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REPORT TO MAJOR NIGEL CAPEL

**STANDARDS SETTING BODY FOR EXPLOSIVES,
MUNITIONS AND SEARCH OCCUPATIONS**

**DRAFT EXPLOSIVES SUBSTANCE & ARTICLES
NATIONAL OCCUPATIONAL STANDARDS:**

OTHER APPLICATIONS (ESA KEY ROLE 10) ¹

19 May 2009

¹ 2010 - Sectoral responsibility for these NOS has been transferred from the SEMTA Sector Skills Council to the Cogent Sector Skills Council Ltd (<http://www.cogent-ssc.com>) by the UK Commission for Employment and Skills (www.ukces.org.uk).

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INTRODUCTION

The standards contained in this booklet have been designed for industries using explosives and describe the preparation and use of explosives. This includes such purposes as for fireworks displays, film special effects, mineral extraction (on and offshore), agriculture, demolition, quarrying and tunnelling, and so on.

EPIC, the quarrying industry's National Training Organization, has already developed a suite of National Occupational Standards (NOSs) and N/SVQs based upon them. These standards are directly relevant to some of the industries listed above, although the terminology might not be readily recognized outside the quarrying industry. They have been included in this booklet for reasons of their direct relevance.

New NOSs have also been developed for other industries where the quarrying standards are not relevant ie for entertainment and engineering purposes. The draft engineering NOSs have been drafted from a functional perspective and do not relate to the roles of the personnel concerned. Further standards would need to be developed to reflect other roles' contributions to the functions listed.

Many of the functions carried out to achieve a particular end have already been described in other explosive substances and articles (ESA) booklets. Those functions listed in this booklet deal with those functions not listed elsewhere. When considering the activities carried out by people in the industries listed above, reference should also therefore be made to these other booklets.

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For example, the functions carried out by a team of people who are giving a fireworks display, or who are staging a battle scene re-enactment (described here as “the effect”) would be as follows:

Activity	Key role/std no.
Design the effect	10.13.1
Plan the effect	11.5
Assess risk	2.11
Receive explosives	13.20
Prepare and position charges for entertainment purposes	10.13.2
Initiate the effect for entertainment purposes	10.13.3
Deal with misfires	10.7 (SF7)
Remediate the area	11.27
Evaluate the effect	11.26

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EPIC TRAINING LIMITED on behalf of PROSKILLS

**REVIEW AND AMENDMENT OF THE NATIONAL OCCUPATIONAL STANDARDS FOR
SHOTFIRING**

Standards – Draft 1
May 1st 2004

Unit BL1: CONTRIBUTE TO AN EFFICIENT AND BLASTING ENVIRONMENT

Unit BL2: CONTRIBUTE TO HEALTH AND SAFETY IN THE BLASTING WORKPLACE

Unit BL3: RECEIVE, STORE AND ISSUE EXPLOSIVE MATERIALS

Unit BL4: RECEIVE AND HANDLE EXPLOSIVE MATERIALS ON-SITE

Unit BL5: CHARGE BLAST HOLES TO SPECIFICATION

Unit BL6: BLAST TO SPECIFICATION

Unit BL7: DEAL WITH MISFIRES

Unit BL8: DETERMINE THE BLAST REQUIREMENTS

**Unit BL9: DESIGN AND ARRANGE FOR THE AUTHORISATION OF THE BLAST
SPECIFICATION**

Unit BL10: PRODUCE PROFILES OF FACES

Unit BL11: SUPERVISE THE BLASTING OPERATION

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Unit 10.1 Contribute to an efficient and effective blasting environment (BL1)

Unit Overview

This unit is designed for the candidate to demonstrate competence to contribute to an efficient and effective work environment. It provides the background to operating efficiently. It provides for the exchange of information, the developing and maintaining of effective working relationships with colleagues, associates and visitors. It recognises the importance of organising one's own work to operate effectively, efficiently, to maintain standards in work and where required to be complementary with the work of others.

During this work the candidate must take account of the relevant operational requirements and safe working practices.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. Approved procedures and practices in the context of the operations, the work activity and the workplace environment (organisational; environmental; regulatory; emergency; operational)
2. Responsibilities under the Health and Safety Statutory Requirements

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Unit 10.1 **Contribute to an efficient blasting environment (BL1)**

10.1.1: **Contribute to efficiency in the workplace**

Contexts

Criteria

In achieving this element you will have ensured that:

- a work and the operational area are organised in an orderly way to minimise hazards
- b work materials are used and stored in accordance with the work activity and to approved procedures and practices
- c tools and equipment are maintained ready for use and stored in designated places when not required
- d restrictions to progress of work are communicated to the appropriate person(s) for appropriate action
- e communications are clear and carried out in accordance with operational and organisational procedures
- f problems and conditions outside the responsibility of the job holder are referred to an authorised person
- g records are maintained in accordance with operational and organisational requirements
- h work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

