DALLO

Moura Recommendations Implementation

Task Group 3

Final Report and Recommendations

7/NOV 96

FOREWORD

Task Group 3 was established to primarily consider actions in respect of these recommendations which apply to training of the mine workforce, the accreditation of those seeking statutory certificates for appointment as deputy, undermanager and manager at underground coal mines, the duration of acceptance of certificates and the appointment, skills and responsibilities of Ventilation Officers.

Because the consideration of matters allocated to the Task Group can have equal impact in New South Wales as well as Queensland, the opportunity was taken to include representatives from the various sectors of the New South Wales industry to contribute, as equal partners, to the work of the group.

Before the recommendations contained in the Wardens Report were presented the coal industry was making advances in the direction of training and accreditation of persons seeking statutory certificates. The Queensland Underground Coal Industry Training Task Force had for some time been developing training material for coal industry employees up to the level of deputy while the Boards of Examiners in Queensland and New South Wales had conducted joint meetings designed to work towards closer cooperation and the development of uniform standards of assessment acceptable to each. The work of these parties has provided good general direction to Task Group 3 work.

The recommendations from Task Group 3 do not absolutely finalise the matters raised by the recommendations. They do, however, provide the path towards the establishment of practices and standards which can be common to both States and result in the Warden's expectations being realised. It is hoped that the work now commenced will be continued through the various groups having the appropriate responsibilities so that the Australian coal industry benefits in the various areas of mine safety and accreditation of statutory officials.

Task Group 3 comprised 11 persons with equal representation from Queensland and New South Wales and an independent Chairman. The persons providing representation on the Task Group are detailed in Appendix 2.

The tabulation below lists the location, date and attendance numbers at the various meetings of the Task Group:

Location	Date	Attendance
Brisbane	17 April	10
Brisbane	14-15 May	10
Sydney	25-26 June	10
Brisbane	9-10 July	10
Brisbane	22-23 July	8
Sydney	1-2 August	9
Brisbane	2 October	8

On 21 June 1996 a special meeting was conducted in Sydney with representatives of the Board of Examiners (Queensland) and Coal Mining Qualifications Board (New South Wales) to receive a presentation by Mr Bob Cooper, BCA Training and Development Services Ltd, with respect to the development of core competencies for underground coal mines statutory certificate applicants. The meeting was attended by a total of 20 persons.

CONTENTS

Page Number

BRIEF

The Task Group was required to provide advice in respect of Recommendations 4, 5, 6, 7, 8 and 24 as contained in the Wardens Report.

In summary the Warden's recommendations are directed to underground coal mining and have regard for:

- the training and retraining of all employees in matters related to mine hazards such as spontaneous combustion and mine gases
- the training and retraining of statutory mine officials and inspectors in communications and also in gases, fires, spontaneous combustion and emergency procedures
- the procedures for granting statutory certificates
- the duration of currency of statutory certificates and consideration of appropriate means of assessing ongoing competency of certificate holders
- the appointment of a Ventilation Officer at an underground coal mine
- the need to assure that courses leading to statutory certificates address the topic of spontaneous combustion in appropriate detail.

Appendix 3 presents the respective recommendations as contained in the Wardens Report.

REPORTING

Under the structure established for the implementation of the Warden's recommendations, the Task Group is required to report to the Moura Recommendations Implementation Committee.

It was proposed that the report be divided into three sections - A, B and C.

Section A is required to apply to recommendations 4 and 5, which relate to the approved training schemes which are mine site specific.

Section B should apply to recommendations 6 and 7 which relate to the granting and currency of statutory certificates and will have as its objective the identification of common standards which will be applied in both Queensland and New South Wales.

REPORTING (cont'd)

Because recommendation 24 applies to academic prerequisites for deputy, undermanager and manager certificates of competency the Task Group has elected to include consideration of this matter in Section B because of the linking of this requirement to those of recommendations 6 and 7.

Section B thus addresses recommendations 6, 7 and 24.

Section C will apply to recommendation 8 which relates to the subject of Ventilation Officer.

DEFINITIONS

ACCREDITATION

Accreditation is the process of granting official approval to courses and training programs. The process is administered by recognition bodies who ensure that accredited courses and recognised training programs deliver the required competency standards with programs of educational quality. The recognition bodies are usually State or Territory authorities.

ACT

Act shall be Coal Mining Act (Qld) and Coal Mines Regulation Act (NSW).

ASSESSMENT

Assessment is the process of judging competency of an individual against prescribed standards of performance. The process involves both the recognition of prior learning and assessment mechanisms.

BOARDS

Boards shall be Board of Examiners (Qld) and Coal Mining Qualifications Board (NSW).

CERTIFICATION

Certification is the provision of formal recognition that competency has been achieved or demonstrated by an individual. It will normally involve the provision of a credential or statement of attainment by a training authority, a registered provider of training or assessment body.

COMPETENCY

Competency comprises the specifications of the knowledge and skill and the application of that knowledge and skill across the industry or within the industry, to the standard of performance required in employment.

The concept of competency focuses on what is expected of an employee in the workplace rather than on the learning process; and embodies the ability to transfer and apply skills and knowledge to new situations and environments. This is a broad concept of competency in that all aspects of work performance, and not only narrow task skills, are included. It encompasses:

- the requirement to understand the appropriate technical logic associated with a particular task.
- the requirement to perform individual tasks (task skills);

- the requirement to manage a number of different tasks within the job (task management skills);
- the requirement to respond to irregularities and breakdowns in routine (contingency management skills)
- the requirement to deal with the responsibilities and expectations of work environment (job/role environment skills), including working with others.

In addition to being based on this broad concept of competency, standards should be:

- related to realistic workplace practices;
- expressed as outcomes;
- understandable to trainers, supervisors and potential employers.

COMPETENCY-BASED SYSTEM

Competency-based system involves the delivery, assessment and certification of training being related to the identification and demonstrated attainment of the knowledge, skills, and their application required for effective performance in work at the required level, as defined in national competency standards. Hence the system is oriented towards outcomes rather than a traditional preoccupation with inputs.

In addition to these definitions the reader may wish to refer to terms in the Glossary of Terms at Appendix 1. These terms have been drawn from the document "Policy and Guidelines - National Competency Standards, Second Edition" and are included to facilitate understanding of training material presently available and in use in the coal industry."

SUMMARY OF RECOMMENDATIONS

Recommendation 4

- Part 59 of the General Rules for Underground Coal Mines should be amended in the table accompanying Rule 59.7 to provide in references applying to "Induction of new employees" and "Refresher training" a topic "The mine environment and potential hazards identified in the Mine Safety Management Plans". "Mine Communication procedures" should also be included as a topic for "Refresher training".

- In approving the training scheme for a mine the Chief Inspector should have regard to the appropriate Units of Competency developed by the Queensland Underground Coal Industry - Training Task Force.

- In approving training schemes recognition should be given to the appropriateness of the training to the hazards to which the trainee is likely to be exposed.

Recommendation 5

- Persons holding statutory appointments, including inspectors should be provided with a training course designed to develop competence in identified basic requirements for both oral and written communication.

- Adequacy of knowledge of gases, spontaneous combustion, mine fires, emergency procedures and communications is an essential part of the requirements for statutory appointees and inspectors to retain the currency of their certificates. Accordingly the requirement for progressive and periodic training is directly linked to requirements for recommendations 6 and 7.

- The outcomes of emergency procedures exercises will provide further training and opportunity for assessment of statutory appointees and inspectors.

Recommendation 6

- Persons seeking certificates as managers, undermanagers and deputies should be assessed on the basis of their knowledge of core safety and health competencies.

- The Boards of Examiners should continue as the authority responsible for determining learning outcomes, assessment criteria and assessment methods in respect of various statutory certificates.

- Those authorities that wish to provide education courses for applicants for certificates will as a minimum be required to meet the Boards' standards for learning outcomes and assessment in the various core competencies.

Recommendation 7

- Certificate holders should be required to demonstrate, within each five year period, that they have maintained their competence in areas of core safety and health competencies relative to the position to which they are appointed.

- The employer shall be responsible to ensure that statutory appointees are trained and reassessed in the core competencies appropriate to the mine.

- There is no requirement for certificate holders to be formally re-assessed by the Boards.

- Under the recommendations the onus is placed on the employer to maintain the competence of statutory appointees.

Recommendation 8

- The position of Ventilation Officer should be a statutory position in that it is prescribed by regulation but not necessarily requiring a certificate issued by the Boards.

- For a person to be appointed Ventilation Officer, such person will require training and assessment in specialised ventilation topics.

- It should not be a prerequisite that a person must possess a certificate as a deputy, undermanager or manager before being considered for appointment as a Ventilation Officer.

- The manager should be responsible to ensure that the person appointed as Ventilation Officer has the abilities to manage the ventilation having regard to the Mine Safety Management Plans.

Recommendation 24

- The identification of core competencies for managers, undermanagers and deputies embraces spontaneous combustion amongst other topics - accordingly no further recommendation is required.

Additional Recommendation

When the various Task Groups were established to contribute to the implementation of the Wardens recommendations time limits were established in respect of which matters would be finalised.

In the case of Recommendations 6, 7, 8 and 24 finalisation is perceived by December 1996.

The work of Task Group 3 has evidenced the need for development work to be undertaken by the Boards and because of this the proposed time frame is inappropriate.

It is recommended that the Minister acknowledges the need for the additional work required of the Boards and that he accepts that a more appropriate date for implementation of the recommendation of the Task Group and the fulfilment of the Wardens Recommendations 6, 7, 8 and 24 would be December 1997.

SECTION A

As previously described this section deals with Recommendations 4 and 5 which respectively state:

> "It is **recommended** that all employees be effectively trained to:
>
> - recognise indicators of specific mine hazards, such as spontaneous combustion, and their control; and
> - become sufficiently familiar with mine gases, and associated risks.
>
> The identification and prevention of these risks must be a part of a compulsory approved training scheme, as well as part of the mine induction process.
>
> It is further **recommended** that all persons holding statutory appointments, including inspectors must undertake:
>
> - training in communications by completing an approved training course that deals with all aspects of communications; and
> - completion of a retraining course each year, progressively covering and periodically revisiting mine gases, spontaneous combustion, mine fires, emergency procedures and communications, as they impact on the mine where they are employed, or over which they have jurisdiction."

Recommendation 4

In Queensland training for underground mines is required by Part 59 of the General Rules for Underground Coal Mines. These rules have been in place since 1988. In the case of New South Wales, Joint Coal Board Order 34 dictates with regard to training, the Order has been in place since 1979.

Training schemes established to meet requirements of the General Rules for Underground Coal Mines require the approval of the Chief Inspector while in the case of Order 34 the Joint Coal Board is the approving authority. In each case requirements dictate the need for induction and refresher training.

Part 59 - Personnel Training contains a listing of the topics to be covered by Induction training and Refresher training. This listing is detailed in a table which is part of Rule 59.7.

The table prescribes eight topics for Induction training, these are:

i. basic first aid and resuscitation
ii. mine transport rules
iii. use of fire fighting appliances
iv. mine emergency procedures
v. mine communication procedures
vi. the mine supervisory structure
vii. general method of working the mine
viii. the mine environment and potential hazards.

In the case of refresher training, the listing contains only six items which are comprised of those stated above less (v) mine communication procedures and (vi) mine supervisory structure.

Reviewing the existing Part 59, the Task Group considered that the matters which should be considered are:

- When approving a training scheme for a particular mine the Chief Inspector should have authority to approve of a scheme which has regard to the particular safety training needs of individual employment strands, eg. workers in the mine office and similarly in a coal preparation plant will not necessarily require the same level or breadth of induction training as underground workers. Part 59 should be amended to clarify this position.

- In respect of refresher training and having regard to the Warden's several references to communication it is necessary to include "mine communication procedures" as a topic to be addressed in refresher training.

- Reference to "the mine environment and potential hazards" as a topic for both induction and refresher training would be better described as "the mine environment and potential hazards identified in the Safety Management Plans" for by so doing not only are mine gases, spontaneous combustion and associated risks attended but also other matters addressed by Safety Management Plans. The amendment also directly links Safety Management Plans to training requirements.

For some time the Queensland Underground Coal Industry - Training Task Force has been developing Units of Competency and Module Descriptors for training the underground workforce. These units address matters of operational activity and also occupational safety and health. The Module Descriptors detail in respect of the various individual topics the Learning Outcomes, Assessment Criteria and Assessment Methods. The Training Task Force comprises representation from management and unions. The majority of the Units of Competency/Module Descriptors have been registered as National Training Standards through the National Mining Industry Training Advisory Board and accordingly apply across the underground coal industry.

The content of the training modules is suitable for adaptation in any training scheme proposed for approval under Part 59. Having regard to such a position, the Task Group reviewed the material and identified the link between the topics detailed in the tabulation to Rule 59.7 and respective Training Units/Module Descriptors.

A broad description of the linkage is detailed below, with a more detailed description being contained as Appendix 4.

It is recommended that the Chief Inspector use the detail identified in Appendix 4 as the basis for approving Training Schemes for by so doing the requirements of Recommendation 4 will be fulfilled.

INDUCTION AND REFRESHER TRAINING

PART 59 TOPIC	*QLD UNDERGROUND COAL INDUSTRY UNIT NO/TITLE*
Basic First Aid and Resuscitation	Unit 1 - Work Safely
Mine Transport Rules	Unit 15 - Conduct Wheeled Vehicle Operations
Use of Fire Fighting Apparatus	Unit 1 - Work Safely
Mine Safety Procedures	Unit 1 - Work Safely Unit 25 - Implement and Maintain Workplace Safety
Mine Communication Procedures	Unit 1 - Work Safely Unit 21 - Respond to Local Emergencies Unit 110 - Apply Mine Communication Systems
Mine Supervisory Structures	Unit 1 - Work Safely Unit 25 - Implement and Maintain Workplace Safety
General Method of Working the Mine	Unit 1 - Work Safely Unit 43 - Conduct Strata Control Operations Unit 47 - Conduct Mine Ventilation Control Measures Unit 73 - Conduct Face Ventilation Operations
Mine Environment and Potential Hazards	Unit 1 - Work Safely Unit 3 - Solve Operational Problems Unit 21 - Respond to Local Emergencies Unit 25 - Implement and Maintain Workplace Safety Unit 44 - Conduct Special Roadway Operations Unit SC1 - Apply Spontaneous Combustion Management Measures to Underground Coal Mining Operations Unit RM1 - Conduct Local Risk Management

Recommendation 5

The recommendation relates to the mine training of statutory appointees and inspectors and identified two areas for training. One aspect is communication and the other identifies topics such as mine gases, spontaneous combustion, mine fires, emergency procedures and communication as each impacts upon the mine.

The Task Group considered that the first reference to communication had particular regard for the basics of communication as distinct from the specific communication systems which would be in place at a mine and which would be specifically addressed by response to the second element of the recommendation.

The Task Group does not possess specialised skills in core topics to be addressed in basic communication and has been obliged to rely upon the syllabus of courses which have been conducted at mines by trainers specialising in the topic. It has been recognised that any training directed to statutory appointees should address both oral and written communication. It was considered that there is a close linkage between the principles of oral and written communication and that some of the subjects which should be addressed can be attended under subject titles such as:

Communication; involves initiating to understanding
Communication takes two
Identification of barriers to communication
Overcoming barriers
Non-verbal communication
Communication, a two-way street
What people need
Key principles
Feedback - what, why - a review
Feedback - do's and don'ts
Interaction guidelines for communicating with others
Communication in negotiation.

In respect of written communications matters of reporting should be addressed with regard to:

Reporting in a non-verbal manner
Reports which are based on data
Reports which are based on exceptions
Interpretation of reports
Recognising report audience
Reporting on action to be taken or recommended
Reporting accuracy by concise description
Layout out a report.

In respect of oral communication training it is recommended that such should be attended by a very interactive delivery technique. A detailed syllabus for delivery is contained at Appendix 5.

There is also need to recognise that Queensland Underground Coal Industry - Training Task Force papers contain Module Descriptors CMUP 110 and CMUP 112 each of which provide subject matter relative to communication

CMUP 110 Mine Communication Systems
CMUP 112 Coordinate Workplace Operations

These modules are also considered appropriate for application even though they tend to be more directly applicable to specific mine requirements.

That part of the recommendation which requires retraining each year in the various mining topics, like mine gases, spontaneous combustion etc. relates to matters which must be acknowledged as core competencies. In keeping with the requirements of the recommendation it is appropriate to recognise the allowability of attending the total range of topics over several years. In order to ensure that the coverage of the topics is achieving the desired result some form of controlled assessment is desirable. The expectations of this part recommendation are closely aligned with requirements which will be later described as applying to the granting of statutory certificates and the assessments appropriate to the continued currency of such certificates. In short, the requirements of this part of Recommendation 5 can be properly attended by the application of principles which will be described as applying to Recommendations 6 and 7.

