Mine Safety – Audit Report
Huntly East 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 Huntly East 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. Establish an internal audit function in all management systems to ensure the requirements of the system are met in a timely manner.

b. Establish further Lead and Lagging Indicators for specific parts of the Safety Management System that will allow for the effectiveness of the system to be better understood and to allow for the continuous improvement phase of the development of the systems to begin.

c. Review the current roles and responsibilities of the management team to ensure that the current management structure is mapped against the Safety Management System. This will ensure that personnel clearly understand their responsibilities and accountabilities within the Safety Management System.

d. Review the current document control process.

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

Failure to conduct low water shut down tests daily at Huntly East mine appears to have fallen short of the required performance stand that “all practicable steps” be taken ensure the safety of people in the workplace. However, the company immediately moved to change practices and meet the required standard.

The audit found that significant documented systems are in place at Huntly East mine. Some of the systems are of a very high standard. The audit found further scope for systems development and better alignment of the various components of the safety management system.

1.3 **Strengths**

Solid Energy utilises a management system that incorporates elements of safety at the early stages of the project planning process. The system is very structured and well documented. It incorporates several levels of assessing projects for viability and considers not only commercial aspects but safety as well. A high standard of the daily reporting was noted.

Monitoring is further enhanced through a comprehensive monitoring program that is designed by the site based geotechnical engineer and is reviewed by an independent consultant. The rigour applied by the geotechnical engineer to this work was of an extremely high standard.

There is an obvious commitment to the training and development of all staff at Huntly East mine.

1.4 **Areas for Development**

While some aspects of the mines safety related systems are particularly good, there remains scope overall for better alignment between component documents, a clearer understanding of roles and responsibilities and better document control.
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 can 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 management team 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 to those in attendance. 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 collected and reviewed by the auditors. The 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 presented by PowerPoint.

2.2.4. Feedback on provisional findings

A draft audit report was produced and discussed with representatives of Solid Energy by telephone conference before this final audit report was completed.

2.3. Audit Limitations

The onsite components of this audit were conducted over a total of four 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. Mr 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. Mr Garland 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. Mr Watson has been employed in the Australian Coal Industry for 20 years and is the holder of a 1st Class Mine Managers Certificate. Mr Watson 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 currently 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 supply of documentation and to provide a working knowledge of New Zealand legislation. He holds a certificate of appointment as a Health and Safety Inspector.

2.5. Key Audit Dates

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Familiarisation Visit, Huntly East Mine</td>
<td>23rd December 2010</td>
</tr>
<tr>
<td>Onsite Audit, Huntly East Mine</td>
<td>Friday 18th February – Tuesday 22nd February 2011</td>
</tr>
<tr>
<td>Draft Report - Telephone conference</td>
<td>8th April 2011</td>
</tr>
</tbody>
</table>
3. Background to Huntly East Mine

The Huntly East Mine is operated by Solid Energy and is located approximately 3km east of Huntly on the North Island. The coal produced is sold directly to New Zealand Steel for use in the Glenbrook mill.

Huntly East mines the Kupa Kupa coal seam and this seam is sub-bituminous in rank. The seam extends under nearby towns, houses, highways, and the Waikato River.

East Mine has a workforce of 160 people, employees and contractors with an annualised mining rate of approximately 400k tonnes.

Development headings are driven with continuous miners and road headers, with driveages in coal and stone where necessary. Panels are extracted using continuous miners taking a series of lifts and bottom coal. The coal is conveyed to the surface on a system of conveyors. Development rates are very slow in the deeper sections of the mine due to the strata conditions. A Welsh miner is used in order to keep roadways narrow to try and improve strata conditions.

The mine is limited to how many development units can operate due to the amount of ventilation available. Extraction rates are much quicker and the development float is decreasing. The mine has plans to install a shaft to improve the ventilation system and allow an increase in the number of development units to regain the development float. Due to the financial outlay of the shaft the mine is also seeking some security from the steel company to ensure the operation is viable.

In the opening presentation by the General Manager, Mr Paul Hunt, gave an overview of the Safety Management System. This presentation also included some of the corporate requirements in regard to the safety Management system. This was extremely useful for the auditors.
4. Audit Findings

4.1. Risk/Hazard Identification and Management Processes

Solid Energy utilises a management system that incorporates elements of safety at the early stages of the project planning process. The system is very structured and well documented. It incorporates several levels of assessing projects for viability and considers not only commercial aspects but safety as well. This is documented in the Solid Safety Manual.

