



# IMPACT ASSESSMENT

## SECTION 4.8 HUMAN HEALTH

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## Jervois Base Metal Project

### VOLUME 2 Impact Assessment

#### SECTION 4.8 | HUMAN HEALTH

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## 4.8 Human health

### 4.8.1. Introduction

The NT EPAs objective for human health is to ensure risks to human health are identified, understood and adequately avoided and/or mitigated.

As with any major industry sector, mining has associated risks which have the potential to impact on human health of the mine workforce and the general public. The risks specific to this Project include those associated with underground and open cut mining activities, ore processing facilities, mine support infrastructure such as site dams and stockpiles, repair and maintenance facilities, the accommodation village, ore transport, historic mining shafts, pits and stockpiles and the remoteness of the site.

The legislation that is applicable to human health and safety for the project includes:

- *Work Health and Safety (National Uniform Legislation) Act, 2016 (Northern Territory)*
- *Work Health and Safety (National Uniform Legislation) Regulations, 2017 (Northern Territory)*
- *Dangerous Goods Act, 2012 (Northern Territory)*
- *Dangerous Goods Regulations, 2018 (Northern Territory)*
- *Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act, 2016 (Northern Territory); and*
- *Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Regulations, 2016 (Northern Territory).*

A Project risk assessment was undertaken to identify the potential risks of the Project on the natural environment, human health, social and economic environments. The approach to the risk assessment included the identification of potential hazards and risks associated with the construction, operational and post mining phases of the Project. The health and safety aspect of the Project risk assessment addressed the potential hazards and risks to the workforce and members of the public. Specifically, the risk assessment process included the following:

- Identification of potential human health and safety hazards, risks and consequences;
- Qualitative and quantitative risk assessment through a preliminary desktop analysis, risk assessment and workshop;
- Allocation of preliminary risk ratings in alignment with the risk criteria;
- Development, discussion and review of management, treatment, prevention and monitoring strategies to mitigate potential risks; and
- Allocation of residual risk ratings.

The preliminary risks were determined by combining the likelihood and potential consequences of identified risks to establish their frequency and determine a preliminary risk rating. Residual risks were estimated following the consideration of available and practical management, treatment,

monitoring and control measures. The risk assessment was based on the requirements of *AS/NZS ISO 31000:2009, Risk management - Principles and guidelines*.

A risk assessment workshop was conducted early in the Project development phase for the Pre-Feasibility Study in October 2014. Whilst this risk assessment is several years old, the content was taken into consideration in the development of the EIS risk assessment.

Outcomes from the risk assessment and resulting risk register aim to serve four main purposes, these being:

- To highlight potential risks, their consequences, control strategies and ongoing management prior to operations commencing;
- To provide a basis for the development of practical management, treatment, prevention and control strategies;
- To manage potential impacts on human health and safety, the environment, communities and the Project owner; and
- To provide a foundation for the evaluation of progress in relation to the management of risks.

The full Project risk assessment can be found in **Appendix C-11**.

### 4.8.2. Relevant Activities

Specific Project activities that have the potential to have a significant impact on or could pose a risk to the human health of the workforce and the public are provided in **Appendix C-11**. These activities include:

- Construction:
  - Workshop activities;
  - Heavy machinery, plant and equipment;
  - Driving on site and on public roads;
  - Fire;
  - Transport and handling of dangerous goods;
  - Limitations of medical facilities;
  - Failure of communication systems;
  - Remote worksite;
  - Working outdoors;
  - Electrical sources;
  - Manual handling activities;
  - Dust;
  - Animal bites;
  - Drowning; and
  - Noise.
- Operations:
  - Underground and open cut mining activities;
  - ROM and waste stockpiles;
  - Heavy machinery, plant and equipment;
  - Driving on site and on public roads;
  - Blasting activities;
  - Fire;
  - Processing Plant activities;
  - Transport and handling of dangerous goods;
  - Limitations of medical facilities;
  - Failure of communication systems;
  - Remote worksite;
  - Working outdoors;
  - Electrical sources;
  - Manual handling activities;
  - Dust;
  - Animal bites;
  - Drowning; and
  - Noise.
- Mine Rehabilitation and Closure:
  - Open cut pits and final voids;
  - Driving on site and on public roads;
  - Fire;
  - Limitations of medical facilities;
  - Failure of communication systems;
  - Tailings Dam;

- Remote worksite;
- Working outdoors;
- Dust;
- Animal bites;
- Drowning; and
- Noise.