SECTION A: RECOMMENDATIONS

The Task Group recommends:

1) Part 59 - "Personnel Training" of the General Rules for Underground Coal Mines be amended to:

   a) Authorise the Chief Inspector to approve of Training Schemes designed specifically to apply to the particular safety training needs of individual employment classifications

   b) Include under the topics for Refresher training a requirement for "mine communication procedures" as is stipulated for Induction training

   c) Add to the topic "the mine environment and potential hazards" where it appears for induction and also refresher training so that in the amended form it reads "the mine environment and potential hazards identified in the Safety Management Plans".

2) For the purposes of approving Training Schemes the Chief Inspector requires any such schemes to provide for Learning Outcomes and Assessment Criteria to at least equal those respectively prescribed in Appendix 4 hereof.

3) For the purposes of training statutory appointees/inspectors in the basic competencies of communications mines engage the services of competent communications trainers with the intention of providing instruction through interactive and flexible delivery techniques in respect of both oral and written communication. Appendix 5 provides expanded detail of a recommended syllabus for such training.

4) The requirement to progressively cover, on an annual basis, specific mine topics relative to mine gases, spontaneous combustion etc. be accepted as being attended by practices and recommendations which are described in Section B relative to the grant of certificates and the currency of such certificates.

SECTION B

This section addresses Recommendations 6, 7 and 24 which respectively state as follows:

> It is **recommended**, therefore, that the procedures for granting statutory certificates for underground coal mining and the conditions under which they are awarded, be reviewed.
>
> In particular, it is **recommended** that certificates not be granted for life and that a system needs to be developed and put into effect as soon as practicable that requires certificate holders to demonstrate their fitness to retain the certificate of competency on a regular basis, at intervals of not less than three and not more than five years.
>
> We **recommend**, therefore, that to be accredited as satisfying the academic pre-requisites for the granting of manager's, undermanager's, and deputy's certificates of competency in coal mining, all courses of instruction be required to include adequate instruction on spontaneous combustion (its nature, cause, detection and management) using appropriate supporting literature, case study material and other learning aids.

Recommendation 6

In considering the subject of the issue of statutory certificates for underground coal mines, the Task Group resolved to contain its considerations to the positions of deputy, undermanager and manager rather than to the wider aspect of reviewing the possibility of providing for a similar range of statutory certificates in both Queensland and New South Wales and the assessment of that range.

A general view was expressed that the respective Boards have been examining candidates, particularly managers, in topics which are outside the range of safety and health. While there is advantage in such persons having skills and knowledge in what might be termed commercial areas, it would be more appropriate for the Boards to concentrate and examine in respect of core competencies only. To move in such a direction requires the identification of such core competencies.

The Task Group acknowledged that the Boards would continue to be responsible for the issue of statutory certificates and that common competencies and assessment methods should apply in each State. It was also agreed that applicants for certificates who have completed mining courses which produce the required learning outcomes or have accreditation via Recognition of Prior Learning strands should be accepted for assessment by the Boards.

Because the Boards would be accountable for the issue of certificates there was an acknowledgment that the identification of core competencies, competency standards and assessment strategies were the responsibility of the Boards. It was, however, proposed that, with the approval, the Task Group could be considered as an appropriate forum in which to develop draft core competencies for further consideration by the Boards.

To advance the matter a meeting was conducted in Sydney where members of the Board of Examiners (Qld), Coal Mining Qualifications Board (NSW) and Task Group 3 were addressed by Mr Bob Cooper, BCA Training and Development Services Pty Ltd, who has acted as a facilitator, to the Queensland Underground Coal Industry - Training Task Force, in the development of training materials. Mr Cooper explained the processes by which Units of Competency, Module Descriptors and Assessment Systems are developed. He proposed that an appropriate program would provide for Task Group 3 to undertake a Scoping Exercise and also Identify and Establish Core Competencies for deputy, undermanager and manager. Following consideration of the position Task Group 3 was authorised by the Boards to undertake the Scoping Exercise and Identification and Establishment of Core Competencies as proposed. Task Group 3 proceeded to engage Mr Cooper, as facilitator, to advance the work.

Because of work previously undertaken the Task Group was not obliged to start from basics. Two sets of documents provided an acceptable launch pad. These were the training documents developed by the Queensland Underground Training Task Force and also documents arising from joint work by Queensland and New South Wales Board representatives which were intended for the assessment of managers and undermanagers.

Mr Cooper was engaged and acted as facilitator at each of two two-day meetings held in Brisbane on 9-10 July and 22-23 July 1996. As a result of these meetings a series of material resulted, with the principle outcomes being:

- the identification units of competency structure for manager, undermanager and deputy
- the detailed content of each unit addressed under issues, performance criteria, range of variables and assessment
- an example - unit of competency, and
- an example - module descriptor.

The examples mentioned were produced for the purposes of advice to the Boards in respect of the next stages of development.

The total document produced by the Task Group is contained at Appendix 6.

In the review of core competencies it was acknowledged that essentially from deputy to manager the topics which are represented in the core competencies are essentially the same. The difference at the various certificate levels is represented by the depth of knowledge required and the application of that knowledge.

Managers are charged with using their knowledge to "design, establish or evaluate". This is intended to denote ultimate responsibility in designing and establishing plans, systems and procedures, in selecting methods and equipment or materials and formally evaluating achievements and outcomes.

In the case of undermanagers the requirements are to "interpret, review" which implies the implementation and review throughout all facets of mining operations of plans, schemes, systems and procedures which have been established under the authority of the Manager.

The terms "apply and monitor" are used for the deputy which requires application and monitoring within an assigned work area of responsibility of approved plans, schemes, systems and procedures.

Having regard to the definitions described above the following tabulation sets out the units prescribed in respect of the various certificate levels from manager to deputy.

PROPOSED UNIT OF COMPETENCY STRUCTURE (Manager, U/Manager, Deputy)

MANAGER

Unit: M1

Title: Establish Criteria & Systems for the Development of Stable Mining Structures

Descriptor:
This unit covers the application of principles of mine design to the establishment and ongoing development of stable mining structures.

Pre-Requisites:
Unit UM1

Unit: M2

Title: Establish & Maintain a Safe Mine Atmosphere

Descriptor:
This unit covers the functions required to establish and maintain a safe mine atmosphere including the development and approval of plans for ventilation, gas management, spontaneous combustion and outburst management.

Pre-Requisites:
Unit UM2
Unit RM3

Unit: M3

Title: Establish & Maintain Personnel Safety Systems

Descriptor:
This unit covers the development, establishment, maintenance and ongoing review and audit of personnel safety structures and systems.

Pre-Requisites:
Unit UM3
Unit RM3

UNDER MANAGER

Unit: UM1

Title: Implement & Maintain Development of Stable Mining Structures

Descriptor:
This unit covers the implementation and monitoring of the operational development and maintenance required to sustain stable mining structures including strata control, methods of work and the development and maintenance of production systems.

Pre-Requisites:
Relevant aspects of Unit DP1.

Unit: UM2

Title: Implement & Maintain Mine Atmosphere Control

Descriptor:
This unit covers the actions required to maintain a safe mine atmosphere through the implementation of approved management plans and systems covering ventilation, gas, spontaneous combustion and outburst requirements.

Pre-Requisites:
Relevant aspects of Unit DP2.

Unit: UM3

Title: Implement & Maintain Personnel Safety Sytems

Descriptor:
This unit covers the implementation, active promotion, monitoring and ongoing review of the effectiveness of all aspects of approved personnel safety systems.

Pre-Requisites:
Relevant aspects of Unit DP3.

DEPUTY

Unit: DP1

Title: Maintain Development of Stable Mining Structures

Descriptor:
This unit covers the application and review of the operational development and maintenance required to sustain stable mining structures including strata control, methods of work and the development and maintenance of production systems.

Pre-Requisites:

Module 25A.2	Systems of Work
Module 43C 1.1 - 1.7	Primary Strata Control
Module 43C 2.1 - 2.7	Secondary Strata Control
Module 47.2	Ventilation Information
Module 111B	Advanced Workplace Communications
NCS Unit 48	**Conduct Shotfiring**

Unit: DP2

Title: Maintain Mine Atmosphere Control

Descriptor:
This unit covers the actions required to maintain a safe mine atmosphere through the implementation of approved management plans and systems covering ventilation, gas, spontaneous combustion and outburst requirements within the allocated area of responsibility.

Pre-Requisites:

Module 26	Environmental Monitoring
Module 40	Gas Drainage Systems
Module 47.1	Ventilation Control Measures
Module 47.2	Ventilation Information
Module 47.3-5	Ventilation Planning
Module 65	Construct Ventilation Structures
Module 111B	Advanced Workplace Communications

Unit: DP3

Title: Apply & Maintain Personnel Systems

Descriptor:
This unit covers the application, active promotion, monitoring and ongoing review of the effectiveness of assigned aspects of approved personnel safety systems.

Pre-Requisites:

Module 25A.1	Deputy-General
Module 25A.3	Personnel Health/Safety
Module 25B	Inspections/Stat Records
Module 111B	Advanced Workplace Communications

MANAGER

Unit: M4 **Title:** Establish the Mine Infrastructure and Associated Maintenance Systems **Descriptor:** This unit covers the development, evaluation and establishment of mine infrastructure and the associated ongoing maintenance systems covering all aspects of engineering including equipment, civil, haulage, transport, communications, lighting and fire abatement systems and mine services. **Pre-Requisites:** Unit UM4	**Unit:** M5 **Title:** Establish & Monitor Mine Emergency Measures **Descriptor:** This unit covers the design, establishment and ongoing audit and review of emergency preparedness and response plans. **Pre-Requisites:** Unit UM5 Unit RM3	**Unit:** **Title:** **Descriptor:** **Pre-Requisites:**

UNDER MANAGER

Unit: UM4 **Title:** Implement Ongoing Maintenance Systems for the Mining Infrastructure **Descriptor:** This unit covers the implementation, coordination and monitoring of the effectiveness of ongoing maintenance systems for the mining infrastructure including all aspects of engineering, but not limited to, equipment, civil works, haulage, transport, communications, lighting, fire abatement systems and mine services. **Pre-Requisites:** Relevant aspects of Unit DP4.	**Unit:** UM5 **Title:** Implement Mine Emergency Response Plans **Descriptor:** This unit covers the ongoing preparation for and subsequent implementation of emergency response plans, the control of emergency situations until relieved, and participation in post-emergency actions. **Pre-Requisites:** Relevant aspects of Unit DP5	**Unit:** RM3 **Title:** Facilitate the Risk Management Process **Descriptor:** This unit covers the actions taken to facilitate and coordinate the risk management process for a site/area including the application of local and formal risk assessment and control. **Pre-Requisites:**

DEPUTY

Unit: DP4 **Title:** Apply Ongoing Maintenance Systems for the Mining Infrastructure **Descriptor:** This unit covers the application of ongoing maintenance systems for the mining infrastructure including, but not limited to, equipment, civil works, haulage, transport, communications, lighting, fire abatement systems and mine services. **Pre-Requisites:** Module 25A.4 Machinery Safety Module 25A.5 Electrical Safety Module 111B Advanced Workplace Communications	**Unit:** DP5 **Title:** Apply Mine Emergency Response Plans **Descriptor:** This unit covers the application of emergency response plans, the control of emergency situations until relieved, and participation in post-emergency actions. **Pre-Requisites:** Module 25A.6 Disaster Management Module 47.2 Ventilation Information Module 111B Advanced Workplace Communications	**Unit:** RM3 **Title:** Facilitate the Risk Management Process **Descriptor:** This unit covers the actions taken to facilitate and coordinate the risk management process for a site/area including the application of local and formal risk assessment and control. **Pre-Requisites:**

The relationship between units and elements in each unit is described as follows:

ELEMENT	UNIT		
Geology	M1	UM1	DP1
Geomechanics	M1	UM1	DP1
Mine Surveying	M1	UM1	DP1
Systems of Mining	M1	UM1	DP1
Mine Gases	M2	UM2	DP2
Gas Drainage	M2	UM2	DP2
Mine Ventilation	M2	UM2	DP2
Gas Outbursts	M2	UM2	DP2
Spontaneous Combustion	M2	UM2	DP2
Occupational Health and Safety	M3	UM3	DP3
Production Equipment	M4	UM4	DP4
Transport Systems and Equipment	M4	UM4	DP4
Mine Services Equipment	M4	UM4	DP4
Fixed Plant	M4	UM4	-
Preparedness and Emergency Response	M5	UM5	DP5
Explosions	M5	UM5	DP5
Fires	M5	UM5	DP5
Risk Management	-	RM3	RM3

Should the Boards accept the core competencies identified by the Task Group they will have some 50 module descriptors to develop (17, manager; 17, undermanager; and 16, deputy) as well as 14 unit descriptors, presuming the example Unit M2 is accepted and would not need to be reworded. One the basis of estimates provided by Mr Cooper the development of units may require up to 10 days of writing effort, including four days for an expert group. In the case of modules it has been estimated that, with access to appropriate technical guidance an experienced writer could attend the task in 15-25 days, depending on the extent of module structure established by the expert group.

It would be possible for the Boards to determine that a structure such as contained at Attachment 4 of Appendix 6 is sufficient, with some minor expansion, to meet their needs. The Task Group would, however, advise against such action in favour of a structure of units of competency and module descriptors which can be accredited through the Australian National Training Authority. By so doing the Boards' requirements become the accepted Australian standards for training and assessment of statutory mine officials and ensure that those who wish to take advantage of the provisions of the Mutual Recognition Act do so in accordance with acceptable standards.

The structured system of training, education and assessment provides avenues for all persons to progress to various levels of statutory responsibility. Educational requirements are clearly described for flexible delivery and for providers while assessment standards are equally clarified.

The Task Group recommends that the Boards accept the Proposed Unit of Competency Structure (Manager, Undermanager, Deputy) as detailed herein and that joint meetings of the Boards be held for the purpose of expanding the existing work into Units of Competency and Module Descriptors acceptable to the Boards and suitable for accreditation as national standards. In the longer term it should be an objective for Queensland and New South Wales to conjointly establish a single accreditation Board representative of all coal industry parties (Government, Operators, Unions and Learning Institutions).

The Task Group recognises the demands these recommendations place upon the Boards and respectfully requests that the Minister for Mines and Energy (Qld) and the Minister for Mineral Resources (NSW) provide the necessary support in order that work may be progressed.

Recommendation 7

The recommendation gives voice to concerns that some persons to whom statutory certificates are issued may not be maintaining their knowledge and skills to an acceptable level. The recommendation proposed that as a result of this position certificates should not be granted for life but rather that certificate holders should be required to demonstrate their competence to retain a certificate on a regular basis. A minimum of three years and a maximum of five years were proposed.

The Task Group was afforded the opportunity to discuss the matter, at different times, with two members of the panel which assisted at the Wardens Inquiry. The advice received indicated that:

- It was not being proposed that certificate holders be re-examined by the Boards.
- There should be a system requiring persons to keep up to date.
- Any system should require persons to progressively demonstrate the capacity to operate ie. a progressive system of development which may be audited and will include all statutory officials.
- The panel had no specific comment on the most appropriate system for determining how knowledge should be maintained nor how audit functions should be performed.

In reviewing the position of currency the Task Group examined the requirements of the Australian Maritime Safety Authority, Civil Aviation Safety Authority, Registration Board for Health Professionals, Institute of Chartered Accountants and the Institute of Mining Engineers (UK).

The requirements of the various authorities are as diverse as are the numbers of authorities, with requirements ranging from the moral obligation to maintain professional development with no time limits (health professionals), to the demands for persons to demonstrate practical capabilities at very short, regular intervals (pilots). Institutions, in the main, require members to personally certify that they have undertaken professional development for stipulated periods. None of the authorities prescribed re-examination by the issuing authority, and the Maritime Safety Authority acknowledged the longest currency period - 5 years.

The Task Group recognised and supported the need for statutory certificate holders to maintain competency in safety and health matters if certificates were to continue to permit them to operate. Ideally any evidence produced to support the maintenance of competence should be creditable, practical, measurable and capable of audit. The required standards should have the acceptance of the Boards..

The Task Group believes that the intention of the Wardens recommendation is not so much the life of the certificate but the necessity to ensure that statutory appointees maintain competence in core competencies appropriate to the mine and the appointment.

The core competencies as defined by the Boards will be a minimum requirement and will not prevent additional professional development being directed to any appointee or group of appointees at the mine.

It is considered that the Wardens expectations can be realised by placing the onus for maintaining competence of statutory appointees directly upon those responsible for employing them. Accordingly it will not be necessary to further involve the Boards.

