Resources Safety & Health Queensland
ZERO SERIOUS HARM

Resources Safety & Health
Mackay Office
P.O. Box 1801, Mackay, QLD 4740
Phone: 07 4999 8512, Fax: 07 49998519

Mine Name	Mine ID	Operator	Activity Type	Activity Date
Vulcan Mine	MI04148	Vulcan Mine Management Pty Ltd	Subject Audit or Specific System Audit	15/11/2021

Mine Record Entry

Note that inspection or audit activities conducted by the Mines Inspectorate are based upon sample techniques. It remains the primary responsibility of Mine Personnel to identify hazards, and risks associated with Operations and ensure those risks are at an acceptable level.

This Mine record entry documents findings from an audit of Vulcan Mine's Occupational Health/ Hygiene risk management process. On 10 November 2021 I attended site and worked through documentation and collected audit evidence material with SHET Superintendent Shane Walters.

The following observations were made after reviewing the evidence provided.

Audit Overview:

Vulcan Coal Mine have developed documentation within the Safety Health Management System (SHMS) for managing occupational health and hygiene exposure risks. The mines SHMS specifically addresses health hazards in a series of site specific procedures and SOPs including but not limited to:

- SOP - Heat Stress.
- SOP - Dust.
- SOP - Noise.
- SOP - Hazardous substances.
- SOP - Personal protective equipment.

To date a health risk assessment (HRA) **has not been** undertaken. This has been delayed while the mine progressed from construction phase, to a test pit and then to full production mining. During this period external hygiene provider (Simtars) has provided advice and guidance on personal exposure monitoring programs that covers dust (respirable and silica) and noise. The components relating to respirable dust have been developed in accordance with RS14. The monitoring results are communicated to the workforce through a range of mechanisms.

There is currently no single overarching site specific management plan or document that requires the mine to undertake a HRA and integrates the outcomes of the HRA into the mines SHMS.

Key audit observations:

Risk Assessment

- A broad bush risk assessment was undertaken at site identifying a number of health

exposure risks including:

- ❑ Dust
- ❑ Noise
- ❑ Biological (waterborne)
- ❑ Heat stress

- SHMS documentation VUL- SOP-089-Dust and VUL-SOP-091-Noise details the mines requirement to control and monitor exposure to these hazards.
- To date the mine has not undertaken a gap analysis against Recognised Standard 20 " Dust control in surface coal mines" and developed an action plan.
- Site specific similar exposure groups (SEGs) have been identified as part of a preliminary desk top review undertaken by Simtars. These align with the SEG listing developed by RSHQ. It is understood that the SEG list has expanded as the mine has progressed in operational status.
- It is intended that a health risk assessment (HRA) will be conducted in 2022 to inform future exposure monitoring and control programs.
- Enviro-Check Enterprises have been engaged to develop a water management plan, including TARPs.
- Contractors, short term and peripatetic workers are also included in the monitoring program (eg. civil construction contractors, blast crew and exploration drillers).

Risk Monitoring

- A copy of a Quarterly Occupational Hygiene monitoring report was provided as evidence (OM180102F1: Issue date 27 July 2021). The following observations were made:
- Airborne contaminants (respirable dust and respirable crystalline silica) and physical agents (noise) are being routinely monitored. Simtars are in the process of collecting sufficient sample numbers to establish a baseline exposure profile in accordance with RS14.
- Full shift monitoring is undertaken by Simtars occupational hygiene technician - Melanie Bridge. The monitoring program has been approved by certified occupational hygienist (COH) - Deborah van Zanten.
- Copies of the required competencies for undertaking dust sampling (BSBWHS409_10692_1) and for approving the monitoring plan (COH) have been verified.

- Elimination of sampling bias is considered by randomising:
    i. selection of crews and coal mine workers
    ii. seasonal variation.
- Activity sheets provided to coal mine workers and used by field technicians capture the required level of information. Examples of completed activity sheets and technicians field sheets were provided as evidence.
- Regulatory limits for atmospheric contaminants are adjusted to account for extended shifts and alternate rosters using the Brief and Scala model in accordance with Simtars Procedure HP0008. These adjustments are made based on working arrangements for each SEG and contaminant.

- Measured noise exposures are shift adjusted and normalised in accordance with AS/NZS 1269.1 - Occupational Noise Measurement.

Risk Control and Control Effectiveness

- Exposure controls are listed in the respective SOPs.
- A statistical review of exposures will be undertaken by Simtars following completion of the baseline monitoring program.
- Vulcan Mine have in place a system for investigating exposures recorded that are above the adjusted regulatory limits. This is specified under section 4.3.3 of the SOP- 089 - Dust. An example of an exceedance recorded by civil construction contractor was sighted. The investigation followed an ICAM process involving a time line and PEEPO. While it was clear that the exceedance had been appropriately investigated and actions had been initiated to prevent further exceednaces, these **had not been** attached to the incident file (ie. actions not identified or closed out on incident file).