The Risk management application is a structured approach beginning with the initial feasibility study of mining and extending through to the daily extraction. The process adopted by the Huntly East Mine ensures that the information collected in the initial studies is continually available to reference and monitor. This facilitates change management and gives the ability to establish corrective actions in an efficient manner. The process is best demonstrated in the documents available in the area of strata control. The sequence of documents is as follows;

- Project assessment Guidelines (PAG)
- Authority To Mine (ATM); In the ATM process, site specific hazards and recommendations for risk mitigation are made in a formal Technical Risk Assessment (TRA) prior to commencement of mining.
- Permit To Mine (PTM); the Permit to Work is issued weekly and includes detailed information of the strata and the geological conditions expected to be encountered. It should be noted that the Huntly East Mine does not advance roadways in a rapid manner and therefore the level of detail supplied in this format is clearly at a very high level.
- Permit To Work (PTW); the PTW process allows for required changes in the roof support to be put in place following correct assessment and procedural actions.

The mine updates the Risk Register each year. The method for ensuring currency is for a nominated person to go around the mine site and asks if there are any new risks.

Mr Hunt was able to demonstrate a documented management structure and that the mine was in the process of proactively implementing a Safety Health Management System.

Extensive training is done. This is demonstrated by management’s commitment to EXITO gas tickets for everyone on site and the construction of a new training centre.

The mine has a corporate requirement to implement the Health and Safety Operating Plan which ensures the manager monitors actions generated to ensure continuous improvement of the Safety Health Management System.
4.1.1. **Strengths**

a. The corporate process used for determining the viability of a project.

b. Management commitment to actively rectify deficiencies identified during the audit. (Low Water Shutdown testing on loaders, oil leak on conveyor drive motor and, tube bundle system monitoring locations – see below).

4.1.2. **Areas for development**

a. An opportunity exists to have a formal review of the Risk Register each year using a cross section of the organisation with the use of an experienced external provider to ensure the importance of the Risk Register is not diminished.

b. Ensure all internal critical actions are entered into mine’s the corrective action system. An example of the potential issues that may arise through not having such a system is that the PAG completed in 2007 required the Spontaneous Combustion Management Plan be separated from the Ventilation management Plan. This had still not occurred.

c. There is an opportunity to improve the mine sites document control and document quality control.

d. There is an opportunity to implement an audit function into the risk management process to ensure the mine is carrying out all of the intended actions identified in the management system. The audit function also allows the superfluous tasks in management systems and management plans to be identified and removed from the process.

4.2. **Mine Gas Management**

The mine utilises both a telemetric and a tube bundle gas monitoring system and also hand held gas monitors.

One of the hazards identified by the auditors was that the ventilation system had intake air passing sealed areas of the mine. If one of these seals was to catastrophically fail it was identified the current location of gas monitors would not identify the immediate hazard and thereby allow for the coal mine workers underground to be quickly alerted.

Three people on site are able to change alarm settings. There is no documented process for changing alarm settings. Gas detection instruments are calibrated 6 monthly. Some control room operators had a sound knowledge of the Safegas system. During the audit of the mine Control Room processes, the auditors observed the superintendent recognising a tube was reading incorrectly and making arrangements to investigate and rectify the problem. Other senior management
personnel did not know what CO-R and GH-R referred to on the Safegas system when they were interviewed.

4.2.1. Strengths

a. All underground coal mine workers had an EXITO gas ticket.

b. A weekly smoke detector test is carried out on all smoke detectors fitted to conveyors.

4.2.2. Areas for development

a. Conduct a fault tree analysis of the major mine hazards and develop management plans to control the identified high to extreme risks.

b. Use of risk based logic to determine the locations of gas monitoring stations.

c. Training in Safegas for relevant senior mine managers and staff.

d. Ensure the gas monitoring system is maintained in accordance with AS/NZS 2290.3 part 3 for maintenance of gas detecting and monitoring equipment. Clause 1.4.5.2 and 2.5.2 refer specifically to tube bundle systems.

e. Some maintenance activities for the gas monitoring system are entered into the Oracle maintenance system. These need to be audited for compliance to the relevant standards.

4.3. Ventilation Control

The mine has two intakes and a return. Extensive ventilation modelling is conducted. This modelling is necessary due to the lack of surplus capacity provided by the existing ventilation infrastructure and network.

The Ventilation Management Plan is written to the format of the guidance documented in the Minex Code of Practice. This includes the following elements;

- Spontaneous Combustion Management,
- hot work,
- frictional ignition,
- contraband, and
- Intrinsically safe equipment.

