

Environmental Risk Management System

April
2022 | Vulcan Coal
Mine

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1 INTRODUCTION

The Vulcan Coal Mine (VCM) is located 34 kilometres (km) northeast of Dysart and approximately 33 km southwest of Moranbah in Queensland's Bowen Basin. The VCM lies to the immediate west of several established mining operations including BHP's Peak Downs and Saraji mines and will target the Alex and multiple Dysart Lower coal seams, extracting approximately 6 million tonnes (Mt) of Run of Mine (ROM) hard coking coal at a rate of up to 1.95 Million tonnes per annum (Mtpa).

There are a number of environmental values that Vitrinite are required to manage under government approvals associated with the VCM. This risk management system (RMS) has been developed in accordance with the VCM environmental authority (EA0002912) and AS ISO 31000:2018 Risk Management—Guidelines. It is to act as a reference document for the management of environmental risk at the VCM. The objective of the RMS is to document a process for environmental risk identification, assessment, management, communication, and review. This RMS can be applied to all activities conducted by Vitrinite as part of its on-site operations.

2 SCOPE AND CONTEXT

2.1 SCOPE

This RMS is a requirement of EA0002912 (refer **Section 3**) and as such has been developed in accordance with AS ISO 31000:2018 Risk Management—Guidelines. The RMS provides a process for environmental risk management that can be expanded and applied to all future operations at the Vulcan Complex. This version addresses the VCM only. **Section 2.2.1** below provides a description of the VCM.

As required by EA0002912 (Condition A20), this RMS is focussed on risks relevant to environmental management and does not address risks to other values, including health, safety, plant and equipment.

2.2 CONTEXT

The following sections provide a description of the VCM and a summary of the environmental values relevant to the proposed activities. The summary is provided to assist with the identification and assessment of risks. The environmental values are described to assist with the consideration of risk consequences and the requirement for management and mitigation.

2.2.1 Project

The VCM falls within the Isaac Regional Council (IRC) local government area. The region has a distinct mining influence with multiple significant coal mining operations in the immediate vicinity of the VCM. Much of the land within the mining lease has been previously disturbed by agriculture and mining related activities. To the east of the project there are several operational mine sites, while to the west land will largely continue to function as a cattle farm in a mixture of native vegetation and cleared pastures. Apart from active mining operations, the area is sparsely populated with limited residential housing.

The VCM is a small-scale mining operation, with the Jupiter hard coking coal target defined and selected for open cut development via a single pit. Coal extraction is planned for approximately 3 years and will extract approximately 6 Mt of ROM hard coking coal at a rate of up to 1.95 Mtpa. This will be followed by completion of rehabilitation activities in year 4. The open cut will extend to a depth of approximately 45 metres (m), following the seam as it dips eastwards. The footprint of the proposed open cut is approximately 136 hectares (ha). Development of the open cut will progress from the southwestern corner, starting in the former bulk sample pit (BSP), in an easterly and northerly direction, to the northern boundary of ML700060.

Blasting is required to access resources below the unweathered rock. Approximately 24 blasts per year are expected. Blasts are to be planned and scheduled to manage potential impacts on Saraji Road and nearby landholders.

Initial waste rock extracted during the early stages of year 1 will be placed in an out-of-pit (ex-pit) dump to the west of the Jupiter pit. This dump will build off the existing BSP out-of-pit dump and will extend further to the west at a similar geometry. Following this initial out of pit placement, and once sufficient pit space has been established, in-pit placement of waste rock will commence. This will continue for the life of the project as the pit advances north. The in-pit dump will extend approximately 15m above the surrounding ground level, with batters shaped at 15%. A central plateau will drain to the west to minimise the requirement for significant drainage infrastructure along the eastern toe of the dump (where space is limited).

An assessment of waste rock geochemistry has concluded that the waste rock does not pose a significant risk of generating saline or metalliferous drainage. Therefore, no selective handling and treatment measures are proposed. Furthermore, low permeability capping over the dump surface is considered not to be required.

In-pit dumping will fill the majority of the pit during operations with the remaining final void to be backfilled upon cessation of mining, resulting in the establishment of a low waste rock dump landform over the former pit area. The initial out-of-pit waste rock dump will be rehabilitated in-situ.