Having regard to the issues raised by the Warden in Recommendation 7 the following points are made:

- Certificates will be granted by the Board
- Core competencies and assessment methods will be determined by the Boards
- Prior to the making of a statutory appointment required under the Act the employer shall ensure that the appointee possesses the competencies to perform the task or duties required of that person
- The core competencies required in respect of the mine shall be determined by the employer from the competencies identified by the Boards as appropriate for the level of certification.
- The employer shall develop a scheme or management plan for training, relevant development and reassessment of individuals based on core competencies determined for the position to which the person is appointed
- Reassessment of statutory appointees in all the relevant competencies for the mine shall be completed within each 5 years
- The appointment of a statutory official shall be terminated if that person is not currently competent in the core competencies for the mine
- Records of the individual's training and assessment in core competencies shall be kept by the employer for a rolling 7 years

Recommendation 24

The recommendation stresses the need for academic courses leading to manager, undermanager and deputy to provide adequate instruction in spontaneous combustion.

The decision by the Boards to develop assessment of applicants for statutory certificates around core competencies identified by Task Group work in respect of Recommendation 6 more than cover the requirements of this recommendation for risks associated with spontaneous combustion.

Presuming the Boards elect to develop the core competencies identified for Recommendation 6, the stated intentions of Recommendation 24 will be attended and accordingly the Task Group recommends no further action is required.

SECTION B: RECOMMENDATIONS

The Task Group recommends that:

1) The Boards accept the Proposed Unit of Competency Structure (Manager, Undermanager, Deputy) identified by the Task Group and detailed on pages 15 and 16 hereof and utilise the data to develop National Competency Standards that are suitable for the development and accreditation of Module Desciptors appropriate to Manager, Undermanager and Deputy.

2) The Boards accept as a future goal the establishment of a single accreditation Board having both Queensland and New South Wales representation of all coal industry parties.

3) The Minister for Mines and Energy (Queensland) and the Minister for Mineral Resources (New South Wales) provide the necessary support to permit the Boards to progress the development of the necessary core competency material.

4) Having regard to the life of certificates the following conditions be applied:

- Certificates will be granted by the Board
- Core competencies and assessment methods will be determined by the Boards
- Prior to the making of a statutory appointment required under the Act the employer shall ensure that the appointee possesses the competencies to perform the task or duties required of that person
- The core competencies required in respect of the mine shall be determined by the employer from the competencies identified by the Boards as appropriate for the level of certification.
- The employer shall develop a scheme or management plan for training, relevant development and reassessment of individuals based on core competencies determined for the position to which the person is appointed
- Reassessment of statutory appointees in all the relevant competencies for the mine shall be completed within each 5 years
- The appointment of a statutory official shall be terminated if that person is not currently competent in the core competencies for the mine
- Records of the individual's training and assessment in core competencies shall be kept by the employer for a rolling 7 years.

5) The provisions described to satisfy Recommendation 6 should be accepted as providing compliance with recommendation 24.

SECTION C

This section addresses Recommendation 8 only. The recommendation states:

> "It is **recommended** that a position of ventilation officer be established as a statutory position at all underground coal mines. The ventilation officer appointed must have demonstrated competencies appropriate to the duties and responsibilities of the position and would be directly responsible to the mine manager for the planning, design and implementation of the mine ventilation system and for the establishment of effective standards of ventilation for the mine, methods for its control and protection, monitoring of performance, reporting procedures, maintenance of ventilation records and plans, and emergency action plans.
>
> The mine manager may be the appointed ventilation officer. Otherwise, if the ventilation officer has other duties at the mine, they would be subordinate to those of ventilation officer."

In consideration of this recommendation the Task Group acknowledged that the appointment of a Ventilation Officer is a matter of major importance because the proper management of ventilation is one of the key requirements necessary for the safety of a mine. In discussion with the Task Group, the Warden's panel members advised that the appointment of a Ventilation Officer was an issue proposed by most counsel in submissions to the Inquiry.

A review of the position regarding Ventilation Officer in the respective legislation reveals that neither the Queensland Coal Mining Act nor the General Rules for Underground Coal Mines make any requirements regarding ventilation officers. Essentially the principle responsibilities for ventilation rest with the undermanager and the manager. In the case of New South Wales, Part 2, Coal Mines Regulation (Ventilation - Underground Mines) Regulation (1984) prescribes the qualifications and duties of a Ventilation Officer.

With respect to qualifications, the New South Wales regulations prescribe:

> "The manager of a mine shall either act as or appoint some other person, who holds a certificate of competency to be an under-manager, as ventilation officer for the mine."

Having regard to the New South Wales requirements, the Task Group reviewed the position with respect to qualifications of a ventilation officer. Some points made were:

- The duties required of a ventilation officer are such that the position dictates that the appointee requires specialised skills which are not totally incorporated in courses presently prescribed for manager and undermanager.

- There have been several examples of persons who possess statutory certificates and have been appointed ventilation officer to be found incapable of managing their responsibility to the extent that unsatisfactory and dangerous conditions have developed in systems under their charge.

- Experiences in the industry have demonstrated that there are ventilation specialists available who have a high degree of ventilation knowledge but not necessarily a coal mining background. Such people could not aspire to qualify for a statutory qualification. These persons are, however, eminently qualified to design and manage ventilation systems and are considered to be the types of persons envisaged in the Warden's recommendation. They should not be denied the opportunity for appointment.

The Task Group considered that the intention of the Warden's recommendation with regard to ventilation officer could best be satisfied by:

- Recognising that "statutory position" be taken to mean that the position is "prescribed by statute" rather than the person appointed being the "possessor of a statutory qualification".

- Describing the skills which should be possessed by a ventilation officer and identifying those aspects which require specialised training.

- Requiring those who are to be appointed Ventilation Officer to have completed a course in Mine Ventilation to ensure that their competencies meet those conjointly prescribed by the Boards.

- Recognising that the Ventilation Officer would be responsible and accountable to the manager.

- Requiring the manager to appoint a suitably qualified Ventilation Officer.

The Task Group acknowledged that the Warden recommended that mines develop Safety Management Plans for key risk areas and that one such area is ventilation. It was considered that the development of a Ventilation Management Plan will dictate whether the conditions at a mine will require a Ventilation Officer to be on site full time or whether because of benign conditions or other limiting features that the availability of the Ventilation Officer on an "as needs" basis will suffice.

In any case the Chief Inspector should exercise his authority in cases where there is a failure to recognise the needs for the proper management of the ventilation system.

To cover the situation of developing mines and similar special cases, it was considered appropriate that it would be proper to allow the Owner or Agent to apply to the Chief Inspector to have the manager, who has been shown to have the competencies, appointed as Ventilation Officer.

The areas where persons who wished to become ventilation officer require specialised training were, for the purposes of the Boards, identified as:

- Theoretical knowledge and skills of ventilation - physics, pressure balancing, etc.
- Practical application of theoretical knowledge - alarms, set points, trends, ratios, action plans, protocols.
- PC literate - ventilation software.
- Spontaneous combustion, sealing and re-entry.
- Fires and explosions and their impact on ventilation.
- Management of process information; statistical techniques.
- Ventilation surveys.

It should be recognised that other competencies are required but these are covered in the various courses for statutory certificates at the various levels and are detailed in the Section B recommendations.

The Task Group considered the development of competency standards for Ventilation Officers should be pursued as a matter of urgency so that training and assessment of industry personnel may commence. Views were expressed that, given priority, results could be achieved within twelve months. To this time two Universities have indicated a willingness to develop courses.

The Warden provides in considerable detail in his recommendation the duties which he considers appropriate for the ventilation officer. The Task Group supports without qualification this detail.

SECTION C: RECOMMENDATIONS

Having regard to Recommendation 8 the Task Group recommends:

(1) ***Appointment***

a) The General Rules for Underground Coal Mines be amended to require the appointment, by the manager, of a Ventilation Officer who shall

i. be accountable to the manager
ii. if he has other duties at the mine then those duties shall be subordinate to those of ventilation officer
iii. possess competencies in ventilation prescribed by the Boards.

b) The Owner or Agent of the mine may apply to the Chief Inspector to have the manager, who has been shown to have the necessary competencies, appointed as a Ventilation Officer.

(2) ***Responsibilities***

The Ventilation Officer shall be responsible for:

a) The planning design and implementation of the mine ventilation system

b) The establishment of effective standards of ventilation of the mine

c) Methods for the control and protection of ventilation

d) Monitoring of the performance of the system

e) Reporting procedures

f) Maintenance of ventilation records and plans

g) Emergency action plans in respect of which ventilation is a consideration.

(3) ***Competencies***

The Ventilation Officer shall possess the following:

a) Special competencies in ventilation

i. Theoretical knowledge and skill of ventilation - physics, pressure balancing, etc.

ii. Practical application of theoretical knowledge - alarms, set points, trends, ratios, action plans, protocols

iii. PC literate - ventilation software

iv. Spontaneous combustion, sealing and re-entry

v. Fires and explosions and their impact on ventilation

vi. Management of process information; statistical techniques

vii. Ventilation surveys.

a) General competence in

i. Knowledge of mining methods

ii. Development and implementation of Ventilation Management Plans

iii. Ventilation appliances; design, construction; purpose

iv. Relevant legislation

v. Mine environment monitoring systems

vi. Mine gases

vii. Communication

viii. Risk assessment and application of controls

ix. Associated hazards; outbursts, windblast; gas drainage.

(4) *General*

(a) Development of competency standards should be pursued as a matter of urgency so that training and assessment of industry personnel for appointment as Ventilation Officer may commence without delay.

(b) There should be no interim arrangements with regard to appointments but rather the implementation of requirements of training and assessment of persons to described standards, thence the appointment of competent persons.

GLOSSARY OF TERMS

advanced standing refers to the amount of exemption granted to a student or trainee from an accredited **course** or **training program** on the basis of previous study, experience or competencies held.

articulation refers to the formal linkage between different levels or different fields of study, including enterprise and industry-based training. Articulation arrangements allow the horizontal or vertical movement between programs or between education and employment.

broadskilling see multiskilling

career path refers to the sequence of jobs or classifications in a work structure that an individual can attain through progressive achievement of competencies and other requirements. Career paths can enable a person to make a hierarchical progression within a particular industry or sector of an industry, or lateral movement and progression into other related sectors of an industry or another industry.

CODAP is a technique of job analysis based on the concept of dividing a job into tasks, Based on interviews with representative members of an occupation, a questionnaire is developed, tested and refined. Job information is collected from workers and supervisors by means of the questionnaire after which a set of computer programs is used to enter, rank, quantify, organise, summarise and report of this information.

common competencies refer to those competencies that are used in a number of industries with essentially the same outcomes, and sometimes form of expression. Often they would be the competencies used in *cross-industry standards*.

competency based training (CBT) refer to training concerned with the attainment and demonstration of specified skills, knowledge and their application to meeting industry standards rather than with an individuals achievement relative to that of others in a group. It is "criterion-referenced" rather than the "norm-referenced".

competency interview is a one-to-one interview carried out by a person skilled in the technique; its purpose is to identify and list competencies of workers in particular positions. Only persons in the position under investigation or their immediate supervisors participate.

competency standards bodies (CSBs) refers to organisations formally recognised by the National Training Board to develop, submit for endorsement and maintain national competency standards for specific industry or cross-industry application. CSBs comprise the relevant industry parties, are often Industry Training Advisory Boards (ITABs), and are partners with training providers and recognition bodies in the implementation of standards.

contributory skilling see multiskilling.

core competencies refers to a group of units of competency within a competency standards that an industry has agreed are essential to be achieved if a person is to be accepted as competent at a particular level. All units may be core, but in many cases competency at a level will involve core units plus optional or specialisation units of competency. Core competencies are normally those central to work in that industry.

course (accredited) refers to a sequence of vocational education and training which is consistent with the principles of accreditation under NFTROT, accredited by a **recognition authority**, and leads to a **credential**.

credential refers to the **certification** given in recognition of successful gaining of a defined set of competencies which, where relevant, relate to the Australian Standards Framework. Credentials are currently termed Certificate, Advanced Certificate, Associate Diploma, etc.

credit transfer refers to the credit given or to be given in an accredited **course** for competencies gained in a **training program** or through **Recognition of Prior Learning.**

critical incident technique is a one-to-one interview carried out by a person skilled in the techniques which requires participants to focus on significant work incidents from their past and the competencies which enabled them to perform successfully. The technique focuses on the underlying attributes and individual characteristics of successful performance rather than on routine duties and tasks.

cross-industry competency standard refers to a group of units of competency that express **common competencies** across a number of industries. The units of competency may be grouped to relate to certain function of work common across those industries. They are developed by recognised CSBs.

curriculum refers to a plan incorporating a structured series of intended learning outcomes and associated learning experiences. (ie the objectives, structure, content, assessment and sequencing of what has been learned, generally organised as a related combination or series of units/modules/elements).

DACUM is an information collection technique using participation from a group which is representative of the particular occupation and a skilled facilitator which identifies:

- the duties of the occupation
- the component tasks of each duty
- the knowledge, skills and applications needed to perform each task.

Delphi is a survey technique usually conducted by mail which aims to reach consensus by repeatedly summarising participants' responses and incorporating these into subsequent questionnaires. Participants learn the opinions of others and can review their own position accordingly, but discussion, debate and open conflict are not possible.

Endorsement refers to the formal recognition by the National Training Board of a national competency standards and it inclusion in the National Register of Competency Standards, Endorsed standards have been agreed by Commonwealth, State and Territory Ministers to be the bench marks for accreditation of courses, curriculum development, and recognition of training in the Vocational Education and Training sector.

functional job analysis is an information collection technique using a group participation, usually by the lead bodies or representative peak training organisation in an industry, and a skilled facilitator to establish the competency standards for an occupation. It identifies:

- the key purpose or function of the occupation in terms of outcome
- the elements of competency which allow the key purposed to be achieved
- the performance criteria for each task identified as necessary for competency.

general competencies refers to those that apply to work generally rather than being specific to work in particular occupations or industries. They tend to underpin performances in other more industry specific competencies. The **key competencies** developed by the Mayer Committee are an example. Also may be called generic competencies.

industry competency standard refers to a grouping of units of competency that expresses at a minimum the requirements to be competent at particular ASF levels, and at a maximum the requirements for all ASF levels linked together in a career path in that industry. They are developed by recognised CSBs.

key competencies refers to employment related **general competencies** defined by the Mayer Committee as essential for all young people's effective participation in emerging patterns of work and work organisation. They focus on the capacity to apply knowledge and skills in an integrated way in work situations and are not restricted to narrow or specific application. They are also essential for effective participation in further education and life, more generally.

knowledge refers to two aspects: 1) cognitive skills involved in processes such as judgement, thinking and understanding; and 2) information, which is the base of factual and theoretical material this as accessed, manipulated and used cognitively.

monitoring or **verification** is in the process of quality assurance involving internal, local and external validation of the integrity of the training system. It should not be confused with assessment.

multiskilling refers to development of competencies through training or other means that have been associated with a number of formerly discreet occupations or classification levels. This equips a worker to perform a variety of tasks or functions across traditional boundaries. It includes concepts such as broadskilling (the expansion of competency into new areas at the same level), upskilling (the expansion of competency into new areas at higher levels) and contributory skilling (the expansion of competency into new areas at the same or different levels drawn from other industries).

national recognised training refers to **accredited courses** and recognised **training programs** under NFROT. They relate to competency based outcomes, and lead to students gaining a **credential** or **credit transfer** towards a credential.

nominal group technique is an information collection technique using group participation and a skilled facilitator which focuses on the generation of answers to a specified question. Participants work independently on the question before the facilitator collects and records information from each person in turn.

optional competencies refers to a group of units of competency within a competency standards where a certain number drawn from the overall group must be achieved if a person is to be accepted as competent at a particular level. Normally combined with **core competencies** to make up the overall group of units to achieve competency at a level. These are also sometimes called elective units, or specialisation units.

recognition refers to any process of **accreditation, credit transfer, assessment** or registration which is used to attest to the acquisition of competencies by individuals.

recognition authority refer to bodies authorised under State, Territory or Commonwealth legislation and designated as agencies under the NFROT Agreement to accredit **courses,** recognise **training programs** and register providers of training. They may have other functions in relation to the recognition of training, including determining **credit transfer** and **certification.**

recognition of prior learning refers to determination on an individual basis of the competencies obtained by a person through previous formal or in-formal training, work experience and/or life experience. It an lead to **advanced standard** that a learner is entitled to in relation to a training course.

registration of providers of training refers to formal recognition by a State/Territory **Recognition Authority** that a provider is competent to offer a particular accredited **course** or recognised **training program.**

search conference is an information collection technique using group participation and a skilled facilitator which moves from generating ideas through synthesising and analysing these ideas to action planning. It is particularly useful in exploring desirable environments and strategies for achieving goals.

skill may be intellectual, manual, motor, perceptual, social. The nature of tasks usually requires a combination of these and usually involve the application of cognitive and psychomotor functions, together with appropriate **knowledge**.

skills audit refers to systematic process which identifies then compare the present stock of skills held by an individual or a workforce (at the enterprise, occupation or industry level), whether or not they are being actively used (i.e. what is), with the skills needed (i.e. what should be), including future skill needs.

specialisation competencies (see optional competencies)

statement of attainment refers to the document given in recognition of the achievement of one or more units of competency that are a subset of those required for the awarding of a **credential**. A Statement of attainment will usually be awarded on satisfactory completion of a **training program**, or on the basis of **recognition of prior learning**.

task (or combination of tasks) is a discreet, identifiable and meaningful component of work that is carried out by the job-holder for specific purpose leading to a specific outcome. The performance of a task required the application of **skill** and **knowledge**.

training program (recognised) refers to a sequence of training which is not an accredited course but which contains a component or components of an accredited course (in terms of competencies), and which leads to a **statement of attainment**.

upskilling see multiskilling

verification see monitoring

vocational education and training (VET) refers to a post-compulsory education or training which is directed to the development of competencies, or is preparatory to, or is directed to the enhancement of opportunities for such education and training up to and including para-professional education and training.

