Mine Safety – Audit Report
Roa Mine

1. Executive Summary

On 19 November 2010 the Pike River Coal Mine suffered the first of a series of catastrophic explosions that resulted in the death of 29 employees and contractors. In response to this disaster, on 29 November 2010, the New Zealand Cabinet required that the Department of Labour arrange a safety audit of all other coal mines, to be undertaken as a matter of urgency using an international expert.

Auditors were subsequently engaged to assure the Department of Labour and the Government that underground coal mines in New Zealand are operating safely and that they have robust and effective health and safety systems to ensure the safe operation of the mines.

This report outlines the findings of an independent audit of Roa mine conducted for the Department of Labour.

1.1. Summary of Audit Findings

This audit did not reveal that a dangerous situation was imminent at this mine. The audit did however identify areas for improvement to be addressed by the mine operator, including:

a. Ensure all relevant AS/NZ standards are followed and documents supporting the safety health management system are maintained to ensure regular audits are able to be done to ensure continuous improvement.

b. Implement an internal auditing function into the management tasks so that the company can ensure the controls identified to mitigate risk are in place and effective.

c. Install and maintain a gas monitoring system and ensure this is supported by documented trigger levels and response plans to ensure that all practical steps are taken to manage the mine atmosphere.

d. Ensure that record keeping and the document control at the mine is improved to allow audits to be conducted. This will also establish if compliance with the Safety Health Management System is being achieved (enabling the effectiveness of the system to be assessed and a continuous improvement process to be established).

e. Address the areas for development identified from this audit (summarised in 1.4 below).
1.2 **Key observations**

The auditors have identified some areas for which the Department of Labour will need to seek further information to confirm that Roa Coal Mining Ltd is complying with all aspects of New Zealand legislation. In particular, the audit identified that, given the high risk nature of underground coal mining, there was a lack of documentation of systems. The documented Health and Safety Management Plan that was reviewed was not fully implemented.

Underground observations demonstrated that the practices directly observed during the limited time of the visits were being carried out in a satisfactory manner.

The lack of documented procedures and the lack of documented records for the Roa Mine operations, made it challenging to apply audit methodology. The auditors were reliant on the visual inspections carried out and this provides only a limited snapshot in time.

Finally, the auditors had anticipated a higher level of engagement with other key staff such as under-managers.

1.3 **Strengths**

The mine manager is clearly a very experienced ‘hands-on’ mining operator who has a high level of local knowledge of the coal seams that are being mined. He and a number of his staff are closely involved with Mines Rescue organisation and support mines rescue training exercises.

1.4 **Areas for Development**

There is a need for a high level risk assessment to identify all potential hazards that have the ability to cause multiple fatalities on site and to then implement appropriate controls.

It is necessary that Roa Mine review the Health and Safety Management Plan to ensure that the components and the procedures are relevant to the operations at the mine and are adhered to.

There is scope for the mine operator to gather further geotechnical information to verify that the mining practices are appropriate. This should include design criteria for pillar dimensions, roadway dimensions, roof support and extractions processes.

Further monitoring of mine gases is required to ensure compliance with the Health and Safety in Employment (Mining-Underground) Regulations 1999.
2. Audit Approach

2.1. Terms of Reference

2.1.1. Purpose

The purpose of the audit is to assure the Department of Labour and the Government that underground coal mines in New Zealand are operating safely and that they have robust and effective health and safety systems in regard to the major hazards that are inherent in underground coal mines.

2.1.2. Areas of Focus

The focus areas for the audit were:

a. Mine Gas management.
b. Ventilation Control.
c. Strata control.
d. Methane drainage.
e. Spontaneous combustion.
f. Mechanical and electrical (management of sources of ignition).
g. Emergency response/ preparedness.
h. Management of methane outbursts (if a potential for such exists).
i. Explosive management.

Other matters that came to the attention of the auditors could be discussed in the audit findings. With regard to the focus areas the audit team considered:

- Sufficiency of documented processes and systems
- Design and Planning
- Performance of plant
- Maintenance programs
- Work method and control
- Inspection monitoring and testing
- Handling and storage (hazardous products)

In the first instance the audit considered the risk/ hazard identification and management processes that are used in the coal mining operation. The Mine management have conducted a risk assessment of the total operation and identified the principal hazards (those with the potential to cause multiple fatalities) and they have developed specific strategies through risk assessment to manage and mitigate the risks. The flow on from this is that the risks with a lesser risk are also identified and that there is a structured process in place for identification and the subsequent management and control of these risks also.