### 4.8.3. Potential Impacts, Controls and Risks

As guided by the ToR, an assessment of the potential impacts and risks to people associated with the construction, operation and closure phases of the Project, including the storage and transport of materials to and from the site has been undertaken. This assessment has been undertaken to establish an understanding of the:

- Potential impacts and risks to human health associated with all aspects of the Project during the construction, operations and closure phases of project operations, including but not limited to safety risks such as:
  - Fire, including combustible materials and wildfire;
  - Emergency situations and exclusions/evacuation zones;
  - Hazardous materials exposure; and
  - Hazards associated with the transportation of personnel, construction materials, consumables and dangerous goods.
- Prevention and mitigation of the identified potential impacts and risks to human health and how these will be addressed within design specifications.

A total of twenty-five (25) potential hazards associated with human health and safety were identified through the risk assessment with none of the initial risk ratings ranked as 'extreme'. A summary of the risk ratings is outlined in Table 4.8-. A summary of the human health and safety risks is provided in

Table 4.8- followed by a discussion of specific events which have the potential to impact on human health. The detail risk assessment is provided in Appendix C-11 Risk Assessment.

**Table 4.8-1: Summary of Risk Ratings**

<b>Risk Levels</b>	<b>Initial Risk Rating</b>	<b>Residual Risk Rating</b>
Very Low	1	5
Low	2	7
Medium	5	12
High	17	1
Extreme	0	0
	25	25

**Table 4.8-2: Human Health and Safety Risks Summary**

Potential Event	Initial Risk Rating	Residual Risk Rating
Dust from construction, mining operations and exploration	Medium	Very Low
Serious animal bites	Medium	Very Low
Personnel drowning	Medium	Low
Collapse of pit walls	High	Medium
Workers or people from the public fall from mine pits, mine shafts	High	Medium
Heavy machinery, plant and equipment accidents during operation	High	Medium
Accidents when driving on mine road	High	Medium
Accidents when driving on public road involving mine worker	High	High
Inadequate ventilation at underground mine	High	Medium
Blasting	High	Medium
Collapse of underground roof or walls	High	Medium
Falling material from underground roof	High	Low
Sudden inrush of waters at underground mine	High	Medium
Uncontrolled fire caused by third party or natural disaster	High	Medium
Uncontrolled fire caused by mining operations	High	Low
Transport and handling of hazardous substances and dangerous goods	High	Medium
Noise	Medium	Low
Failure of communication systems	High	Low
Working in remote location – Emergency Response	High	Low
Working in remote location – Mental Health	Low	Very Low
Working in the field – Dehydration	High	Low
Contact with an electrical source	High	Medium
Manual handling	Low	Very Low
Site not appropriately rehabilitated post closure, site not geotechnically stable, or ease of public access	Medium	Medium
Inadequate rehabilitation of exploration sites, including drill holes, pads, sumps, costeans, tracks, etc	Very Low	Very Low



