Training, Qualifications and Competency Project Phase 1 Report

Prepared for

Underground Coal Mining Safety Research Collaboration

by

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Introduction

The Underground Coal Mining Safety Research Collaboration (the Collaboration) is a collaboration between stakeholders. The Collaboration was formed in 1998 to provide a forum for ongoing networking and research project work for the small and geographically stretched underground coal mining industry in Canada. Participants include operators, labour representatives, regulators, inspectors and university researchers from across four jurisdictions (Nova Scotia, Alberta, British Columbia and initially Federal). The Collaboration has two main goals, one to provide a forum for exchange of news, views and experiences between stakeholders and the other to conduct specific research projects on topics of mutual interest.

In 2004, the Collaboration undertook the Legislative Review project with the support of the Chief Inspectors of Mines to compare legislative requirements affecting underground coal mining health and safety in the four Canadian jurisdictions involved. On completion in May 2006, the one recommendation by the Chief Mine Inspectors was for the Collaboration to pursue a key concern identified as a follow-on project on "training, qualification and competency". The recommendation was accepted and the Training Project was initiated. As the work unfolded the project was split into two phases as described below. This report was compiled by Dave Forester, DJFCL, and Fazal Hussain, graduate student at University of Alberta and edited by Dave. It summarizes the background, context, approach, findings, conclusions and recommendations for Phase 1.

Background Context

A growing concern among the Collaboration Participants as the industry has struggled to survive has been issues associated with moving resources (personnel and equipment) around the North American continent and related concerns over varying regulatory requirements. Over the last two years the Collaboration has concentrated its project work on a legislative review project to systematically identify these differences for further

consideration by our stakeholders. One key topic that illustrates the importance of these differences is that of how qualifications and competency are determined, especially for mine workers, mine rescue and management. This project investigates it in more detail; the concept for it was presented to and endorsed in principle by the annual meeting of the Canadian Association of Chief Inspectors of Mines in May 2006.

The current shortage of mine workers, trades and engineers puts particular pressure on mine operators to fill that shortage by pushing long established requirements of qualifications and the depth and duration of training necessary to demonstrate the necessary competency. In turn this can create situations where young 'green' recruits could theoretically be pushed too far, too soon and hence beyond their capacity to perform effectively. The industry responds to this temptation in differing ways, in Ontario, for example, the Mining Regulation of 1996 introduced a "common core" training requirement for new mine workers. This in turn has fostered the growth of training companies to provide training courses to meet these requirements.

Regulators with only one underground coal mining operation within their jurisdiction, who recognize the accompanying safety hazards such as spontaneous combustion and the explosibility of methane and coal dust may consider various questions: What training requirements do the various jurisdictions set, how do they differ and why? What is industry best practice for ensuring adequate qualifications and appropriate training and experience to demonstrate sufficient competency to work safely and consistently and ensure that companies deploy reasonable persons with adequate training and demonstrated competency? This project sets out to provide some answers to such questions and especially to examine the differences and identify core commonalities. As well, the project team will attempt to identify available sources of related training materials and will compile a syllabus for use by underground mining personnel.

Objectives

In order to address the above concerns and issues, this project aimed to provide an overview of qualifications, training and competency requirements for personnel in underground coal mines in Canada, covering syllabus, qualifications, competency and experience requirements. Specific objectives included:

Phase 1

1) Review regulatory requirements, initially within the Canadian jurisdictions.
2) Determine the regulatory components for competency, particularly for mine workers and mine management.
3) Review industry requirements, document industry best practice, and compile a data base of training curriculum – highlighting consistency and inconsistency.
4) Write a project report, summarizing Phase 1, the findings, and commenting on opportunities for greater consistency among Canadian jurisdictions.

Phase 2

5) Identify training resources and training providers for qualifying miners – mining companies, private sector (training), manufacturers, etc – again highlighting consistency and inconsistency.
6) Compile a data base of training curriculum.
7) Prepare a Training Fact Sheet, similar to the Light Alloy Fact Sheet (reference: www.ugcoal.ca).
8) Write a project report, summarizing Phase 2 findings, and commenting on opportunities for greater consistency among Canadian jurisdictions.

Approach

Under the direction of the Project Leader, Team Members worked together to complete the project tasks. A master student, Fazal Hussain was hired from the University of Alberta who worked under the supervision of Dr. Tim Joseph in the Mining Engineering Department. Legislation review for the provinces of Alberta, British Columbia and Nova

Scotia was conducted and as a result Microsoft Excel spreadsheets were created outlining the comparison and contrasts of regulatory requirements for different positions amongst jurisdictions. Informal progress review meetings were held by conference call as required with other communication by email and occasionally by phone. As the project unfolded it was split into two phases as outlined in the objectives above.

Project Team

Various volunteers, who were drawn from the Collaborations' Participants, performed the project work. Periodic conference calls were held from time to time and supplemented by face-to-face meetings where circumstances allowed and on an as required basis.

As the Phase 1 project covered a period of two years from May 2006 to May 2008, team composition and extent of participation varied but included the following individuals:

- **Co-Chairs:** Don Hindy / Muneer Naseer and Ken Barron
- **Members:** Don Hindy, Tim Joseph, Fazal Hussain, Gary Bonnell, Dave Young & Darren Nicholls.

Legislative Requirements

Current requirements for key positions at underground coal mines as outlined in the Occupational Health & Safety legislation were sought in the four jurisdictions of interest: British Columbia, Alberta, Nova Scotia and Federal. The latter two are assumed to be the same as under the CBDC mining regulations qualification and certification was made under the provincial Mines Examination Board. However in 2003 the current NS Regulations replaced the latter body with requirements for an Employer's "Job Training Program" and the minimum requirements for key positions are defined in detail. The findings are summarized in text below with those for key positions being highlighted in tables below.

Employee Positions

Underground Coal Mine Manager

The position of underground mine manager, is described by all three jurisdictions. British Columbia leaves it to the discretion of the Chief Inspector, depending on the number of employees working underground and requires a competency certificate. However, B.C does not describe what comprises a competency certificate, which is granted by the BC Examiner's Board whose requirements were considered. Alberta categorizes the requirement in two ways; either a bachelor degree with five years experience or ten years experience with no degree is required. Nova Scotia requires 5 years experience underground including 1 year in a supervisory/management position and a grade 12 education with knowledge of the regulations and an acceptable mining education. There is a gap here between different jurisdictions as illustrated in the comparative table below

U/G Coal Mine Manager

Comparison of Competency Criteria of U/G *Mine Manager* for different Canadian Jurisdictions

Provinces	Alberta		British Columbia	Nova Scotia [& Fed.]	
Competency Criteria					
Canadian-accredited Engineering Degree or Equivalent	Mining degree	No degree	Either	Mining Degree	
U/G coal mining experience total (Experience at Working Face)	5 yrs (1 yr)	10 yrs (2 yrs)	> 1 yr OR >3 yrs n/a	> 5 [1] yrs	
First Aid Certificate (as per adopted code)					
Other training & experience in first aid & u/g mine rescue acceptable to BOE					
Knowledge of u/g mine rescue procedures					
U/G coal mine foreman/fire boss/supervisor certificate			<10 employee		
Second class cert. of competency			<30>9 employee		
First class certificate of competency			> 30 employee		
Experience as an u/g manager OR supervisor			n/a	> 1 yr OR >3 yrs	
Knowledge of Act & U/g Reg's					
Knowledge of mine ventilation, strata control, safety					
Knowledge of mining					
Knowledge of blasting					

Acting (Intermediary) Underground Mine Manager

Nova Scotia requires almost the same qualifications for this position as for underground mine manager but in Alberta, upon receiving a request from the

owner of the company, the Director of Mines can appoint a person having other qualifications depending on the number of employees, for a specified period of time. British Columbia does not describe this position.

