Alberta, Canada. Report prepared for Coalspur Mines Ltd. January 2011.

10 Acronyms

ACPS	Analysis of Coal Pillar Stability (NIOSH Software)
AER	Alberta Energy Regulator
ARBS	Analysis of Roof Bolt Systems (NIOSH Software)
ARMPS	Analysis of Retreat Mining Pillar Stability (NIOSH Software)
BFS	Bankable Feasibility Study
CMRR	Coal Mine Roof Rating
EIA	Environmental Impact Assessment
ERCB	Energy Resources Conservation Board
ISRM	International Society of Rock Mechanics
KCB	Klohn Crippen Berger, Limited
NEH	National Engineering Handbook
OH&S	Occupational Health and Safety
PLT	Point Load Tests
ROM	Run-of-Mine
RQD	Rock Quality Designation
SIR	Supplemental Information Request
UCS	Uniaxial Compressive Strength
VFD	Variable Frequency Drive
VTUM	Vista Test Underground Mine

Appendices

A1: Approved Design Figures
Note that these figures are attached for reference and are not intended to be used for application documents where replacement figures are provided elsewhere in this submission.

A2: Proposed Design Figures

B1: 2023 Agapito Report – Highwall Slope Stability
B2: 2014 KCB report
B3: Generalized Hoek-Brown failure criteria
B4: Agapito Report – Subsidence
B5: VTUM Geotechnical Assessment
B6: Highwall Support Detail
B7: Geotechnical Instrumentation and Monitoring Plan
B8: Certified Specifications for Covered Access Tunnels

C1: VM-21 Series Core Logs
C2: OX-17 Series Core Logs

D1: VTUM Ventilation Model (Summary Report)

E1: Water Management Structure Designs, submitted for authorization (February 7, 2024)

F1: Approved Authorization Request: VTUM Access Tunnel Design and Construction

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December 1, 2023

Sent via e-mail

The Honourable Diane Lebouthillier
Minister of Fisheries, Oceans
and the Canadian Coast Guard
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Alberta Regional Office
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Re: Outstanding Permits for Vista Phase II and the Vista Underground Mine

We write on behalf of Keepers of the Water Society and the West Athabasca Watershed Bioregional Society to alert you to an issue of potential non-compliance with federal laws requiring urgent action by Fisheries and Oceans Canada ("**DFO**").

Coalspur Mines (Operations) Ltd. ("**Coalspur**") has two planned expansions to the existing Vista coal mine near Hinton, AB: Phase II and the Underground Mine. Until recently, both expansions were subject to a federal impact assessment and associated prohibitions on work.

Now, due to the pending resolution of related litigation at the Federal Court, the expansions will likely be released from the requirement for a federal assessment in the coming days. While Phase II still requires provincial assessment, the Underground Mine has all provincial approvals. However, DFO has confirmed that both expansions still require federal permits and can not proceed until Coalspur applies for and receives permits under the *Fisheries Act* and *Species at Risk Act* ("**SARA**").

Coalspur has made representations that it does not require these federal permits to proceed with the expansions, in particular for the Underground Mine. It is critical that DFO enforce these laws and not allow the Vista expansions to proceed without all federal approvals in place.

1) Impacts from the Vista Expansions

The impacts of these expansions on at-risk fish populations and their critical habitat will be significant. Athabasca Rainbow Trout and Bull Trout (Saskatchewan-Nelson River populations), both protected under SARA, live in and around the expansions. Both species live within McPherson Creek and its tributaries, which run directly through the proposed Phase II open pit. The two sub-watersheds where the expansions occur have some of the larger estimated populations of endangered Athabasca Rainbow Trout in this region, making them critically important for the species' survival and recovery.[1] The critical habitat of Athabasca Rainbow Trout, identified in part within the footprint of the expansions, was legally protected by an order under s.58 of SARA in March 2021 by the Minister of Fisheries and Oceans.[2] Critical habitat is necessary and required under SARA to ensure species' survival and recovery.[3]