**Table 4.8-3: Potential Human Health and Safety Impacts and Controls**

Potential Event	Details	Controls
Accidents when driving on public roads	<p>The Project is located approximately 380 km by road north-east of Alice Springs. As a result of its remote location, travelling to and from site will increase the risks of workers travelling on the road, particularly if the workforce travels after shift work when they are tired. This event was identified as the highest risk identified for the Project with an initial risk rating of High. Following mitigation, the residual risk level remained high.</p>	<p>The following mitigation measures were identified to manage the risk:</p> <ul style="list-style-type: none"> <li>• Implement a Traffic Management Plan;</li> <li>• Fitness for work policy, drug &amp; alcohol policy and fatigue management;</li> <li>• A public awareness campaign;</li> <li>• Regular vehicle maintenance including pre-start inspections; and</li> <li>• Transport of dangerous goods to be in accordance with the NT Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act and Regulation and Australian Dangerous Goods Code.</li> </ul>
Accidents when driving on mine roads	<p>The initial risks related to vehicle movements on site were identified as High and include:</p> <ul style="list-style-type: none"> <li>• Impacts between two vehicles/mobile plants/vehicle-mobile plant while moving;</li> <li>• Single vehicle/mobile plant rollover, over the edge and impact with structures; and</li> <li>• Impacts between vehicle/mobile plant and pedestrian while moving.</li> </ul>	<ul style="list-style-type: none"> <li>• Implement a Traffic Management Plan detailing speed limits on mine roads;</li> <li>• Procedure for site vehicle specifications, such as radios, flashing lights, flags, vehicle decals etc;</li> <li>• Training and competency;</li> <li>• Establish an authorisation process for vehicles to enter site;</li> <li>• Site access restrictions;</li> <li>• Road maintenance;</li> <li>• Procedure to ensure regular vehicle maintenance including pre-start inspections;</li> <li>• Procedure to ensure regular mobile plant maintenance and heavy vehicle maintenance;</li> <li>• Fitness for work policy, drug &amp; alcohol policy and fatigue management procedures;</li> <li>• High visibility PPE; and</li> </ul>

Potential Event	Details	Controls
		<ul style="list-style-type: none"> <li>Transport of dangerous goods to be carried out according to the NT Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act and Regulation and Australian Dangerous Goods Code.</li> </ul>
Uncontrolled fire caused by mining operations, a third party or natural disaster	<p>The risk assessment rated initial fire related risks associated with the Project as High. The main potential sources of fires include (SLR Consulting Australia, 2018):</p> <ul style="list-style-type: none"> <li>Lightning generated natural wildfire;</li> <li>Traditional Owner practices;</li> <li>Accidental fires caused by community activities; and</li> <li>Accidental fires caused by mining operations, such as flammable and combustible materials, welding, cutting, grinding, spontaneous combustion and plant.</li> </ul>	<p>The following mitigation measures were identified to manage the risk of fire (SLR Consulting Australia, 2018):</p> <ul style="list-style-type: none"> <li>Mechanical control of vegetation and fuel loads surrounding infrastructure;</li> <li>Maintenance of fire breaks and access tracks;</li> <li>Equipping all mobile and stationary equipment within the Project area with appropriate fire extinguishers;</li> <li>Procedural controls such as Hot Work permitting, fire management within designated area under controlled conditions, monitoring of wildfires and implementing firefighting strategies as required;</li> <li>Store hydrocarbon fuels according to the requirements of AS1940-2004 - The storage and handling of flammable and combustible liquids; and</li> <li>Develop and implement a BFMP, establishing Emergency Muster Points within safe areas, identifying safe egress routes in the event of fire emergency.</li> </ul> <p>The following are to be adhered to by all mine workers (SLR Consulting Australia, 2018):</p>