Mine Manager & Acting (Intermediary) Mine Manager

Nova Scotia is the only province describing this particular position and requires a mining engineering degree from a Canadian- accredited University. Alberta, B.C and Federal regulations do not describe this position. It is assumed that mine manager & acting mine manger are for the overall mine not just for the underground operations

Mine Foreman / Shift-boss / Fire-boss / Mine Supervisor

These four positions are assumed to be equivalent except that their names are different in the different jurisdictions: shift-boss or fire-boss in B.C; mine foreman in Alberta; and mine supervisor in Nova Scotia. However, there are gaps between competency requirements, e.g. Alberta & B.C require a bachelor degree for this position, which is considerably more than for Nova Scotia, see below.

Mine Foreman/ shiftboss/fireboss/Mine supervisor.

Comparison of competency criteria for Mine Foreman for different Canadian Jurisdictions

Provinces	**Alberta** (Mine Foreman}	**British Columbia** (shiftboss/fireboss/ comp.certificate)	**Nova Scotia/Fed** (Mine supervisor)
Competency Criteria			
First Aid Certificate			
Knowledge of Blasting procedures			
U/G Mine Rescue Training & Experience			
Other training & experience acceptable to BOE			
Knowledge of Mines Act, the Code- and the Regulation			
Canadian-accredited Engineering Degree or Equivalent	deg/dip.with1yr.exp OR 3 yrs exp.	deg/dip.with1yr.exp OR 3 yrs exp.	
Experience in a coal mine - time[u/g]	[1+ yr]	3 yrs	1 OR 3 [1] yrs
(Experience at Working Face)	(1 yr)		
Language	English	English	[English]
Completed Grade 12		23 or older	
Formal Mining Education acceptable to Director			
Supervisor Certificate/U/G coal mine fire boss certificate			
Reciprocal qualification other jurisdictions			

Electrical Superintendent

Alberta describes the position of electrical superintendent and requires a bachelor degree in electrical engineering or a trade certificate with an experience of four

years with one year's experience in underground coal mining. However, Alberta does not describe the position of electrician or mechanic, who supposedly works under the supervision of the electrical superintendent. (Ref: Appendix III), whereas Nova Scotia does, see below.

Mine Rescue Worker/ Mine Rescue Captain/ Mine Rescue Trainer

British Columbia and Nova Scotia describe the qualifications for this position while Alberta leaves it up to the owner or mine manager's satisfaction to appoint an employee who is capable of performing these duties. Comment on difference in requirements

Hoist Operator

British Columbia and Nova Scotia describe the qualifications required for this position while Alberta does not. Comment on difference in requirements

Mine Blaster

All the provinces describe the mine blaster's position but there are no common criteria of qualification among these. Alberta describes a blaster's permit in addition to a mine blaster's certificate.

Mine Worker

Alberta puts the position of mine worker under the supervision of u/g mine manager or foreman and does not give specific requirements, whereas Nova Scotia requires specific qualifications and B.C does not describe this position, see table.

Mine Worker - Regulatory Requirements

Comparison of Competency Criteria of *Mine Worker* for different Canadian Jurisdictions

Provinces / Competency Criteria	Alberta, (Ref:1)	British Columbia,(Re	Nova Scotia,(Ref:3)	
Competency Criteria				
Supervision by the holder of an U/G coal-mine manager or foreman's certificate				
Supervision by the holder of an U/G coal-mine fireboss/supervisor certificate				
Supervision by the holder of a second class-competency certificate		> 50 workers empl-oyed u/g per shift		
Minimum Age	(Blaster 18yrs)	18 yrs	19 yrs	
Mine Worker Certificate				
Coal Production Experience				
Mine-worker Regulations Knowledge				
Practical Personal Skill Certificate				
Experience in a coal mine - time [u/g]			> 6 mon	

Electrician / Mechanic

Nova Scotia requires trade certification for an electrician and a mechanic but Alberta and B.C do not specify requirements.

Mine Surveyor

Only Nova Scotia describes for this position and requires certification., Alberta and B.C do not describe it.

Examiner

The position of Mine Examiner is only described in Nova Scotia regulations.

Engineer

Like some other positions that are only described under Nova Scotia regulations, the position of an engineer is also regulated, while other jurisdictions do not describe such a position.

Industry Training Practice in Underground Coal Mine Operations

There are only three underground coal mines currently in operation or have potential operations in near future. They are:

- Grande Cache Coal Corporation, Alberta
- Quinsam Coal Corporation, British Columbia
- Xstrata Coal (Potential operations in near future), Nova Scotia

The three underground coal mines were approached to obtain information about qualifications, training & competency criteria, and the information obtained is summarized below. However, from 1967 to 2001 the Cape Breton Development Corporation (Devco) was a major underground coal mine operator and had a sophisticated training program and internal staff to prepare and deliver their programs. The training information for all key positions are on file.

Grande Cache Coal Corporation, Alberta

For the current project, Fazal Hussain accompanied Don Hindy to Grand Cache Coal site. During the visit to the mine site, mine personnel were contacted and asked about the training & competency criteria. The following information was received:

- Verbal information about qualifications and competency criteria for different employees working underground
- Team matrix flow chart
- Incident reporting flow chart
  - Incident report form
  - Incident report form witness statement
- General orientation check list
- Underground orientation check list
- Explanation of the term 'Black Tag Miner'
- A CD containing future training plans

These materials are also available on the project file at the University of Alberta.

On the basis of all the information and material obtained from Grande Cache Coal Corporation, the criteria for qualification and training can be summarized under two headings:

- Existing criteria, and
- Criteria planned for the near future

Existing Criteria for Qualifications & Training

The existing criteria for different job categories, training & qualification requirements can be described by the following groups:

I - Operators

II - Tradesmen

III - Staff Positions

As mentioned before all the information is verbal and no documents could be obtained.

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I - Operators

This category is further subdivided into the following groups.

Miner – 6 or (M-6)

This is an entry level position. An inexperienced person is hired and put underground with an experienced person for a period of 3 – 6 months. Depending on the recommendations of the experienced person, the individual is upgraded to the next category. No particular experience or education is required for this category.

Miner – 5 or (M-5)
At this stage the person is still considered entry level but after being underground for 3- 6 months, the individual starts performing specific duties under the supervision of an experienced person and works here for another 3- 6 months

Miner – 4 or (M-4)
At this stage the individual has some experience and can perform specific labour related duties but still requires supervision

Miner – 3 or (M-3)
At this stage after working about a year or more underground, the individual starts training for underground equipment operation. But M-3 category worker is restricted to servicing the equipment and not actual operations.

Miner – 2 or (M-2)
M-2 category workers start operating underground equipment
Equipment categories consist of Face Miners, Roof Bolters and Shuttle Cars.

Miner – 1 or (M-1)
An M-1 category operator is considered to be the most experienced operator who will operate a continuous miner.
The above description is for different categories of operator. There is no defined distinction between categories. The only criterion is observation by an experienced person or the supervisor to consider him for advancement to next category.

II - Tradesmen
There are only two categories of tradesmen;
- Underground electrician
- Underground mechanic

The following are requirements for tradesmen;
- Journeyman ticket
- Supervision of electrical superintendent

There is no specific academic or experience requirement.

III - Staff Positions
The followings are termed staff positions, including position criteria;

- Fire-boss / Underground Foreman
- An experienced miner
- Has to pass two examinations set by the Board of Examiners
- Legally responsible for a crew of 2- 18 people

- Underground Superintendent OR U/G Mine Manager
The person is qualified as per the regulatory requirements and is an experienced supervisor
- Has to pass two examinations set by the Board of Examiners
- Is legally responsible for a underground operations and crews

- Electrical Superintendent / Foreman
The person is qualified as per the regulatory requirements. (Ref: Appendix III)
- An experienced underground electrician
- Has to pass two examinations set by the Board of Examiners

- General Manager

The general manager is the overall manager not just related to underground operations.

- Mine Safety Co-coordinator

The mine safety coordinator is a person with the health & safety department and should be qualified appropriately having knowledge of and training in mine rescue procedures.