Given that the Risk Management Standard AS/NZ ISO 31000:2009 and the preceding standard AS/NZ 4360 are common across Australia and New Zealand the expectation
is that the mines in NZ are applying the standard as a basic tool and that there is at least a basic Hazard Identification /Risk Assessment Process in place at the mine.

2.2. The Audit Approach

2.2.1. Familiarisation visit

An initial familiarisation visit to the mine was undertaken by Brett Garland (Auditor) accompanied by Alan Cooper (Department of Labour) and Johan Booyse, Senior Advisor – Extractives (Department of Labour). This involved a discussion with the mine manager regarding the approach to systems and risk management and an underground inspection.

2.2.2. Document Request

Before the onsite audit each mine was asked to provide the following documents:

a. Details of the system or process for identifying key risks/ significant hazards associated with the underground mining operation.

b. Details of the system or process for managing change of process or infrastructure in the underground mining operations.

c. A copy of the hazard/risk register relating to underground mining activities (this should include details of the controls that are in place to manage the individual risks/ hazards). In particular please provide detail with regard to the management of:
   • Spontaneous combustion
   • Strata control
   • Mine gas management
   • Methane drainage
   • Ventilation control
   • Outbursts management
   • Explosives management
   • Mechanical and Electrical (management of sources of ignition)

Note: If these hazards/ risks were not considered as relevant to the mining operation the mine operator was asked to explain the basis on which this has been determined.

d. A plan of the underground coal mine.

e. Copies of reports, data and information describing the geotechnical conditions at the mine.

f. A detailed ventilation plan (including ventilation infrastructure, mine volume and ventilation performance data).
g. Copies of emergency response plans (including details of refuge areas, self rescue caches, CABA re-fill stations etc).

Documents provided in advance of the onsite audit are listed at Appendix One.

2.2.3. Onsite audit

Audit tools were developed for the scope of the audit against the audit criteria and with current legislative requirements in New Zealand.

The Minex Health and Safety Council Industry Code of Practice was referred to by the auditors, but it was recognised that following this code of practice is not a mandatory requirement for New Zealand mines.

Given the background of the auditors it would be fair to say that comparisons with Queensland practice and legislation were made despite this was not being a specific requirement of the audit. The audit findings are based on objective evidence found and not reliant on hearsay.

An entry meeting was held at the start of the onsite audit process. This was to outline the scope and method. It was stressed in this meeting that the confidentiality of interviewees would be maintained in as far as specific observation and comments would not be attributed to any individual employee of the mine. It was also stressed that the audit report would be delivered to the Department of Labour and that any subsequent release would be at the Department’s discretion.

The onsite audit involved a mix of document reviews interviews and observations. During this stage of the audit a number of documents were reviewed by the auditors. Additional documents collected from onsite are listed in Appendix Two.

The Exit Meeting was held at the end of the onsite audit. At this meeting the purpose of the audit was restated and a provisional findings of the auditors regarding strengths and opportunities for improvement and were verbally presented.

2.2.4. Feedback on provisional findings

Following the onsite audit Roa Mining Ltd was provided a further opportunity to provided documents and information to the audit team.

A draft audit report was produced and discussed with representatives of the company by telephone conference.

Following the telephone conference further documents were provided to the auditors with regard to explosives management.

The documents received after the onsite audit are listed at Appendix Three.
2.3. Audit Limitations

The onsite components of this audit were conducted over a total of 1.5 days.

Auditing is a sampling process which aims to verify the adequacy of systems and processes that are in place and to verify the extent to which those systems and processes are put into practice. This is achieved by reviewing the documented processes and systems, interviewing staff to determine the degree to which systems are understood and followed. Observations of practice and conditions at the mine also occur to verify that the mine is actively applying its own systems.

As a sampling exercise an audit will not identify all weaknesses or non-conformance within a system. Equally, an audit will not identify all of the system and process strengths that exist at a mine. The findings are based on the documents provided, the information disclosed in interviews and the observations of the auditors during the period of the audit.