The Ventilation Engineer holds formal qualifications (Ventilation Engineer and Ventilation Officer from NSW, First Class Mine Managers ticket, and a Degree in Mine Engineering). The current ventilation officer had recently been appointed and had taken the role on the 13th January 2011.
The auditors noted that the Mine did not have a formal process for authorising significant alterations to the Mines Ventilation Control Devices (VCDs). The auditors made comments to the management personnel that mines demonstrating, what is accepted as best practice, utilise a permit system to make critical changes to the ventilation system. This includes altering regulators, installing/removing VCDs, altering inertisation ranges and gas alarm levels. This ensures an accurate record of all changes is documented so the knowledge of the currency of the system is always up to date.

The auditors also noted that Ventilation Control Devices (VCDs) are not built to a standard.

4.3.1. **Strengths**

a. The mine has a qualified Ventilation Officer.

4.3.2. **Areas for development**

a. Ensure that ventilation control devices (VCD) are verified as having been built to a recognised standard.

b. Implement a permit system for alterations to the ventilation system.

c. Ensure that the permit system introduced for the ventilation covers variations or modifications to the inertisation ranges and gas monitoring alarm levels.

4.4. **Strata Control**

The Huntly East Mine experiences extremely challenging geological conditions, the physical conditions at the mine present the operators of the mine with a significant challenge to achieve productive advance rates in a safe manner.

The Mine has developed a comprehensive Strata Control Management Plan which is targeted at mitigating the risks associated with the mining activities. The Plan is based on Risk Management principals. This is achieved through a process where the overall assessment of the current mining area is undertaken through the PAG and the Strata Management Plan forms part of this process. The PAG is formally reviewed in the generation of the Authority to Mine (ATM) ensuring that all relevant data is assessed. The Strata Control Management Plan is “owned” by the Mine General Manager and is managed by the Strata Management Committee. This committee is in turn coordinated by the Mine’s Production Geologist. During the audit it was identified that the members of the Strata Management Committee are not formally appointed by the General Manager and the role descriptions held by the personnel did not specifically include the requirement.
Trigger Action Response Plans (TARPS) have been developed through technical risk assessment involving a cross section of technical expertise both internal and external to the organisation. It should be noted that this does not extend to a broad cross section of the workforce. The TARPS have a comprehensive set of roof support rules associated with each level.

Monitoring of the TARPS is a thorough and complete process. This flows from the Process Assessment Guidelines through the Authority to Mine, Permission to mine and the Permission to Work processes. The process is controlled through the weekly issue of the Permission to Mine” documentation and supported by the reporting standards of the section managers. The auditors noted the high standard of the daily reporting ensuring that the level of detail in these reports is very good.

Monitoring is further enhanced through a comprehensive monitoring program that is designed by the site based geotechnical engineer and is reviewed by an independent consultant. The records of the monitoring program were observed and found to be complete and up to date. The rigour applied by the geotechnical engineer to this work was of an extremely high standard.

Education and training of personnel was through a structured program. Mineworkers completed the EXITO units of competency relevant to strata control as well as Site Based Units developed by an external Consultant in conjunction with the site. It should be noted that the external consultant has a long term relationship and knowledge of the site. The mine’s training department could clearly show detailed files containing records of training undertaken by employees along with competency based testing and practical experience log books.

The auditors noted during this process that some of the competency based testing resulted in consistent 100% results being achieved by candidates. Huntly East Mine personnel stated that the testing was of an “Open Book” format. The auditors made comment that the testing may not demonstrate retained knowledge and some level of closed book questioning may also be advantageous to include in the future.

Training of Supervisory Staff was evident with the development of a comprehensive Site based training module that detailed the Strata Management process at the Huntly East Mine. This training was undertaken by all new supervisory personnel but had not entered the refresher training phase.

The site based Production Geologist/Geotechnical Engineer held specific qualifications specialising in geotechnical engineering. This was in the form of a Masters degree in Mining Engineering awarded from the University of New South Wales.

4.4.1. Strengths

a. The overall Strata Management Process is a comprehensive system.
4.4.2. Areas for development

a. Introduce a systems based audit to ensure that all facets of the management plan are being complied with.

b. Review the "Permission to Work" classification to reflect the actual process being used.

c. Introduce a document control process.

d. Review an incident that occurred in QLD where the failure of a roadway directly behind a development crew occurred potentially trapping the crew at the mining face with no ventilation. The mine has not identified this hazard or implemented controls. An opportunity is to learn from this incident and to put appropriate controls in place exists.