Once waste rock has been removed to expose the coal seam, coal will be extracted via truck and excavator. Coal will be hauled to the ROM pad and processed through dry crushing and screening mobile plant, as required. Once crushed and screened, coal will be placed on the ROM stockpile for haulage. Rejects from the crushing and screening process will be stockpiled separately and placed within the relevant active dump.

ROM coal is to be trucked off site for toll washing at a number of nearby facilities. The current mine plan proposes the disposal and long-term storage of reject material from the Coal Handling and Preparation Plant (CHPP) at the same operation selected to provide toll washing and product coal handling services for VCM. Should such a storage facility not be available, Vitronite will maintain the option to back-load the ROM coal haul trucks to bring reject material back to the VCM for co-disposal in-pit with the waste rock material. An assessment was undertaken to analyse waste rock and coal reject material geochemistry which suggests that co-disposal of reject material with waste rock material would be advantageous from a geochemical perspective. Furthermore, the deeper within the pit that the co-disposed reject is stored, the better. Both of these recommendations shall be adopted in the event that reject material is required to be hauled back to site for disposal.

Ancillary infrastructure, including a ROM pad, Mine Infrastructure Area (MIA), offices, roads and surface water management infrastructure will be established around the open cut activities. A realignment of the existing Saraji Road and services infrastructure to the eastern boundary of the mining lease, adjacent to the existing rail easement, is also to be undertaken. The re-alignment will occur on lease; however, the connection back to the existing alignment of Saraji Road to the north will extend off lease and is subject to a separate approvals process.

2.2.2 Environmental Values

2.2.2.1 Air

The environmental values to be enhanced or protected by meeting conditions of an EA include qualities of the air that are conducive to human health and wellbeing. Due to the proximity of the VCM to other large-scale mining operations and agricultural activities, background air pollutant levels are moderate to high. The VCM itself is expected to have minimal cumulative contributions to the background dust, SO₂ and NO_x for the surrounding rural community given the scale of the operation. Therefore, minimal impacts to the local air shed environment are expected from the VCM.

2.2.2.2 Noise and Vibration

The area surrounding the VCM ML is primarily used for mining and rural beef grazing. Apart from active mining operations, the area is sparsely populated with limited residential housing. This sparse population means that noise and vibration impacts on the local community are expected to be minimal.

2.2.2.3 Water

The VCM is located in the Fitzroy Basin, within the Isaac River drainage basin sub-area. The entire VCM ML has been altered by agricultural practices (light to medium density cattle grazing) and mining associated activities. The impacts of these activities, including land clearing, weed invasion, and exacerbated erosion processes are observed in the area of the VCM. An existing water diversion levee passes through the VCM ML, which serves as flood protection for up-catchment mining infrastructure owned by neighbouring operations. Surface flows from the diversion direct waters from north to the south through the VCM ML with the diversion discharging into North Creek immediately to south the of the VCM. As the area experiences substantial temporal variability in rainfall, this water diversion and other drainage lines are highly ephemeral. All proposed VCM infrastructure has been sited outside of the Q1000 flood extent, including that associated with the existing levee. With respect to the Environmental Protection (Water and Wetland Biodiversity) Policy 2019, the environmental values to be protected are:

- aquatic ecosystems;
- irrigation;
- farm supply/use;

- stock water;
- aquaculture;
- human consumption;
- primary recreation;
- secondary recreation;
- visual recreation;
- drinking water;
- industrial use; and
- cultural and spiritual values.

Exploration drilling logs indicate that groundwater in the pit shell may be intercepted at 28 m below ground level (bgl). One exploration hole located north-east of the pit crest intercepted water at approximately 20.8 m bgl. Groundwater in the area is of poor quality and is limited in extent and flow. A number of monitoring bores within the VCM ML have remained dry since installation.

2.2.2.4 Waste

With respect to waste management, the environmental values to be enhanced or protected at the VCM include the following:

- the life, health and wellbeing of people;
- the diversity of ecological processes and associated ecosystems; and
- land use capability, having regard to economic considerations.

2.2.2.5 Land

The land within the VCM ML has been modified by mining activities and agricultural activities. In an effort to promote pasture improvement, vegetation within flat and undulating areas has been cleared throughout parts of the ML. No Strategic Cropping Land (SCL) occurs within the VCM ML, which was confirmed with the SCL trigger mapping, under the Regional Planning Interest Act 2014 (RPI Act). The environmental values of the land that are to be protected or enhanced include:

- a beneficial post mining land use: low intensity grazing using appropriate grass species; and
- a stable, non-polluting landform.