Underground coal mining is a complex industry within which there is a range of technical and professional disciplines. This includes specialists in disciplines such as ventilation engineering, electrical engineering and geotechnical services. This audit has been conducted to the best of the ability of the assigned auditors within the limit of their professional skills and experience. The experience and qualifications of the auditors is set out below.

Accordingly, it is recommended that the mine operator take this opportunity to review all of the systems that are in place rather than focusing only on the specific findings of this audit.

As auditors, Brett Garland and Tim Watson have no statutory authority to require any remedial action by a mine operator. Had any significant failure with a high potential for harm been identified, for which a mine operator failed to take immediate and appropriate remedial actions, the matter was to be referred to the Department’s representative for an appropriate regulatory intervention.

2.4. The audit team

2.4.1. Auditors

Mr Brett Garland BE (Mining) Hons, MBA, FAusIMM, CP (Mining), RPEQ. Brett Garland is employed as the Chief Operating Officer of Caledon Resources Plc and has been employed in the Australian Coal Industry for 34 years. He is the holder of a 1st Class Mine Managers Certificate. He is currently a member of the Coal Mine Safety & Health Act Advisory Committee and a Director of Queensland Mines Rescue Pty Ltd.

Mr Tim Watson is currently employed as a Mines Inspector by the Queensland Government. Tim Watson has been employed in the Australian Coal Industry for 20 years and is the holder of a 1st Class Mine Managers Certificate. He is currently a
member of the Coal Mines safety and Health Act Advisory Committee and is a member of the Technical Advisory Committee for Queensland Mines Rescue Pty Ltd.

2.4.2. Audit Support

Mr Alan Cooper is employed by the Department of Labour in New Zealand as a Practice Leader - Health and Safety Practice Development. His role during the inspections was to co-ordinate the audits and the requests for documentation. He also provided a working knowledge of New Zealand legislation. He holds a certificate of appointed as a Health and Safety Inspector.

2.5. Key Audit Dates

<table>
<thead>
<tr>
<th>Familiarisation Visit, Roa Mine</th>
<th>21st December 2010</th>
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<tbody>
<tr>
<td>Onsite Audit, Roa Mine</td>
<td>Friday, 25th February 2011</td>
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<tr>
<td>Draft Report - telephone conference</td>
<td>4th April 2011</td>
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</table>
3. Background to Roa Mine

Roa mine is owned and operated by Roa Mining Co Ltd and consists of two underground operations and one surface operation. Annual production is approximately 153,000 tonnes. This is generated by 90,000 tonnes from the Morgan West Underground and 40,000 tonnes from the Morgan South Underground. The remainder of the production is from the nearby open cut mine.

The underground mines have a combined workforce of 35. It is expected that in approximately two months from the time of the audit the Morgan West underground mine will finish extraction and be replaced by the Kimbell Mine. The Morgan West Mine was started in 2004 and the seam varies between 4m -7m in thickness.

The individual operations are manned with 3 crews per day, 5 days a week.

Ventilation is maintained continuously with the main fans running over weekends. All crews are managed by statutory ticket holders and each mine is controlled by the holder of an Underviewers’ Certificate.

The manager of the mines, Andrew Holley applies a ‘hands-on’ approach. He is an experienced coal miner and is involved in the MINEX group that has written a code of practice for mining. He is also an active mines rescue member.

At the time of the audit the Morgan West Mine was using a hydraulic monitor for extraction and the Morgan South mine was developing using a hydraulic monitor and hand held bolters for installing roof support. Three underground diesel powered Load Haul Dump machines also operate at the mine. Electrical equipment is used underground. The mines require 2 stage pumps in order to pump out the mined coal slurry from the monitor. Both mines are steeply dipping and the coal seam outcrops around the escarpment.
4. Audit Findings

4.1. Risk/Hazard Identification and Management Processes

Management at the Roa operations appears to be controlled by one individual, the Mine Manager. He is an extremely experienced and knowledgeable practitioner, but it must be stated that this operation suffers from the lack of documented procedures and systematic management practices that would be expected to support a business of this size in the underground coal mining industry.

There is a formal Risk / Hazard Identification process detailed in the safety management system. This process identifies the manner in which risks are to be ranked. There is no evidence of the implementation of the process and as such no formal records of risk assessments were available to the auditors.