Team Matrix Flow Chart

At Grande Cache Coal Corporation, a team matrix flow chart is maintained, which contains the names, numbers, department and crew categories of all underground employees. This is updated as competency or qualifications are attained by an employee in the specific areas listed. Categories for task/ qualification & task/ certification include: Orientation; Audiometric Examination; Medical; WHMIS; Emergency First Aid; Lock Out / Tag Out; Fire Extinguisher; Confined Space Entry; Fall Protection; Plant Orientation; Rigging & Hoisting; Bobcat (Skid steer); Fork Lift; Picker Truck; Aerial Lift; Hilti Gun; U/G orientation & Exams; Tag Board Procedures; Conveyor Safety; Mine Gases & Ventilation; CSE Self Rescuer; MSA-W-65-Self Rescuers; Emergency Procedures; Scaling & Timbering; 12-12 R C Miner; Fletcher Double Boom Roof Bolter; Freedom Shuttle Car; Stamler Feeder Breaker; Wagner Scoop Tram; AMSA; Mine Rescue; Standard First Aid; Rope high Angle Rescue; ATV Rider Training; Hazardous Waste Management; Spill Response; Transportation of dangerous Goods; Incident Investigation; and Root Cause analysis. The matrix flow chart maintains a record of each employee showing the date that person qualified in any given certification or training category.

Planned Criteria for Qualifications, Training & Competency

Planned criteria are summarized as follows:

I - Plan for New Hire or Entry Level Position

- **Five days** basic training or orientation including;
- General orientation, for two days
- Underground orientation, for three days
- **Utility Group**- A new hire will work with an experienced person for a period of three months
- **Practical Test i**–After three months, the person will be given a practical test

- **Permit or Permitted Miner** – If the persons pass the test after three months they get a permit to work at the face with an experienced operator for at least a year
  - During that one year period, they will work as a roof bolter, shuttle car operator and continuous miner operator, under the supervision of an experienced person
  - The hire is required to get certified in these three fields as **roof bolter**, **shuttle car operator** and **continuous miner operator**
- **Practical Test ii** – After at least working for 15 months underground, under the supervision of an experienced operator and having certified in the above three categories, they will be given practical test
- **Certified Miner Qualification** – On satisfactory completion, the employee will be interviewed by a panel of three people including a person from management, an experienced miner and a mine inspector. On passing this **interview,** the employee will become a certified miner. As a **certified miner** the employee will be allowed to work independently

II - Black Tag Miner System

On the basis of the above plan for training and certification, a "black tag miner" scheme is under consideration. The purpose is to differentiate between workers underground, on the basis of experience and qualifications. This black tag scheme is expected to start in conjunction with the above planned program. This term refers to a 1970s/80s scheme and title which clearly recognized qualified experienced competent underground miners.

Quinsam Coal Corporation

Training Approach

In 2006 during a site visit to Quinsam Coal Corporation (QCC), the Team Leader made enquires of their training approach, which can be summarized as follows:

- *Basic Training Program - 40-hours* including survival mine rescue, firefighting and geology
- *General Miner Training – 6 months:*
- *Entry-level Supervision* (at QCC a Roof Bolter is an Entry-level position) including 1 –3 months machine orientation,
- *General Supervision:* to a minimum target of 6 months experience
- Leading to a full-day review (exam?) to determine competency:

survival/underground plan/hazards/geology

- *Face Machine Operator – 6 months:*

  Leading to another, more in-depth review (exam?) including ventilation, ground control and support

QCC's approach is one of *Graduated Training* based on the individual's abilities and they have an informal system of in-mine "tickets" Miner – Face Machine Operator – Supervisor, etc. They concentrate on hands-on or on-the-job training, compressing the time frame is unrealistic; procedures are demonstrated and learned on the basis of "if you don't know > ask"; emphasis is put on "keeping standards up", more on practical hands-on in-mine experience than on written. Equipment and material suppliers such as Jenmar (for ground support) provide specialized training for technical support on an as required basis. A Training File is kept for each individual.

Quinsam Coal Corporation provided the following training material, supporting info is given in Appendix 3:

- Training and Development, Shuttle Car Operator's Manual
- Training and Development, Scoop Tram Checklist
- Shuttle Car Questionnaire
  It contains the questions about the shuttle car as explained in the operator's manual. A passing mark of 75 % is required to pass this test.
- Roof-bolter Questionnaire
  It has questions about roof bolter operation and 75 % is the passing mark
- Trackless Equipment Test
  It contains multiple choice questions about trackless equipment.

Existing Criteria for Qualifications & Training

Mine Regulations require formal training and tickets by exam for Management ($3^{rd}/2^{nd}/1^{st}$ Class Certificates of Competency) and Mechanics & Electricians. At Quinsam Coal Mechanics receive specific supervised surface-based training, are trained to CANMET diesel standards, and then receive underground and other in-house training; For Electricians, they usually recruit construction electricians and even 3^{rd} year apprentices. Keith Bracewell (former retired Training Officer) prepared a 3^{rd} Class QCC study booklet

and based some of QCC's courses on National Coal Board (UK) materials. Confined spaces/ hazard awareness etc is included. In 2006, QCC had 2 Electrical apprentices and 2 Mechanical apprentices on an in-house 4-year apprenticeship program to their own schedule and program.

Xstrata Coal Donkin Management

Xstrata Coal, Nova Scotia has not started its operations at the time of this report, however, the current Exploration Project deploys approximately 20 people, who each require Code of Practice (COP) Training, which has some components of relevance here. This includes definition of requirements for various positions, as follows:

> "**COP Training** All persons involved in the work program for this code of practice will undergo COP training. A training matrix, included in **Appendix 19**, will identify the training requirements for the drilling COP. A training assessment will be conducted following the training in the form of written challenge tests. Records of training will be kept.
> **Project Manager** will be qualified and experienced as an underground manager or another acceptable jurisdiction, and will have daily control of the site
> **Project Engineering Coordinator** will be qualified and experienced to coordinate the work of tradesmen and workers and will supervise the Shift Supervisors.
> **Shift Supervisors** will be qualified as coal mine supervisors as per past practice in Nova Scotia, or another acceptable jurisdiction, and will supervise the tradesmen and workers. The site will be under the continuous on-site supervision of a qualified supervisor whenever anyone is underground.
> **Surface Competent Person** during idle periods when no one is underground the site must be under the continuous on-site supervision of a qualified supervisor or a COP trained surface competent person. Such surface competent person will be specifically trained for the role and will not allow anyone to go underground without the presence of a qualified supervisor on-site.
> **Underground workers** will be qualified tradesmen and miners, and include:
>
> i. **Mechanical Operator** will be a coal mine mechanic and will have valid NS trade certificates and experience in coal mines,
> ii. **Electrical Operator** will be a coal mine electrician and will be first class mine electricians, or journeymen industrial electricians (inter-provincially certified, red seal) or construction electrician, and have experience on electrical equipment for use in hazardous locations,
> iii. **Operators** with mining or construction experience, and
> iv. **Drillers** with experience in drilling underground in coal mines.

Designation in Writing all personnel working on the drilling project will be designated in writing by the Project Manager. The Project Manager will designate in writing a qualified person as Acting Project Manager during an absence that would prevent him from exercising his day to day control of the project activities. A qualified Acting Project Manager is someone who is qualified as per past practice in Nova Scotia, or *another acceptable jurisdiction*. The Acting Project Manager may fulfill any requirements of the Project Manager with regard to the drilling COP.

Cape Breton Development Corporation (prior to 2001)

The primary underground coal mine operator in Nova Scotia from 1967 to 2001 was the Cape Breton Development Corporation (Devco), employing over 4,000 workers at their peak. During the 1980's Devco established a formal training department which developed a comprehensive training program, which includes formal binders for each major underground position. Copies of these manuals have been provided by Devco to the Collaboration and form a valuable resource. They include manuals for: Mine Manager; Underground Mine Manager, Supervisor, Mine Examiner and Underground Miner. They are available on project file. The overall training experience and competence framework within which they operated is reflected in the current Nova Scotia Underground Mining Regulations, 2003, as referred to the above section. An example is given in the Annex.

Ontario, NORCAT

Basic underground hard rock miner - Common Core

This safety indoctrination program is required by the **Ministry of Training, Colleges and Universities (MTCU)** for any person to be employed underground in Ontario.