2.2.2.6 Nature Conservation

The VCM is located within the Brigalow Belt bioregion. Habitats within the entire VCM ML have been heavily modified by past cattle grazing and clearing. Within the VCM tenure area only 1.9% of the disturbance footprint comprises remnant vegetation, 31.7% comprises high value regrowth, and the majority (66.4%) comprises cleared pastures. No threatened plant species have been recorded or are likely to occur within the VCM footprint.

The VCM ML contains the following vegetation units:

Remnant

- 11.10.3 (*Acacia shirleyi* open forest on coarse-grained sedimentary rocks. Crests and scarps), which is 'Least Concern' under the Vegetation Management Act 1999 and has the Biodiversity Status, 'No Concern at Present' under the Environment Protection Act 1994;
- 11.10.7 (*Eucalyptus crebra* woodland on coarse-grained sedimentary rocks), which is 'Least Concern' under the Vegetation Management Act 1999 and has the Biodiversity Status, 'No Concern at Present' under the Environment Protection Act 1994;
- 11.3.25 (*Eucalyptus camaldulensis* woodland fringing drainage lines), which is 'Least Concern' under the Vegetation Management Act 1999 and has the Biodiversity Status, 'Of Concern' under the Environment Protection Act 1994;

Non-remnant

- high value regrowth of Regional Ecosystem (RE) 11.10.3 (*Acacia shirleyi* open forest on coarse-grained sedimentary rocks. Crests and scarps), which is 'Least Concern' under the Vegetation Management Act 1999 and has the Biodiversity Status, 'No Concern at Present' under the Environment Protection Act 1994;
- high value regrowth of Regional Ecosystem (RE) 11.10.7 (Eucalyptus crebra woodland on coarse-grained sedimentary rocks), which is 'Least Concern' under the Vegetation Management Act 1999 and has the Biodiversity Status, 'No Concern at Present' under the Environment Protection Act 1994;
- high value regrowth of Regional Ecosystem (RE) 11.10.25 11.3.25 (Eucalyptus camaldulensis woodland fringing drainage lines), which is 'Least Concern' under the Vegetation Management Act 1999 and has the Biodiversity Status, 'Of Concern' under the Environment Protection Act 1994;
- high value regrowth of Regional Ecosystem (RE) 11.5.9 (*Eucalyptus crebra* and other *Eucalyptus spp.* and *Corymbia spp.* woodland on Cainozoic sand plains and/or remnant surfaces.), which is 'Least Concern' under the Vegetation Management Act 1999 and has the Biodiversity Status, 'No Concern at Present' under the Environment Protection Act 1994; and
- cleared pasture with scattered trees on a sand plain.

No category A or C environmentally sensitive areas occur in or near the VCM and no category B environmentally sensitive areas are contained in or within 500 m of the VCM. No environmentally sensitive areas (category A, B, or C) will be disturbed for works associated with the VCM

An existing water diversion levee bisects the VCM to direct water towards North Creek and away from current mine infrastructure. The watercourse along the western foot of this levee lacks riparian vegetation; however, there is a dam located at the foot of this levee, immediately northwest of the VCM. This dam supports a fringe of riparian vegetation (*Melaleuca leucadendra*, *Typha sp.* and native sedges) and provides habitat for waterbirds, frogs and other aquatic wildlife. It also provides a source of drinking water for wildlife, including the vulnerable Squatter Pigeon (*Geophaps scripta scripta*).

Field surveys of the broader area detected 22 species of mammal, 133 species of bird, 34 species of reptile, 11 species of frog and 422 species of vascular plants across the region containing the VCM.

In accordance with best practice, the footprint of the VCM has been carefully positioned to avoid disturbance to as many matters of State and/or National Environmental Significance as practicable. No protected conservation estates, wetlands or watercourses of high ecological significance, secured offset areas, environmentally sensitive areas (category A, B or C) or remnant vegetation will be disturbed for the VCM.