The Health & Safety Management Plan forwarded to the auditors identified a systematic approach to management detailing a process of controlling risks, monitoring the procedures and auditing the components of the plan as well as reviewing the overall document. Evidence of this systematic approach to managing risk being applied at these operations was not provided.

The file management processes at the mine were paper based and predominantly handwritten. The auditors were given access to documents that were stored in sleeves within a single filing drawer. These papers were disorganised with the labels on the file sleeves not necessarily representing the documents contained within. There was very little document evidence available for the auditors to review.

The absence of applied systems for health and safety or risk management at the mine was apparent from the time of the familiarisation visit that was conducted in December 2010. The company by way of explanation indicated that some documents had been lost in a flash flood event that had damaged a portacom office early in 2011. The permanent loss of records from an event of this nature should be seen as an indication that a system is vulnerable.

The following are used as examples of the application of hazard identification and risk assessment practices;

a. During the underground inspection, a mineworker was asked about the hazards in and around his work area. At first he was unsure but then was able to identify some when prompted. This indicated poor understanding of the terms of risk management but a good knowledge by the mineworker of what could go wrong in his work area.

b. The operation at some stage had identified the hazard of narrower roadways in the Morgan South Mine as signage was observed for use of vehicles with regard to size of loads and people interaction.

Overall there appears to be a practical use of the concepts of Risk/ hazard assessment but there is a general lack of application of a systematic and consistent approach to identifying, analysing and mitigating risk/ hazards in an auditable manner.
4.1.1. **Strengths:**

The following were observed during the audit process;

- From interviews with coal mine workers there appears to be a good understanding of the hazards at the mine but this is unable to be supported by the associated management system.

4.1.2. **Areas for development**

- Conduct a high level risk assessment to identify all the potential hazards that have the ability to cause multiple fatalities on site and implement appropriate controls.

- Review the Health and Safety Management Plan with the purpose to ensure that the components and the procedures are relevant to the Roa operations and are adhered to.

- Implement an effective audit process of the Health and Safety Management Plan to ensure that the self imposed controls and the statutory controls are indeed carried out and that these are effective.

- Implement a document control process that incorporates an improved record keeping system that is auditable.

- Implementation of a change management process that ensures the variations to the endorsed procedures are undertaken only after the “new” procedures have been assessed to ensure that new risks and unintended consequences are not introduced.

4.2. **Mine Gas Management**

The document “Letter to DOL procedures.docx”, was supplied to the auditors prior to the audit. This stated that the Morgan South Mine had readings in the return of 0.3% CH4 and the Morgan West Mine had readings in the return of 0.1% CH4. The ventilation report “VENTILATION 28-1-10.xlsx” supplied in the documentation records only 0.2% Methane. The Mine Manager was questioned on this anomaly and stated that he treated the Mine as a gassy mine. The Mine Manager was then asked if the main fan for the mine was interlocked to the underground power and it was stated that it was not.

The following were identified;

- No fixed atmospheric monitoring was observed at the mine in either the form of a tube bundle system or telemetric system.
b. The mine utilises seven (7) hand held gas monitors of which there is only four (4) battery chargers.
c. A Span Gas cylinder was noted near the instruments in the mine manager’s office.
d. On one gas monitor the NATA calibration sticker was observed to be missing.

Roa Mining Operations ensures that each underground employee has a sound knowledge of the gases that make up the atmosphere in an underground coal mine and the risks associated with the specific characteristics of the constituent gases. Mr Holley stated that once coal mine workers had been employed at the company for over one year they then complete the formal training to achieve the EXITO Gas Measurement Certificate. This fact was supported by documentary evidence demonstrating that each employee held a current certificate.

4.2.1. Strengths

a. The system of having coal mine workers trained in the EXITO Unit of Competency to achieve the Gas Measurement Certificate is commendable. This provides a strong base to mitigate the risk of employees not being aware of the signs of danger associated with methane, spontaneous combustion and mine fires.

b. The mine is completing some of the required ventilation monitoring and record keeping.

4.2.2. Areas for development

a. Install a robust tube bundle and telemetric gas monitoring system and develop a process to ensure the monitoring locations are in the best strategic locations. This ensures that the mine atmosphere is being monitored on a real time basis at strategic locations. Further, any significant change can be alarmed so that appropriate and timely responses can be made.

b. Comply with New Zealand legislation with regard to isolating power underground in a gassy mine.