The program offered by NORCAT is 4 weeks long in total and covers via computer the theory for all the modules below, which takes place at their Training Centre. This is followed by nine days of Career Preparation and Safety Training for Hard Rock Mining at the NORCAT Mine, where participants are taught all the aspects of mining and what they have learned in the theory portion. Once participants have successfully completed their training, they proceed to the ten days of practical training as a hard rock miner, which also takes place at the NORCAT Mine, where they implement the training they have completed. The following components are included:

U0000 Follow Surface and Underground Induction
U0001 Perform General Inspections

U0002 Scale Loose Rock
U0003 Set Up Wooden Staging
U0004 Drill Rock
U0005 Rock Bolt Ground
U0006 Blast Rock
U0010 Muck with Load Haul Dump Machine
U0011 Extend Services
U0012 Perform General Lock Out and Tag

New Entrant Time-Lines

The information below is for the various operations and includes the basic requirements at the different companies for new entrants. For interest this is also compared with the requirements for one underground coal mining jurisdiction in the USA, Kentucky:

NEW ENTRANT TIME-LINES

Stage	Quinsam	Grande Cache	Donkin	Devco < 2001	Kentucky USA	Hard-rock Ontario (Norcat)
Pre-U/Ground:	5 days	2 days	3-5 days	10 days	5 days	2 days
U/G Orientation:	1 day	3 day	1 day	20 days	1 day	9 days
Direct Supervision:	3 months	3 months	6 months	(inc. 2d/wk	2 months	10 days
				in class)		
Indirect Supervision:	6 months	3 months	2-3 months			company
						specific
Qualification:	general miner	mine-worker	qualified		experienced	basic hard
	+ 6 months >	+ 12 months >	miner		miner	rock miner
	qualified miner	black tag miner				

Gap Analysis

The above information was compiled and assessed for commonalities and difference between the various jurisdictions. These are now discussed, first in terms of legislative perspectives and second in terms of industry perspectives.

Legislative Perspectives

On reviewing the regulatory requirements for different employee positions in different jurisdictions, it has been observed that two philosophies are working behind these requirements. First philosophy is to describe all the requirements and position descriptions in detail and make it applicable according to all those details and

specifications. The first philosophy seems prevalent is provinces like Alberta and British Columbia. The second philosophy is to describe about some key positions and their requirements and leave the rest up to the owner or management and make them responsible for the rest, as typified in the province of Nova Scotia.

It is debatable over which philosophy should be adopted. As in the first type of philosophy, most of the things are described in details that mean the operators or management are either preoccupied with or confine themselves to meeting only those requirements described in the regulation or code. On the other hand the second type of philosophy describes the key positions and their requirements and relies heavily upon their voluntary compliance, which arguably is open to abuse. However many jurisdictions have moved towards the voluntary compliance philosophy within a strong overall regulatory framework have fund their industry's safety performance has improved.

Within the above different philosophical approach, some of the key positions are discussed as follows:

- Province of Nova Scotia describes different employee positions and qualification requirements in detail. Alberta and British Columbia describe some of the positions and leave the rest to the responsibility of the owner or the management. It is big gap here between these jurisdictions. Underground coal mining in Canada is a small industry and regulatory bodies could benefit from increased dialogue over the differences and potential benefits/opportunities.
- For some employee positions there is a big gap between jurisdictions over the requirements for the same employee position. For example the position of underground mine manager. Alberta requires for a mining degree with 5 years experience or 10 years experience with no degree. However, Nova Scotia requires for grade 12 education with 5 years of experience and knowledge of Act & regulations, while B.C requires the competency certificate depending on the number of employees working underground. This is a big gap. In the same way

Alberta describes about the position of electrical superintendent but does not describe the position of the electrician and the mechanic.

- Alberta describes the mine blaster's certificate as well as mine blaster's permit but it does not differentiate between two positions, possibly the mine blaster's certificate is a mining position where as blaster's permit is a non mining position.
- Positions of Mine Examiner and Engineer are described only by Nova Scotia. For the position of engineer, each province has its own professional body to issue a license as professional engineer to work in a particular province.
- Only Alberta and B.C maintain a provincial board of examiners for mines, Nova Scotia moving away from this model in 2003 to one requiring an Employers Job Training Program defined in regulations.

Industry Perspectives

Based on the information and training material received from Grande Cache Coal Corporation and Quinsam Coal Corporation, it is noted that both mines are relatively small but have formal training and examination system in practice to test the eligibility of the individual to qualify him/her for specific worker category. There are similarities between the mines, which reflect in commonalities in their training systems. There is scope for more coordination, communication, exchange of training materials and common training related orientations. Such increased collaboration could lead to development of new benchmarks for best mining practices within varying regulatory requirements. Within that process and recognizing the differing characteristics of Eastern coalfields and their use of longwall mining methods, it will be important to both utilize the legacy of the Devco training manuals and to monitor the future role of multi-national corporations in the development of the Donkin project in Cape Breton, NS.

Within the above different operational processes, the following comments are offered to prompt discussions.

- As per the information and training material obtained from Grande Cache Coal Corporation, they are planning and introducing some new ideas regarding training

and qualifications beside their existing criteria. It could be a good opportunity for both GCC and QCC to work together and exchange the ideas and training material to establish benchmarks for room and pillar underground coal mining practices.

- It has been observed that the operators are share some common criteria for the training of the new entrants, e.g. on the job training of the new worker by a fellow experienced worker or supervisor. It depends upon the observation of the experienced worker or supervisor to put the new entrant to a certain category of workers and then promote to next category
- It was also realized at some stages that there was scope for supplementing training materials by sharing resources.

Training Resources

The project has identified a broad range of training resource materials from both current and historic underground coal operations within Canada. These provide a valuable resource for future curriculum development towards a common core or similar approach to future training of competent people for the key positions in underground coal mines. These resources include those materials form the following operations, which are currently available within the broader files of project team members:

1) McIntyre Mines
2) Devco
3) Grande Cache Coal
4) Quinsam
5) Xstrata coal
6) Other (e.g. web-based materials).

Should further steps be taken in future towards curriculum development, then the above will need to be assembled in one location and provided as a resource to fuel that development.

Discussion

It is recognized that Canada's underground coal mining industry is tiny by world standards but that generates specific pressure on operators and regulators alike on how to meet job requirements from a small pool of suitably experienced and qualified people of demonstrable competence for key positions.

The project draws fresh attention to an ongoing evolution within the underground coal mining industry (and many other industries) over recent decades concerning education, training, experience, and time requirements to be considered competent in any key position in a mine. Traditionally, underground coal operations were often clustered together geographically and employed many people. Most positions were considered trades and such 'critical mass' allowed for a combination of apprenticeship-based training and on-the-job training. So, a new entrant would start at a low level, work in various jobs and slowly gain experience, demonstrate competence and be gradually promoted to positions of higher responsibility (both technically and managerially).

However, the twentieth century saw an increased recognition for a combination of training in theory with practical training especially for positions with significant responsibility for technical aspects, supervision and management of employees. So technical colleges provided co-op (or sandwich) courses and evening courses to complement practical training and experience gained 'on the job' with theoretical skills development leading to the offering of Certificates and Diplomas as appropriate. Such training prepared students for the formal examinations set by the various Mine Examination Boards. Competency was therefore demonstrated by a combination of minimum time and experience spent in practical involvement in the industry combined with passing exams and 'Certificates of Competency' were awarded.

The latter half of the twentieth century saw a rapid growth in university education and formal bachelor degrees began to be offered in various specific engineering disciplines, including mining engineering and expectations in industry changed. Candidates for Mine Manager positions were expected to have degrees and requirements for minimum time and experience in a practical underground coal mining environment were often relaxed accordingly. At the same time, underground coal had become expensive to mine compared to competing fuels and so many mines closed, and many experienced people were lost to the industry and in many cases the 'critical mass' needed to support these traditional systems was lost.

The various jurisdictions studied within Canada in this project can be seen to have responded to these evolutionary shifts in society and industry at varying speeds and to varying extents. This can be seen in the various differences in detail of minimum requirements of education, training, experience and time to satisfy a reasonable definition of competency. So the question must be raised as to whether these changes in society and the industry have been such as to merit a radical redefinition of competency and a perceived relaxation of requirements to meet pragmatic realities of supply-and-demand of suitably experienced and qualified candidates? Such relaxation can be perceived in the minimum time spent on 'the coal face' underground to become an underground coal manager, varying across jurisdictions from 5 years to 1 year or less (depending on interpretation of the coal face). The project has not to date been comprehensive enough to answer such questions but it does provide significant fuel to the debate.