A total of 56 species of non-native plants were recorded within the survey area. Of these, seven species of weeds present within the survey area are category 3 restricted matters under the Biosecurity Act 2014, which prohibits their sale, trade or spread. These restricted weeds are:

- *Cryptostegia grandiflora* (Rubber Vine);
- *Harrisia martinii* (Harrisia Cactus);
- *Hymenachne amplexicaulis* (Olive Hymenachne);
- *Jatropha gossypifolia* (Bellyache Bush);
- *Opuntia stricta* (Prickly Pear);
- *Opuntia tomentosa* (Velvet Pear); and
- *Parthenium hysterophorus* (Parthenium).

The following eight species of non-native animals were recorded within the survey area:

- Feral Cat (*Felis catus*)*;
- Red Fox (*Vulpes vulpes*)*;
- Dingo (*Canis lupus dingo*)*;
- European Rabbit (*Oryctolagus cuniculus*)*;
- House Mouse (*Mus musculus*);

- Feral Pig (*Sus scrofa*)*;
- Cane Toad (*Rhinella marina*); and
- Common Myna (*Acridotheres tristis*).

Species marked with an asterisk are category 3, 4 and 6 restricted matters under the Biosecurity Act 2014. The Red Fox, Dingo and European Rabbit are also category 5 restricted matters under the Biosecurity Act 2014. Category 3 restricted matters must not be distributed or released, category 4 restricted matters must not be moved, category 5 restricted matters must not be kept, and category 6 restricted matters must not be fed.

3 REGULATORY REQUIREMENTS

3.1 ENVIRONMENTAL PROTECTION ACT (1994)

3.1.1 Environmental Authority

The VCM is subject to environmental authority (EA) EA0002912 which authorises environmentally relevant activities within ML700060. Vitrinite is required to implement the VCM in accordance with the conditions of the EA.

EA0002912 authorises the following environmentally relevant activities on ML700060:

- Resource Activity, Schedule 3, 13: Mining Black Coal;
- Ancillary Activity 16(2): Extracting, other than by dredging, in a year, the following quantity of material, (b) more than 100,000t but not more than 1,000,000t;
- Ancillary Activity 16(3): Screening, in a year, the following quantity of material, (b) more than 100,000t but not more than 1,000,000t;
- Ancillary Activity Schedule 2, 33: Crushing, milling, grinding or screening more than 5,000 t of material in a year.

This RMS has been developed to comply with condition A21 of EA0002912 which specifies:

"The holder of this environmental authority must, prior to the commencement of mining activities, develop and implement a risk management system for activities which mirrors the content requirements of the Standard for Risk Management (ISO31000:2018), or the latest edition of an Australian Standard for risk management, to the extent relevant to environmental management."

3.2 ENVIRONMENTAL PROTECTION AND BIODIVERSITY CONSERVATION ACT (EPBC) (1999)

The VCM was referred under the EPBC Act to determine if assessment and approval under the EPBC Act was required. The Department of Agriculture, Water and the Environment concluded, based on the project designs, footprint and proposed management measures, that the impact was not significant and that no further assessment or approval was required. This finding is conditional on Vitrinite implementing the VCM as it proposed in the Referral.

4 RISK ASSESSMENT

4.1 RISK IDENTIFICATION

This risk assessment aims to identify relevant potential risks to environmental values associated with operations at the VCM. Once identified, these risks are assessed based on the likelihood and consequence of them occurring. To identify and assess risk, Vitrinite utilises the Workplace Risk Assessment and Control (WRAC) methodology. This approach has been used to identify relevant environmental risks associated with operation of the VCM and to facilitate design and implementation of associated treatments. The identified relevant environmental risks associated with the VCM operations are listed and assessed in **Section 4.3**. It should be noted that the potential impacts of the VCM have been assessed as part of the EA application process. Mitigation measures, where required, are included in the application supporting documentation. This risk assessment primarily addresses unintended risks to environmental values that do not constitute part of the authorised activities and environmental harm associated with the VCM.

4.2 RISK ANALYSIS

The purpose of risk analysis is to comprehend the nature of risk and all its characteristics including the level of risk. Level of risk has been assessed using Vitrinite's WRAC methodology which considers the likelihood and consequence of a hazard occurring. Likelihood rating is assigned to each risk (from A to E) using definitions in **Table 4-1**. The consequence rating is assigned to each risk (from 1 to 5) based on the consequence definitions in **Table 4-2**. The risk level represents the inherent risk associated with a task, prior to the implementation of risk treatments.