Appendix 2

REPRESENTATION TASK GROUP 3

G E HARDIE (Chairman)	-	Board of Examiners	-	Qld
M BEST	-	United Mineworkers Union	-	Qld
F B BIGGAM	-	Department of Mines and Energy	-	Qld
B GARLAND	-	Queensland Mining Council	-	Qld
B GOEDDE	-	Aust. Collieries' Staff Association	-	Qld
G MITCHELL	-	Queensland Mining Council	-	Qld
J BOYD	-	Colliery Officials' Association	-	NSW
S BROWN	-	Aust. Collieries' Staff Association	-	NSW
R GIBBONS	-	Coal Mining Qualifications Board	-	NSW
P HAYES	-	Colliery Managers Association	-	NSW
B McKENSEY	-	Department of Mineral Resources	-	NSW

WARDENS RECOMMENDATIONS

Recommendation 4

It is **recommended** that all employees be effectively trained to:

- recognise indicators of specific mine hazards, such as spontaneous combustion, and their control; and
- become sufficiently familiar with mine gases, and associated risks.

The identification and prevention of these risks must be a part of a compulsory approved training scheme as well as part of the mine induction process.

Recommendation 5

It is further **recommended** that all persons holding statutory appointments, including inspectors must undertake:

- training in communications by completing an approved training course that deals with all aspects of communications; and
- completion of a retraining course each year, progressively covering and periodically revisiting mine gases, spontaneous combustion, mine fires, emergency procedures and communications, as they impact on the mine where they are employed, or over which they have jurisdiction.

Recommendation 6

It is **recommended**, therefore, that the procedures for granting statutory certificates for underground coal mining and the conditions under which they are awarded, be reviewed.

Recommendation 7

In particular, it is **recommended** that certificates not be granted for life and that a system needs to be developed and put into effect as soon as practicable that requires certificate holders to demonstrate their fitness to retain the certificate of competency on a regular basis, at intervals of not less than three and not more than five years.

The process should aim to ensure that certificate holders maintain a sound knowledge base on, and keep abreast of, technical developments in coal mining and most particularly those relevant to coal mine safety.

Recommendation 8

It is **recommended** that a position of ventilation officer be established as a statutory position at all underground coal mines. The ventilation officer appointed must have demonstrated competencies appropriate to the duties and responsibilities of the position and would be directly responsible to the mine manager for the planning, design and implementation of the mine ventilation system and for the establishment of effective standards of ventilation for the mine, methods for its control and protection, monitoring of performance, reporting procedures, maintenance of ventilation records and plans, and emergency action plans.

The mine manager may be the appointed ventilation officer. Otherwise, if the ventilation officer has other duties at the mine, they would be subordinate to those of ventilation officer.

Recommendation 24

We **recommend**, therefore, that to be accredited as satisfying the academic pre-requisites for the granting of manager's, undermanager's, and deputy's certificates of competency in coal mining, all courses of instruction be required to include adequate instruction on spontaneous combustion (its nature, cause, detection and management) using appropriate supporting literature, case study material and other learning aids.

APPLICATION OF "QUEENSLAND UNDERGROUND COAL INDUSTRY TRAINING TASK FORCE" TO THE REQUIREMENTS OF GENERAL RULES FOR THE UNDERGROUND COAL MINES TABLE TO RULE 59.7

INDUCTION AND REFRESHER TRAINING

PART 59 TOPIC	*QLD UNDERGROUND COAL INDUSTRY UNIT NO/TITLE*
Basic First Aid and Resuscitation	Unit 1 - Work Safely
Mine Transport Rules	Unit 15 - Conduct Wheeled Vehicle Operations
Use of Fire Fighting Apparatus	Unit 1 - Work Safely
Mine Safety Procedures	Unit 1 - Work Safely Unit 25 - Implement and Maintain Workplace Safety
Mine Communication Procedures	Unit 1 - Work Safely Unit 21 - Respond to Local Emergencies Unit 110 - Apply Mine Communication Systems
Mine Supervisory Structures	Unit 1 - Work Safely Unit 25 - Implement and Maintain Workplace Safety
General Method of Working the Mine	Unit 1 - Work Safely Unit 43 - Conduct Strata Control Operations Unit 47 - Conduct Mine Ventilation Control Measures Unit 73 - Conduct Face Ventilation Operations
Mine Environment and Potential Hazards	Unit 1 - Work Safely Unit 3 - Solve Operational Problems Unit 21 - Respond to Local Emergencies Unit 25 - Implement and Maintain Workplace Safety Unit 44 - Conduct Special Roadway Operations Unit SC1 - Apply Spontaneous Combustion Management Measures to Underground Coal Mining Operations Unit RM1 - Conduct Local Risk Management

Part 59 Topic	*Module*	*Learning Outcomes*	*Assessment criteria*
Basic First Aid and Resuscitation	CMUC 1	U 1.2 U 1.3	U 1.2.2, U 1.2.6 U 1.3.5, U 1.3.6
Mine Transport Rules	CMUP 15	U 15.1	U 15.1.1 → U 15.1.5 U 15.1.7 → U 15.1.10, U 15.1.13
Use of Fire Fighting Apparatus	CMUC 1	U 1.1 U 1.2 U 1.3	U 1.1.1 U 1.2.6 U 1.3.7, U 1.3.10
Mine Safety Procedures	CMUC 1	U 1.1 U 1.2 U 1.3	U 1.1.1 U 1.2.3 U 1.3.7 → U 1.3.9
	CMUP 25A	U 25A.6	U 25A.6.2 → 25A.6.8
Mine Communication Procedures	CMUC 1	U 1.1 U 1.2 U 2.1 U 2.5	U 1.1.1, U 1.1.2, U 1.1.6 → U 1.1.8 U 1.2.7 U 2.1.1 → U 2.1.7 U 2.5.1 → U 2.5.3
	CMUP 21	U 21.1	U 21.1.7, U 21.1.10
	CMUP 110	U 110.1 ↓ U 110.2	U 110.1.1 → → U 110.2.6
The Mine Supervisory Structure	CMUC 2	U 2.2	U 2.2.1
	CMUP 25A	U 25A.1	U 25A.1.1 → U 25A.1.9
General Method of Working the Mine	CMUC 1	U 1.1 U 1.3	U 1.1.1, U 1.1.2, U 1.1.4 U 1.3.2
	CMUP 43A	U 43A.1 ↓ U 43A.4	U 43A.1.1 → → U43A.4.5
	CMUP 43B	U 43B.1 ↓ U 43B.4	U 43B.1.1 → → U 43B.4.5

Part 59 Topic	*Module*	*Learning Outcomes*	*Assessment criteria*
	CMUP 47	U 47.1 ↓ U 47.5	U 47.1.1 → → U 47.5.2
	CMUP 73	U 73.1 ↓ U 73.4	U73.1.1 → → U73.4.3
Mine Environment and Potential Hazards (Gases Spon Com)	CMUC 1	U 1.1	U 1.1.1
	CMUC 3	U 3.1 ↓ U 3.3	U 3.1.2 → → U 3.3.3
	CMUP 21	U 21.1	U 21.1.1, U 21.1.3, U 21.1.4, U 21.1.6, U 21.1.9
	CMUP 21	U 21.2	U 21.2.1 → U 21.2.11
	CMUP 25A	U 25A.5	U 25A.5.10
	CMUP 44	U 44.1 ↓ U 44.4	U 44.1.1 → → U 44.2.4
	SC1	1.1 ↓ 1.4	1.1.1 → → 1.4.5
	RM1	1.1 ↓ 1.3	1.1.1 → 1.3.8

PROPOSED SYLLABUS FOR COMMUNICATION TRAINING

STATUTORY APPOINTEES/INSPECTORS

"The Act of Communication"

* Involves two people doing these things:

  Initiating → Responding → Explaining → Acknowledging → Confirming → Understanding

* It takes two.

* Identify barriers to communication

  - What goes wrong
  - Environmental
  - Verbal
  - Interpersonal

* Overcoming barriers

  - Environmental
  - Verbal
  - Interpersonal

* Non verbal communication

  - More than words
  - Avoiding confusion

* Communication - A two-way street

  - One way communication
  - Two way communication

* What people need

  - Two kinds of needs
  - Both are necessary
  - Personal needs
  - Practical needs

* Key principles

  - Maintain and enhance self-esteem
  - Listen and respond with empathy
  - Ask for help and encourage involvement

* Feedback - what, why a review

  - More than just words
  - Critical to working together
  - Two kinds of feedback
  - Balance and sincerity

* Feedback - Do's and Don'ts

  - Giving feedback
  - Receiving feedback

* Interaction guidelines for communicating with others

  - Open with what and why
  - Clarify details
  - Develop ideas
  - Agree on actions
  - Close with review and follow-up

* Communication in negotiation

  - Right to express view
  - Focussing on facts
  - Acknowledging arguments
  - Summarising outcomes

Additionally, written communication training should provide for:

Reporting in a non-verbal manner
Reports which are based on data
Reports which are based on exceptions
Interpretation of reports
Recognising report audience
Reporting on action to be taken or recommended
Reporting accuracy by concise description
Laying out a report.

BELOW

BCA *Training & Development Services Pty Ltd*

25 July 1996

Mr Grahame Hardie
Chairman, Task Group 3
Moura Implementation
GPO Box 194
BRISBANE QLD 4001

Dear Mr Hardie,

Re: Core Competency Identification and Scoping Project

We have now completed the documentation related to the project and submit it to you together with this report.

The project called for two outcomes as follows:

- the identification and establishment of core competencies for the Manager, Under Manager and Deputy, and
- the provision of scoping guidance on measures to implement the core competencies.

Representative Reference Groups met in Brisbane on 9/10 July and again on 22/23 July to progress the project and develop the outcomes.

System Components. Throughout this report we will be discussing the following components:

- ***Core Competencies.*** The term **core** refers here to the fundamental competencies which are formally required by all Managers/Under Managers and Deputies. They cover the technical and mining safety activities. (As against **general** competencies such as those for management, finance, budgetary and marketing activities).

  The core competencies are shown in two ways. Firstly as a series of individual elements based on the developments from the recent Penrith Workshop and secondly, with the individual elements grouped as formal units of competency in accordance with national guidelines.

ACN 057 113 587 Telephone : (06) 288 8124 Mobile 018 632 236 Facsimile: (06) 288 3060 PO Box 3628 Weston Creek ACT 2611

- ***Curricula.*** Curricula relates to the documentation of competency-based outcomes and, in the national vocational education and training system, curricula is required to receive or secure formal **accreditation.**

  The building blocks of curricula are **Modules** which reflect the industries intent as expressed in their units of competency.

A competency development overview or map which depicts the normal steps from core competencies to formal assessment systems is included at Attachment 1. It is placed there to assist the reader to follow what has occurred to date and what may be needed in the future.

Core Competencies

The Reference Groups worked through a number of iterative exercises to refine the draft core elements of competency which were produced at the recent Penrith workshop. To aid this process, in particular to assist with differentiation between the functions of Manager, Under Manager and Deputy, the Reference Group coined and agreed to a definition of the action words to be used in the competencies. This definition of terms is at Attachment 2.

The draft core elements of competency were examined and grouped into five functional fields covering structures, atmosphere, personnel, equipment and failure. These fields were considered appropriate for each level, ie: Manager, Under Manager and Deputy, and were therefore used as a basis for an articulated framework of formal units of competency.

The detail of the proposed structure for the core competencies is shown at:

- *Attachment 3* which depicts the Unit of Competency titles, a descriptor which explains the focus of the unit, and the pre-requisite relationships between levels.

- *Attachments 4, 5 and 6* build on this by providing further details of the elements and other matters which may make up the final core competency units. (These are the updated outcomes of the Penrith developments).

The information contained at Attachments 3 - 6 addresses the first project outcome as it identifies and establishes the core competencies for Manager, Under Manager and Deputy.

Scoping Guidance

The second objective of providing scoping guidance required us to address the issue of 'where to from here'. Having identified the core competencies, how do we translate them into education and training processes and ultimately into the effective and consistent assessment of outcomes.

As many of the pre-requisites for the Deputy are already established within the national vocational education and training framework, it was considered that it may be appropriate to adopt that framework and model. The model encompasses or contains:

- nationally endorsed **competency standards.**

- **curricula (modules)** which translate the units of competency into educational and training outcomes and provides the authoritative basis for accreditation.

- **training programs** which may be developed by a range of training providers but which, in the end, must satisfy the competencies and modules.

- **assessment structures and systems** which are also terminally based against the accredited modules.

If the national framework and model are adopted, the steps needed to be undertaken to implement the core competencies are as follows:

- ***Nationally Endorsed Competency Standards.*** The core competencies will need to be translated into formal **units** of competency. An indicative example of the proposed unit M2, *Establish and Maintain a Safe Mine Atmosphere*, is at Attachment 7.

  The development of the units may be undertaken by or for a suitably qualified Reference Group with the results being circulated for consideration and ultimate approval.

  Based on the 15 - 20 units which may ultimately be required, together with the material already in place, this development may require up to ten (10) days of writing effort, including four days for an expert Reference Group.

- ***Accredited Modules.*** Once the units of competency have been agreed, the development of Modules may also be undertaken by a suitably qualified Reference Group(s). At all three levels there are likely to be a number of modules for each unit of competency. An indicative example of the proposed Module M2C, *Spontaneous Combustion*, is at Attachment 8.

  The completed draft modules would need to be circulated for consideration prior to formal approval. This is essential as the final modules, when accredited, will need to serve as an unambiguous articulation of the industries education and training needs to all potential training providers.

  The modules also serve as the benchmark for the preparation of assessment processes.

  Provided with access to appropriate technical guidance an experienced module writer should achieve this requirement in 15 - 25 days, depending on the extent of module structure established by the Reference Group.

- ***Training Programs.*** Education and training, depending on the level of requirement, may be designed and provided by universities and other private and public providers. The programs should satisfy the requirements of the accredited modules.

  The design and development of programs is a commercial prerogative of any potential provider. As long as the programs satisfy the agreed competency unit and module requirements, the market place will determine which programs are commercially acceptable and viable.

- ***Assessment Structures and Systems.*** Within the agreed modules, there will be detailed assessment criteria covering both the knowledge and application outcomes required for demonstration of competency. The modules may, if wished, also address the issue of the life of the competency and therefore the required frequency of assessment.

  Quite independently of the training program development, the module content may be used to develop assessment tools or instruments. To the extent possible, these tools or instruments may be common and consistent across State boundaries. Assessment tools or instruments may include:

  - Computerised banks of questions covering the knowledge requirements of the modules.

  - Real-time and simulated exercises which address the practical assessment requirements

  Estimating the time to prepare assessment instruments is extremely difficult and should not be undertaken prior to the completion of the modules. There may be benefit in managing this process on a decentralised sub-project basis to spread the workload, with the final coordination in the hands of a suitably qualified Reference Group.

  The development of assessment instruments and tools is reasonably labour and expertise intensive, however, if established effectively in the first place, the instruments and tools are relatively easily maintained and underpin an acceptable level of consistency of assessment throughout the industry.

  The issue of structures is outside the remit of this exercise, however, a competency-based assessment system would lend itself to effective decentralisation through a licensed assessor framework. Subject to satisfying rigorous requirements, individuals could be prepared and licensed to conduct assessment of the knowledge and/or practical components of competency.

The investment required to apply the model outlined above is substantial. The advantages of making this investment is that it will produce nationally agreed units and module which underpin and provide a benchmark for consistent education, training and assessment activities. The existence of the agreed units and modules also facilitates the long term cost effective maintenance of the system as they remove the need for the traditional and expensive periodical overhaul of curricula.

Conclusion

The Project has identified core competencies for the Manager, Under Manager and Deputy. These core competencies and the proposed units of competency structure have been framed for consideration by the State constituencies.

The framework, model and steps required to implement the core competencies have been discussed by the Reference Group and are presented as an option for progressing the matter.