Where to Next

The above work on Phase 1 of the project was presented in a summary powerpoint presentation to the April 28, 2007 meeting of the Chief Inspectors of Mines for their consideration. The meeting showed strong support for the Collaboration with its recognition of underground coal hazards and a need for ongoing focus). There was also a

strong consensus of the benefits of moving towards a 'common core' approach for new entrant training and in particular support to move to Phase 2 of the project, should resources allow.

Phase 2 of the project should have a key focus on the following:

- common core competencies for new entrants
- common core competencies for all key jobs (supervisor, manager, mine rescue, etc.) i.e. a standard core course outline for each
- a central repository of training resources.

Conclusions

This project set out to examine the differences and identify core commonalities and to provide some answers to questions posed below. The findings can be summarized as follows:

Regulatory Perspectives

- Some differences
  - philosophy (prescriptive vs performance based)
  - Boards of Examiners and certification
  - Requirement for a Degree
  - Training – Experience – Time - Competency
- Some commonalities
  - Specific requirements in First Aid, Knowledge of Legislation,
  - Experience in lower position (come up thru the steps)
- Some observations
  - expectations (& standards?) vary among jurisdictions

Industry Perspectives

- some differences in
  - documentation
  - resources available
- some commonalities
  - much on-the-job training
  - reasonable agreement in timeframe
  - equipment training

What training requirements do the various jurisdictions set, how do they differ and why?

The provincial jurisdictions considered all have requirements for training and competency of underground workers and management. They differ widely in terms of underlying philosophy and in the extent and detail of their requirements. The Federal regulations relied in the past on the Board of Examiners requirements and oversight for the province of Nova Scotia. Since the demise of this board in 2003 the expectations are not clear.

What is industry best practice for ensuring adequate qualifications and appropriate training and experience to demonstrate sufficient competency to work safely and consistently and ensure that companies deploy reasonable persons with adequate training and demonstrated competency? Based on the information and training material received from Grande Cache Coal Corporation and Quinsam Coal Corporation, it is noted that both mines are relatively small but have formal training and examination system in practice to test the eligibility of the individual to qualify him/her for specific worker category.

Identify available sources of related training materials – a start has been made which includes historic manuals from McIntyre Mines in Alberta and Devco in Nova Scotia.

Compile a syllabus for use by underground mining personnel – postponed to a Phase 2.

Recommendations

The following recommendations are made:

- conduct a SWOT analysis (strengths-weaknesses-opportunities-threats) of the potential adoption of the common core training for new entrants in underground coal mining in Canada; this would be based on experience in both Ontario hardrock underground mining and New South Wales Australia underground coal mining.
- develop a common curriculum for core competency training in u/g coal mining
- conduct a Phase 2 of the training project to implement the above two recommendations and develop a central repository of training resources as a common resource especially for candidate preparation.

Support-in-principle was received from the Chief Mine Inspectors for such a Phase 2.

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Xstrata Coal: Darren Nicholls
CANMET: Gary Bonnell

Appendices

Appendix 1 - Training Resources

7) McIntyre Mines
8) Devco
9) Grande Cache Coal
10) Quinsam
11) Other (net stuff)

Appendix 2 - Work Plan & Schedule

Project Tasks

1) Compile spreadsheets summarizing Province specific training requirements, both regulatory and industry based, for the categories of Mine Worker & Mine Managers. *June – November/06*
2) Extend data capture to include summary information from non-Canadian jurisdictions, e.g. USA and Australia *December 2006*
3) Discuss training provision, the main players and need for/types of extra prepared courses, syllabus, training materials, willingness to share information with others. *< December 15/06*
4) Conduct an analysis of the spreadsheets, compare and identify differences/gaps. *< December 31, 2006*
5) Summarize and highlight the 'gaps', options, pros and cons and discuss core commonalities. *< January 11, 2007*
6) Determine potential for 'On-line training' and 'distance ed'. *< January 31, 2007*
7) Draft a Training Fact Sheet. *< March 9, 2007*
8) Draft a Written Project Report. *< March 16, 2007*
9) Submit the two drafts to the UCMSRC Executive Committee for review, and finalize. *April 20, 2007*
10) Present to Annual Meeting of Chief Inspectors of Mines *April 28 or 29,2007*
11) Post final copies on the 'ugcoal' website. *< May 28, 2007*

Project Deliverables

- A training fact sheet
- A written report

Milestones

Project Start	– July 4/06
Regulatory Spreadsheet	– Nov 30, 2006
Industry Spreadsheet	– Dec 8, 2006
Agree core commonalities	– Jan 11, 2006
Agree Training Delivery Mechanisms	– Jan 26, 2007
Draft Training Fact sheet	– Mar 9, 2007
Draft Project report	– Mar 16, 2007
Exec Comm approved fact sheet and report and to Chiefs	– Apr 20, 2007
Meet with Chiefs	- April 28 or 29, 2007
Final Fact Sheet and Report	– May 25, 2007
Post on Web-site	– May 28, 2007.

Appendix 3 - Quinsam Coal Corporation

Sources of the Information

Training material from Quinsam Coal Corporation is:

Material Received from Quinsam Coal Corporation

- Training and development, shuttle car operator's manual
- Training and development, scoop tram checklist
- Shuttle car questionnaire
- Roof bolter questionnaire
- Trackless equipment, test

Training and Development, Shuttle Car Operator's Manual

It includes the following;

- Introduction
- Safety by preventative maintenance
- Walk around
- Before starting the car
- Starting the AC and AC/DC car
- After starting the car
- The 5-point safety system
- Tramming
    - Introduction
    - Tramming/braking
    - Speed control
- Steering
    - Introduction
    - Steering process
    - Steering procedure
- Cable reel
- Parking

Training and Development, Scoop Tram Checklist

This checklist is to be completed by the examiner while observing the operator.

It includes;

- Inspection check
- Starting
- Emergency brake applied
- Service brake

- Park brake
- Loading
- Parking
- General

The check list also includes the recommendations and remarks of the instructor about;

- Attitude
- Safety
- Mechanical
- Production

Shuttle Car Questionnaire

It contains the questions about the shuttle car as explained in the operator's manual.

A passing mark of 75 % is required to pass this test

Roof-bolter Questionnaire

It has questions about roof bolter operation and 75 % is the passing mark

Trackless Equipment Test

It contains multiple choice questions about trackless equipment.

ANNEX 1

CAPE BRETON DEVELOPMENT CORPORATION -

OCCUPATIONAL INSPECTION STANDARDS

FOR

MINE EXAMINERS

INTRODUCTION

All underground employees share in the responsibility for mining safely. However, the mine examiner's position has been specifically created to make the mine as safe as a place to work as possible. The sole purpose of the mine examiner is to examine the work place under his jurisdiction, taking gas readings to ensure the atmosphere is safe as well as identify deficiencies or sub-standard conditions and reporting the same for corrective action.

This document is prepared to assist mine examiners to **identify** and **observe** specific inspection standards during his **visual inspections** on the job to ensure these standards exist and report on the deficiencies he may find. A mine examiner who is alert in detecting hazards or sub-standards and conscientious and aggressive in reporting them is safeguarding lives and protecting the jobs of everyone in the colliery.

This document will identify things you can look for in the workplace. Only you can put the information into practice. Everyone is counting on you to thoroughly inspect the area assigned and help keep the mine safe through competent inspections and reporting of sub-standard conditions or deficiencies.

REMEMBER

- Visually check for substandard conditions in the areas assigned to be inspected.
- Report substandard conditions to the Supervisor of the area affected for corrective action.
- Record substandard conditions found during your inspection and report these conditions in the Mine Examiner's report book.