4.2.1 Risk Analysis Criteria

For the purposes of this RMS, risk has been separated into two risk criteria or "loss types" based on the matters to be protected during project operations. **Table 4-2** defines the consequence and likelihood ratings based on the scale of impact to each loss type. The loss types are:

- Environmental Impact (E); and
- Community or Reputation (C).

Table 4-3 provides the risk matrix and categories based on the assigned likelihood and consequence criteria. Categories range from Low (L), through Medium (M), and High (H) to Extreme (E). **Table 4-4** provides guidance for the management of risks along with associated approval responsibilities.

Table 4-1 Likelihood Definitions

	Likelihood				
	A – Extremely Likely	B – Very Likely	C –Likely	D – Unlikely	E – Rarely
Definition	Almost certain to happen. Would be expected daily or more frequently.	Could happen anytime. Could occur as often as weekly.	Could happen sometime. Could occur as often as monthly.	Could happen. Could occur once a year or less.	Could happen but probably never will. Would require exceptional circumstances. Occurs less than every 10 years.

Table 4-2 Loss Types and Consequence Definitions

Loss Type	Consequences				
	Level 1 Insignificant	Level 2 Minor	Level 3 Moderate	Level 4 Major	Level 5 Catastrophic
Environmental Impact (E)	No environmental harm or remedial action.	Environmental nuisance event (as per EP Act 1994). No regulatory action likely. Remedial time and cost as per (D).	Environmental Harm Event (as per EP Act 1994) – localised to site. Environmental infringement notice possible. Remedial time and cost as per (D).	Environmental Harm Event – extending off-site OR Material Environmental Harm Event (as per EP Act 1994). Environmental prosecution possible Remedial time and cost as per (D).	Material Environmental Harm Event – extending off-site. Possible suspension of licence to operate. Remedial time and cost as per (D).
Community or Reputation (C)	Slight impact – public awareness may exist but no public concern (complaint).	Limited impact – some local public concern and complaints.	Considerable impact; regional public concern and multiple complaints. Local Media attention.	Regional impact – Regional public concern. Regional media attention.	National impact – National media attention.

Table 4-3 Risk Assessment Matrix

Likelihood	Consequences				
	Level 1 Insignificant	Level 2 Minor	Level 3 Moderate	Level 4 Major	Level 5 Catastrophic
A Extremely Likely	M (11)	H (16)	E (20)	E (23)	E (25)
B Very Likely	M (7)	M (12)	H (17)	E (21)	E (24)
C Likely	L (4)	M (8)	H (13)	E (18)	E (22)
D Unlikely	L (2)	L (5)	M (9)	H (14)	E (19)
E Rarely	L (1)	L (3)	M (6)	M (10)	H (15)

Table 4-4 Risk Management Guidance

Risk Rating	Risk Level	Approval	Guidelines for Risk Management
18 to 25	(E) – Extreme Risk	Site Senior Executive (SSE) or delegate	The level of risk is deemed unacceptable without the relevant approval to ensure that the level of risk to as low as reasonably achievable and must be proactive in monitoring the risk.
13 to 17	(H) – High Risk	Superintendent	The level of risk is deemed unacceptable without the relevant approval to ensure that the level of risk to as low as reasonably achievable and must be proactive in monitoring the risk.
6 to 12	(M) – Medium Risk	Appointed Supervisor	The level of risk is deemed acceptable to undertake with active monitoring to ensure identified controls are in place and that changes to the conditions or process are identified and further risk assessed and approved by the Supervisor.
1 to 5	(L) – Low Risk	Coal Mine Workers	The level of risk is deemed acceptable to undertake with active monitoring to ensure identified controls are in place and that changes to the conditions or process are identified and further risk assessed.

4.3 RISK EVALUATION

Risk evaluation is utilised to determine whether further management or mitigation measures are required after the inherent risk is analysed. This decision accounts for the level of inherent risk associated with an activity in consideration of current management measures. It ultimately considers whether the inherent risk is acceptable and whether any further action is required to reduce that risk. It also considers the wider context of a scenario where risks become hazards, including the actual and perceived consequences to the relevant stakeholders. To address the inherent risk of an action the following broad risk treatment pathways are considered, with specific treatment actions outlined in the risk treatment plan:

1. Nothing further required.
2. Consider risk treatment options.
3. Undertake further analysis to better understand risk.
4. Maintaining existing controls.
5. Reconsider objectives.