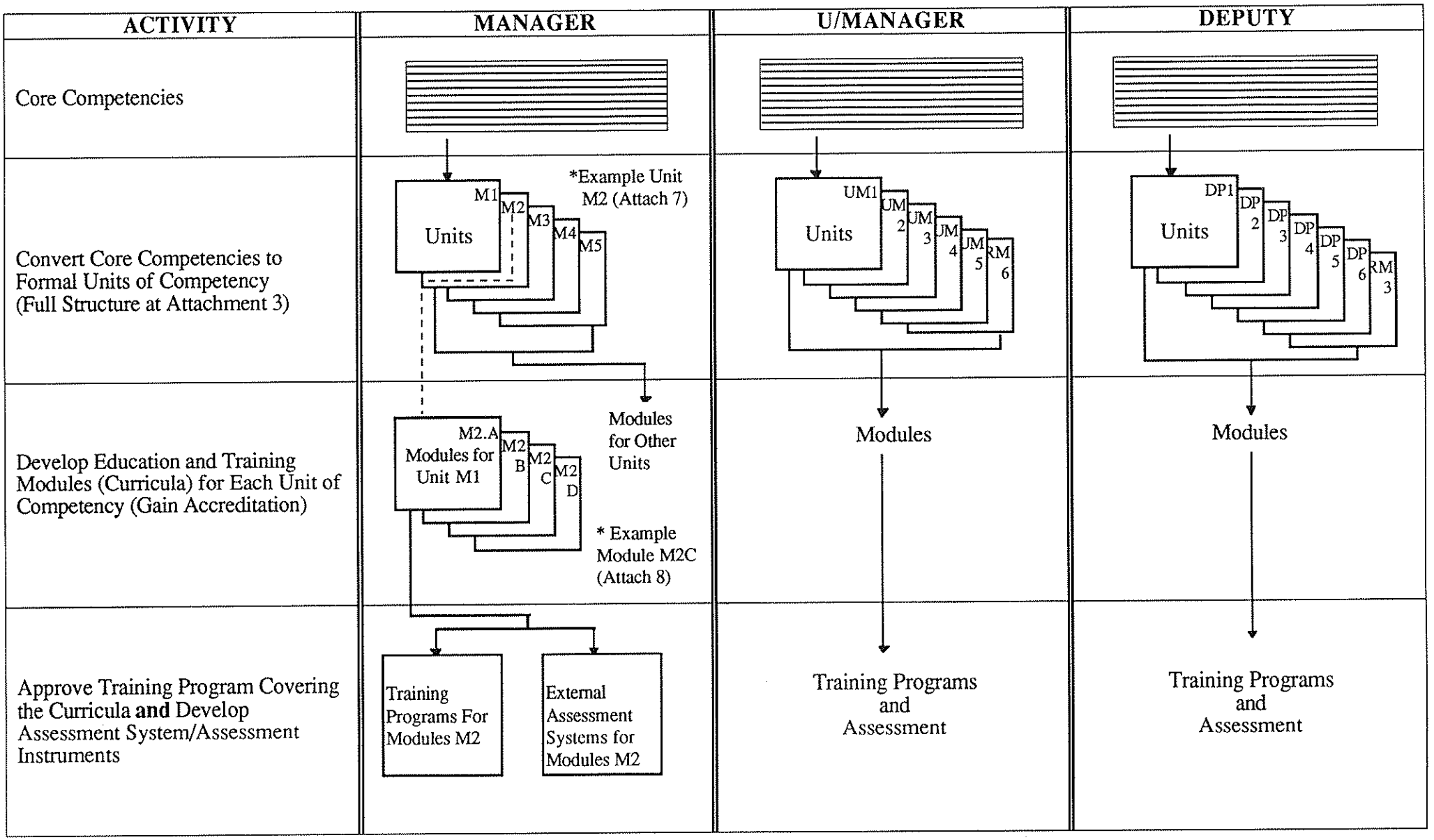
Both outcomes are referred for your consideration and disposal.

Bob Cooper

Attachments:

1. Competency System Development Overview/Map
2. Definitions of Action Words
3. Proposed Unit of Competency Structure
4. Core Competencies - Manager
5. Core Competencies - Under Manager
6. Core Competencies - Deputy
7. Example/Indicative Unit of Competency M2, Establish & Maintain a Safe Mine Atmosphere
8. Example/Indicative Module M2C, Spontaneous Combustion Plan
9. List of NCS Competency Units and Existing Module Descriptors (Background only)

COMPETENCY SYSTEM DEVELOPMENT OVERVIEW/MAP



TASK GROUP 3 MEETING - 23 JULY 1996

DEFINITIONS AND SCOPE FOR ACTION WORDS USED IN CORE COMPETENCIES AND CRITERIA

- **Design, Establish, Evaluate**

  Generally used at the Manager level to denote ultimate responsibility and autonomy in designing and establishing plans, systems and procedures, in selecting methods and equipment or materials, and formally evaluating achievements and outcomes.

- **Implement, Review**

  Generally used at the Undermanager level to denote the implementation and review throughout all facets of mining operations, of plans, schemes, systems and procedures which have been established under the authority of the Manager.

- **Apply, Monitor**

  Generally used at the Deputy level to denote the implementation and monitoring within an assigned work area or responsibility, of approved plans, schemes, systems or procedures.

PROPOSED UNIT OF COMPETENCY STRUCTURE (Manager, U/Manager, Deputy)

MANAGER

Unit: M1

Title: Establish Criteria & Systems for the Development of Stable Mining Structures

Descriptor:
This unit covers the application of principles of mine design to the establishment and ongoing development of stable mining structures.

Pre-Requisites:
Unit UM1

Unit: M2

Title: Establish & Maintain a Safe Mine Atmosphere

Descriptor:
This unit covers the functions required to establish and maintain a safe mine atmosphere including the development and approval of plans for ventilation, gas management, spontaneous combustion and outburst management.

Pre-Requisites:
Unit UM2
Unit RM3

Unit: M3

Title: Establish & Maintain Personnel Safety Systems

Descriptor:
This unit covers the development, establishment, maintenance and ongoing review and audit of personnel safety structures and systems.

Pre-Requisites:
Unit UM3
Unit RM3

UNDER MANAGER

Unit: UM1

Title: Implement & Maintain Development of Stable Mining Structures

Descriptor:
This unit covers the implementation and monitoring of the operational development and maintenance required to sustain stable mining structures including strata control, methods of work and the development and maintenance of production systems.

Pre-Requisites:
Relevant aspects of Unit DP1.

Unit: UM2

Title: Implement & Maintain Mine Atmosphere Control

Descriptor:
This unit covers the actions required to maintain a safe mine atmosphere through the implementation of approved management plans and systems covering ventilation, gas, spontaneous combustion and outburst requirements.

Pre-Requisites:
Relevant aspects of Unit DP2.

Unit: UM3

Title: Implement & Maintain Personnel Safety Systems

Descriptor:
This unit covers the implementation, active promotion, monitoring and ongoing review of the effectiveness of all aspects of approved personnel safety systems.

Pre-Requisites:
Relevant aspects of Unit DP3.

DEPUTY

Unit: DP1

Title: Maintain Development of Stable Mining Structures

Descriptor:
This unit covers the application and review of the operational development and maintenance required to sustain stable mining structures including strata control, methods of work and the development and maintenance of production systems.

Pre-Requisites:

Module 25A.2	Systems of Work
Module 43C 1.1 - 1.7	Primary Strata Control
Module 43C 2.1 - 2.7	Secondary Strata Control
Module 47.2	Ventilation Information
Module 111B	Advanced Workplace Communications
NCS Unit 48	**Conduct Shotfiring**

Unit: DP2

Title: Maintain Mine Atmosphere Controls

Descriptor:
This unit covers the actions required to maintain a safe mine atmosphere through the implementation of approved management plans and systems covering ventilation, gas, spontaneous combustion and outburst requirements within the allocated area of responsibility.

Pre-Requisites:

Module 26	Environmental Monitoring
Module 40	Gas Drainage Systems
Module 47.1	Ventilation Control Measures
Module 47.2	Ventilation Information
Module 47.3-5	Ventilation Planning
Module 65	Construct Ventilation Structures
Module 111B	Advanced Workplace Communications

Unit: DP3

Title: Apply & Maintain Personnel Safety Systems

Descriptor:
This unit covers the application, active promotion, monitoring and ongoing review of the effectiveness of assigned aspects of approved personnel safety systems.

Pre-Requisites:

Module 25A.1	Deputy-General
Module 25A.3	Personnel Health/Safety
Module 25B	Inspections/Stat Records
Module 111B	Advanced Workplace Communications

MANAGER

Unit: M4

Title: Establish the Mine Infrastructure and Associated Maintenance Systems

Descriptor:
This unit covers the development, evaluation and establishment of mine infrastructure and the associated ongoing maintenance systems covering all aspects of engineering including equipment, civil, haulage, transport, communications, lighting and fire abatement systems and mine services.

Pre-Requisites:
Unit UM4

Unit: M5

Title: Establish & Monitor Mine Emergency Measures

Descriptor:
This unit covers the design, establishment and ongoing audit and review of emergency preparedness and response plans.

Pre-Requisites:
Unit UM5
Unit RM3

UNDER MANAGER

Unit: UM4

Title: Implement Ongoing Maintenance Systems for the Mining Infrastructure

Descriptor:
This unit covers the implementation, coordination and monitoring of the effectiveness of ongoing maintenance systems for the mining infrastructure including all aspects of engineering, but not limited to, equipment, civil works, haulage, transport, communication, lighting, fire abatement systems and mine services.

Pre-Requisites:
Relevant aspects of Unit DP4.

Unit: UM5

Title: Implement Mine Emergency Response Plans

Descriptor:
This unit covers the ongoing preparation for and subsequent implementation of emergency response plans, the control of emergency situations until relieved, and participation in post-emergency actions.

Pre-Requisites:
Relevant aspects of Unit DP5

Unit: RM3

Title: Facilitate the Risk Management Process

Descriptor:
This unit covers the actions taken to facilitate and coordinate the risk management process for a site/area including the application of local and formal risk assessment and control.

Pre-Requisites:

DEPUTY

Unit: DP4

Title: Apply Ongoing Maintenance Systems for the Mining Infrastructure

Descriptor:
This unit covers the application of ongoing maintenance systems for the mining infrastructure including, but not limited to, equipment, civil works, haulage, transport, communication, lighting, fire abatement systems and mine services.

Pre-Requisites:

Module 25A.4	Machinery Safety
Module 25A.5	Electrical Safety
Module 111B	Advanced Workplace Communications

Unit: DP5

Title: Apply Mine Emergency Response Plans

Descriptor:
This unit covers the application of emergency response plans, the control of emergency situations until relieved, and participation in post-emergency actions.

Pre-Requisites:

Module 25A.6	Disaster Management
Module 47.2	Ventilation Information
Module 111B	Advanced Workplace Communications

Unit: RM3

Title: Facilitate the Risk Management Process

Descriptor:
This unit covers the actions taken to facilitate and coordinate the risk management process for a site/area including the application of local and formal risk assessment and control.

Pre-Requisites:

MINE MANAGER'S COMPETENCIES

POTENTIAL UNIT M1. ESTABLISH CRITERIA AND SYSTEMS FOR THE DEVELOPMENT OF STABLE MINING STRUCTURES

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
M1	Geology	K	**Describe** geological features found in an adjacent to coal bearing strata.	Faults Intrusions (igneous and seam) Sedimentary structures Potential inrush zones Coal bearing strata Seam gradients Gas content and composition Cleats, joint and bedding planes Coal seam properties Legislation Methods of work Methods of access (shafts & drifts)	Written Oral
		KA	**Plan and establish** exploration programmes to identify geological features and coal characteristics which may impact on mining operations.		
M1	Geomechanics	KA	**Evaluate** geomechanics information which may impact on mining operations.	Lithology Tectonics (stresses) Stratigraphy Strength of rocks (inc coal and coal pillar) Subsidence Stresses (lithology, tectonics, stratigraphy) Strain Depth of cover (stresses) Hydrology Slope stability Legislation Methods of work Roadway design Methods of access (shifts or drifts) Strata control methods Goaf edge control Roof bolt mechanics Roof and rib control Monitoring systems and techniques	Written Oral
		KA	**Design and establish** strata control management plans taking account of relevant geotechnical information.		
		KA	**Design and plan** coal mining operations taking account of the geomechanical environment. (Apply the principles of mine design to design and planning).		

Key: K - Knowledge
KA - Knowledge and Application

POTENTIAL UNIT M1. ESTABLISH CRITERIA AND SYSTEMS FOR THE DEVELOPMENT OF STABLE MINING STRUCTURES

M1	Mine Surveying	K KA	**Define** the terminology and principles of mine surveying. **Perform** simple survey calculations and functions.	Survey standards System of work Legislation Survey instruments Survey methods and techniques	Written Oral
M1	Systems of Mining	KA KA KA KA	**Design and evaluate** the methods of entry to a coal seam. **Design, evaluate and establish** the systems of mining. **Design, evaluate and establish** action sequences for mining operations. **Audit and review** effectiveness of systems of mining.	Tunnels, drifts, shafts, adit B and P, longwall Breaker-line supports Stone drivage Shaft sinking Pillar extraction Partial extraction Single entry High-wall mining Punch mining Shotfiring Legislation Mine manager's rules and schemes Management plans	Written Oral

POTENTIAL UNIT M2. ESTABLISH AND MAINTAIN A SAFE MINE ATMOSPHERE

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
M2	Mine Gases	K	**Identify** gases liable to be present in a mine atmosphere.	Physical characteristics Physiological effects Modes of occurrence Allowable concentrations Methods of detection Methods of control Legislation	Written Oral Practical Demonstration
M2	Gas Drainage	K	**Identify** conditions where gas drainage may be required.	Types of gases Outburst conditions Equipment selection In seam/cross Measures/surface/goaf Pre/post mining Legislation	Written Oral
		K	**Identify** advantages/disadvantages of gas drainage.		
		KA	**Establish** design criteria.		
		KA	**Establish** hazard control procedures.		
		KA	**Establish and audit** monitoring processes.		
		KA	**Evaluate** current methods of gas drainage for specific applications.		
		KA	**Design and establish** a gas drainage plan.		
M2	Mine Ventilation	KA	**Evaluate** types of mine fans and select the most suitable for a particular application.	Main Booster Auxiliary Face ventilation structures (define-expand) Ventilation control devices (define-expand) Seam conditions Legislation Sealing types of monitoring (expand)	Written including ventilation of mine plan. Oral questions.
		KA	**Design** mine ventilation circuits and structures to ventilate whole mine workings and individual air circuits.		
		KA	**Establish and evaluate** mine ventilation investigations.		
		KA	**Design, evaluate and establish** atmosphere monitoring systems.		
		KA	**Design and establish** mine ventilation management plans.		

POTENTIAL UNIT M2. ESTABLISH AND MAINTAIN A SAFE MINE ATMOSPHERE (Cont...)

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
M2	Gas Outbursts	K	**Describe** factors which may contribute to a gas outburst.	Geological environment Gas composition Ventilation Mining methods Gas drainage Safe operating procedures Legislation Detection methods	Written Oral
		KA	**Design and establish** programmes to monitor and control the factors which may contribute to an outburst.		
		KA	**Design and establish** audit procedures for compliance/adequacy of outburst prevention/detection/control programmes and systems.		
		K	**Identify, describe and evaluate** detection methods.		
		KA	**Design and establish** gas outburst management plan.		
M2	Spontaneous Combustion	KA	**Identify and evaluate** the causes of spontaneous combustion .	Coal chemistry Ventilation pressure difference Mining system Mine design Coal seam characteristics Risks and hazards Control options Structures Physical spontaneous combustion indicators Gaseous spontaneous combustion indicators Inspection Monitoring Sampling Analysis	Written Oral
		KA	**Identify** the risks and hazards associated with spontaneous combustion .		
		KA	**Identify and evaluate** spontaneous combustion control options, structures, systems and procedures.		
		KA	**Identify and evaluate** spontaneous combustion detection methods.		
		KA	**Design and establish** programmes to monitor and control the factors which may contribute to spontaneous combustion .		
		KA	**Design and establish** audit procedures for compliance/adequacy of spontaneous combustion prevention/detection/control programmes and systems.		