4.5. Methane Drainage

Methane drainage is not used at the Huntly east Mine. The gas content of the seam is recorded as 2-3 m$^3$ / tonne of in-situ coal. It is understood that this feature is planned through the PAG process to ensure a change in this characteristic would be identified at an early stage. Ongoing monitoring of mining conditions provided information for future PAG processes.

4.6. Spontaneous Combustion

The examination and testing of Huntly East Mine coals as well as historical evidence indicate that spontaneous combustion has been and continues to be a major hazard of underground mining at Huntly East. These combined with geological and mining factors set up the level of the spontaneous combustion risk at Huntly East Mine as extreme.

- R70 <0.5OC/hr indicates a moderate to low propensity,
- R70 >0.8OC/hr indicates a high propensity.

The results of East Mine coal are as follows:

<table>
<thead>
<tr>
<th>Sample</th>
<th>R70 (OC/hr)</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borehole 7946 TW2</td>
<td>16.7</td>
<td>Extreme</td>
</tr>
<tr>
<td>NST MM face</td>
<td>30</td>
<td>Extreme</td>
</tr>
</tbody>
</table>

No evidence was located to determine if Spontaneous Combustion TARPs for sealed areas had been developed. The mine actively uses nitrogen to inject into sealed chambers and also directly into the goaf if a heating is detected. Processes for the use of nitrogen were not included in the section of ventilation plan detailing spontaneous combustion management. The mine utilises prep seals and also routinely seals up sections as extraction takes place.
The calculation of CO make and velocity measurement is not included in a documented section of the ventilation management plan for spontaneous combustion.

4.6.1. Strengths

a. The use of nitrogen chambers to ensure effective seals.

4.6.2. Areas for development

a. The mine should develop Trigger Action response Plans (TARPS) regarding the risk of spontaneous combustion in sealed areas.

b. Introduce documented systems for the use of nitrogen at the mine. This should cover circumstances in which nitrogen is appropriate, the method of use and the management of risks associated with nitrogen use.

4.7. Mechanical and Electrical - Management of sources of ignition

The mine has three ED7 Eimco LHD underground diesels and a number of Driftrunners. The mine also has an Eimco 913 LHD but this vehicle had been parked up since July 2010 due to it being non-compliant.

The mechanical engineer was familiar with the AS/NZS 3584 suite of standards.

The audit revealed that low water shutdown tests were not being completed on a daily basis but rather were being completed weekly. This was considered a significant issue. Action was taken to implement a change of practice immediately following this matter being brought to the attentions of the mines management.

It was stated that even though the mine utilises Oracle as its maintenance system, not all equipment had been entered into the system. The maintenance schedule for this equipment was being managed by the use of spreadsheets.

The hot work underground work instruction document is the same document found within the ventilation management plan and is duplicated as a stand alone procedure.

The mine has written its own code of practice for the use of electronic survey equipment underground. This is not underpinned by a risk assessment.

Electricians were trained to the AS/NZS 4761 standard for electrical competencies in hazardous areas.

Conveyor Audits had been completed in October 2010.
4.7.1. **Strengths**

a. Training had been scheduled in March for electricians on in accordance with AS/NZS 4761 standard for electrical competencies in hazardous areas.

4.7.2. **Areas for development**

a. Ensure that 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.

4.8. **Emergency Response/Preparedness**

The Huntly East Mine has a comprehensive Emergency Response Plan. The plan has been developed in accordance with the New Zealand Coordinated Incident Management System (CIMS). The plan is also developed in conjunction with the New Zealand Mines Rescue.

The Mine has in place an Emergency Response Plan that details the duties of the personnel charged with managing the situation.

Simulated emergencies are conducted to test the system, the people and the equipment.

Regular training of personnel is completed with all underground mineworkers having to complete a full walk out. Records of this training were supplied by the training department.

It was stated that CIMS training has been completed by the Control Room Operators at the mine together with members of the Senior Management. Records of this were supplied by the training department.

The mine plans to have a second separated escapeway in approximately 18 months time once the new shaft is commissioned. High standards of changeover bases had been implemented at Huntly East Mine. It was stated that no CABA was available on site.