Table 4-5 presents:

- identified environmental risks associated with the VCM;
- an analysis of inherent risk in consideration of existing mitigation measures;
- an evaluation of the inherent risk;
- nomination, where required, of additional risk treatments; and
- an analysis of residual risk.

Table 4-5 Risk Analysis and Treatment Evaluation

Item No.	Activity	Hazard	Existing Controls	Loss Type	Consequence	Likelihood	Risk Rating	Proposed Risk Treatments	Residual Risk
1.	Earthworks (vegetation clearing, site preparation, topsoil stockpiling and early rehabilitation establishment)	Clearance outside of approved disturbance areas	<p><u>Prevention Controls:</u></p> <ul style="list-style-type: none"> Permit to Disturb issued by Environmental department, signed off by task supervisor, and provided to operator with appropriately detailed maps, coordinates, and description of area; GPS systems in plant or equipment (if available) / and proposed clearance area demarcated via survey with flagging tape. <p><u>Preparedness Controls:</u></p> <p>Pre and post clearing inspections to ensure compliance with permit to disturb and approved clearance limits.</p>	E	3	D	M9	None required	M9

1.		Clearance without relevant cultural heritage clearance – potential destruction of culturally significant sites or artefacts	<p><u>Prevention Controls:</u></p> <ul style="list-style-type: none"> • Agreement in place with traditional owners (Barada Barna); • Site survey of proposed disturbance areas has been undertaken with Barada Barna survey team and archaeologist (if required) prior to any clearance works being undertaken; • Authorisation received for works to proceed received from traditional owners. Any identified sites or artifacts mapped with appropriate exclusion zones implemented; • Physical signage and/or barriers in place around exclusion zones; • Permit to Disturb issued by Environmental department, signed off by task supervisor, and provided to operator with appropriately detailed maps, coordinates, and description of area; • GPS systems in plant or equipment (if available) / and proposed clearance area demarcated via survey with flagging tape. <p><u>Preparedness Controls:</u></p> <ul style="list-style-type: none"> • Pre and post clearing inspections to ensure compliance with permit to disturb and approved clearance limits. 	C	5	D	E19	None required	E19
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		Uncontrolled release of sediment laden waters to environment	<p><u>Prevention Controls:</u></p> <ul style="list-style-type: none"> All works undertaken in accordance with Erosion and Sediment Control Plan; Identification and implementation of appropriate drainage, erosion and sediment controls; Water monitoring equipment functional, fit for purpose, and calibrated; Water infrastructure (dams, levees) appropriately constructed, maintained, and managed. <p><u>Preparedness Controls:</u></p> <p>Planning significant earthworks around severe weather events.</p>	E	3	D	M9	None required	M9
2.	Mining operations (waste rock and coal excavation, waste and ROM handling and transport)	Generation of excessive dust offsite resulting in a complaint	<p><u>Prevention Controls:</u></p> <ul style="list-style-type: none"> Visual monitoring of dust levels combined with adequate and timely dust suppression; Covering loads prior to transport; Vehicle washdown facilities in place; Significant distance to receptors; Neighbours notified of activities. <p><u>Preparedness Controls:</u></p> <ul style="list-style-type: none"> Complaints register; Dust monitoring program in place and ready for implementation if required. 	E C	2	D	L5	None required	L5

		Generation of excessive noise, vibration, or airblast overpressure nuisance offsite resulting in a complaint	<p><u>Prevention Controls:</u></p> <ul style="list-style-type: none"> Blasting conducted in line with EA limits and site controls; Significant distance to receptors Neighbours notified of activities in advance <p><u>Preparedness Controls:</u></p> <ul style="list-style-type: none"> Complaint register; Blast monitoring program in place and ready for implementation if required. 	E C	2	D	L5	None required	L5
3.	Storage and handling of hydrocarbons	Hydrocarbon release to soil or waterways	<p><u>Prevention Controls:</u></p> <ul style="list-style-type: none"> Site personnel follow MSDS for handling, use and storage of hydrocarbons on site; Bunded storage areas available (permanent or temporary); Appropriate waste management practices in place. <p><u>Preparedness Controls:</u></p> <ul style="list-style-type: none"> Spill kits; Rehabilitation and disposal of contaminated land if required. 	E	3	D	M9	None required	M9