POTENTIAL UNIT M3. ESTABLISH AND MAINTAIN PERSONNEL SAFETY SYSTEMS

Part of Unit	Elements/Issues	Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
M3	Occupational Health & Safety	**Design & establish** systems for personnel safety in mines and associated surface area. **Design, establish and audit** training policies and operating procedures to comply with OH&S requirements. **Establish** audit programmes for OH&S systems compliance. **Apply** statutory requirements and relevant standards.	Personal Protection *(PPE, briefings, smoking, drug, alcohol, contraband, local hazard identification and assessment, first-aid)* Mine Risks and Threats *(Noise and respirable dust)* Hygiene Safety Management *(Safety organisational structures, composition, methods of functioning, responsibilities, prerogatives, communication channels, suggestion systems)* Equipment/Working Safety *(Transport, equipment operation, isolation, tagging, evacuation, fire fighting, rescue, authorisations)* Safety Communications/Information *(•Routine information - information structures, communication means/methods) (•Special information - information structures, communication means/methods/protocols) (•Safety records) (•Safety statistics)* Accident/Incident Reporting/Investigation *(Reporting procedures, investigation procedures, safety achievement analysis/disposal)* Safety Training *(Induction, emergency response, equipment/operational safety, first-aid, fire fighting, mines rescue)* Hazardous Substances Relevant legislation	Written Oral

POTENTIAL UNIT M4. ESTABLISH THE MINE INFRASTRUCTURE AND ASSOCIATED MAINTENANCE SYSTEMS

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
M4	Production Equipment	KA	**Design, evaluate and select** production equipment.	Longwall equipment B & P equipment Protection systems Power sources Mechanical principles Electrical principles	Written Oral
		KA	**Establish** systems for the installation and commissioning of production equipment.		
		KA	**Establish** systems for the operation and maintenance of production equipment.		
		KA	**Establish** systems for audit, review and continuous improvement of production equipment.		
M4	Transport Systems and Equipment	KA	**Design, evaluate and select** transport systems and equipment.	Rail mounted Free steer Coal, material, personnel Conveyors Pipelines Winders Protection systems Power sources Mechanical principles Electrical principles	Written Oral
		KA	**Establish** systems for the installation and commissioning of transport systems and equipment.		
		KA	**Establish** systems for the operation and maintenance of transport systems and equipment.		
		KA	**Establish** systems for audit, review and continuous improvement of transport systems and equipment.		
M4	Mine Services Equipment	KA	**Design, evaluate and select** services equipment.	Pumping Communication Monitoring Lighting Fuel storage Water Fire abatement Ventilation Power supply Power reticulation Stonedusting Explosion barriers Gas drainage Protection systems Power sources Mechanical principles Electrical principles	Written Oral
		KA	**Establish** systems for the installation and commissioning of services equipment.		
		KA	**Establish** systems for the operation and maintenance of services equipment.		
		KA	**Establish** systems for audit, review and continuous improvement of services equipment.		

POTENTIAL UNIT M4. ESTABLISH THE MINE INFRASTRUCTURE AND ASSOCIATED MAINTENANCE SYSTEMS (Cont...)

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
M4	Fixed Plant	KA	**Design, evaluate and select** fixed plant.	Shafts Drifts Gas Drainage Compressors Switch yards Magazines Workshops Warehouses Bathrooms Offices Coal preparation plant Stockpile Load-out Water treatment Sewage plant Protection systems Power sources Mechanical principles Electrical principles Explosion proofing	Written Oral
		KA	**Establish** systems for the installation and commissioning of fixed plant.		
		KA	**Establish** systems for the operation and maintenance of fixed plant.		
		KA	**Establish** systems for audit, review and continuous improvement of fixed plant.		

POTENTIAL UNIT M5. ESTABLISH AND MAINTAIN MINE EMERGENCY MEASURES

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
M5	Preparedness and Emergency Response	KA	**Design and establish** emergency preparedness and response plans.	Fires Explosions Spontaneous combustion Outbursts Inundations Strata failure Wind blast Accidents Personnel Equipment Organisation Legislation	Written Oral
		KA	**Establish** emergency response plans.		
		KA	**Audit and review** emergency response plans.		
		KA	**Design and establish** post-evacuation procedures.		
M5	Explosions	K	**Describe** factors which may contribute to an explosion.	Fuel sources (expand) Electrical Compressors/compressed air Ignition sources (expand) Oxygen sources-suspension, confinement, fire triangle Ventilation (expand) Safe operating procedures Control mechanisms (expand: stonedusting, sealing, explosion barriers, inertisation) Legislation Equipment fires (mechanical heat/open flame)	Written Oral
		KA	**Design & establish** programmes to monitor and control the factors which may cause explosions.		
		KA	**Design and establish** audit procedures for compliance/adequacy of explosion prevention, detection and control programmes and systems.		

POTENTIAL UNIT M5. ESTABLISH AND MAINTAIN MINE EMERGENCY MEASURES (Cont...)

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
M5	Fires	K	**Describe** factors which may contribute to a fire.	Underground Surface Fuel sources Ignition sources Oxygen sources Fire triangle - oxygen, fuel, ignition Ventilation Electrical Compressors/compressed air Safe operating procedures Legislation Control measures (inertisation, water, sealing, stonedusting) Fire fighting equipment (expand) Fire fighting techniques	Written Oral
		KA	**Design and establish** programmes to monitor and control the factors which may cause a fire.		
		KA	**Design and establish** audit procedures for compliance/adequacy of fire prevention/detection/control programmes and systems.		
		KA	**Evaluate and establish** fire fighting methods and equipment.		

MINE UNDERMANAGER'S COMPETENCIES

POTENTIAL UNIT UM1. IMPLEMENT AND MAINTAIN DEVELOPMENT OF STABLE MINING STRUCTURES

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
UM1	Geology	K	**Describe** geological features found in and adjacent to coal bearing strata.	Faults Volcanic intrusions Sedimentary structures Potential inrush zones Coal bearing strata Seam gradients Gas content and composition Cleats, joint and bedding planes Coal seam properties Legislation Exploration (long hole drilling, core sampling, bore hole survey, seismic, radio imaging)	Written Oral
		KA	**Describe** exploration operations to identify geological features and coal characteristics which may impact on mining operations.		
UM1	Geomechanics	KA	**Evaluate** geomechanical information which may impact on mining operations.	Lithology Tectonics (stresses) Stratigraphy Strength of rocks (inc coal and coal pillar) Subsidence Stresses (lithology, tectonics, stratigraphy) Strain Depth of cover (stresses) Hydrology Slope stability Legislation Methods of work Roadway design Methods of access (shifts or drifts) Strata control methods Goaf edge control Roof bolt mechanics Roof and rib control Monitoring systems and techniques	Written Oral
		KA	**Plan** coal mining operations taking account of the geomechanical environment.		
		KA	**Implement** strata control management plans taking account of relevant geomechanical information.		

Key: K - Knowledge
KA - Knowledge and Application

POTENTIAL UNIT UM1. IMPLEMENT AND MAINTAIN DEVELOPMENT OF STABLE MINING STRUCTURES

UM1	Mine Surveying	K KA	**Define** the terminology and principles of mine surveying. **Perform** simple survey calculations and functions.	Survey standards System of work Legislation Survey instruments Survey methods and techniques	Oral
UM1	Systems of Mining	K KA KA KA	**Describe** the methods of entry to a coal seam. **Describe and implement** the systems of mining. **Plan and implement** action sequences for mining operations. **Implement** audit and review of systems of mining.	Tunnels, drifts, shafts, adit B and P, longwall Breaker-line supports Stone drivage Shaft sinking Pillar extraction Partial extraction Single entry High-wall mining Punch mining Shotfiring Legislation Mine manager's rules and schemes Management plans	

POTENTIAL UNIT UM2. IMPLEMENT AND MAINTAIN MINE ATMOSPHERE CONTROLS

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
UM2	Mine Gases	K	**Identify** gases liable to be present in a mine atmosphere and their properties.	Physical characteristics Physiological effects Modes of occurrence Allowable concentrations Methods of detection Methods of control Legislation	Written Oral Practical Demonstration
UM2	Gas Drainage	K	**Identify** conditions where gas drainage may be required.	Types of gases Outburst conditions Equipment In seam/cross measures/surface/goaf Pre/post mining Legislation	Written Oral
		K	**Identify** advantages/disadvantages of gas drainage.		
		K	**Describe** design criteria.		
		KA	**Describe and implement** hazard control procedures.		
		KA	**Describe, implement and audit** monitoring processes.		
		K	**List and describe** current methods of gas drainage.		
		KA	**Implement** gas drainage plan.		
UM2	Mine Ventilation	KA	**Describe** types of mine fans and select the most suitable for a particular application.	Main Booster Auxiliary Face ventilation structures (define-expand) Ventilation control devices (define-expand) Seam conditions Legislation Sealing types of monitoring (expand)	Written including ventilation of mine plan Oral
		KA	**Implement and review** mine ventilation layout to ventilate whole mine workings and individual air circuits.		
		KA	**Implement and review** mine ventilation investigations.		
		KA	**Implement** atmosphere monitoring systems.		
		KA	**Implement** mine ventilation management plans.		

POTENTIAL UNIT UM2. IMPLEMENT AND MAINTAIN MINE ATMOSPHERE CONTROLS (Cont...)

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
UM2	Gas Outbursts	K	**Describe** factors which may contribute to a gas outburst.	Geological environment Gas composition Ventilation Mining methods Gas drainage Safe operating procedures Legislation Detection methods	Written Oral
		KA	**Describe and implement** programmes to monitor and control the factors which may contribute to an outburst.		
		KA	**Describe and implement** audit procedures for compliance/adequacy of outburst prevention/ detection/ control programmes and systems.		
		KA	**Describe and implement** protection methods.		
		KA	**Implement** gas outburst management plan.		
UM2	Spontaneous Combustion	KA	**Identify and describe** the causes of spontaneous combustion .	Coal chemistry Ventilation pressure difference Mining system Mine design Coal seam characteristics Risks and hazards Control options Structures Physical spontaneous combustion indicators Gaseous spontaneous combustion indicators Inspection Monitoring Sampling Analysis	Written Oral
		KA	**Identify** the risks and hazards associated with spontaneous combustion .		
		KA	**Identify and describe** spontaneous combustion control options, structures, systems and procedures.		
		KA	**Identify and describe** spontaneous combustion detection methods.		
		KA	**Implement** programmes to monitor and control the factors which may contribute to spontaneous combustion .		
		KA	**Implement** audit procedures for compliance/adequacy of spontaneous combustion prevention/detection/control programmes and systems.		

POTENTIAL UNIT UM3. IMPLEMENT AND PROMOTE MINE PERSONNEL SAFETY SYSTEMS

Part of Unit	Elements/Issues	Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
UM3	Occupational Health & Safety	**Describe & implement** systems for personnel safety in mines. **Describe and implement** training policies and operating procedures to comply with OH&S requirements. **Describe and implement** audit programmes for OH&S systems for compliance. **Apply** statutory requirements and relevant standards.	Personal Protection *(PPE, briefings, smoking, drug, alcohol, contraband, local hazard identification and assessment, first-aid)* Mine Risks and Threats *(Noise and respirable dust)* Hygiene Safety Management *(Safety organisational structures, composition, methods of functioning, responsibilities, prerogatives, communication channels, suggestion systems)* Equipment/Working Safety *(Transport, equipment operation, isolation, tagging, evacuation, fire fighting, rescue, authorisations)* Safety Communications/Information *(•Routine information - information structures, communication means/methods)* *(•Special information - information structures, communication means/methods/protocols)* *(•Safety records)* *(•Safety statistics)* Accident/Incident Reporting/Investigation *(Reporting procedures, investigation procedures, safety achievement analysis/disposal)* Safety Training *(Induction, emergency response, equipment/operational safety, first-aid, fire fighting, mines rescue)* Hazardous Substances Relevant legislation	Written Oral

POTENTIAL UNIT UM4. IMPLEMENT ONGOING MAINTENANCE SYSTEMS OF THE MINING INFRASTRUCTURE

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
UM4	Production Equipment	KA	**Implement** systems for the installation and commissioning of production equipment.	Longwall equipment B & P equipment Protection systems Power sources Mechanical principles Electrical principles	Written Oral
		KA	**Implement** systems for the operation and maintenance of production equipment.		
		KA	**Implement** systems for audit, review and continuous improvement of production equipment.		
UM4	Transport Systems and Equipment	KA	**Implement** systems for the installation and commissioning of transport systems and equipment.	Rail mounted Free steer Coal, material, personnel Conveyors Pipelines Winders Protection systems Power sources Mechanical principles Electrical principles	Written Oral
		KA	**Implement** systems for the operation and maintenance of transport systems and equipment.		
		KA	**Implement** systems for audit, review and continuous improvement of transport systems and equipment.		
UM4	Service Equipment	KA	**Implement** systems for the installation and commissioning of services equipment.	Pumping Communication Monitoring Lighting Fuel storage Water Fire abatement Ventilation Power supply Power reticulation Stonedusting Explosion barriers Gas drainage Protection systems Power sources Mechanical principles Electrical principles	Written Oral
		KA	**Implement** systems for the operation and maintenance of services equipment.		
		KA	**Implement** systems for audit, review and continuous improvement of services equipment.		

POTENTIAL UNIT UM4. IMPLEMENT ONGOING MAINTENANCE SYSTEMS OF THE MINING INFRASTRUCTURE (Cont...)

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
UM4	Fixed Plant	KA	**Implement** systems for the installation and commissioning of fixed plant.	Shafts Drifts Gas Drainage Compressors Switch yards Magazines Workshops Warehouses Bathrooms Offices Coal preparation plant Stockpile Load-out Water treatment Sewage plant Protection systems Power sources Mechanical principles Electrical principles Explosion proofing	Written Oral
		KA	**Implement** systems for the operation and maintenance of fixed plant.		
		KA	**Implement** systems for audit, review and continuous improvement of fixed plant.		

POTENTIAL UNIT UM5. IMPLEMENT MINE EMERGENCY RESPONSE PLANS

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
UM5	Preparedness and Emergency Response	K KA KA KA KA	**Describe** emergency preparedness and response plans. **Maintain** preparedness status in accordance with plans. **Implement** emergency response plans. **Audit and review** emergency response plans. **Implement** post-evacuation procedures.	Fires Explosions Spontaneous combustion Outbursts Inundations Strata failure Accidents Wind blast Personnel Equipment Organisation Legislation	Written Oral
UM5	Explosions	K KA KA	**Describe** factors which may contribute to an explosion. **Implement** programmes to monitor and control the factors which may cause explosions. **Implement** audit procedures for compliance/adequacy of explosion prevention, detection and control programmes and systems.	Fuel sources (expand) Electrical Compressors/compressed air Ignition sources (expand) Oxygen sources-suspension, confinement, fire triangle Ventilation (expand) Safe operating procedures Control mechanisms (expand: stonedusting, sealing, explosion barriers, inertisation) Legislation Equipment fires (mechanical heat/open flame)	Written Oral

POTENTIAL UNIT UM5. IMPLEMENT MINE EMERGENCY RESPONSE PLANS (Cont...)

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
UM5	Fires	K	**Describe** factors which may contribute to a fire.	Underground Surface Fuel sources Ignition sources Oxygen sources Fire triangle - oxygen, fuel, ignition Ventilation Electrical Compressors/compressed air Safe operating procedures Legislation Control measures (inertisation, water, sealing, stonedusting) Fire fighting equipment (expand) Fire fighting techniques	Written Oral
		KA	**Describe and implement** programmes to monitor and control the factors which may cause a fire.		
		KA	**Describe and implement** audit procedures for compliance/adequacy of fire prevention/detection/control programmes and systems.		
		KA	**Evaluate and implement** fire fighting methods and equipment.		

DEPUTY CORE COMPETENCIES

POTENTIAL UNIT DP1. MAINTAIN DEVELOPMENT OF STABLE MINING STRUCTURES

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
DP1	Geology	K	**Describe** geological features found in and adjacent to coal bearing strata which may impact on mining operations.	Faults Volcanic intrusions Sedimentary structures Potential inrush zones Coal bearing strata Seam gradients Gas content and composition Cleats, joint and bedding planes Coal seam properties Legislation	Written Oral
		KA	**Identify and respond** to changing geological conditions.		
DP1	Geomechanics	KA	**Apply** strata control management plans taking account of relevant geomechanical information.	Lithology Stratigraphy Strength of rocks (inc coal and coal pillar) Subsidence Stresses/Strain Depth of cover (stresses) Hydrology Slope stability Legislation Methods of work Roadway design Methods of access (shifts or drifts) Strata control methods Goaf edge control Roof bolt mechanics Roof and rib control Monitoring systems and techniques	Written Oral
		KA	**Prepare for and conduct** coal mining operations taking account of the geomechanical environment.		
		KA	**Describe and apply** primary strata control methods and techniques.		
		KA	**Describe and apply** secondary strata control methods and techniques.		
DP1	Mine Surveying	KA	**Perform** simple survey calculations and functions.	Systems of work Legislation Survey instruments Survey methods and techniques	Oral

Key: K - Knowledge
KA - Knowledge and Application

POTENTIAL UNIT DP1. IMPLEMENT AND MAINTAIN DEVELOPMENT OF STABLE MINING STRUCTURES

DP1	Systems of Mining	K	**Describe** the methods of entry to a coal seam.	Tunnels, drifts, shafts, adit
		KA	**Describe** the systems of mining.	B and P, longwall
		KA	**Describe and apply** action sequences for mining operations.	Breaker-line supports
				Stone drivage
				Shaft sinking
				Pillar extraction
				Partial extraction
				Single entry
				High-wall mining
				Punch mining
				Shotfiring
				Legislation
				Mine manager's rules and schemes
				Management plans

POTENTIAL UNIT DP2. MAINTAIN MINE ATMOSPHERE CONTROLS

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
DP2	Mine Gases	K	**Identify** gases liable to be present in a mine atmosphere and their properties.	Physical characteristics Physiological effects Modes of occurrence Allowable concentrations Methods of detection Methods of control Legislation	Written Oral Practical Demonstration
DP2	Gas Drainage	K K KA KA KA	**Describe** conditions where gas drainage may be required. **List and describe** current methods of gas drainage. **Describe, install and maintain** gas drainage system. **Describe and implement** hazard control procedures. **Describe, implement and audit** monitoring processes.	Types of gases Outburst conditions Equipment In seam/cross measures/surface/goaf Pre/post mining Legislation	Written Oral
DP2	Mine Ventilation	KA KA KA KA KA	**Describe** types of underground fans and their uses. **Apply** atmosphere monitoring systems. **Apply** mine ventilation management plans. **Apply** and maintain the planned ventilation circuits. **Conduct and review** mine ventilation investigations.	Face ventilation structures (define-expand) Ventilation control devices (define-expand) Seam conditions Legislation Sealing types of monitoring (expand)	Written including ventilation of section plan Oral

POTENTIAL UNIT DP2. MAINTAIN MINE ATMOSPHERE CONTROLS (Cont...)