On the underground section of the audit the change over bases were observed. These had self rescuers, compressed air, communications, gas monitoring, first aid facilities, were well signposted, and of reasonable construction. One of the stations was movable and was fitted with an alarm. The control room was able to monitor if anyone had entered.
It should be noted that the auditors became aware of the existence of a Corporate Crisis Management Plan. It is the auditors understanding that this plan had been developed in relative isolation from the site. The corporate Crisis Management Plan is at odds with the site based Emergency Response Plan. This lack of alignment has the potential to cause confusion in the event of an emergency/crisis situation.

4.8.1. **Strengths**

a. The changeover bases are of a high standard.

4.8.2. **Areas for development**

a. Consider the use of CABA for first response to emergency situations.

b. Document the planned use of a secondary separated escapeway once the new shaft is commissioned.

c. An emergency exercise should be conducted.

d. Mapping of the Corporate Crisis Management Plan to the Site based Emergency Response Plan and Site Management structure to ensure continuity of management protocols.

4.9. **Explosive Management**

Explosives were not used at the Huntly East Mine. The mine does have a compliant storage facility (magazine) and trained handlers should explosives be required.

4.10. **Fire and Explosion**

On the underground section of the audit it was observed that no trickle duster was in use in development section. Stonedust barriers were observed.

During the full course of the audit of all mines the auditors became aware that only one mine had reviewed the potential for an ignition in a flammable atmosphere. This was carried out at Solid Energy’s Spring Creek mine. It had been achieved by establishing a detailed Fault Tree Analysis with the associated WRAC. This practice was commended and is recommended that each of the other mines consider this process as a means of proactively reviewing of this hazard.

4.10.1. **Strengths**

a. Stonedust barriers were observed in place.
4.10.2. Areas for development

a. Ensure trickle dusters operate when coal cutting is taking place.

b. Conduct a review of the potential for ignition in a flammable atmosphere. Consider the use of fault tree analysis as a means of achieving this review.

Brett Garland
Date: 3/5/2011

Tim Watson
Date: 3/5/2011
APPENDIX ONE

List of documents reviewed prior to the onsite audit

Documents provided prior to the onsite audit component:
- Application of risk management tools.pdf
- Approved handler explosives P.Tregoweth.pdf
- Audit of East Mine, supporting information.pdf
- Certificate Of Recognition enclosures.pdf
- cnz3042_Final HN Geotech Characterisation.pdf
- Copy of East-Mine-Risk-Register as at 27 Apr 10.pdf
- COS SCSR.pdf
- Emergency Response Plan Table of Contents.pdf
- Location Test certificate explosives.pdf
- Nitrogen injection behind seals.pdf
- North5TV6 ATM.pdf
- SENZ UG Fixed Mobile Plant HRMS - Draft 100708.pdf
- Strata Management Plan.pdf
- Ventilation Management Plan.pdf
- Ventilation Plan.pdf
APPENDIX TWO

Documents obtained onsite

- Spontaneous Combustion and Sealed-off Areas Management Plan.doc
- Ventilation Safety Management Plan East Mine August 2010.doc
- Ventilation Standard - Final Apr 10 (2).doc