You need to know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii characteristics of work materials relevant to the work activity
- iii types of tools and equipment used with the operation and work activity
- iv arrangements, designated places and working procedures for storing tools and equipment
- v relevant methods for the storage of the work materials
- vi relevant means of communication used in the work activity
- vii procedures for reporting of problems

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Unit 10.1 **Contribute to an efficient blasting environment (BL1)**

10.1.2: **Develop and maintain effective working relationships**

Contexts

Criteria

In achieving this element you will have ensured that:

- a work colleagues and associates are treated in a manner that promotes goodwill and maintains good working practices
- b reasonable working requests are responded to positively and willingly
- c where colleagues and associates appear to be in work related difficulties, appropriate support is offered or sought
- d communications are clearly conveyed in a style and language appropriate to the situation and comply with approved procedures and practices
- e exchange and recording of information is carried out in accordance with organizational procedures
- f responses to personnel are courteous and in a manner appropriate to the situation
- g problems and conditions outside the responsibility of the job holder are referred to an authorised person

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii responsibility of and to work colleagues, associates and visitors in relation to the work activity
- iii type and methods of communication involved with the work activity
- iv procedures for exchange and recording of information

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Unit 10.1 **Contribute to an efficient blasting environment (BL1)**

10.1.3: **Organize own work and maintain standards**

Contexts

Criteria

In achieving this element you will have ensured that:

- a work is organised to comply with instructions and the agreed schedules
- b work methods are employed in accordance approved procedures and practices and optimise the use of time
- c own work is co-ordinated with other relevant personnel and related activities as required
- d any suggestions for improvements to work methods are referred to an authorised person for confirmation and agreement on the action to be taken
- e work is done to the agreed standards and is in accordance with the specification and the organisational policy
- f deviations in standard or specification are agreed with an authorised person
- g work that may be detrimental to safety or the environment is referred to the appropriate person(s) in accordance with organisational and operational procedures
- h waste and debris are removed and disposed of in accordance with approved procedures and practices
- i work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii the work requirement and specifications
- iii terminology used with the work activity
- iv work methods employed in the context of the work activity involved
- v categories and uses of materials in the work activity
- vi the processes and sequence of events for the work activity
- vii standards relative to the work activity and the workplace environment

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Unit 10.2 Contribute to health and safety in the blasting workplace (BL2)

Unit Overview

This unit is designed for the candidate to demonstrate competence to contribute to health and safety in the workplace, particularly in relation to blasting, explosives and explosive substances. It asks the work operator to be on the look out for hazards and, when identified, deal with them if appropriate, ensuring they are reported for others to become aware of. The work operator must be aware of their responsibilities in respect of Health and Safety at Work and the practices and procedures which help to maintain H&S for themselves and others. The work operator would be expected to have a basic understanding of emergency services and procedures and be able to respond appropriately. Similarly, there would be a requirement to assist with security procedures with regard to trespassing and breaches of security involving damage or theft of plant, equipment, materials and property.

During this work the candidate must take account of the relevant operational requirements and safe working practices.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. Approved procedures and practices in the context of the operations, the work activity and the workplace environment (organisational; environmental; regulatory; emergency; operational)
2. Responsibilities under the Health and Safety Statutory Requirements

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Unit 10.2 Contribute to health and safety in the blasting workplace (BL2)

10.2.1 Operate safely in the workplace

Contexts

Criteria

In achieving this element you will have ensured that:

- a work activities are carried out safely to avoid creating hazardous situations that may endanger operators of the work and other personnel
- b hazards and potential hazards identified in the workplace are dealt with appropriately within the responsibility and capability of the work operator and reported promptly to the appropriate person(s)
- c communications are clear and information or instruction is confirmed as understood
- d all tools and equipment are used safely in accordance with organisational procedures, manufacturers instructions and relevant statutory regulations
- e work materials and components are handled and stored in accordance with approved procedures and practices
- f manual handling is carried out safely using appropriate handling techniques
- g accident(s) and incident(s) are reported promptly to an authorised person in accordance with approved procedures and practices
- h appropriate personal protective equipment is used in compliance with safe working practices
- i work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii hazards in the context of the working environment
- iii procedures for reporting and dealing with hazards
- iv types of tools and equipment to be used relevant to the work activity
- v types of materials and substances associated with the work
- vi how to identify and report hazards to the working environment including restrictions to access and egress; mis-use of tools and equipment; faulty equipment; hazardous substances; interference with and from adjacent activities; obstructions; exposed apparatus; structures; services.