4.3. Ventilation Control

The Morgan South mine has the main mine fan located remotely from the main surface infrastructure and as such is powered by cables that run through the main workings of the mine. The fan is driven by an electric motor that is not monitored nor is it interlocked with any telemetric gas monitoring. It should be noted that motor is located in the main ventilation path. In the event of an extended ventilation failure allowing a build-up of methane gas in the mine, the current infrastructure presents a real risk to this operation. The potential for a methane rich atmosphere passing over the electric motor without any knowledge of the mine personnel should be analysed.
Further, the auditors did not find evidence of recorded procedures on how to safely restart operations should there be such a ventilation failure and methane build-up.

During the underground visit it was observed that practices associated with the use of the 4 cubic meter air were robust and that effective earthing techniques were being observed.

4.3.1. Strengths

a. Standards of air fans being earthed.

4.3.2. Areas for development

a. Conduct a risk assessment on the current arrangements of the main ventilation fan and document and implement the required controls to ensure all practical steps have been taken to ensure the health and safety of coal mine workers.

4.4. Strata Control

Roa Mining appears to have long term knowledge of the coal fields it is currently working. This is gained through the practical experience of the current mine manager and the network of past mining identities named during the audit process. The network of individuals is currently available to the organisation for consultancy purposes. The geological knowledge and modelling of the seams is based on history with many geological features such as seam outcrops and faults being comprehensively mapped back in the 1950’s and this information is still relied on today.

During the course of the audit the mine manager was asked as to the availability of documented background information and design criteria used to establish the roadway and pillar sizes in place at the mining operations. Further, it was asked that the documented design criteria used for the establishment of the current roof support practices be supplied. The Mine Manager responded that there was no such information available and that the design criteria were based on practical knowledge of the coal deposits.

Underground observations made by the auditors indicated that the roadways were being adequately supported and pillar sizing appeared to be adequate. The auditors must clarify that these observations are simply a snapshot in time and that the design criteria should be available.

Demonstrated practical knowledge of the strata conditions was evident from the following observations;

a. The Morgan South Mine had narrower roadways than the Morgan West.

b. Roof support was comprehensive in the roadways observed with the entire roof area being covered with mesh.
The company provided a copy of correspondence received from an independent geotechnical consultant indicating that on a regular basis the consultant visited the mining operations and conducted a walkaround "inspection". The consultant provided brief comment on the observed adequacy of the strata control practices but provided no comment as to the adequacy against design criteria nor was any comment made in regard to any variation in expected performance versus actual performance of the strata control measures utilised.

The mine manager was asked if drawings existed detailing the roof support required to be installed in the underground roadways to support the written criteria established in the Safety Management Plan. The Manager stated that no drawings existed due to the simplicity of the support pattern utilised and the knowledge of the workforce as to the requirements.

The mine manager was asked if regular testing of the roof bolting practices were carried out through "pull-out" tests and if so could the data be provided. The Manager provided one set of test results that was over 3 years old that detailed the performance at the time of the tested roof bolts was acceptable.

4.4.1. **Strengths**

a. The mine manager appeared to have a good knowledge of local geology.

b. The use of historical knowledge and expertise was practiced ensuring continuity of experience with known hazards and risks.

c. Observations underground indicted that the roof appeared well supported.

d. The use of independent specialist engineering reviews.

4.4.2. **Areas for development**

a. Documentation provided indicted that the company does obtain independent geotechnical assessment. It appears that this work is consistently carried out by the one agency. The opportunity is available to expand the criteria for this assessment to include establishing the design criteria for;
   * Pillar size,
   * Roadway dimension,
   * Roof support,
   * Extraction process.

Once the criteria are established it is then possible to audit the actual performance of the strata control measures. Further, this work could be validated by periodically seeking alternate opinions to ensure a cross check was in place.
b. Develop a monitoring program to scientifically test the adequacy of the strata control practices at the mining operation. Records of the monitoring program should be maintained for audit purposes and for change management control.

4.5. Methane Drainage

No methane drainage was conducted at Roa Mine. Due to the coal outcropping low strength (3MPa) and small mine size the requirement for methane drainage is currently not required.