Potential Event	Details	Controls
		<ul style="list-style-type: none"> <li>• All staff, contractors and visitors will comply with fire ban days and advice provided by Bushfires NT; and</li> <li>• Vegetation clearing using fire will not be undertaken.</li> </ul>
Hot weather related risks	The Project is in an area with mean maximum temperatures above 35 degrees Celsius in the summer months. Air temperature, humidity, radiant heat, air movement and wind speed, workload, physical fitness of workers and clothing are factors that might cause heat related illnesses such as dehydration, heat stroke, rashes and fatigue. Continuous exposure to high UV sunlight may also result in sunburn and skin cancer. As a result of these extreme temperatures the risk assessment identified initial risks from working outdoors under extreme hot weather conditions as High.	The following mitigation measures were identified to manage the risk of heat related illness and sun damage: <ul style="list-style-type: none"> <li>• Where reasonably practical, reschedule tasks to the cooler part of the day;</li> <li>• Install shade cloth to reduce radiant heat from the sun;</li> <li>• Provide cool drinking water near work sites and encourage mine workers to drink a cup of water (about 200 ml) every 15 to 20 minutes during hot weather conditions;</li> <li>• Provide PPE such as long-sleeve UV protection/High-Visibility shirts, trousers, hats, sunglasses and sunscreen;</li> <li>• Provide workforce with information and supervision on heat related illness, symptoms, sunburn, dehydration, and first aid; and</li> <li>• Fitness for work policy, drug &amp; alcohol policy and fatigue management procedures.</li> </ul>
Heavy machinery, plant and equipment accidents during operation	The risk assessment identified heavy machinery and plant operation related risks as High initially. Hazards related to heavy machinery including drawing in or trapping, entanglement, shearing, cutting, impact, crushing, puncturing, ejection, noise, heat, machinery stability, release of hazardous substances, fall and impact with other mobile plant and/or light vehicles. Common injuries associated with heavy machinery and	Measures to assist in preventing accidents involving equipment will include: <ul style="list-style-type: none"> <li>• Guarding;</li> <li>• PPE;</li> <li>• Competency and Standard Operating Procedures;</li> <li>• Isolation Procedures;</li> <li>• Safe work platforms when working at heights;</li> </ul>

Potential Event	Details	Controls
	plant include crushing, cutting, shearing, puncturing, abrasion, burns, tearing, stretching, electric shock, hearing loss and health impact from the release of hazardous substances.	<ul style="list-style-type: none"> <li>• Regular servicing of machinery and plant according to the manufacturers recommendations;</li> <li>• Emergency Management Plan; and</li> <li>• Traffic Management Plan</li> </ul>
Underground mining related risks	<p>The risk assessment identified underground mining related risks as High initially. Hazards identified include:</p> <ul style="list-style-type: none"> <li>• Inadequate Ventilation;</li> <li>• Blasting;</li> <li>• Geotechnical, collapse of roof and walls;</li> <li>• Falling material from underground roof; and</li> <li>• Sudden inrush of waters.</li> </ul>	<p>The following mitigation measures were identified to manage the underground mining related risks:</p> <ul style="list-style-type: none"> <li>• Ensure adequate ventilation system design according to detailed mine plans and mine layout to provide an adequate air flow rate to maintain a healthy and safe atmosphere at all times;</li> <li>• Regular monitoring of temperature, humidity and air quality;</li> <li>• Ventilation system auditing and maintenance;</li> <li>• Reduction/suppression of dust deposition in intake roadways;</li> <li>• Accurate survey and measurement for blasting design;</li> <li>• Blasting design and blasting to be carried out by competent personnel only;</li> <li>• Restriction of access to only authorised personnel;</li> <li>• Inspections to be carried out after blasting and restoration of supports;</li> <li>• Inspection of roof and walls prior to and during work;</li> <li>• Installation of barriers;</li> <li>• Geotechnical and geological monitoring;</li> <li>• Hazard reporting;</li> </ul>