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Unit 10.2 Contribute to health and safety in the blasting workplace (BL2)

10.2.2: Respond to emergencies

Contexts

Criteria

In achieving this element you will have ensured that:

- a in the event of an emergency, procedures are implemented promptly and correctly in accordance with recognised safe practice and organisational policy
- b accident(s) and incident(s) are responded to within the responsibility and capability of the work operator and promptly reported to an authorised person
- c use of emergency appliances is carried out in accordance with approved procedures and practices
- d details of accident(s) and incident(s) are recorded in accordance with approved procedures and practices
- e problems and conditions outside the responsibility of the job holder are referred to an authorised person

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii fire and emergency precautions and procedures
- iii classification of fires and the appropriate extinguishers for dealing with them
- iv procedures for accident(s) and incident(s)
- v common forms of personnel accidents or health emergencies and the actions to be taken
- vi work operators' scope and limitations for dealing with emergencies

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Unit 10.2 Contribute to health and safety in the blasting workplace (BL2)

10.2.3: Assist in the security of the workplace

Contexts

Criteria

In achieving this element you will have ensured that:

- a unauthorised personnel seen in the workplace are dealt with in accordance with organisational procedures and the appropriate person(s) advised
- b arrangements for security are observed and maintained in accordance with approved procedures and practices
- c potential risks to security are reported promptly to the appropriate person(s) and remedial action taken as necessary in accordance with organisational procedures
- d breaches of security are reported immediately to an authorised person
- e problems and conditions outside the responsibility of the job holder are referred to an authorised person

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii the organisation's security procedures
- iii action to take in cases of breaches of security including acts of vandalism and theft
- iv potential security risks
- v methods of dealing with unauthorised persons

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Unit 10.3 Receive, store and issue explosive materials (BL3)

Unit Overview

This unit is designed for the candidate to demonstrate competence to receive, store and issue explosive materials. This unit covers receiving and storing explosive materials and the issue of explosive materials to authorised persons.

Candidates will require knowledge across a range of specialisms which includes: covering site security procedures; potential risks to security; procedures to avoid deterioration of explosives and accidental initiation; manufacturers, labels and their meaning; statutory stock control; relevant legislation and packaging and labelling of explosives.

During this work the candidate must take account of the relevant operational requirements and safe working practices.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. Types and range of explosive materials
2. Packaging and labelling of explosives
3. Security rules and procedures; action to take in cases of breach of security; potential risks to security
4. Approved procedures and practices in the context of the operations, the work activity and the workplace environment (organisational; environmental; regulatory; emergency; operational)
5. Responsibilities under the Health and Safety Statutory Requirements

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Unit 10.3 Receive, store and issue explosive materials (BL3)

10.3.1: Receive and store explosive materials

Contexts

Criteria

In achieving this element you will have ensured that:

- a explosive materials for store are received, handled and stored in accordance with operational and organisational procedures and with relevant legislation
- b keys are secured in conformity with organisational and operational requirements and relevant legislation
- c security measures, safety and condition of area surrounding the store are checked thoroughly to ensure that they comply with legislative requirements
- d potential security risks are correctly identified and reported to the appropriate person(s)
- e storage conditions are checked and confirmed to ensure that they comply with manufacturers' recommendations for the explosives
- f stock control, movements and quantities of explosives are accurately recorded in accordance with operational and organisational procedures and the relevant statutory requirements
- g identified and authorised persons only are allowed into the storage area in accordance with store security procedures
- h problems and conditions outside the responsibility of the candidate are referred to an authorised person
- i work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii how to verify authorised persons
- iii ways of dealing with unauthorised persons
- iv procedures to avoid overloading storage limitations of licence
- v procedures to avoid deterioration of explosives
- vi procedures to avoid accidental initiation
- vii manufacturers' information and recommendations for storage and handling of explosive materials
- viii relevant legislation associated to the receipt and storage of explosive materials (ie new stock; returned stock)
- ix licence procedures and limitations

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Unit 10.3 Receive, store and issue explosive materials (BL3)

10.3.2 Issue explosive materials to authorised persons

Contexts

Criteria

In achieving this element you will have ensured that:

- a All explosives materials are correctly issued to identified and authorised persons only
- b Explosive materials are issued accurately in conformity with the requirements of the blasting specification
- c Explosive materials are issued in containers which meet the requirements of the relevant legislation
- d Reports and records are completed accurately and are available to authorised persons
- e Faulty stock is promptly identified and appropriate procedures followed
- f Explosive materials are handled safely and in accordance with operational and organisational rules and procedures
- g Problems and conditions outside the responsibility of the candidate are referred to an authorised person
- h Work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

You need to know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii types and range of explosive materials
- iii relevant legislation
- iv design of containers and relevant legislation
- v packaging and labelling of explosives
- vi marking and coding of detonators
- vii methods of controlling stock
- viii recognition of deteriorated stock

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Unit 10.4 Receive and handle explosive materials on-site

Unit Overview

This unit is designed for the candidate to demonstrate competence to receive and handle explosive materials. This unit covers receiving explosive materials from store and/or delivery vehicle, and handling explosive materials on site.