The impacts from Phase II on these species are self-evident. Phase II is an open-pit operation which will inevitably take up and destroy parts of McPherson Creek and its tributaries.[4] Despite being located within the existing footprint of Phase I, significant impacts are also expected from the Underground Mine. Mining under tributaries of McPherson Creek for the Underground Mine, as well as processing and waste management, have been noted by the Impact Assessment Agency (the "**Agency**") as being expected to adversely affect critical habitat.[5] Both expansions are also expected to release selenium, a toxic substance for which deposit into fish-bearing streams is prohibited under the *Fisheries Act*.[6]

It is because of these effects that DFO has already expressed its opinion that permits are required for both expansions.[7] While Coalspur has proposed mitigation measures, the Agency expressed high uncertainty about whether these effects could be mitigated, including the expected impacts to "survival and recovery" – a prerequisite for SARA authorization.[8]

However, as recently as April 2021, Coalspur has expressed the opposite opinion about anticipated effects: "[t]he activities associated with the [Underground Mine] have no anticipated effects on fish and fish habitat as they reside within the existing operating footprint of Phase I."[9]

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[1] Impact Assessment Agency, "Analysis Report: Whether to designate the Vista Coal Underground Mine and Vista Mine Phase II Expansion Physical Activities in Alberta" (September 2021), online: https://iaac-aeic.gc.ca/050/documents/p80731/141463E.pdf [**Agency Analysis**] at page 9.
[2] *Critical Habitat of the Rainbow Trout (Oncorhynchus mykiss) Athabasca River Populations Order*, SOR/2021-32.
[3] *Species at Risk Act*, SC 2002, c 29, s. 2(1).
[4] Agency Analysis, *supra* note 1 at page 9.
[5] Agency Analysis, *supra* note 1 at page 9.
[6] Agency Analysis, *supra* note 1 at pages 9-10.
[7] Agency Analysis, *supra* note 1 at page 13: "DFO indicated that the physical activities would require a *Fisheries Act* authorization and that the VUM and Phase II will be considered in a single review under the *Fisheries Act* and *Species at Risk Act*."
[8] Requirements for authorizations under SARA include that "the activity will not jeopardize the survival or recovery of the species": *Species at Risk Act*, SC 2002, c 29 at s. 73(3)(c).
[9] Coalspur Mines (Operations) Ltd, "Vista Mine Initial Project Description Summary" (April 2021) at page 30, online: https://iaac-aeic.gc.ca/050/documents/p80731/138950E.pdf

Because Coalspur holds all required provincial approvals for the Underground Mine, Coalspur may attempt to begin construction immediately on this expansion in violation of DFO's statement that approvals are required for both expansions.

2) Action Required

It is critical that DFO be proactive and put Coalspur on notice about the outstanding permits required. These projects can not go forward before impacts on fish and fish habitat are understood and mitigated, assuming mitigation is indeed possible.

Sincerely,

<Original signed by>

Daniel Cheater
Barrister and Solicitor

cc: The Honourable Steven Guilbeault, P.C., M.P.
Minister of Environment and Climate Change Canada
ministre-minister@ec.gc.ca

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February 27, 2024

Sent via e-mail

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Re: Outstanding Permits for Vista Underground Mine

We write on behalf of Keepers of the Water Society and the West Athabasca Watershed Bioregional Society to request enforcement action by Fisheries and Oceans Canada ("**DFO**") for non-compliance with the federal *Fisheries Act* and *Species at Risk Act*.

This letter follows from our letter dated December 1, 2023, where we alerted you about potential non-compliance with these laws by Coalspur Mines (Operations) Ltd. ("**Coalspur**"), if Coalspur were to begin construction of the Vista Underground Mine (an expansion of its existing Vista Coal Mine) without first obtaining *Fisheries Act* and *Species at Risk Act* authorizations. That letter is appended for ease of reference.

In phone correspondence with Natalie Cousins of the Alberta Energy Regulator on February 26, 2024, we learned that Coalspur has started work on the Underground Mine.