4.6. Spontaneous Combustion

No historical events of spontaneous combustion have occurred at Roa Mine. The Roa coal is a high rank, low moisture coal. The return side of goafs are monitored for Carbon Monoxide before start of shift on Monday.

Regulation 36(b) of The Health and Safety in Employment (Mining-Underground) Regulations 1999, requires a monitoring system is maintained that will ensure early detection of spontaneous combustion. The mine was unable to supply evidence of the monitoring system other than a weekly CO sample taken by a handheld monitor in the return.

Adiabatic Self Heating Test (R70) had not been conducted to establish the propensity of the coal to spontaneous combustion.

4.6.1. Areas for development

a. The opportunity to develop a program to conduct testing to determine the propensity of spontaneous combustion of the coal through the R70 value exists. This is particularly relevant due current reliance on historical evidence and the fragmented nature of the deposit. The potential for variation in the characteristics of the seam exists and could go undetected without a formal testing program.

b. Install appropriate telemetric and tube bundle monitoring to ensure early detection of spontaneous combustion as required in Regulation 36(b) of the Health and Safety in Employment (Mining-Underground) Regulations 1999.

"Every employer must take all practicable steps to ensure, in relation to every coal mine or gassy mine, that—
a monitoring system, of a kind that will ensure early detection of spontaneous combustion, is maintained."
4.7. Mechanical and Electrical - Management of sources of ignition

Page 34 of the Roa Mine Health and Safety Management Plan 2010, asks “Have the diesel machines up to date certificates for flameproof (FLP) enclosures and other electrical components, and certification for mechanical components to D code standard?” Documentation was provided regarding a machine overhaul done at Teterin Engineering. This was an engine head overhaul. The documentation stated head flatness and did not consider manifold and flame path flatness or gap. The auditors were not able to be supplied with adequate information for them to be assured that the underground diesel fleet was being maintained in accordance with AS/NZS 3584 suite of standards.

The diesel fleet consists of three (3) Load Haul Dump (LHD) vehicles. These are
- 2 x Eimco 913s, and
- 1 x Eimco 913-6.

Mr Holley stated the machines were purchased 8, 6, and 3 yrs ago respectively.

During the underground visit, the LHD in the Morgan South Mine was observed to be parked in a safe manner, this being particularly relevant due to the steep grades. The practice of facing the vehicles wheels to the rib and chocking being the accepted standard practice.

It was noted that the Prestart Procedure cards did not include the component for low water shutdown checks.

In discussions with the mine manager it was noted that the mine utilises a contract electrician. It was stated that the individual does conduct underground electrical checks. No documentation could be found to support the qualifications of the electrician particularly with regard to working in hazardous areas. The auditors raise the issue of the mine not having an electrician on the mine site on a daily basis. This questions the ability to conduct electrical Code A inspections on flameproof equipment. There are numerous pieces of electrical equipment underground including:
- The electrical pumps.
- a crusher.
- An electrical motor to power the hydraulic power pack for the monitor.

The pump stators are located on the surface and on emergency stop button located at the pump station trips all power underground.

Prior to the audit being undertaken, the mine had recently reviewed the mines holdings of lifting and towing slings and chains and replaced any stock that did not comply with current certification.
4.7.1. Strengths

a. The mine has work shops for conducting maintenance and is manned with mechanical trades’ personnel.

b. Some self-auditing practices were being followed.

4.7.2. Areas for development

a. Ensure Low water shutdowns are conducted in accordance with AS/NZS 3584.3 Appendix E.

b. Implement interlocked methane monitoring systems on all underground diesel equipment.

c. Review all equipment compliance with AS/NZS to ensure maintenance to control ignition sources on equipment in hazardous areas is compliant.

d. Ensure Electrical Code Inspections are conducted in accordance with AS/NZS Standards.

e. Ensure competency certificates are appropriate, checked and recorded for tradesmen working on certified equipment. The relevant reference for the electrical trades personnel is AS/NZS 4761.

4.8. Emergency Response/ Preparedness

The Roa mining operations are of a small scale that reduces some of the hazards associated with emergency response and preparedness. Both the Morgan South and Morgan West Mines were trafficable by foot and entry and exit from the portal to the face workings was achievable in approximately 10 – 15 minutes. The mine manager stated that regular familiarisation of the primary and secondary egress roadways by all mineworkers were carried out at the mine. Documentation supporting the periodic walking of the escapeways was viewed by the auditors.