Risk Communication

- Results from personal monitoring are provided to individuals participating in the monitoring by way of a template sheet issued to the individual. This includes basic results interpretation and comparison to exposure limits. This is provided to the CMW by the paramedics.
- Dust exceedances and outcomes from investigation are presented in tool box talks to work force during pre-shift meetings.
- Training on occupational health risk is provided to CMW through the induction and under the relevant SOPs. In addition there have been tool box talks / awareness sessions provided on various health and safety hazards at return to tour pre-start meetings. (eg. dust). Vulcan Mine are currently undertaking consultation on the mines Training Need Analysis (TNA).

Records Management

- Monitoring records are securely stored electronically for 30 years and managed by SHET Superintendent.

Actions items arising from the audit

The following action items raised during the audit are covered in four (4) SCPs.

1. **Health Risk Assessment (HRA)**
    i. The mine is required to undertake a health risk assessment (HRA). This process must be overseen by a competent person (eg. COH) and consider physical, chemical and biological exposure risk that may impact health and safety of coal mine workers.
    ii. Integrate the requirements of the HRA into the mines SHMS. Consider doing this by developing an Occupational Hygiene Management Plan that includes but is not limited to the following:
        - Site requirement to conduct a health risk assessment (HRA)
        - competency of person undertaking/ approving HRA
        - description of site SEGs.
        - how the HRA is used to assess site exposure risks and monitoring requirements.
        - requirement and frequency of statistical analysis and reporting (eg. annual).
        - triggers from statistical review that require development of new or review of existing exposure control plans.

- triggers from statistical review that require CMW training and education on health/ hygiene hazards.
- review dates of HRA etc and the training requirements.
- reference the various management plans/ procedures/ SOPs for hazards identified. These documents would then provide the specific detail/ requirements for each occupational hygiene hazard.

2. **Fit testing of PPE**

   i. **Hearing conservation program** - Currently there is no fit testing program for CMW required to wear hearing protective devices (HPD). The mine is required to develop and implement a fit testing program for coal mine workers required to wear HPD. Consider using fit testing systems that measure the attenuation achieved after fitment of HPD. List the requirement for fit testing in the SHMS under VUL-SOP-091-Noise and/or VUL-SOP-065-PPE.

   ii. **Respiratory fit testing program** - VUL-SOP-089-Dust requires fit testing of CMW required to wear respiratory protective equipment (RPE). Currently there is no fit testing program. The mine is required to develop respiratory protection fit testing program for site to include all those persons with potential exposure to airborne contaminants. As a guide this program should cover those CMWs in SEGs where average exposures exceed 50% of the shift adjusted regulatory limit. This fit testing may be qualitative or quantitative and records of this should be kept. Refer to AS1715: 2009 Selection, Use and Maintenance of Respiratory Protective Equipment.

3. **Develop SHMS Documentation** - Review and/ or develop relevant documents within the mines SHMS and in procurement specifications, to ensure the design criteria and performance of pressurisation and filtration media applied to operator cabins on heavy mobile equipment (HME) are clearly specified and aligned to requirements of RS20. This should also include operational check procedures and scheduled maintenance routines to ensure the design specifications and performance is regularly monitored and maintained in accordance with RS20.

4. **Review SHMS Documentation**

   i. **Dust management** - Review VUL-SOP-089-Dust by conducting a gap analysis against Recognised Standard 20. Particular attention should be provided to the sections for the filtration and pressurisation of HME. Develop an action plan for implementation. Provide training to coal mine workers as required.

   ii. **Hot Works** - Review VUL-FRM-19-05-Hot Works Permit. Currently there is no reference to exposure control to welding fume, metals or gases. As a minimum this must consider ventilation and RPE requirements (Type and class). Welding Fume has been classified as a group 1 human carcinogen.

Opportunities for improvement.

Consider the following opportunities for improvement.

1. It is recommended that competencies for the dust sampling technicians and the COH approving the monitoring programme and HRA are kept on file in the appropriate location by Vulcan Coal Mine.
2. Consideration to implementing a real time dust monitoring program to assess control effectiveness for locations/ tasks deemed to moderate to high risk (eg. dry scan, blast crew, field maintenance, dozer push, overburden drillers, exploration drillers). This can be used to understand the effectiveness of cabin sealing, operator positioning and

communication of risk to CMW etc. Further advice and assistance can be obtained from Simtars who have a fleet of these devices.