Potential Event	Details	Controls
		<ul style="list-style-type: none"> <li>• Accurate surveying of new workings and maintenance of a register of plans of old workings;</li> <li>• Drainage of old workings;</li> <li>• Adherence to underground working design;</li> <li>• Mine plan to be based on surface and groundwater models;</li> <li>• Continuous groundwater monitoring;</li> <li>• Fault grouting if necessary;</li> <li>• Probe drilling where necessary;</li> <li>• Ensure adequate pump capacity;</li> <li>• Implementation of an Emergency Response Plan and evacuation procedure; and</li> <li>• PPE.</li> </ul>
Transport and handling of hazardous substances and dangerous goods	The risk assessment identified initial risks of workers exposed to hazardous substances as High. Potential hazardous substances that will be used on site include reagents for ore processing such as - Sodium di-isobutyl dithiophosphinate (Aerophine 3418A or similar), Sodium di-isobutyl-dithiophosphate (Aero 3477 or similar), Frother - Glycol ether or similar, Flocculant, Hydrated lime, SAG Mill Grinding Media, Ball Mill Grinding Media; diesel; acidic solutions and/or acids in solid form and other chemicals in the site laboratory, fire suppression chemicals, copper and other concentrate products. Mine workers may become exposed to these hazardous substances during use, storage or transportation.	Transport activities risks will be managed through the following measures: <ul style="list-style-type: none"> <li>• Maintain a hazardous substances register and ensure MSDSs are provided;</li> <li>• Storage and handling of hazardous substances to be carried out as specified in the relevant MSDS and AS1940-2004 - The storage and handling of flammable and combustible liquids;</li> <li>• Regular inspection and maintenance of the hazardous substance storage facilities;</li> <li>• Provide PPE to mine workers;</li> <li>• Provide training to personnel for appropriate handling of hazardous materials;</li> <li>• Implement a procedure for transport and storage of hazardous substances and follow the legislative requirements for transport of dangerous goods;</li> </ul>

Potential Event	Details	Controls
		<ul style="list-style-type: none"> <li>• Vehicles to be registered and fitted with spill kits and PPE for emergencies;</li> <li>• Ensure labelling of substances and signage;</li> <li>• Provide spill kits and first aid kits; and</li> <li>• Implement Emergency Management Plan.</li> </ul>
Ground geotechnical conditions related risks	The risk assessment identified the initial risks associate with ground geotechnical conditions as High. Collapse of pit walls or other geotechnical failure can cause serious injury or death to mine workers.	Ground geotechnical conditions will be managed by: <ul style="list-style-type: none"> <li>• Detailed mine design and planning based on mine geotechnical data;</li> <li>• Geotechnical and geological monitoring;</li> <li>• Hazard reporting; and</li> <li>• Emergency Management Plan.</li> </ul>
Workers or people from the public fall into mine pits, mine shafts	The risk assessment identified initial risks of falls of workers or the general public into mine pits or mine shafts as High.	Risks of falls into mine pits and shafts will be managed through the following measures: <ul style="list-style-type: none"> <li>• Secure the Project site appropriately and impose access restrictions to ensure the public or unauthorised workers do not have access to the pit ramps, slopes, crests or shaft areas;</li> <li>• Hazard reporting; and</li> <li>• Emergency Management Plan.</li> </ul>
Contact with an electrical source	The risk assessment identified the initial risks associated with workers' contact with an electrical source as High. The potential impact can be electric shocks, injury or death.	Accidents and injuries from electrical sources will be managed by measures including: <ul style="list-style-type: none"> <li>• Only licensed electricians to carry out electrical work;</li> <li>• Procedures and training to ensure electricity is isolated before working on equipment;</li> <li>• Testing and tagging of electrical equipment;</li> <li>• Removal of unsafe electrical equipment from site; and</li> <li>• Tag out and isolation procedures.</li> </ul>