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
DP2	Gas Outbursts	K	**Describe** factors which may contribute to a gas outburst.	Geological environment Gas composition Ventilation Mining methods Gas drainage Safe operating procedures Outburst conditions Legislation Detection methods	Written Oral
		KA	**Describe and apply** programmes to monitor and control the factors which may contribute to an outburst.		
		KA	**Describe and apply** protection methods.		
DP2	Spontaneous Combustion	KA	**Identify and describe** the causes of spontaneous combustion .	Coal chemistry Ventilation pressure difference Mining system Mine design Coal seam characteristics Risks and hazards Control options Structures Physical spontaneous combustion indicators Gaseous spontaneous combustion indicators Inspection Monitoring Sampling Analysis	Written Oral
		KA	**Identify and describe** the risks and hazards associated with spontaneous combustion .		
		KA	**Identify and describe** spontaneous combustion detection methods.		
		KA	**Apply** programmes to monitor and control the factors which may contribute to spontaneous combustion .		
		KA	**Apply** monitoring procedures for compliance/adequacy of spontaneous combustion prevention/detection/control programmes and systems.		

POTENTIAL UNIT DP3. APPLY AND MAINTAIN PERSONNEL SAFETY SYSTEMS

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
DP3	Occupational Health & Safety	KA	**Describe & apply** systems for personnel safety in mines.	Personal Protection *(PPE, briefings, smoking, drug, alcohol, contraband, local hazard identification and assessment, first-aid)* Mine Risks and Threats *(Noise and respirable dust)* Hygiene Safety Management *(Safety organisational structures, composition, methods of functioning, responsibilities, prerogatives, communication channels, suggestion systems)* Equipment/Working Safety *(Transport, equipment operation, isolation, tagging, evacuation, fire fighting, rescue, authorisations)* Safety Communications/Information *(•Routine information - information structures, communication means/methods) (•Special information - information structures, communication means/methods/protocols) (•Safety records) (•Safety statistics)* Accident/Incident Reporting/Investigation *(Reporting procedures, investigation procedures, safety achievement analysis/disposal)* Safety Training *(Induction, emergency response, equipment/operational safety, first-aid, fire fighting, mines rescue)* Hazardous Substances Relevant legislation	Written Oral
		KA	**Describe and apply** training policies and operating procedures to comply with OH&S requirements.		
		KA	**Apply** statutory requirements and relevant standards.		

POTENTIAL UNIT DP4. APPLY ONGOING MAINTENANCE SYSTEMS FOR THE MINING INFRASTRUCTURE

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
DP4	Production Equipment	KA	**Apply** systems for the installation and commissioning of production equipment.	Longwall equipment B & P equipment Protection systems Power sources Basic mechanical principles Basic electrical principles	Written Oral
		KA	**Apply** systems for the operation and maintenance of production equipment.		
DP4	Transport Systems and Equipment	KA	**Apply** systems for the installation and commissioning of transport systems and equipment.	Rail mounted Free steer Coal, material, personnel Conveyors Pipelines Winders Protection systems Power sources Basic mechanical principles Basic electrical principles	Written Oral
		KA	**Apply** systems for the operation and maintenance of transport systems and equipment.		
DP4	Mine Services Equipment	KA	**Apply** systems for the installation and commissioning of services equipment.	Pumping Communication Monitoring Lighting Fuel storage Water Fire abatement Ventilation Power reticulation Stonedusting Explosion barriers Gas drainage Protection systems Power sources Basic mechanical principles Basic electrical principles	Written Oral
		KA	**Apply** systems for the operation and maintenance of services equipment.		

POTENTIAL UNIT DP5. APPLY MINE EMERGENCY RESPONSE PLANS

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
DP5	Preparedness and Emergency Response	K KA KA KA	**Describe** emergency preparedness and response plans. **Maintain** preparedness status in accordance with plans. **Apply** emergency response plans. **Apply** post-evacuation procedures.	Fires Explosions Spontaneous combustion Outbursts Inundations Strata failure Accidents Wind blast Personnel Equipment Organisation Legislation	Written Oral
DP5	Explosions	K KA	**Describe** factors which may contribute to an explosion. **Describe and apply** programmes to monitor and control the factors which may cause explosions.	Fuel sources (expand) Electrical Compressors/compressed air Ignition sources (expand) Oxygen sources-suspension, confinement, fire triangle Ventilation (expand) Safe operating procedures Control mechanisms (expand: stonedusting, sealing, explosion barriers, inertisation) Legislation Equipment fires (mechanical heat/open flame)	Written Oral

POTENTIAL UNIT DP5. APPLY MINE EMERGENCY RESPONSE PLANS (Cont...)

Part of Unit	Elements/Issues		Performance/Final Assessment Criteria	Range of Variables/Knowledges	Assessment
DP5	Fires	K	**Describe** factors which may contribute to a fire.	Underground Surface Fuel sources Ignition sources Oxygen sources Fire triangle - oxygen, fuel, ignition Ventilation Electrical Compressors/compressed air Safe operating procedures Legislation Control measures (inertisation, water, sealing, stonedusting) Fire fighting equipment (expand) Fire fighting techniques	Written Oral
		KA	**Describe and apply** programmes to monitor and control the factors which may cause a fire.		
		KA	**Describe and apply** fire fighting methods and equipment.		

UNIT M2 : **Establish and Maintain a Safe Mine Atmosphere**

Descriptor: This unit covers the functions required to establish and maintain a safe mine atmosphere including the development and approval of plans for ventilation, gas management, spontaneous combustion and outburst management.

Pre-Requisite: Unit UM1 Implement and Maintain Mine Atmosphere Controls
Unit RM3 Facilitate the Risk Management Process

Elements		Performance Criteria	
M2.1	Establish and Maintain the Mine Ventilation Management Plan.	M2.1.1	The risks and hazards associated with mine ventilation are identified and clarified.
		M2.1.2	Ventilation control options, structures, systems and procedures are identified and evaluated.
		M2.1.3	Types of mine fans are evaluated and the most suitable for particular applications are selected.
		M2.1.4	Mine ventilation circuits to ventilate the whole mine workings are designed.
		M2.1.5	Individual air circuits are designed.
		M2.1.6	Atmosphere monitoring systems are designed, evaluated and established.
		M2.1.7	Mine ventilation investigations are established and evaluated.
		M2.1.8	Mine ventilation management plan is designed, documented, established and audited.
M2.2	Establish and Maintain Gas Outburst Management Plan.	M2.2.1	Causes of gas outbursts are identified, clarified and evaluated.
		M2.2.2	Detection methods are identified, described and evaluated.
		M2.2.3	Risks and hazards associated with gas outbursts are identified and clarified.
		M2.2.4	Gas management options, structures, systems and procedures are identified and evaluated.
		M2.2.5	Programs to monitor and control the factors which may contribute to an outburst are designed and established.
		M2.2.6	Audit procedures for compliance/adequacy of outburst prevention/detection/control programs and systems are designed and established.

Unit M2 : Establish and Maintain a Safe Mine Atmosphere (Continued)

Elements		Performance Criteria	
M2.3	Establish and Maintain Spontaneous Combustion Management Plan	M2.3.1	Causes of spontaneous combustion are identified, clarified and evaluated.
		M2.3.2	Risks and hazards associated with spontaneous combustion are identified and clarified.
		M2.3.3	Spontaneous combustion control options, structures, systems and procedures are identified and evaluated.
		M2.3.4	Detection methods are identified and evaluated.
		M2.3.5	Programs to monitor and control the factors which may contribute to spontaneous combustion are designed, documented and established.
		M2.3.6	Audit procedures for compliance/adequacy of spontaneous combustion prevention/detection/control programs and systems are designed and established.
M2.4	Establish and Maintain Gas Drainage Systems	M2.4.1	Conditions where gas drainage may be required are identified.
		M2.4.2	The types and advantages/disadvantages of the current methods of gas drainage for specific applications are identified and evaluated.
		M2.4.3	Design criteria for gas drainage are established.
		M2.4.4	Hazard control procedures are established.
		M2.4.5	Monitoring processes are established and audited.

Range of Variables:

M2.1 Mine Ventilation

- Risks and hazards may include noxious atmospheres, flammable mixtures, explosive mixtures, temperature, humidity and respirable dust, coal dust, wind blast.
- Ventilation structures may include main, booster and auxiliary fans, stoppings. Overcasts, regulators, preparation seals, fire doors, bulk heads, goaf seals, final seals and pressure chambers.
- Defects to ventilation structures may include deterioration of materials, quality of construction, effects of surrounding strata, physical damage and water damage.
- Mine fans may include main, booster, auxiliary.
- Circuit design may involve simulation.
- Theory of ventilation to be applied may include applied fluid mechanics, applied thermodynamics.
- Mine atmosphere monitoring may include continuos monitoring, portable (hand held) monitoring, collection of bag samples, gas chromatography, ventilation measurements in all areas of the mines including sealed areas and waste workings.
- Investigation of mine atmosphere may include the selection and application of ventilation survey equipment and techniques.

M2.2 Gas Outburst

- Mechanisms which contribute to gas outburst include maceral composition, depth, gas content and composition, porosity, permeability, micro-geology, stress, mining rate, seam thickness, adjacent seams.
- Detection methods may include long-hole drilling, gas sampling, micro-seismic detection, changing face conditions, gas emission rates.
- Risks and hazards may include asphyxiation, poisoning, explosions, fires, entrapment, roof falls, irrespirable atmosphere, ventilation disruption.
- Amelioration measures may include pre-drainage, methods of work.
- Monitoring may include sampling, drilling, physical mining conditions.
- Geological conditions may include faults, dykes, intrusions and strata deformities.

M2.3 Spontaneous Combustion

- Mechanisms which contribute to spontaneous combustion may include coal chemistry, ventilation pressure difference, mining system, mine design, size distribution, humidity of air stream, temperature, moisture, depth of cover.
- Coal seam characteristics may include inherent factors such as rank, petrology, moisture, particle size, seam gas, pyrites or depositional factors such as seam thickness, multi seams, seam dip and depth of cover.
- Risks and hazards may include fires, explosions, asphyxiation, poisoning, burns, flying material, and watergas.
- Control options may include mine design, methods of work, ventilation practices, atmosphere monitoring, sampling, analysis, seals, prep seals, inertisation, water, flooding, digging out, grouting, pressure balancing.
- Structures - seals may include panel, whole of mine, explosion proof.
- Physical spontaneous combustion indicators may include smoke, haze, sweating, smell, heat.
- Gaseous spontaneous combustion indicators may include increased production of carbon monoxide, hydrogen and hydrocarbons or the use of indicator ratios such as CO make, Graham's ratio or other ratios as determined suitable.
- Detection may include inspection, monitoring, sampling, analysis.

M2.4 Gas Drainage

- Types of gases may include methane, CO^2.
- Conditions requiring gas draining may include high gas content and release, contamination of workings, outburst conditions.
- Types of gas drainage may include per-mining, post-mining, in-seam, goaf drainage, cross-measure, surface, hydro-fraccing.
- Design criteria and hazard controls may include gas purity, desorption, pipeline criteria, pump specifications, dewatering, flame-traps, gas engines, static electricity, flame arrester, automatic shut-off, quenching systems, pipeline repair, lighting arresters.

Definitions:

For the purposes of this standard, the definitions below apply:

- Mine Ventilation management Plan may include . . . . .
- Mine Outburst Management Plan may include . . . . .
- Spontaneous Combustion Management Plan may include procedures for mine atmosphere monitoring, reporting requirements, auditing, ventilation systems and usage, inertisation techniques, mine plan, action plans, response plans, emergency procedures, individual group responsibilities, training and education procedures.
- Mine Gas Drainage Plan may include . . . . .

Definitions (continued) :

- Principles of mine design include recovery, reserve optimisation, mining direction, geological structures, ventilation, strata control, mining method, productivity, environmental considerations and access.
- Action (alarm or trigger) level is a generic term used to describe a level determined at the mine site at which action is initiated or a response made.
- Audit is a validation process to ensure the procedure, process, system fills it's objective.
- Inertisation may be defined as the displacing or reducing of oxygen to a level that will not support combustion. It may be either a natural process using seam gases or a process of introducing incombustible gases.

Evidence:

Knowledge only at this stage. Subsequent detail to be added covering:

- Critical aspects of evidence
- Resource implications
- Consistency of performance
- Context of assessment
- Skills

Underpinning Knowledge and Skills:

(i) **Knowledge.** A knowledge of:

M2.1 Mine Ventilation

- legislation
- physics of ventilation flow
- types of mine gases, their properties, characteristics and effects
- mine operating procedures
- mine plan
- mine design relating to atmosphere
- survey techniques and instruments
- types of mine fans
- principles of ventilation management
- ventilation controls and structures
- simulation techniques
- management plan development/documentation systems
- communication methods
- real time monitoring

M2.2 Gas Outburst

- mine geology
- history of previous occurrence
- physical process of outburst
- equipment design
- mine design relating to outburst

M2.3 Spontaneous Combustion

- physical characteristics of coal
- chemistry related to spontaneous combustion
- seal design
- monitoring systems and techniques
- atmospheric indicators and ratios
- alarm protocols
- history of the seam
- range of control methods and their application
- the gas makes
- spontaneous combustion ventilation practices
- seam propensity for spontaneous combustion
- testing procedures
- stockpile management
- mine design related to spontaneous combustion
- statutory inspections
- mine reporting procedures

M2.4 Gas Drainage

- seam gas content and pressure
- history
- gas drainage systems
- gas disposal
- pipeline technology
- borehole technology
- static electricity and earthing
- drilling techniques (in mine)
- gas analysis
- mine geology
- water management

MODULE: M2C SPONTANEOUS COMBUSTION MANAGEMENT PLAN DEVELOPMENT

2. MODULE DETAILS

A. Module Name : Spontaneous Combustion Management Plan Development

B. Nominal Duration :

C. Module Code : M2C

2. MODULE PURPOSE

The purpose of this module is to prepare Managers and others responsible for this function to satisfy the competency for developing a spontaneous combustion management plan.

3. A. PRE REQUISITES

RM3 Facilitate the Risk Management Process

B. ALLIED MODULES

M2A Ventilation Management
M2B Outburst Management
M2D Gas Management

4. RELATIONSHIP TO COMPETENCY STANDARDS

This module relates directly to the NCS Competency Standards, Unit M2, Establish and Maintain a Safe Mine Atmosphere

5. CONTENT

The content of this module reflects the contents of the competency unit including:

* Element 3 and its attendant performance criteria
* The range of variables expressed in the Standard
* Knowledge requirements expressed in the standard
* Skills requirements expressed in the standard

6. ASSESSMENT STRATEGY

The Underground Coal Mining competencies are, in the main, holistically based. In this module an individual is not competent because they can develop parts of the spontaneous combustion Management Plan on one occasion. The competency is much broader than that.

In order to be found competent in conducting these responsibilities, the candidate is required to:

- gain and maintain a comprehensive knowledge of the theory underpinning this important function.
- develop technically and legally sound procedures which will work in the mine.

The Assessment Strategy for employees should normally involve three tiers or levels.

Diagnostic Assessment is normally used to determine the candidates competency gap or deficiencies and to identify their training needs.

Diagnostic assessment may be carried out by a range of methods including:
- open text reference location tests (computer aided or hard copy)
- recorded interview
- observation by a second party using prompts, guides and check lists
- self assessment using the above
- designated project outcomes based on a work coordinator's structured referees report

As the principal purpose of this assessment is to identify training needs, the results should be reviewed with the appropriate parties by a qualified workplace trainer.

Candidates may apply, or trainers and workplace coordinators agree and recommend that, individuals move directly to summative/final assessment where the evidence of the level of current competency or prior learning supports this.

Formative or progressive assessment is appropriate for each learning outcome.