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INSPECTION ITEMS FOR MINE EXAMINERS

VENTILATION SYSTEMS

As you are aware the installation, operation and maintenance of a ventilation system is critical to the safe operation of a mine. The ventilation system requirements for the operation change as the mine is being developed. During your travels it is important that you are aware of the specific approved ventilation plan for the area(s) you are inspecting. Knowing the requirements of the approved plan will assist you in conducting a competent inspection and being able to report sub-standard conditions or deficiencies.
(See Appendix "A")

- **VENTILATION DOORS**

  Check that:

  - They do not leak excessively.
  - They are not damaged or bent.
  - Operating handle mechanism is functional.
  - Regulators in door are not damaged.
  - They are not left open unless posted as such.

- **VENTILATION FANS (AUXILIARY)**

  Check that:

  - Fans are suspended securely to prevent dropping or falling.
  - Flume is coupled together properly and not leaking excessively.
  - Single Force ventilation requires the end of the flume from the fan to be not more than 5 meters from the working face.
  - Single exhaust ventilation requires the end of the flume from the fan to be not more than 2 meters from the working face

- Force/Exhaust overlap ventilation requires the end of the exhaust fan flume to be not more then 2 meters from the working face and the exhaust fan to be at least 5 meters outbye the end of the fresh air fan flume.

INSPECTION ITEMS FOR MINE EXAMINERS
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- The fresh air fan flume must be within 45 meters of the working face and the fan to be a minimum of 5 meters outbye the intersection of the main entry.

- All singular simple forced and exhaust fans installed to ventilate headings must be installed a minimum of 5 meters outbye the intersection of the main entry.

- Gas monitors to be working and readings checked with hand held methanometers, any difference in reading to be reported. Ventilation plan specifies alarm of shutdown gas levels.

- Noise and hearing signs to be posted at all auxiliary fans operating.

GAS TESTING

Testing for flammable gas (methane) in the underground operation and following legislative requirements is an essential activity to ensure the integrity of the environment.

- Check to ensure your methanometer is charged, operating properly and not damaged before going underground. **Test it.**

- Take and record all gas readings for the area that has been designated to your route or area of responsibility.

- Where a gas level reading exceeds **1.25%** and electrical equipment is present, the Mine Examiner is to report to the Supervisor instructing that all electrical equipment is to be shut off in the affected area underground.

- Where a gas level reading exceeds **2%** in an area underground, the Mine Examiner is to report to the Supervisor instructing that all employees shall be immediately evacuated to a safe ventilated area.

- Check to ensure that all BM1 or BM3 monitors used are operating and not damaged. Report deficiencies:

  - Sensor head and cable not damaged
  - Beeping at appropriate intervals

- Glass not damaged

INSPECTION ITEMS FOR MINE EXAMINERS
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PERSONAL SELF RESCUER AND OXY-K-PLUS

Check that:

- Individuals always wear their self rescuers on their person.
- OXY-K-Plus SCSR are stored in section in covered containers and are sufficient in numbers for the number of persons in the section.
- Indicators on the OXY-K-Plus SCSR are showing blue, for any other color the unit is defective. Report defective units to area Supervisor for removal and replacement.

EXPLOSION BARRIERS

Explosion barriers are an important suppression device in the event of an explosion, the extent of an explosion throughout the mine maybe arrested at the barrier. Through safe operating procedures, proper inspections and correction of sub-standard conditions the risk of having to use them is reduced or eliminated. It is extremely important to ensure they are in place as required to the standard identified.

Check that:

- Stonedust or water barriers to be installed in airway leading to a work face are within three hundred (300) meters of the face on the intake for the wall and within 300 meters of the development faces on slopes and levels.
- Stonedust is placed on barrier.
- Water trays are full of water.

STONEDUST

Check that:

- Not less than twenty (20) bags of stonedust are stored for emergency use within one hundred and fifty (150) meters of each working face in the intake airway and within 40 meters of each working face in the return airway.

- Bags are stacked are stored so as to avoid being damaged and away from operating conveyor belt rollers.

INSPECTION ITEMS FOR MINE EXAMINERS
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- There is visual evidence of adequate stone dusting in all places in your district.

- Emergency supplies of stonedust are in place at all electrical switches and transformers in you inspection area.

MANHOLES AND REFUGE PLATFORMS

Employees during the normal course of their work travel on roadways and slopes. Rakes, trips and trams also operate in these areas. In order to provide a place of refuge from passing modes of transportation, manholes or refuge platforms can provide a place of security for employees in time of need.

Check that:

- Manholes shall be kept clear of material, free of obstacles to entry and marked by a sign with a number.

- Manholes are to be securely supported, approximately 1.3 meters in depth, approximately 0.9 meters in width and at least 1.5 meters in height.

- On main deeps where trips or mobile equipment is operated manholes shall installed every 50 meters.

- On levels where trips or mobile equipment is operated by **locomotives,** manholes shall be installed every 100 meters. If curves are present, manholes shall be installed every 30 meters.

- On levels where refuge ramps are used, the ramps are to be installed every 100 meters and pinned to the pavement.

ROOF CONTROL

The roof support system is essential to the continued safe operation of a mine.

The requirements for installation of components can be different from one section of a mine to another. Roof control encompasses securing of roof and rib to prevent them from collapse. Because of this it is important you know the roof control plan for the area(s) of your inspection. Ensuring the plan is followed during the development and operation of sections and reporting sub-standards or deficiencies will maintain its integrity.
(See Appendix "B")

INSPECTION ITEMS FOR MINE EXAMINERS
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STEEL SUPPORTS

Check that:

- Roof supports at face are set on solid bottom or wood foot block where required.
- All struts are in place and properly secured.
- All steel sheets are in place leaving no open roof.
- No abnormal deflection or weight on roof.
- No abnormal distortion of collar or legs.

ROOF BOLTS

Check that:

- All roof bolt holes drilled and bolts are installed in accordance with the roof bolting plan.
- Tell tale is monitored and actions are taken as required according to roof support plan.
- When lifting is being preformed, not more than one (1) tonne is lifted on a regular roof bolt which is set for strata control purposes and the lift is to be a direct lift.
- When required to lift more than one (1) tonne proper lifting bolts as identified in the Roof Control Plan are used.
- Where tensar mesh roll is used on the roof and rib, the ends are overlapped during the installation and secured in accordance with the Roof Control Plan.

WALKWAYS

Check that:

- There are no excessive accumulations of water.
- There are no sleeper/pot holes.
- They are properly ballasted.

- They are free of slip, trip or fall hazards (timber, pipe, rails, etc.)
- There are no intrusions from rib.
- There are no washouts of ground.
- There are no falls of stone on roadway.
- Evacuation and location signs posted to indicate area.

GUARDS, FENCES, STOPPING AND BARRICADES

Guards, fences, stopping and barricades protect persons from entering hazardous locations. These devices should be used as required.

Check that:

- Guards are erected where machines, pieces of equipment and tools are likely to be hazardous to the safety and health of an employee.
- Fences are erected where flammable gases are discharged from a methane drainage system in an area where the concentration of flammable gases may exceed two (2) percent to prevent access to the area by employees.
- Fences are at all openings to any underground are that is not being ventilated to prevent access to such area.
- Fences are at all intersections where deep trips are passing and men normally travel.

MAN/MATERIAL TRANSPORTATION

The smooth running of a colliery depends on the operation of man/material transportation systems. The equipment components associated with the systems must always be in proper condition in order to prevent serious incidents or accidents and ensure an efficient safe operation.

Check that:

- Materials on tram and trips are placed properly and secured from falling off.

INSPECTION ITEMS FOR MINE EXAMINERS

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- Cars are coupled using proper coupling attachments and safety chains as required on main deeps.
- Radio and pull cord signals are operational on roadways as indicated by operator.
- Pull cords are accessible for operation alone the entire length of roadway as indicated by operator.
- Samsons are in place on roadways as required.
- An electric lamp with a red light is affixed to the approaching end of trip on mobile equipment.

MAIN HUALAGE ROPE/ROLLERS

Check that:

- The rope is connected to trip by socket/grab and safety chain(s).
- The rope is not operating outside trapping, guide or road rollers.
- The rope is not causing damage to itself and other structures.
- The road rollers are operating freely.
- There is no excessive spillage of lubricant oil or combustible materials around rollers.
- There is no visible damage or kinks in rope.