Potential Event	Details	Controls
Working in remote locations	The risks for workers may be increased due to the remote location of the site and include: <ul style="list-style-type: none"> <li>• Working alone or in isolation;</li> <li>• Communication failure;</li> <li>• Limited medical facility on site;</li> <li>• Long travel distances;</li> <li>• Increased emergency response time resulting in life threatening situations; and</li> <li>• Mental health issues.</li> </ul>	Risks will be reduced through the implementation of measures including: <ul style="list-style-type: none"> <li>• Strict worker code of conduct;</li> <li>• Site safety inductions;</li> <li>• Pre-employment medical checks;</li> <li>• Fitness for work procedure;</li> <li>• Fatigue management and drug &amp; alcohol policy;</li> <li>• Personnel only to work alone using Remote Work Procedures;</li> <li>• First response medical facility and first aid kits to be established in consultation with local health service providers;</li> <li>• First aid kits, recovery equipment and water supply to be fitted in site vehicles;</li> <li>• Implement and provide training on Emergency Response Plan;</li> <li>• Implement communication protocols including use of communication equipment suitable for the location;</li> <li>• Human resources management support for workers living away from families;</li> <li>• Mentoring of staff, particularly Indigenous workers; and</li> <li>• Implement lifestyle FIFO rosters.</li> </ul>
Personnel drowning	The risk assessment identified the initial risks associate with unauthorised worker or people from the public gaining access to and drowning in the site water storages as Medium.	Drowning incidents will be prevented through: <ul style="list-style-type: none"> <li>• Secure water storage areas to ensure the public and unauthorised workers do not have access;</li> <li>• Signage; and</li> <li>• Emergency Management Plan.</li> </ul>
Serious animal bites	The Project is located in an area that is subject to animals such as snakes and spiders which may pose a	This risk of animal bits will be managed through measures such as:

Potential Event	Details	Controls
	threat to human health and safety. The risk assessment identified initial risks related to serious animal bites as Medium.	<ul style="list-style-type: none"> <li>• Potential wildlife hazards to be included in Mine Site Induction;</li> <li>• Animal bite first aid to be incorporated in the site first aid facility;</li> <li>• Snake bite kits to be available on site;</li> <li>• Implement Emergency Management Plan; and</li> <li>• Provide PPE including steel cap boots, long-sleeve shirts and trousers.</li> </ul>
Noise related risks	The risk assessment identified initial risks caused by noise from construction, mining operations and exploration activities as Medium.	Excessive noise risks will be reduced through: <ul style="list-style-type: none"> <li>• Maintenance of construction equipment and machinery in accordance with manufacturers specifications and Australian Standards;</li> <li>• Noise suppression equipment fitted;</li> <li>• Provide training to mine workers; and</li> <li>• PPE such as earplugs or muffs.</li> </ul>
Dust from construction, mining operations and exploration	The risk assessment identified initial risks caused by dust from construction, mining operation and exploration activities as Medium. The air quality study completed by Air Noise Environment concludes that the estimated total particulate emissions for the Project are relatively low compared to other significant mines and the potential for air quality impacts are likely to be negligible. (Air Noise Environment, 2018)	Dust will be managed through measures such as: <ul style="list-style-type: none"> <li>• Regular watering of haul roads;</li> <li>• Adoption of speed limits on site for all vehicles;</li> <li>• Regular maintenance of haul roads;</li> <li>• Staged clearing and construction activities to minimise areas of exposed ground;</li> <li>• Visual inspections;</li> <li>• Limits to burning of cleared vegetation;</li> <li>• Wet dust suppression measures in the form of high pressure, low volume water sprays;</li> <li>• Rehabilitation and revegetation of cleared areas as soon as practicable;</li> <li>• Minimise drop heights into hoppers, onto stockpiles and into haul trucks;</li> <li>• Minimise doubling handling of materials; and</li> </ul>