The mine had a cap lamp register and utilised a tag system to monitor the number and name of coal mine workers underground.

A mines rescue room was located in the bathhouse complex and consisted of CABA. A cache of rescuers was located underground in an esky.

Mine plans were displayed on the surface and communications to face areas were present.

Morgan South utilised a radio link to the manager’s office to ensure communication.
4.8.1. **Strengths**

a. Commitment to mines rescue.

b. Consistent record keeping of the names and numbers of people underground.

c. Continual training and familiarisation of the workforce in the location and condition of the escapeways.

4.8.2. **Areas for development**

a. To highlight the cache with signage/droppers or reflectors.

b. Send self rescuers away for testing. This practice occurs in QLD and NSW and is referenced in MDG3609 section 4.2.

c. Address the risk of entrapment at the development face. This should be included in the list of major hazards at the mine.

4.9. **Explosive Management**

An explosives magazine was observed on site. Since the onsite audit a current test certificate has been provided for this facility.

A letter from the Inspectorate stated that no delay shotfiring was to occur in coal. Mr Holley seemed unclear about the exact requirement of the letter and this generated some discussion on the requirements. No shotfiring was occurring at the time of the audit.

4.9.1. **Strengths**

a. The storage magazine has a current test certificate.

4.9.2. **Areas for development**

a. Improve protocols for maintaining shotfiring records and for maintaining documentation sent from the inspectorate.

4.10. **Fire and Explosion**

Fire fighting equipment was observed to be located at all electrical installations.

During the underground visits it was evident stonedust had been applied. The manner of application had been by broadcasting by hand. This task had been carried out
following an inspection carried out by a Department of Labour Inspector during November 2010. The supporting documentation for testing of the incombustible content was available but was not conclusive due to the amount of moisture present in the samples creating inaccurate results. (Note: The inconclusive testing was clearly due to moisture levels in the mine and was beyond the control of the mines management and staff)

A Contraband sign was observed to be in place at an unused portal but not at the active portals.

Mr Holley stated contraband searches were not done. During the short duration of underground observations conducted by the auditors no obvious failures to apply contraband standards were detected. It should be noted that observation alone is not an effective means of assessing compliance with contraband requirements.

4.10.1. Strengths

a. Underground housekeeping standards were of a satisfactory level.

4.10.2. Areas for development

a. The mine operator should conduct a high level fault tree analysis of all fire and explosion sources at the Roa operations and develop and action plan to effectively implement controls.

Brett Garland
Date: 2/05/2011

Tim Watson
Date: 3/05/2011
APPENDIX ONE

List of documents reviewed

Documents provided prior to the onsite audit component

- Cam Geotech report 10-10-10.pdf
- CH4 ACCUMULATION.docx
- First Response Procedure.pdf
- H&S Mgt Plan - 2010.doc
- Letter to DOL procedures.docx
- Roa A1Plan Kimbell & Morgan_South.pdf
- Roa A1Plan Morgan.pdf
- Roa_Cams report.pdf
- Roa_geotech report 8-10.pdf
- Roa_L-060301003-08 cams report.pdf
- Health and Safety Management Plan Review Form
- HS02 Hazard Register 2010 .(01)
- HS02 Hazard Register 2010 . (02)
- VENTILATION 28-1-10.xlsx
# APPENDIX TWO

Documents obtained onsite

<table>
<thead>
<tr>
<th>Ref No</th>
<th>Document description</th>
<th>Mine (received)</th>
<th>Auditor (holding document)</th>
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<tbody>
<tr>
<td>R1102- T</td>
<td>Operators prestart checklist – EIMCO 913</td>
<td>Roa Mine</td>
<td>Tim Watson.</td>
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APPENDIX THREE

Documents obtained after onsite audit.

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<th>Ref No</th>
<th>Document description</th>
<th>Mine</th>
<th>When provided</th>
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<tr>
<td>R2101- Post</td>
<td>Appointment Letter – Shift Supervisor</td>
<td>Roa Mine</td>
<td>Post onsite audit</td>
</tr>
<tr>
<td>R2102- Post</td>
<td>Qualification certificates-Electrician</td>
<td>Roa Mine</td>
<td>Post onsite audit</td>
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