4.	Mine affected water (MAW) storage and transport	Uncontrolled release of MAW	<p><u>Prevention Controls:</u></p> <ul style="list-style-type: none"> MAW storage dams constructed and maintained in accordance with RPEQ requirements; Structural integrity of MAW pipelines checked regularly; <p><u>Preparedness Controls:</u></p> <ul style="list-style-type: none"> Groundwater monitoring undertaken downgradient of MAW dams. 	E	4	E	M10	None required	M10
5.	Rehabilitation	Rehabilitation does not meet post-mining land use objectives	<p><u>Prevention Controls:</u></p> <ul style="list-style-type: none"> Implement PRCP commitments; Rehabilitation completed as per prescribed methodology. <p><u>Preparedness Controls:</u></p> <ul style="list-style-type: none"> Approved PRCP and ERC in place. 	E	3	D	M9	None required	M9

5 RISK TREATMENT

5.1 DETERMINING RISK TREATMENTS

The purpose of risk treatment is to identify, assess and implement options for addressing risk. Selecting the most appropriate risk treatment options involves balancing the potential benefits relative to costs, effort or disadvantages of implementation. The degree of intervention for a given risk is determined by the level of inherent risk. Regardless of risk level, a number of broad strategies are to be considered for addressing inherent risk. These include:

- avoiding the risk by deciding not to start or continue with the activity that gives rise to that risk;
- taking or increasing the risk to pursue an opportunity;
- removing the risk source;
- changing the likelihood;
- changing the consequences;
- sharing the risk (e.g. through contracts, buying insurance); or
- retaining the risk by informed decision.

Before deciding on one of the above risk treatment pathways, consideration should be given to the wider context of the project. Even though a treatment may resolve one particular source of extreme risk, it may compromise other aspects of the broader project. Risk treatments should take into consideration the breadth of factors associated with the internal and external contexts of the project. This includes:

- environmental matters;
- stakeholders;
- agreements with government regulators (EA permit);
- effectiveness of risk treatment; and
- capability of Vitrinite to implement risk treatment.

5.2 ENVIRONMENTAL RISK TREATMENT PLAN

Once the risk treatments have been identified, a plan for prioritisation and implementation should be developed and documented. The risk treatment plan is a tool for specifying how the chosen treatment options will be implemented. It is to be accessible to those involved so that they understand the risk treatment processes. It also serves as a benchmark against which progress and performance can be monitored and recorded, which allows for informed revision and review.

Through monitoring and review (refer **Section 6**), risk treatments are likely to evolve over time. This process will incorporate the views of stakeholders and aims to identify and minimise unintended consequences of the risk treatments themselves while refining and better targeting risk mitigation.

The treatment plan should include:

- the rationale for selection of the treatment options including the expected benefits to be gained;
- the resources required, including contingencies;
- the performance measures;
- the constraints;
- the required reporting and monitoring; and
- when actions are expected to be undertaken and completed.

An example Risk Treatment Action Plan is provided in **Appendix A**

6 MONITORING & REVIEW

The purpose of monitoring and review is to assure and improve the quality and effectiveness of the RMS, treatment implementation and evaluation of outcomes. Monitoring will take place at all stages of project development. This includes planning, gathering and analysing information, recording results and providing feedback. Using information gathered as part of a consistent monitoring program, an annual review of the RMS will be conducted. The focus of this review will be on the effectiveness of the RMS, treatment implementation and evaluation of outcomes.

It will also revisit the risk identification process to determine if new hazards/ risks have arisen. In such a case, the new hazard will be subject to the risk assessment process and will trigger a review of the current risk treatment plan to account for any new treatment requirements and to identify further vulnerabilities (e.g. overlapping impacts of emergent risks with previously identified risks).

The Risk Assessment and Treatment Plan should also be reviewed if any of the follow events occur:

- exceedance of trigger values outlined in EA permit;
- failure of current risk treatment to mitigate risk;
- discovery of new environmental values that now need to be accounted for; and
- changes in legislation.

Should a review be triggered on an event basis, it does not occur in place of the annual review. The outcomes of monitoring and review (i.e. whether changes to risk management have occurred or not) will be communicated to all relevant stakeholders as soon as practicable. Monitoring and review are the responsibility of the Environmental Department and the Operations Manager.