Candidates will require knowledge across a range of specialisms which includes: relevant legislation; recognition of explosive types, detonator types and delays; site rules for handling and transport; requirements for testing explosives; potential dangers/ hazards during transportation; security in transport and safety procedures when loading and unloading explosive equipment.

During this work the candidate must take account of the relevant operational requirements and safe working practices.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. The types and range of explosive materials (to include explosives; detonating devices; blasting agents; blasting accessories)
2. The approved procedures and practices in the context of the operations, the work activity and the workplace environment (to include organisational; environmental; regulatory; emergency; operational)
3. The responsibilities of yourself and relevant others under the Health and Safety Statutory Requirements

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Unit 10.4 Receive and handle explosive materials on-site (BL4)

10.4.1 Receive explosive materials on-site

Contexts

Criteria

In achieving this element you will have ensured that:

- a all explosive materials are obtained correctly and checked in conformity with the requirements of the blasting specification;
- b records are completed accurately and made available to authorised persons;
- c explosive materials are handled safely in accordance with operational and organisational procedures and relevant legislation requirements;
- d problems and conditions outside the responsibility of the candidate are referred to an authorised person;
- e work is carried out to approved procedures and practices and in compliance with statutory requirements.

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii the relevant legislation associated to the handling and movement of explosives;
- iii how to recognise detonator types and delays;
- iv the operational and organisational procedures and practices for handling and transport of explosives;
- v the requirements for checking explosives type and condition

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Unit 10.4 Receive, store and issue explosive materials (SF3)

10.4.2 Issue explosive materials to authorised persons

Contexts

Criteria

In achieving this element you will have ensured that:

- a all explosive materials are contained safely and securely and precautions taken to avoid any loss or damage;
- b explosives and detonators are separated and handled in conformity with operational and organisational rules and procedures and in accordance with relevant legislation;
- c approved routes are used when transporting explosive materials;
- d relevant danger notices are clearly displayed in conformity with operational and organisational rules and procedures and with relevant legislation;
- e explosive materials are handled and moved safely and in accordance with site rules;
- f problems and conditions outside the responsibility of the candidate are referred to an authorised person;
- g work is carried out to approved procedures and practices and in compliance with statutory requirements.

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii the reasons for, and location of, specified routes to be used when transporting explosive materials;
- iii the potential dangers/ hazards during transportation;
- iv the safety procedures when loading and unloading explosive materials;
- v the manufacturers' recommendations for handling explosives and detonators;
- vi the relevant legislation associated to the transport of explosives;
- vii the dangers associated with environmental conditions;
- viii the dangers of induced currents from external sources

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Unit 10.5 Charge blast holes to specification (BL5)

Unit Overview

This unit is designed for you to demonstrate your competence to charge blast holes to specification. The unit covers checking blast sites prior to charging by checking the setting out and profiling of the drill holes, finalising the blast specifications and confirming the charge. Preparing the explosive materials and charging blast holes with the explosive materials. The unit also covers disposing of surplus packaging and removing surplus explosive material from blast site.

You will require knowledge across a range of specialisms which include: Blasting specification, plans, vertical sections, symbols and terminology, reporting procedures, potential hazards, effects of adverse environmental and site conditions on explosives, relevant legislation, manufacturers recommendations for handling explosives and detonators and types and properties of explosive materials used, explosive types and susceptibility to detonation, approved procedures and practices for disposal of packaging, approved methods of disposing of surplus explosive materials, detonators, primers, detonating cord and their detonation, explosive regulations relating to packaging and labelling and relevant published information e.g. HSE publications.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. Approved procedures and practises in the context of the operations, the work activity and the workplace environment (organisational; environmental; regulatory; emergency; operational)
2. Responsibilities under the Health and Safety Statutory Requirements

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Unit 10.5 Charge blast holes to specification (BL5)

10.5.1 Check blast sites prior to charging

Contexts

Criteria

In achieving this element you will have ensured that:

- a Written information relevant to the blasting specification is scrutinised and checked as complete and any ambiguities are clarified with authorised persons
- b Each blast hole is checked for condition, dimension and direction, as appropriate, to ensure it is suitable for charging to the blast specification
- c Any variations to the blasting specification are identified, recorded, reported and confirmed to the appropriate persons
- d Problems and conditions outside the responsibility of the candidate are referred to an authorised person
- e Work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii written information relating to the operation
- iii the principles and practice of ensuring blast hole suitability
- iv measuring instrumentation and techniques
- v reporting procedures
- vi potential hazards
- vii dangers and effects of adverse environmental conditions
- viii limits of own responsibility