<table>
<thead>
<tr>
<th>Ref No</th>
<th>Document description</th>
<th>Mine (received)</th>
<th>Auditor (holding document)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1001 - B</td>
<td>East Mine Strata Management Plan – Section Managers’ Training</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1002 - B</td>
<td>Health and Safety Lead Indicators Recommendations</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1003 - B</td>
<td>Underground Sites LTIFR (Per 1 million man hours) - graph</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1004 - B</td>
<td>LTIFR and AIFR - graph</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1005 - B</td>
<td>Mine Managers Minimum Support – TARP P1 Primary Support Normal Roof Conditions</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1006 - B</td>
<td>TARP P2 – Primary Support Normal Roof Conditions</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1007 - B</td>
<td>TARP S1 – Secondary Support Moderate Roof Conditions</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1008 - B</td>
<td>TARP S2 – Secondary Support Moderate Roof Conditions</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1009 - B</td>
<td>TARP T1 Tertiary Support Poor Roof Conditions</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1010 - B</td>
<td>TARP T2 – Tertiary Support Poor Roof Conditions</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1011 - B</td>
<td>TARP T3 – Tertiary Support Poor Roof Conditions</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1012 - B</td>
<td>Roof Bolting Response level matrix (version 006) - untitled</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1013 - B</td>
<td>Roof Bolting Response Level matrix (A3) with reference diagrams</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1014 - B</td>
<td>Unit Standards 21818 / 21278 - Workbook</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1015 - B</td>
<td>WASP – Workplace Assessment Safety Plan - Card</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1016 - B</td>
<td>East Mine – organisation chart</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1017 - B</td>
<td>Job Description – Operations Manager</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1018 - B</td>
<td>Job Description – Superintendent (Extraction/ Development/Outbye &amp; Projects</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1019 - B</td>
<td>Job Description – Section Manager</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1020 - B</td>
<td>Job Description – Maintenance Coordinator</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1021 - B</td>
<td>Support Pattern for Bolting into Roof Parting - Plan</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>Ref No</td>
<td>Document description</td>
<td>Mine (received)</td>
<td>Auditor (holding document)</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>E1022 - B</td>
<td>Strata Control Committee – Minutes of 4 February 2011</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1023 - B</td>
<td>East Mine Extraction Procedures 2010</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1024 - B</td>
<td>East Mine Weekly Permit to Mine North 55T</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1025 - B</td>
<td>East Mine Weekly Permit to Mine North 65</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1026 - B</td>
<td>Permit to Mine – Location N65 Section – Issued 16.9.10</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1027 - B</td>
<td>Permit to Mine – Location N65 – issued 4.5.10</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1028 - B</td>
<td>East Mine Section Leaders production Control</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1029 - B</td>
<td>Investigation Report Incident 31429 – V50 N65 Continuous miner burial incident investigation.</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1030 - B</td>
<td>Strata Management Plan – Version 006</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>Ref No</td>
<td>Document description</td>
<td>Mine (received)</td>
<td>Auditor (holding document)</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>E1039- B</td>
<td>Ventilation management structure – organisation chart</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
<tr>
<td>E1041- T</td>
<td>Job safety Analysis Card</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1042- T</td>
<td>Safegas Analysers - 2 Weekly Manual calibration Check</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1043- T</td>
<td>Underground Conveyors – Weekly smoke detector test</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1044- T</td>
<td>RTV ED 7 LHD Service Check List</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1045- T</td>
<td>Plant maintenance spreadsheet (A3)</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1046- T</td>
<td>Solid Energy North – Operators prestart- Drifterunner Diesel</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1047- T</td>
<td>Solid Energy North – Operators prestart- EIMCO LHD Diesel</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1048- T</td>
<td>Solid Energy Permit to Work – Hot Work - Underground (Non hazardous zone)</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1049- T</td>
<td>Solid Energy Permit to Work – Confined Spaces</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1050- T</td>
<td>Solid Energy Permit to Work – Work at heights - Harness</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1051- T</td>
<td>Solid Energy Permit to Work – Entry into an excavation</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1052- T</td>
<td>Solid Energy Permit to Work – Exploration Drilling</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1053- T</td>
<td>Ventilation Management Plan</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1054- T</td>
<td>Tubes- Zone Two 3 Monthly Flow Test of Maihak</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1055- T</td>
<td>Maihak Tubes – Zone Three 3 monthly flow test</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1056- T</td>
<td>Maihak Tubes – Zone 13 Monthly Flow Test</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1057- T</td>
<td>Continuous Miner Gas Monitor Inspections</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1058- T</td>
<td>Conveyor Gas Monitor Inspections</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1059- T</td>
<td>FLP Mobile Equipment Gas Monitor Inspections</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1060- T</td>
<td>Sensor calibration record sheet</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1061- T</td>
<td>Non-FLP Mobile Equipment Gas Monitor Inspections</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1062- T</td>
<td>Section Managers record of Inspection (completed) X 3</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>Ref No</td>
<td>Document description</td>
<td>Mine (received)</td>
<td>Auditor (holding document)</td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>-----------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>E1063-T</td>
<td>Hot Work Underground Work Instruction</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1065-T</td>
<td>Ventilation readings – Monthly Survey</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1067-T</td>
<td>Authority to use no approved equipment underground</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1069-T</td>
<td>Project management System- Risk Management</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1070-T</td>
<td>ATM Process Guidelines</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1071-T</td>
<td>Authority to Mine – North 6.5 Panel Development</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1072-T</td>
<td>Health and Safety Environment Award Scheme</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1073-T</td>
<td>Mining Operations – Organisation chart</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1074-T</td>
<td>East Mine – Organisation chart</td>
<td>East Mine</td>
<td>Tim Watson</td>
</tr>
<tr>
<td>E1076-B</td>
<td>Quarterly Health and Safety Report</td>
<td>East Mine</td>
<td>Brett Garland</td>
</tr>
</tbody>
</table>