3. On completion of the HRA, it is recommended that the current training requirements for all coal mine workers are reviewed. Specific training on health hazards should be based on risk and determined in accordance with the HRA to identify SEGs which require training (for example those SEGs recording moderate to high risk for various exposure hazards, additional training would be required). Some examples for consideration include: Whole body vibration training for dozer operators, additional training on welding fume/gases for boiler makers, additional training on dust exposure for drillers, targeted training on blast fume for shotfirers and blast guards. The training should provide general information on:

    - the hazard and the resultant health effect;
    - exposure limits (if applicable) and there interpretation;
    - personal monitoring process (if applicable);
    - Hazard controls including the use of required PPE; and
    - reference to the related SOPs, MOPs, SWI etc.

4. Consider investigating **any** personal exposure monitoring events when concentrations/ measured levels for contaminants and physical agents exceed regulatory limits or guideline values(as is currently required for dust). With respect to noise it may be only those events where **HPD were not worn** and measured levels exceeded to the regulatory limit.
5. As operational status of the mine progresses, personal monitoring programmes should include night and weekend shifts to allow for variation in environmental conditions and work process.
6. Consider reviewing pre-start check lists for HME to ensure they cover operation of HVAC systems, including filters and cabin seals.
7. Consider utilising the hygiene service provider (Simtars) to :
    a. Present an overview of the HRA recommendations to the SLT.
    b. Present annual statistical analysis of monitoring program required under RS14 to the SLT (eg. powerpoint presentation). This provides an opportunity for SSE to understand site exposure risks, visualise exposure trends and determine SEGs that require further focus/ control.
8. Consider providing a summarised overview of all exposure monitoring results at the return to work pre-start meetings. This may use colour coding (simple traffic light system) to provide overview of all results and more detail provided to results that exceed or approach the regulatory limits. This has previously been provided by SHET superintendent and it is recommended that this is repeated following all hygiene monitoring campaigns. Refer below as an example. It is important for CMW to understand all the monitoring undertaken on site including exposures determined to be low (controlled).

Table D – Summary of Results

Hazard	Samples Collected	Less than 50% of Shift Adjusted Exposure Limit	Within Action Zone	Exceeded Shift Adjusted Exposure Limit	Invalid Samples
Respirable Dust	36	33	-	-	3
RCS	36	32	-	1	3
Noise	31	1	4	24	2
Welding Fume	2	1	-	-	1

Action zone refers to:

- Respirable Dust & RCS concentrations between 50% – 100% of the shift adjusted exposure limit.
- Shift adjusted average noise levels between 82 – 85 dBA.

Please address the SCPs and consider the opportunities for improvement that have been provided. A follow up inspection is planned in Q1 2022 to review progress with implementation and to review operation of the Dry Scan facility.

The SSE and his team are thanked for the assistance provided on this day.

Number	Substandard Condition or Practice	Due Date
1	**Fit testing of Respiratory and Hearing Protective Equipment**	**04/02/2022**

The SSE is required to develop and implement a program for fit testing of respiratory protective equipment and hearing protection devices. This program should cover CMWs required to wear these devices to reduce exposure to be within acceptable levels.
The due date of this SCP refers to the time to develop an action plan to complete the fit testing.

Number	Substandard Condition or Practice	Due Date
2	**Health Risk Assessment (HRA)**	**28/01/2022**

The mine is required to undertake a health risk assessment. This process must be overseen by a competent person (eg. COH) and consider physical, chemical and biological exposure risks that may impact health and safety of coal mine workers.

The HRA must be integrated into the mines SHMS.

The due date for this SCP refers to the time required to provide evidence that a competent person (ie. COH) has been engaged to undertake the HRA.

Number	Substandard Condition or Practice	Due Date
3	**Mobile Equipment Cabin Pressurisation and Filtration**	**11/02/2022**

Develop/ review/update relevant documents within the mines SHMS and in procurement specifications, to ensure the design criteria and performance of pressurisation and filtration media applied to operator cabins on HME is clearly specified and aligned to requirements of RS20.
This should also include operational check procedures and scheduled maintenance routines to ensure the design specifications and performance is regularly monitored and maintained in

accordance with RS20.

Number	Substandard Condition or Practice	Due Date
4	**Review SOP Dust and Hot Works Permit.**	**18/02/2022**

1.) Dust management - Review VUL-SOP-089-Dust by conducting a gap analysis against Recognised Standard 20. Particular attention should be provided to the sections for the filtration and pressurisation of heavy mobile equipment. Develop an action plan for implementation. Provide training to coal mine workers as required.

2.) Hot Works - Review VUL-FRM-19-05-Hot Works Permit. Currently there is no reference to exposure control to welding fume, metals or gases. As a minimum this must consider ventilation and RPE requirements.

Please provide a written status report on each SCP together with the actions taken to address each item by their due dates

Fritz Djukic
Inspector of Mines