DFO has previously confirmed that the Underground Mine is expected to adversely affect the legally-defined critical habitat of endangered Athabasca Rainbow Trout, as well as the habitat of protected Bull Trout.[1] On this basis DFO stated that permits are required under the *Fisheries Act*

[1] Impact Assessment Agency, "Analysis Report: Whether to designate the Vista Coal Underground Mine and Vista Mine Phase II Expansion Physical Activities in Alberta" (September 2021), online: https://iaac-aeic.gc.ca/050/documents/p80731/141463E.pdf [**Agency Analysis**] at pages 9 and 13. *Critical Habitat of the Rainbow Trout (Oncorhynchus mykiss) Athabasca River Populations Order*, SOR/2021-32.

and *Species at Risk Act*.[2] These impacts and DFO's opinion are summarized in our previous letter dated December 1, 2023.

Despite this, Coalspur has now started work on the Underground Mine without permits in place. Impacts to fish and fish habitat are prohibited without these permits.[3] We request that DFO investigate this potential non-compliance with federal law and take enforcement action if needed.

These impacts are now likely to occur. In 2020, the Impact Assessment Agency (based on input from the proponent, DFO, and Environment and Climate Change Canada) confirmed specific impacts to fish and fish habitat likely to result from the Underground Mine:[4]

- changes to stream flow through Project-related water withdrawal and discharge, including dewatering of the underground mine; and
- changes to surface water quality such as increased contaminants or sediments from Project activities, including increased mining and associated activities and groundwater-surface water interactions during underground mining.

For this reason, before the Underground Mine could proceed, DFO was set to review an application from Coalspur for an authorization under the *Fisheries Act* and *Species at Risk Act*, including "detailed information on impacts and the proposed plans to offset losses", and conduct consultation with potentially affected Indigenous groups to determine whether the Underground Mine "would not jeopardize the survival or recovery of aquatic species at risk".[5] To our knowledge, this never occurred as Coalspur did not apply to DFO for authorization.

On at least two occasions reported in the past year, Coalspur has released wastewater from its existing Vista Coal Mine into fish bearing watercourses – including McPherson Creek where critical habitat is located.[6] Incidents like this further jeopardize the continued survival of federally-protected species. Coalspur's inability to manage impacts from its existing operations raises red flags with respect to *Fisheries Act* and *Species at Risk Act* compliance in the construction and operation of the Underground Mine.

The two sub-watersheds where the Underground Mine is located have some of the larger estimated populations of endangered Athabasca Rainbow Trout in this region, making them critically important for the species' survival and recovery.[7] The impacts of the Underground

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[2] Agency Analysis, *supra* note 1 at page 13.
[3] *Fisheries Act*, RSC 1985, c F-14 at ss. 34.4(1), 35(1); *Species at Risk Act*, SC 2002, c 29 at s. 58(1).
[4] Impact Assessment Agency, "Analysis Report: Whether to Designate the Coalspur Mine Ltd. Vista Coal Underground Mine and Expansion Activities Project In Alberta" (July 2020) [**2020 Agency Analysis**] at pages 8, 16-17, online: https://iaac-aeic.gc.ca/050/documents/p80731/135628E.pdf.
[5] 2020 Agency Analysis, *supra* note 4 at page 10.
[6] Alberta Energy Regulator, "Compliance Dashboard" (accessed February 27, 2024), online: https://www1.aer.ca/compliancedashboard/incidents.html. Incident reference Nos. 20231552 and 20241007, dated June 19, 2023 and April 27, 2023.
[7] Agency Analysis, *supra* note 1 at page 9.

Mine (along with the planned Phase 2 expansion) may undermine any hope for the survival and recovery of this species.[8] Urgent action is required to address this risk.

We request that you take urgent action to investigate Coalspur's potential non-compliance with these federal laws and take enforcement action if needed. Please provide an update by March 12, 2024 confirming that you are taking steps to address this issue.

Sincerely,

<Original signed by>

Daniel Cheater
Barrister and Solicitor

Encl.

cc: The Honourable Steven Guilbeault, P.C., M.P.
Minister of Environment and Climate Change Canada
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[8] As previously noted by the Impact Assessment Agency of Canada: Agency Analysis, *supra* note 1 at page 10.

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December 1, 2023

Sent via e-mail

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