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Unit 10.5 Charge blast holes to specification (BL5)

10.5.2 Prepare the explosive materials

Contexts

Criteria

In achieving this element you will have to assure that:

- a explosives are correctly checked to ensure they conform, in quantity and type, to the blasting specification
- b explosives are handled and prepared in conformity with the manufacturers' recommendations, operational and organisational rules and procedures and with relevant legislation
- c precautions are taken to protect materials and personnel against adverse environmental conditions
- d required quantities of explosives are prepared in accordance with the blast specification
- e problems and conditions outside the responsibility of the candidate are referred to an authorised person
- f work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii types and range of explosive materials (including packaged explosives; site mixed explosives; detonators and detonating devices)
- iii effects of adverse environmental and site conditions on explosives
- iv effects of water in blast holes and the limitations on choice of explosive and initiating system
- v manufacturers' recommendations and site rules for handling ingredients and explosives
- vi relevant legislation

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Unit 10.5 Charge blast holes to specification (BL5)

10.5.3 Charge blast holes with explosive materials

Contexts

Criteria

In achieving this element you will have ensured that:

- a explosive materials are handled in accordance with the operational and organisational rules and procedures and with relevant legislation
- b the charging of blast holes is in accordance with the blasting specification.
- c detonators and primers are placed accurately in conformity with the blasting specification
- d use of non-explosive materials is in conformity with the blasting specification.
- e precautions are taken to protect materials and personnel against adverse environmental conditions
- f variations between the specification and the actual conditions at the time of charging are identified and reported in conformity with operational and organisational rules and procedures
- g surplus explosive materials and packaging are removed to a safe and secure place in accordance with operational and organisational rules and procedures
- h problems and conditions outside the responsibility of the candidate are referred to an authorised person
- i work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii types and range of explosive materials
- iii detonators, primers, detonating cord and their characteristics
- iv the candidate's responsibilities under relevant parts of the legislation applying to the extractive industries
- v effects of adverse environmental and site conditions on system performance and premature ignition
- vi effects of water in blast holes and the limitations on choice of explosive and initiating system
- vii reasons for blockages in holes and authorised remedial action

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Unit 10.5 Charge blast holes to specification (BL5)

10.5.4 Remove and disposal of surplus materials

Contexts

Criteria

In achieving this element you will have ensured that:

- a explosive materials which are surplus to requirements are returned to store and correctly packaged and labelled and records maintained
- b approved procedures and practices for disposal of surplus materials are correctly interpreted and implemented
- c disposal site is located safely and correctly in accordance with operational and organisational rules and procedures
- d hazards arising from adverse environmental conditions are correctly identified and interpreted and appropriate action taken
- e problems and conditions outside the responsibility of the candidate are referred to an authorised person
- f work is carried out to approved procedures and practices and in accordance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii approved methods of removal and disposal of surplus materials
- iii explosive types and susceptibility to detonation
- iv explosives regulations relating to packaging and labelling
- v correct and effective packaging of surplus explosives
- vi how to access and correctly interpret the relevant guidance
- vii increased danger of accidental detonation of explosive materials during disposal

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Unit 10.6 Blast to specification (BL6)

Unit Overview

This unit is designed for the candidate to demonstrate competence to blast to specification. It covers completing and checking the initiation circuit, clearing and securing the danger zone, sounding warning and fire blast and inspecting blast site after detonation. It covers logging of results and data for records and information towards future blasts. This may be in terms of the technical requirements of the blast or may be for safety or for the environment. Information and feedback are assessed for improvements to the operation.

During this work the candidate must take account of the relevant operational requirements and safe working practices.

Candidates will require knowledge across a range of specialisms which includes: types of detonating devices and explosives used; initiation sequences for single and multi row blasting and the possible effects on the time delay period between individual charges; relevant legislation; dangers from flyrock and the types of warning and communication systems.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. Approved procedures and practices in the context of the operations, the work activity and the workplace environment (organisational; environmental; regulatory; emergency; operational)
2. Relevant legislation
3. Responsibilities under the Health and Safety Statutory Requirements
4. Site rules

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10.6.1 Complete and check the initiation circuit

Contexts

Criteria

In achieving this element you will have ensured that:

- a the ignition system for the explosive is connected accurately in conformity with the blast specification
- b connections are protected against adverse environmental conditions, premature ignition and mechanical damage
- c operational safety procedures are fully implemented whilst preparing the initiation circuit and connecting the ignition system in conformity with approved procedures and practices
- d the ignition system and initiation sequences are checked thoroughly in accordance with operational and organisational rules and procedures and relevant legislation
- e faults in the ignition system are accurately identified and appropriate action is taken to rectify them
- f any faults in the ignition system which cannot be rectified are reported promptly as misfires to the appropriate person
- g problems and conditions outside the responsibility of the candidate are referred to an authorised person
- h work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii types of detonating devices and explosives used
- iii delayed detonators and how the delay is created
- iv effects of adverse environmental conditions on system performance and possible premature detonation
- v how to identify and deal with faults that cannot be rectified
- vi types of approved circuit testers
- vii initiation sequences for blasting patterns and the possible effects on the time delay period between individual charges
- viii how to check that the exploder is appropriately calibrated
- ix blast patterns
- x circuit testing for electrical initiation
- xi types of initiation and premature ignitions
- xii types and uses of shotfiring equipment

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10.6.2 Clear and secure the danger zone

Contexts

Criteria

In achieving this element you will have ensured that:

- a The specified danger zone is cleared and secured effectively in compliance with operational and organisational rules and procedures and the blast specification
- b Sentries are posted correctly in compliance with the blasting specification, operational and organisational rules and procedures
- c Warning systems are checked and confirmed to be operable and working
- d The firing station is safely located in accordance with the blasting specification
- e Clear notification is given to public of intention to fire the explosive
- f Operational safety precautions are confirmed and maintained in place for the firing of the explosive
- g Problems and conditions outside the responsibility of the candidate are referred to an authorised person
- h Work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii dangers from flyrock
- iii causes of flyrock
- iv how to access and correctly interpret the relevant guidance
- v warning systems (ie site radio; siren; flags; hand signals; warning signs)
- vi public roads and rights of way
- vii powers and duties of sentries
- viii the issues likely to arise arising from the blast operation

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Unit 10.6 Blast to specification (BL6)

10.6.3 Sound the warning and fire the blast

Contexts

Criteria

In achieving this element you will have ensured that:

- a Warning and communication systems are confirmed in place in accordance with the operational safety procedures
- b Security of danger zone is confirmed with the sentries via the warning systems
- c Position for firing the explosive is taken at the firing station in accordance with the blasting specification
- d Security of exploder is maintained in compliance with relevant explosives regulations, operational and organisational rules and procedures
- e The explosive is fired when all safety precautions have been taken and verified
- f Problems and conditions outside the responsibility of the candidate are referred to an authorised person
- g Work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii types of warning systems
- iii types of communication systems

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10.6.4 Inspect blast site after detonation

Contexts

Criteria

In achieving this element you will have ensured that:

- a Inspection of the blast area is thoroughly undertaken in accordance with site rules and operational procedures
- b dangerous conditions are identified and are promptly reported in accordance with operational procedures
- c Re-entry to the area following blasting is only allowed in accordance with operational and organisational rules and procedures
- d The all clear is given on satisfaction that the area is safe and the blasting operation is complete
- e Problems and conditions outside the responsibility of the candidate are referred to an authorised person
- f Work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii hazards associated with misfires and unexploded charges
- iii recognition of misfires
- iv reasons for post blast slippage of ground and its effects
- v dangerous effects of fumes created by blasting
- vi effects of adverse environmental and site conditions

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10.6.5 Collate feedback and record findings of the blast operations

Contexts

Criteria

In achieving this element you will have ensured that:

- a All information from the evidence and assessment of the post blast inspection is collated and recorded in accordance with approved procedures and practices and in compliance with statutory requirements
- b Type and quantity of explosive materials and means of initiation are recorded in accordance with organisational and operational procedures
- c Records are maintained of the operation and environmental conditions relevant to the blasting in accordance with organisational and operational procedures
- d Any problems and incidents associated to the blasting are recorded and communicated to the appropriate persons
- e Any ground vibration and air over pressure surveys are carried out, interpreted accurately and recorded
- f Details of fragmentation and length and height of rock piles are accurately recorded
- g Issues arising from the blast are appropriately dealt with

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii monitor and use recordings of ground vibration/air over pressure
- iii record aspects of blast performance
- iv approved procedures and practices in the context of the operations, the work activity and the workplace environment (organisational; regulatory; emergency; operational)
- v responsibilities under the Health and Safety Statutory Requirements
- vi how to deal with issues arising from the blast

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Unit 10.7 Deal with misfires (BL7)

Unit Overview

This unit is designed for the candidate to demonstrate competence to deal with misfires. This unit covers identifying type and position of misfire, taking remedial action with misfires and recovering explosive materials.

“Misfire” means an occurrence in relation to the firing of shots during blasting operations where:-

- (a) testing before firing reveals broken continuity which cannot be rectified; or
- (b) a shot or part of a shot fails to explode when an attempt is made to fire it.

Candidates will require knowledge across a range of specialisms which includes: hazards associated with misfires and unexploded charges; approved methods of testing circuits, candidate's statutory and organisational specific responsibilities for recording and reporting misfires; causes of premature detonation.