Potential Event	Details	Controls
		<ul style="list-style-type: none"> <li>• Tailings storage facility (TSF) dust management and monitoring as recommended by the TSF design recommendations.</li> </ul>
<p>Site not appropriately rehabilitated post closure, sites not geotechnically stable, or ease of public access</p>	<p>The risk assessment identified initial risks to the public related to mine site not appropriately rehabilitated as Medium. Unsafe post-closure site can cause injury or death of people from the public if access is at ease.</p>	<p>Post mining rehabilitation will adopt the following strategies:</p> <ul style="list-style-type: none"> <li>• All infrastructure to be removed from site as per Mine Rehabilitation and Closure Plan (MRCP);</li> <li>• Ensure stability of potentially dangerous structures such as waste rock dump;</li> <li>• A pit bund to be constructed around each pit according to relevant standards at closure to prevent public access; and</li> <li>• Secure site to restrict public access by obstructing or concealing the access road and constructing bunds.</li> </ul>
<p>Inadequate rehabilitation of exploration sites, including drill holes, pads, sumps, costeans, tracks, etc</p>	<p>The risk assessment identified initial risks to the public related to exploration sites not appropriately rehabilitated as Medium. Unsafe exploration sites can cause injury to or death of people from the public if accessed.</p>	<p>Exploration sites will be rehabilitated in accordance with the following measures:</p> <ul style="list-style-type: none"> <li>• All drill holes, pads, costeans and sumps will be backfilled according to the relevant Northern Territory guidelines;</li> <li>• Tracks and gridlines rehabilitated as per the MRCP and relevant Northern Territory guidelines; and</li> <li>• Monitoring after rehabilitation to ensure objectives are met.</li> </ul>
<p>Manual handling</p>	<p>The risk assessment identified initial risks related to manual handling as Low. Potential injuries relate to lower back injuries, knee and ankle injuries and soft tissue strains.</p>	<p>A manual handling procedure will be implemented to mitigate the risk of injuries.</p>

#### 4.8.4. Mitigation and monitoring

A key component of implementing the identified preventative, management, treatment and monitoring strategies will be the Health and Safety Management System. Risk management is an integral part of the Project, as such the Health and Safety Management System will be implemented on site and adopted by all site contractors to manage the risks to human health and safety and to ensure compliance with relevant occupational health and safety regulatory requirements. The Health and Safety Management System will be based on *AS/NZS 4801:2001 Occupational Health and Safety Management Systems* and will adopt the relevant NT Worksafe Codes of Practice. The Health and Safety Management System will include:

- Policies;
- Roles and responsibilities;
- Management structure;
- Change management;
- Management plans;
- Standard operating procedures;
- Emergency response procedures;
- Medical and First Aid procedures;
- Education and training programs;
- Incident reporting;
- Hazard reporting;
- Investigation;
- Inspections;
- Record keeping; and
- Monitoring, auditing, reporting and review.

The management system will follow the hierarchy of control to ensure the appropriate safeguards are implemented and human health and safety risks are either eliminated, substituted, isolated or engineered as reasonably practicable. The following hierarchy of controls will be adopted:

- **Elimination:** physically removing the hazard;
- **Substitution:** replace the source of the hazard with something that does not produce a hazard;
- **Engineering control:** isolating or separating the hazard or hazardous work practice from people involved in the work or people in the general work area.
- **Administrative controls:** manage mine workers behaviour by introducing procedures, management plans, systems, training, signs and labels to manage risks; and
- Use of personal protective equipment.

Where possible and practical during the design stage of the Project, controls higher in the hierarchy will be applied.

KGL will develop an Emergency Management Plan as part of the Health and Safety Management System for emergency response in the event of an emergency or accident. A site emergency response team will be set up using qualified staff and regular training will be provided. Specific Emergency Plans will be developed for possible emergency scenarios such as traffic accidents, fires, chemical spills and explosions.

The Project risks will vary and evolve throughout the life of the Project and as a result, ongoing monitoring and periodic review of the risk management process will be undertaken as part of the

Project Health and Safety Management System. Risk assessments will be undertaken to incorporate Project changes at different stages of the Project and task related risk assessments such as Job Safety Analyses will be carried out. Safe Operating Procedures will be developed to manage risks associated with specific tasks on site and be included in the Project Health and Safety Management System.

As the Health and Safety Management System and its associated policies and procedures are reviewed and updated, the Project workforce will be provided with updates and the appropriate training to ensure risks are effectively managed. A positive attitude towards human health and safety will be adopted on site to promote proactive involvement by the workforce.