ENDLESS HAULAGE

Check that:

- Signal system is installed and is operational as indicated by operator.
- Track limits (inside and outside) are installed.

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LIVE ROPE

Check that:

- The rope is secured to trip by rope socket/grab and safety chain attached.
- The rope is not causing damage to itself or other structures.
- The road rollers are operating freely with no shell damage from rope wear.

RETURN ROPE

Check that:

- The rope is contained within sheave wheels.
- The rope is not rubbing on arches.
- Sheave wheels are covered, operating freely and not jammed or stuck.
- There are no kinks, knots or fox tails in live or return rope.

MECHANICAL EQUIPMENT

Conveyors and cutting machines are two pieces of mechanical equipment that are the heart of a mining operation. Their association and use from development and operating faces through roadways and slopes have a potential to impact greatly on a safe operation of a mine. To insure their integrity inspection, operation and maintenance functions are critical. Through early recognition of potential problems, reporting and correction of

substandards to these major mechanical systems can contribute to a safe and productive operation.

CONVEYORS

Check that:

- There are no noisy rollers indicating bad roller bearings.
- Rollers are not operating in coal fines or muck.
- Rollers are not collapsed.

- Belt is not rubbing on structure.
- Structure or stands are not damaged.
- Guards are installed at head, tail ends and weight towers.
- There is no excessive spillage along conveyance.
- Areas under belt around rollers are clean.
- Lockout boxes and audio boxes are installed every 90 meters.
- Pull cords are extended between lockout boxes for the entire length of the conveyor.
- Belt is not slipping.
- Spill points are clean.
- There are no missing top or bottom rollers.
- Armoured face conveyors operating under roadways are to have a minimum clearance overhead of 18 inches.
- Conveyors operating overhead have a clearance of 12 inches above the trip.

CUTTING MACHINES

Check that:

- Pre-start alarm is operating (with operator)
- Emergency stop buttons operate (with operator)
- Cables supplying power to various motors are routed to protect them from damage by the machine or moving components on the machine, such as boom assembly and apron.
- Trailing cables associated with the machine are contained in the cable trays.

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- All trailing cables are attached to a cutting machine using a chained restraining clamp.
- Gas monitors (BM3) mounted on cutting machines is operational, with cables and sensor heads protected and not damaged (with operator).
- Water pressure at cutting head adequate with all sprays clear and cutting head fully picked (with operator)
- Machine's cutting operation is in accordance with the roof control plan.

LIFTING EQUIPMENT

Lifting equipment is used on a daily basis by employees at the collieries. Their use, installation, operation and maintenance are critical in the prevention of accidents. By recognizing deficiencies, reporting and correcting them you can reduce injury to employees and systems.

TUGGERS

Check that:

- They are anchored during operation preventing twisting or pulling loose.
- Rope coils and uncoils straight off and on the drum.

- Air hose is safely chained to tugger unit.
- Throttle returns to neutral position when throttle is released after operation (with operator)
- Brakes are in good condition, drum will not move when brake is applied with throttle on (with operator)
- Rope has no knots, kinks or broken wires.
- Drum of tugger is guarded.
- Where the tugger has to operate for a distance of over 100 feet, a rapper and bell signal system is used.

INSPECTION ITEMS FOR MINE EXAMINERS

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CHAIN HOISTS/COME ALONG

Check that:

- Where used, they are suspended using a proper shackle.
- Hooks are not bent, damaged or spread.

MONO RAIL

Check that:

- It is suspended securely from the roof using proper shackle.
- Mechanical stops are installed at both ends of mono rail.

ELECTRICAL EQUIPMENT

Almost all machinery and equipment used underground is operated by electricity. The voltages can range from 6900 volts to 12 volts, and when electrical equipment is installed, operated and maintained as required, electricity contributes safe operations.

By reporting any substandard conditions or deficiencies and ensuring they are corrected, the use of electricity in our mines will contribute to a safe and productive operation.

SWITCHGEAR/TRANSFORMERS

Check that:

- Switch gears mounted in a stable condition on trays and trams (i.e. level securely anchored by bolts)
- All bolts are installed in glands, covers and door flanges.
- Glass gauges are not cracked or broken.
- Equipment cables and couplers are protected from water intrusion.
- Main power supplying cables are hung away from floor and moving equipment.
- Equipment is labeled as to circuit or equipment it controls.

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- Signs are posted at equipment (some examples):
  - A notice prohibiting any other than an authorized person from handling or interfering with electrical apparatus.
  - A notice warning of danger and indicating highest voltages in use.
  - A notice containing directions on how to communicate with the supervisor of electrical equipment.
  - A notice containing directions for the procedure to be followed to rescue persons in contact with live electrical conductors and the restoration of persons from the effects of electrical shock.
  - Nearest location where equipment can be isolated or otherwise de-energized.

ELECTRICAL MOTORS

Check that:

- There are no signs of damage or abnormal noise, vibrations, overheating, or smell of smoke.
- Motors are kept reasonably clear with no accumulations of rubble or debris around the motor in order that heat can be dissipated.
- Where required, are protected from physical, mechanical or water damage.

TRAILING CABLES/COUPLERS

Check that:

- Cables/couplers are attached to machines using a restraining clamp.
- Are not rubbing on conveyor belts or scraper conveyors.
- Are suspended and supported clear of materials on floor or in level.
- There is no visible damage to outer sheath of cables (rips, tears, cuts)
- Trailing cable installed is contained within the cable carrier, where applicable.
- Spare cables are hung and stored in a dry place and protected from damage.
- Couplers are not laying in water or being dragged by machines.

INSPECTION ITEMS FOR MINE EXAMINERS
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LIGHTING FIXTURES

Check that:

- They are not burnt out and glass is not broken.

SIGNS

Signs provide notice to persons in regard to certain conditions or access to areas or equipment that could be hazardous to them. It is important to ensure the signs required are **posted**.

Check that:

- Overhead clearance signs are posted where conveyors cross over slopes or deeps, as required.
- All manholes are marked by a numbered sign.
- Signs are posted on electrical equipment as required.
  (See Switchgear/Transformers Section)
- Location signs are posted at intersection to slopes, deeps and crosscuts which intersect with levels.

- Evacuation signs are posted in all primary and secondary escapes routes and the arches between signs are marked with green or red reflective tape as required.

- Warning signs are posted on barricades indicating that access by unauthorized persons is prohibited.

- All fire hydrant stations are indicated by a posted sign.

- Signs are posted at all openings to underground areas that are not being worked or developed "DO NOT ENTER".

- Noise and hearing signs are posted at all equipment and locations, where required.

- Self contained self rescuers (SCSR) signs are posted at all locations where caches of self rescuers are stored.

- Telephone signs are posted at all locations where telephones are placed.

INSPECTION ITEMS FOR MINE EXAMINERS

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HOUSEKEEPING

Materials stacking and storage as well as waste disposal are areas that require constant attention in the workplace. When not monitored and controlled this can contribute to employee injury and the potential for sources of combustible material associated with fire. An organized, tidy workplace is essential for an accident and fire free environment.

MATERIALS STACKING AND STORAGE

Check this:

- All materials in roadways and walkways are stored and stacked to prevent obstruction to movement of employees and equipment.

- All materials are stored and stacked in a manner that will prevent damage to the materials.

- All lubricants or oils are stored in metal containers.

- All empty lubricant or oil containers are put in refuse containers for removal from section and mine.

WASTE DISPOSAL

Check that:

- Refuse containers are available for waste at employee's work station.
- Refuse containers are not overflowing with waste (e.g. papers, bags, cans).
- Papers, bags, cans, and bottles are not accumulating in areas underground.
- Refuse containers are used by employees and emptied when full.

INSPECTION ITEMS FOR MINE EXAMINERS
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FIRE EQUIPMENT

Fire equipment used in the underground environment is essential and critical for the control of a fire in the workplace should one occur. The best approach to fire prevention is to be proactive and ensure quality inspections and the correction of sources of ignition.

If a smoulder, open flame or fire did occur, it is important that all equipment designed and designated to be in place at your work station is available and operational. Through quality inspections any deficiencies can be identified, reported and corrected.