During this work the candidate must take account of the relevant operational requirements and safe working practices.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. Approved procedures and practices in the context of the operations, the work activity and the workplace environment (organisational; environmental; regulatory; emergency; operational)
2. Responsibilities under the Health and Safety Statutory Requirements

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Unit 10.7 Deal with misfires (BL7)

10.7.1 Identify type and position of misfire

Contexts

Criteria

In achieving this element you will have ensured that:

- a electrical misfires before firing are correctly recognised and identified by an approved systematic method of testing
- b signs of misfires after firing are correctly recognised and communicated to appropriate person(s)
- c located misfire is clearly marked in accordance with operational and organisational rules and procedures
- d problems and conditions outside the responsibility of the candidate are referred to an authorised person
- e work is carried out to approved procedures and practices and in compliance with statutory requirements.

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii hazards associated with misfires and unexploded charges
- iii approved methods of testing circuits
- iv systematic testing to reveal location of faults in a circuit
- v recognition of undisturbed ground and indications of unfired charges after blasting
- vi relevant legislation and guidelines
- vii format and detailed requirement for completion of misfires record
- viii candidate's statutory and organisational specific responsibilities for recording and reporting misfires
- ix safety procedures during testing and inspection
- x marking of misfires
- xi definition of misfire types
- xii causes of misfires
- xiii avoidance of misfires.

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Unit 10.7 Deal with misfires (BL7)

10.7.2 Take remedial action with misfires

Contexts

Criteria

In achieving this element you will have ensured that:

- a Initial and remedial action(s) for dealing with a misfire are carried out in accordance with operational and organisational rules and procedures
- b An exclusion zone is correctly secured in conformity with operational and organisational rules and procedures
- c Method of dealing with the misfire is recorded and reported clearly and accurately in accordance with operational and organisational procedures
- d Problems and conditions outside the responsibility of the candidate are referred to an authorised person
- e Work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii recognised safe procedures for dealing with misfires
- iii hazards associated with misfires and unexploded charges
- iv possible effects of sympathetic detonation on projection of flyrock
- v causes of premature detonation
- vi the accurate location of blast holes
- vii format and detailed requirement for completion of misfires record
- viii candidate's statutory and organisation specific responsibilities for recording and reporting misfires
- ix relevant published information

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Unit 10.7 Deal with misfires (BL7)

10.7.3 Recover explosive material

Contexts

Criteria

In achieving this element you will have ensured that:

- a the area of recovery is secured and isolated until recovery has been carried out and the area made safe
- b the method of recovery used for unexploded charges minimises the risk of accidental initiation and is in conformity with operational and organisational rules and procedures for misfires
- c explosives and detonating devices are recovered in accordance with operational and organisational rules and procedures
- d the recovery operations is carried out to maximise the safe and complete recovery of all unexploded charges
- e problems and conditions outside the responsibility of the candidate are referred to an authorised person
- f work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii the dangers of accidental initiation by impact or friction
- iii safe methods of handling and disposal of explosive materials recovered from the site
- iv desensitisation of bulk/loose grain explosives
- v detonators, primers, cords and fuses
- vi relevant legislation.

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Unit 10.8 Determine the blast requirements (BL8)

Unit Overview

This unit is designed for the candidate to demonstrate competence to determine the blast requirements. It identifies the area where blasting is required, it takes account of the amount of ground and materials to be moved, safety and environmental considerations as well as the determination of the size of fragmentation required. This addresses the competence of collating information to evaluate and take into account for the design of the blast. These are then incorporated into the overall competence of analysis and design of the blast specification.

During this work the candidate must take account of the relevant operational requirements and safe working practices.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. Approved procedures and practices in the context of the operations, the work activity and the workplace environment (organisational; environmental; regulatory; emergency; operational)
2. Responsibilities under the Health and Safety Statutory Requirements

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Unit 10.8 Determine the blast requirements (BL8)

10.8.1 Identify the area for blasting

Contexts

Criteria

In achieving this element you will have ensured that:

- a the location and area for blasting is identified and confirmed to conform with the overall development plans of the site
- b the quality and extent of mineral materials for removal are assessed and confirmed with the relevant persons (ie operator; manager; explosives supervisor; blasting team; contractors) and the operational requirements
- c any geological anomalies of the blast site are identified visually and recorded to be taken into account in the blast design
- d dimensional information is collected and recorded in accordance with the blast specification requirements
- e the effects of a blast are considered on quarry plant, buildings, external features and the surrounding environment
- f potential hazards and danger sources are accurately identified and recorded in the blast specification
- g work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii how to interpret the specification for blasting
- iii the geological anomalies that affect the blast specification
- iv plans, vertical sections, symbols and terminology
- v measuring instrumentation and techniques
- vi potential hazards, dangers and effects of signal interference