Formative assessment may be used over time to capture the range of theory to be addressed and to identify when a person is ready to undertake their final or summative assessment.

Formative assessment may be conducted by the coordinator or trainer. The assessment should be recorded but only as an aid to the candidate and the person assessing.

Summative or final assessment for spontaneous combustion should separately address two aspects: the theory and the practical applications related to the outcomes. Records of outcomes shall be prepared and retained for both aspects.

Theory or knowledge underpinning requires formal summative assessment using instruments and aids specifically designed for the purpose. This assessment should be conducted by, or under the authority of a qualified workplace assessor and the results certified by an appropriate party.

A candidate is not to proceed to practical activities until they have successfully completed the summative assessment for Learning Outcomes 1 - 2.

Practical Activities. The assessment of practical activities may need to be carried out under simulated work circumstances. Whilst it would be preferable to assess within a normal working situation, in this case, this option may not be practical because the range of situations may not occur or be readily available in the routine work situation

Summative or final assessment of practical activities is to be conducted by a qualified workplace assessor.

Methods of assessment are to be determined by the assessing authority at the local level. Section 7 provides a guideline for assessment methods against each of the assessment criteria. These guidelines are provided to aid the process: they are neither exhaustive nor obligatory and they should not dissuade the use of suitable alternatives.

7. LEARNING OUTCOMES DETAILS

There are a total of three learning outcomes, with two focussed on theory and one requiring the development of procedures. Details of the outcomes and assessment criteria are as follows:

Learning Outcome M2C.1

At the completion of this outcome the candidates will be able to access and interpret information underpinning the identification of the Spontaneous Combustion hazards and risks.

Assessment Criteria

The candidate will be able to:

M2C.1.1 Explain the causes and effects of spontaneous combustion.

M2C.1.2 Identify the types and impacts of the main mine gases in relation to spontaneous combustion.

M2C.1.3 Identify the coal seam characteristics which affect the likelihood of spontaneous combustion.

M2C.1.4 Describe the hazards associated with overlying and underlying seams in relation to spontaneous combustion.

M2C.1.5 Describe the effects of changes in mine atmosphere on the risks of spontaneous combustion.

M2C.1.6 Describe the hazards associated with goaf and waste working atmosphere on the risks of spontaneous combustion.

M2C.1.7 Explain the impact of dewatering goaf areas on the risks of spontaneous combustion.

M2C.1.8 Explain the impact of production delays on the risk of spontaneous combustion.

M2C.1.9 Describe the impact of mine ventilation structures on minimising spontaneous combustion risks.

and

Explain the effect of defective ventilation structures on the spontaneous combustion risk in relation to:

(1) accumulation of water
(2) effects of geological conditions
(3) effects of pressure differentials across seals
(4) effect of changing barometric pressure
(5) effect of rib, roof and floor conditions

M2C.1.10 Explain spontaneous combustion risks associated with coal stowage systems.

Conditions

For both learning and assessment the candidate is to be given access to: **(Examples only)**

* relevant extracts of spontaneous combustion legislation/statutory requirements
* relevant spontaneous combustion reference text(s)
* relevant mine design reference text(s)
* relevant mine ventilation reference texts(s)

Assessment Methods

The key purpose of assessment is to ensure the candidate is capable of locating, reading, interpreting and applying the latest authoritative technical information on spontaneous combustion hazards and risks.

There are two main ways to administer this assessment:

(1) To require the candidate to provide an individual written response to each of the subjects/issues included at Assessment Criteria M2C.1.1 - M2C.1.10 above.

(2) To provide the candidate with the list at M2C.1.1 - M2C.1.10 and request a structured and integrated essay response which addresses Hazards and Risks and covers the assessment criteria.

As we are dealing with Managers, it is reasonable to set this as a project with a suspense date. It is also reasonable to expect the candidates to provide their research bibliography.

Learning Outcome M2C.2

At the completion of this outcome the candidate will be able to access and interpret information underpinning the identification of spontaneous combustion control systems and procedures.

Assessment Criteria

The candidate will be able to:

M2C.2.1 Describe the principles of mine and ventilation design and their impact on the spontaneous combustion risk.

M2C.2.2 Describe the principles of ventilation design and their impact on the spontaneous combustion risk.

M2C.2.3 Explain the methods, purpose and procedures for installation and uses of atmosphere monitoring systems with regards to spontaneous combustion.

M2C.2.4 Describe the impact of gas management on spontaneous combustion.

M2C.2.5 Describe the impact of water management on spontaneous combustion.

M2C.2.6 Describe the methods and purposes of natural and induced inertisation in the goaf and waste workings in relation to spontaneous combustion.

M2C.2.7 Explain the seal design requirements in terms of construction, location and the use of materials for spontaneous combustion risks.

Conditions

For both learning and assessment the candidate is to be given access to: **(Examples only)**

* relevant extracts of spontaneous combustion legislation/statutory requirements
* relevant spontaneous combustion reference text(s)
* relevant mine design reference text(s)
* relevant mine ventilation reference texts(s)

Assessment Methods

The key purpose of assessment is to ensure the candidate is capable of locating, reading, interpreting and applying the latest authoritative technical information on spontaneous combustion control systems and procedures.

There are two main ways to administer this assessment:

(1) To require the candidate to provide an individual written response to each of the subjects/issues included at Assessment Criteria M2C.2.1 - M2C.2.7 above.

(2) To provide the candidate with the list at M2C.2.1 - M2C.2.7 and request a structured and integrated essay response which addresses Hazards and Risks and covers the assessment criteria.

As we are dealing with Managers, it is reasonable to set this as a project with a suspense date. It is also reasonable to expect the candidates to provide their research bibliography.

Learning Outcome M2C.3

At the completion of this outcome the candidate will be able to apply mine design principles and related technical information to the development of spontaneous combustion procedures.

Assessment Criteria

The candidate will be able to:

M2C.3.1 Apply the principles of mine design to spontaneous combustion developments.

M2C.3.2 Develop or contribute to the development of mine atmosphere monitoring systems.

M2C.3.3 Develop or contribute to the development of mine atmosphere sampling, analysis and response systems.

M2C.3.4 Develop or contribute to the development of inspection, reporting and recording systems for spontaneous combustion indicators.

M2C.3.5 Determine and review action levels to minimise the risk of spontaneous combustion.

M2C.3.6 Develop or contribute to the development of water management procedures to minimise the risk of spontaneous combustion.

M2C.3.7 Develop or contribute to the design and development of ventilation systems and controls to minimise the risk of spontaneous combustion.

M2C.3.8 Design or contribute to the design of inertisation systems to satisfy the operational conditions of the mine.

M2C.3.9 Develop contingency plans to mitigate the risk of spontaneous combustion (eg, production delays).

M2C.3.10 Develop and document review processes for design and development activities.

Conditions

For both learning and assessment the candidate is to be given access to: **(Examples only)**

* relevant extracts of spontaneous combustion legislation/statutory requirements
* relevant spontaneous combustion reference text(s)
* relevant mine design reference text(s)
* relevant mine ventilation reference texts(s)
* relevant Mine Manager's Rules and Schemes
* a copy of the Mine Spontaneous Combustion Management Plan
* technical and geological information related to mine and mining operations.

Assessment Methods

In practical terms, there are limitations on the assessment of this outcome. The ultimate assessment would be to have the candidate prepare the Spontaneous Combustion Management Plan in its entirety for the specific mine, however, how often does that occur and what would the candidates level of involvement really be?

It is suggested that a two stage assessment process as follows may be appropriate:

- **Stage 1.** The candidate, as a self-paced project, would be required to prepare an outline structure for a Spontaneous Combustion Management Plan. The structure would need to include:

  - Structure divided into parts/procedures
  - Outline table of contents for each procedure
  - Bibliography or list of references which would need to be consulted by those responsible for the development of the procedures.

  and would have, at a minimum, to address the issues at Assessment Criteria 3.1 to 3.10 above.

- **Stage 2.** The candidate would be required to develop or substantially review and modify a minimum of two procedures. Development would normally be against a simulated mine site requirement to ensure consistency and adequacy of scope and coverage. If however a **real** requirement requiring equal effort was available at the minesite, this may, with the approval of the assessing authority, be substituted for the simulated subjects. The candidates level of involvement in this process would also need to be certified by an appropriate authority.

8. DELIVERY OF THE MODULE

Delivery Strategy

From a delivery perspective, this Module is divided into two parts. The first is related to the theory underpinning and the second to the practical application.

Theory or Knowledge Underpinning. In determining the delivery mode there is only one obligatory stipulation - the mode must satisfy adult learning theory and requirements.

Within this constraint the mode selected should:

- provide maximum flexibility of access to learning
- be sustainable in terms of quality and cost
- complement emerging trends in information management

This module provides for delivery in a variety of modes including:

- full-time or part-time
- teacher centred and self-paced student-centred learning
- off-the-job training
- on-the-job training
- distance education/mentoring
- open learning

Delivery within these modes may include:

- lectures and presentations
- programmed learning(computer aided or hard copy)
- audio and video aided learning
- project activities
- written exercises

Delivery of Practical Subjects. In determining the delivery mode for practical subjects the principles of adult learning need to be applied. In addition, the practical delivery needs to be structured, systematic and subject to agreed quality control and assurance measures.

Practical training and preparation should continue to embrace:

- **Explanation.** A formal explanation and agreement on the objectives and the training activities.

- **Demonstration.** A formal demonstration of how to go about the work, what is involved and the safety features and requirements for each activity. The demonstration must itself satisfy the competency and not revert to local abridged practices. Candidates need to be exposed to how it should be done despite the fact that this may not reflect some local practices. The demonstration may need to be repeated until the candidate is considered able to proceed.

- **Practice.** Practice will normally occur under a reducing level of supervision. Initially, the trainer will need to closely monitor the candidates actions to confirm that the lessons from the demonstration have been assimilated and that the candidate is able to function safely. Reinforcement by further demonstration may be required.

  Subsequent practice in the workplace may be under the general guidance of a coordinator however, in this capacity the coordinator should accept the training responsibility and administer the training/practice against the agreed objectives.

- **Confirmation.** The candidates achievements against the objectives need to be confirmed by the trainer/coordinator, shortcomings identified and addressed and the candidate cleared before proceeding to formal assessment.

Resource Requirements

Human Resources

Those involved in training and assessing within the course need to comply with the minimum human resource standard as endorsed by the relevant accreditation agency or authority.

Content related. Possession of competencies and knowledge relevant to the module/unit which are at a level equivalent to or higher than the module/unit or phase/stage. This may be indicated by one or a combination of:

- employment history
- training/educational history
- qualifications
- recognition of prior learning

Instruction Skills. Possession of competencies, as appropriate, relating to the development, presentation, assessment and evaluation of courses of study/training. This may be indicated by one or a combination of:

- workplace trainer and/or assessor competencies or equivalent
- recognition of prior learning

Industry Relationship. Demonstrated capacity to relate the module content to industry needs and career progression. This may be indicated by one or a combination of:

- work history (paid or unpaid)
- release to industry
- attendance at seminars/workshops/conferences focussed on industry developments/needs

(Human Resources continued)

Currency. Knowledge of practices consistent with emerging/current best practice in industry and training. This may be indicated by one or a combination of:

- relevant work history (paid or unpaid)
- relevant release to industry
- attendance at seminars/workshops/conferences focussed on industry developments/needs
- current membership of relevant professional/technical/trade associations
- professional reading program
- statement of professional activities supported by responsible industry referee

Learning Resources: (Examples Only)

- relevant extracts of spontaneous combustion legislation/statutory requirements
- relevant spontaneous combustion reference text(s)
- relevant mine design reference text(s)
- relevant mine ventilation reference texts(s)
- relevant Mine Manager's Rules and Schemes
- a copy of the Mine Spontaneous Combustion Management Plan
- technical and geological information related to mine and mining operations.

Occupational Health and Safety Requirements

These are covered within the body of the module.

LIST OF CURRENT COMPETENCY UNITS AND EXISTING DRAFT MODULE DESCRIPTORS

Unit No	National Units of Competency Title	Module No	Module Descriptor Title
1.0	Work Safely	CMUC 1	Work Safely
2.0	Work Co-operatively with Others	CMUC 2	Work Co-operatively with Others
3.0	Solve Operational Problems	CMUC 3	Solve Individual Work Problems
4.0	Plan and Organise Individual Work	CMUC 4	Plan and Organise Individual Work
5.0	Contribute to Quality Assurance Systems	CMUC 5	Contribute to Quality Assurance Systems
10.0	Operate General Service Vehicles and Plant	CMUP 10	General Service Vehicle and Plant Operation
11.0	Conduct Forklift Operations	CMUP 11	Forklift Operation
12.0	Operate Power Tram	CMUP 12	Power Tram Operations
13.0	Conduct Rail Vehicle Operations	CMUP 13	Rail Vehicle Operations
14.0	Conduct Tracked Vehicle / Plant Operations	CMUP 14	Tracked Vehicle / Plant Operations
15.0	Conduct Wheeled Vehicle Operations	CMUP 15	Wheeled Vehicle Operations
21.0	Respond to Local Emergencies	CMUP 21	Respond to Local Emergencies
25.0	Implement and Maintain Workplace Safety	CMUP 25A CMUP 25B	Implement and Maintain Workplace Safety (Statutory Theory) Implement and Maintain Workplace Safety (Practice)
26.0	Conduct Environmental Monitoring	CMUP 26	Conduct Environmental Monitoring
40.0	Install Maintain and Recover Gas Drainage Systems	CMUP 40	Gas Drainage Systems Installation, Maintenance and Recovery
41.0	Install Maintain and Recover Electrical Services	CMUP 41	Electrical Services Installation, Maintenance and Recovery

42.0	Install Maintain and Recover Water and Air Systems	CMUP 42	Water and Air Systems Installation, Maintenance and Recovery
43.0	Conduct Strata Control Operations	CMUP 43A CMUP 43B CMUP 43C	Primary Strata Control Operations Secondary Strata Control Operations Advanced Strata Control
44.0	Conduct Special Roadway Operations	CMUP 44	Special Roadway Operations
45.0	Recover Equipment	CMUP 45	Major Equipment Recovery
47.0	Conduct Mine Ventilation Control Measures	CMUP 47	Ventilation Control Measures
48.0	Conduct Shotfiring	CMUP 48A	Shotfiring Theory
		CMUP 48B	Shotfiring Practice
49.0	Support Shotfiring Operations	CMUP 49	Support Shotfiring
60.0	Conduct Roadway Maintenance	CMUP 60	Roadway Maintenance
61.0	Conduct Stonedusting Operations	CMUP 61	Stonedusting Operations
62.0	Dewater Roadways and Work Areas	CMUP 62	Dewater Roadways and Work Areas
64.0	Install and Maintain Explosion Barriers	CMUP 64	Explosion Barriers Installation and Maintenance
65.0	Construct and Maintain Ventilation Structures	CMUP 65	Ventilation Structures Construction and Maintenance
66.0	Extend, Retract and Maintain Conveyor Systems	CMUP 66	Conveyor Extension, Retraction and Maintenance
67.0	Install and Maintain Major Conveyor Componentry	CMUP 67	Major Conveyor Componentry Installation and Maintenance
70.0	Conduct Continuous Miner Operations	CMUP 70	Continuous Miner Operations
71.0	Conduct Shuttle Car Operations	CMUP 71	Shuttle Car Operations
72.0	Conduct Feeder Breaker Operations	CMUP 72	Feeder Breaker Operations
73.0	Conduct Face Ventilation Operations	CMUP 73	Face Ventilation Operations

75.0	Conduct Shearer Operations	CMUP 75	Shearer Operations
76.0	Conduct Longwall Face Ancillary Equipment Operations	CMUP 76	Longwall Face Ancillary Equipment Operations
77.0	Conduct Pan Tech Operations	CMUP 77	Pan Tech Operations
78.0	Install and Recover Longwall Equipment	CMUP 78	Longwall Equipment Installation and Recovery
79.0	Operate Breaker Line Supports	CMUP 79	Breaker Line Supports
90.0	Conduct Operator Maintenance	CMUP 90	Minor Maintenance
91.0	Maintain Lamp Cabin Operations	CMUP 91	Lamp Cabin Operations
92.0	Maintain Bathroom Hygiene	CMUP 92	Bathroom Hygiene
95.0	Monitor Control Processes	CMUP 95	Process Control Monitoring
99.0	Perform Basic Cutting and Welding	CMUP 99	Basic Cutting and Welding
110.0	Apply Mine Communications Systems	CMUP 110	Mine Communications Systems
111.0	Facilitate Operations	CMUP 111A CMUP 111B CMUP 111C CMUP 111D CMUP 111E CMUP 111F	Facilitate Operational Safety Advanced Workplace Communication Plan the Work of a Group Solve Operational Problems Lead a Team or Group Facilitate Quality Practices
112.0	Co-ordinate Workplace Operations	CMUP 112	Coordinate Workplace Operations