FIRE HYDRANT STATIONS

Check that:

- They are installed every 500 feet along all belt deeps, wall levels and development areas where conveyor belts are located.
- They are installed on the upstream intake side of belt drives at a distance not to exceed sixty (60) feet.

- They are installed on the inbye end of each wall face level and development area water supply line.

- They are installed on the upstream intake side of all hoist rooms at a distance not to exceed sixty (60) feet.

- They are located so as to be provided protection from movement of trip.

- Valve handle is not obstructed.

FIRE HOSE(S)

Check that:

- Each hydrant station is equipped with a location sign, rib mounted hose canister containing five (5) lengths of 1 ½" diameter fire hose with nozzle fitted to one end of a length.

INSPECTION ITEMS FOR MINE EXAMINERS
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- Eight hundred and fifty feet (850') of 1 ½" fire hose and nozzle is located on the inbye end of the waterline on the intake level of each standard wall face or the equivalent hose to reach the top of the wall face from the hydrant on the end of the pipeline.

- One hundred feet (100') of 1 ½" fire hose and nozzle is located at the following hydrant locations at the intake side upstream of:

  - All drives
  - Hoist rooms (underground)
  - Diesel room
  - Booster fans
  - Pump rooms
  - End of waterline in development areas

- Note any fire hoses that are removed from canister and being used for purposes other than fire fighting.

FIRE EXTINGUISHERS

Check that:

- Each fire extinguisher is mounted upright on rib or machine mounted where possible.
- Inspection tag identifies the current month's inspection date.
- No dent or cracks are in the shell and the safety ring pin is inserted and the seal is not broken.
- There is no damage to discharge hose and nozzle free of debris.
- Discharged or defective extinguishers are reported to supervisor for removal and replacement.

INSPECTION ITEMS FOR MINE EXAMINERS
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LOCATION OF EXTINGUISHERS

Check that:

- One (1) twenty (20) pound ABC extinguisher is at the top and bottom of wall and at 100' intervals along face.
- Two (2) twenty (20) pound ABC extinguishers are inbye at the end of top level.
- Four (4) twenty (20) pound ABC fire extinguishers are in the area of switch gear and transformer in the bottom level.
- Two (2) twenty (20) pound ABC fire extinguishers are at all drives, switch gear and transformer along level.
- One (1) twenty (20) pound ABC extinguisher is on all cutting, loading equipment and diesel or electric locomotives.

NOTE: **This does not apply to cutting equipment with fire suppression systems providing the suppression system is functional.**

- Two (2) twenty (20) pound ABC extinguishers are located at all booster fans, hoist rooms, diesel rooms, pump rooms and electrical switch rooms.

FIRE SUPPRESSION SYSTEMS

Dry Chemical Systems

Check that:

- Pressure gauges on both Pneumatic Make-up Device and Detection and Activation Device are in "Green Area". Report to Supervisor if gas pressure is approaching "Red Area".

- The red detection tubing is secured and not prone to mechanical damage.

- Discharge nozzles are secured in place, not obstructed by coal spillage or other material and protected with plastic dust caps.

- Signs indicating the location of manual activation devices and instruction for their use are present.
- Tamper pin and seal is installed on the manual activation device.

Water Curtain System

Check that:

- 2 inch valve on water supply line is sealed in the open position and its location is identified with signage.

- Wire cable and fusible links are free of obstruction and possible binding of the cable.

- Water spray manifolds are clean and free of any obstruction which would interfere with water spray.

Detection Systems

Check that:

- CO detectors are in place and working, verified by L.E.D. readout being present.

- The sample inlet on the CO detectors are clean and unobstructed by dust or other materials.
- Smoke detectors are present, undamaged and hanging unobstructed.

FIRST AID SUPPLIES

When accidents occur it is important the employee receives first aid treatment as soon as possible. In order to be able to provide this treatment and transport the injured person, first aid supplies are required. By maintaining area and personal first aid supplies identified below, you will be able to respond quickly and efficiently to provide the care and assistance needed.

AREA REQUIREMENTS

Check that:

- The following first aid supplies and equipment are to be within one hundred (100) meters of:
  - The face of each development
  - Each working face on the roadway to the face:

1 - stretcher
2 - blankets
1 - back board

2 - wooden splints (10 cm X 81 cm)
2 - wooden splints (10 cm X 152 cm)
2 - sand bags (medium size)
2 - bandages (5cm X 3 m)

PERSONAL REQUIREMENTS

Every Mine Examiner should carry a first aid kit which contains:

1 - bandage (5cm X 3 m)
24 - bandaids (various)
2 - slings
2 - 4 cm X 4 cm gauze dressings
2 - foil tubes
12 - alcohol swabs
2 - knuckle dressings
2 - alcohol dressings
1 - adhesive tape (13 mm X 2 m)

APPENDIX "A"

VENTILATION PLANS FOR COLLIERY

(TO BE COMPLETED BY SITE)

APPENDIX "A"

VENTILATION PLANS

Listed below are the ventilation plan numbers for the various areas underground:

VENTILATION PLAN NUMBER	AREA APPLICABLE

APPENDIX "B"

ROOF CONTROL PLANS

FOR COLLIERY

(TO BE COMPLETED BY

SITE)

APPENDIX "B"

ROOF CONTROL PLANS

Listed below are the roof control plan numbers for the various areas underground:

ROOF CONTROL PLAN MEMBER	AREA APPLICABLE

APPENDIX 4

II - Black Tag Miner System

On the basis of the above plan for training and certification, a black tag miner scheme is under consideration. The purpose is to differentiate between workers underground, on the basis of experience and qualifications. This black tag scheme is expected to start in conjunction with the above planned program. State what is different about the term "black tag miner" [it refers to a 1970s/80s scheme and title but how does that differ from today's practice.

Details of Planned Criteria

I - General Orientation

General orientation will consist of two days and following areas will be covered; (Ref: 6)

Day One:

- Sign on with pay roll
- Employee handbook review
- Safety / prescription glasses policy
- General site safety rules
- Emergency procedures
- Light duty program
- Radio protocol
- Violence in the workplace policy
- WHMIS training

Day Two:

St. John Emergency First Aid Certification

II - Underground Orientation

Day Three:

This will be day one of underground orientation, as an underground mine tour for the whole day. (8 hrs). It will consist of the following:

- **Entering and Leaving the Mine**
  - Control
  - Transportation
  - Communication
- **Emergency and Evacuation Procedures**
  - Mine plan
  - Escape route, signage
  - Warning system
  - Emergency medical procedures
- **Safe Work Procedures**

- Lock out & procedures
- Fire extinguisher & video orientation
- Mine Rescue Awareness
- Self Rescuer W65

Day Four:

Day two of underground orientation will consist of the following:

- **Electrical Distribution / Air Quality Monitor 1 hr**
  - Equipment
  - Monitoring system
- **Hazard Recognition 3 hrs**
  - Environmental
  - Electrical
  - Mechanical
  - Explosives
- **Health 2 ½ hrs**
  - Regulations
  - Dust, noise & industrial diseases
  - Monitoring
  - Drug & alcohol policy
- **Ventilation Plan 1 hr**
  - Overview
  - Ventilation devices
  - Monitoring

Day Five:

This is the day three and final day of orientation underground and consists of the following;

- **Roof Control Plans 2 hrs**
  - Overview
  - Remedial support
- **Mine Gases 2 hrs**
  - Recognition & effects
  - Hazard Avoidance
- **Coal Dust 2 hrs**
  - Dangers
  - Clean up & rock dusting
  - Explosion barrier

- **Safe Work Procedures** **2 hrs**

At the end of each day, the persons attending the orientation will have to go through a written test showing that they understand the overall information given to them during the day.

A Brief List of Proposed Planned Tests

A brief list of proposed plan tests is:

I - Practical Assessment

- Buffalo feeder breaker
- Continuous miner
- Roof bolter
- Shuttle car
- Fletcher dual head-arm feed roof drill (theoretical assessment)

II - Risk Assessment

- Belt splicing
- Changing belt rollers
- Pick changing
- Continuous miner operator
- Roof bolter operator.