7 ROLES AND RESPONSIBILITIES

7.1 SITE SENIOR EXECUTIVE

The SSE has the following responsibilities under the RMS:

- sole approval authority for “extreme risk” actions, and actions of any lower risk category, provided all necessary controls are in place;
- overall responsibility for, and oversight of, the RMS and its review process;
- accountable for the management structure and ultimately compliance with the RMS; and
- overall financial control and assigns budget and funding for risk management.

7.2 OPERATIONS MANAGER

The Operations Manager is the owner of this Environmental RMS. Their responsibilities include:

- approval authority for “high risk” actions and actions of any lower risk category provided all necessary controls are in place;
- initial development of the system (this document);
- annual review of the document (refer **Section 6**);
- implementation of the existing and proposed risk management treatments (note the risk treatment plan may delegate implementation responsibilities to other parties).
- event-based reviews of the documentation; and
- communication of the system requirements and outcomes (particularly the risk treatment plan) to all relevant stakeholders.

7.3 SUPERVISORS

Appointed supervisors have the following responsibilities under the RMS, only for activities they have authority over:

- approval authority for “medium risk” or “low risk” activities provided all necessary controls are in place;
- ensuring all operations under their supervision are undertaken in accordance with the RMS; and
- ensuring all employees and contractors under their supervision are appropriately trained and informed regarding their responsibilities under the system; and
- reporting to their supervisor or the Operations Manager on matters of risk management that may arise.

7.4 COAL MINE WORKER

All coal mine workers are responsible for:

- authority to proceed with “low risk” activities provided all necessary controls are in place;
- working in accordance with the RMS; and
- reporting to their supervisor on matters of risk management that may arise.

8 COMMUNICATION & CONSULTATION

Information on identified hazards and risks will be communicated to relevant internal and external stakeholders. This information includes the relevant risks and treatments in place along with how they can provide feedback on how to improve risk treatments.

Relevant stakeholders for the RMS include all those involved with project operations. This includes workers, management staff, landholders and third-party consultants and contractors who operate on site. For these personnel, key risks will be communicated through inductions and toolbox meetings prior to the commencement of works. Additionally, the Department of Resources (DOR) and the Department of Environment and Science (DES) are key stakeholders in the VCM and have been consulted through application and approvals processes. Future consultation with the departments will occur through Vitrinite meeting reporting requirements. The EA also include incident reporting requirements.

For the broader community, a complaints register will be kept, documenting criticism or concern over perceived environmental issues. This will be available for consultation by the relevant stakeholders, should a violation of the EA permit occur or be suspected. The complaints register will record:

1. name, address and contact number of the complainants;
2. time and date of the complaint;
3. reasons for the complaint;
4. investigations undertaken;
5. conclusions formed;
6. actions taken to resolve the complaint;
7. any abatement measures implemented; and
8. person responsible for resolving the complaint.

The Environmental Department is responsible for investigations into any uncontrolled risks that do not meet EA condition requirements. EA non-compliances are to be communicated to Government regulatory bodies by the Environmental Department. Potential mitigation measures will then be implemented to prevent further impacts, where practical. The Environmental Department will also review this RMS, operational plans, site procedures and monitoring records. If required, management plans and site procedures will be amended. Any monitoring records are required to be kept until the surrender of the Environmental Authority (EA0002912, Condition A5) and should be incorporated into any review of the RMS.

9 RECORDING & REPORTING

The risk management process and its outcomes will be documented and reported following each review. This will assist to:

- communicate risk management activities and outcomes across the organisation;
- provide information for decision making; and
- facilitate interaction with stakeholders, including those with responsibility and accountability for risk management activities.

Internal reporting will predominantly take the form of incident and RMS review reporting. Any incidents involving failures of risk treatment measures should be reported to the Environmental Department as soon as practicable and within 24 hours. It is then the responsibility of the Environmental Department to investigate the cause of the incident. This process requires cooperation at all levels with recording and reporting data and evidence relating to the incident.

10 REFERENCES

Biosecurity Act 2014 (Qld).

Environment Protection Act 1994 (Qld).

Environment Protection and Biodiversity Conservation Act 1999 (Australia)

Standards Australia, 2018. *AS ISO 31000:2018 Risk management Guidelines*. Sydney, NSW:

Regional Planning Interests Act 2014 (Qld).

Vegetation Management Act 1999 (Qld).



Appendix A

Risk Treatment Action Plan