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Unit 10.8 Determine the blast requirements (BL8)

10.8.2 Determine the objectives of the blast

Contexts

Criteria

In achieving this element you will have ensured that:

- a the geological makeup of the ground and mineral strata is visually surveyed and evaluated for matching with the specified requirements
- b the extent of ground and mineral materials to be removed with the blast operation is confirmed and agreed with the relevant persons (ie operator; manager; explosives supervisor; blasting team; contractors)
- c the fragmentation requirement of the blast is confirmed to meet with the production plant capabilities
- d the extent of the blast is determined from the production requirements, the fragmentation and geological makeup of the ground and mineral strata, face provision and availability and drill size
- e possible hazards and dangers resulting from a blast are identified and recorded for consideration in the blast design
- f work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii how to interpret the blasting specification
- iii plans, vertical sections, symbols and terminology
- iv how to use the measuring instrumentation and techniques
- v potential hazards and dangers from a blast

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Unit 10.9 Design and arrange for the authorisation of the blast specification (BL9)

Unit Overview

This unit is designed for the candidate to demonstrate competence to design and arrange for the authorisation of the blast specification. The blast design is key to the operation in that it both provides the detail specifications for the pattern of holes required and the amount of charge to be used in the blasting operation. These specifications are a reflection of previous blast performance and are significant to safety and performance with any further blasts. This would cover previous blast results, driller's log, face examination, blast hole geometry, surveying, type of explosive and the initiation method. Adhering to detail accuracy is important and this demands that the specifications are prepared and presented in meticulous detail and requires interpretation and confirmation that all procedures have been followed to ensure maximum safety and will provide for an effective performance of the blast operation. These then culminate in the final competence to arrange for the authorisation of the blast specification.

During this work the candidate must take account of the relevant operational requirements and safe working practices.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. Approved procedures and practices in the context of the operations, the work activity and the workplace environment (organisational; environmental; regulatory; emergency; operational)
2. Responsibilities under the Health and Safety Statutory Requirements

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10.9.1 Collate information for the blast design

Contexts

Criteria

In achieving this element you will have ensured that:

- a information from records of previous blasts are examined and evaluated in determining the blast design
- b information determined through assessment of the blast requirements is evaluated for the blast design
- c constraints and capabilities of plant and equipment used for moving and processing mineral materials are identified and taken into account in the blast design
- d all information is collectively evaluated to determine the blast design
- e approved procedures and practices are incorporated to minimise danger to persons, damage to plant and equipment and the environment
- f proactive audits of written procedures and rules concerning minimising danger to persons, and damage to plant, equipment and the environment have been carried out
- g problems are identified and communicated to the appropriate person(s)
- h work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii types of explosive materials, their strengths and characteristics (ie explosives, detonating devices; blasting agents; blasting accessories)
- iii types of initiating systems
- iv methods and techniques involved with preparing blasting specifications
- v the candidate's responsibilities under relevant parts of the legislation applying to the extractive industries for producing a detailed blast specification
- vi assessment of the extent of the danger zones
- vii interpretation of preparation activities (drillers log; profiling)

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10.9.2 Produce a detailed blast specification

Contexts

Criteria

In achieving this element you will have ensured that:

- a design of the blast specification is developed for the pattern and size of charge required
- b types of explosive materials, method of initiation and shotfiring system are clearly stipulated in accordance with operational and organisation rules and procedures and comply with legislative requirements
- c the blast design will not give rise to danger to people, plant, equipment, property, livestock
- d the blast specifications are designed in accordance with approved procedures and practices and conforms with the requirements of legislation
- e information and details of the blast specifications are recorded in accordance with operational and organisational rules and procedures
- f work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii types of explosive materials, their strengths and characteristics (ie explosives, detonating devices; blasting agents; blasting accessories)
- iii types of initiating systems
- iv methods and techniques involved with preparing blasting specifications
- v the candidate's responsibilities under relevant parts of the legislation applying to the extractive industries for producing a detailed blast specification
- vi assessment of the extent of the danger zones
- vii interpretation of preparation activities (drillers log; profiling)

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10.9.3 Arrange for the authorization of the blast specifications

Contexts

Criteria

In achieving this element you will have ensured that:

- a specifications for the preparation requirements of the blast operation are designed in accordance with operational and organisation rules and procedures
- b information from the preparation activities is evaluated and any variations to the blast specification are identified
- c records of the blast design and its specifications are maintained in accordance with operational and organisational rules and procedures and in compliance with legislative requirements
- d rules and procedures for the storing, transporting and handling of explosives are clearly established which comply with legislative requirements
- e requirements for safety and security of the blast operations are clearly identified and communicated to all appropriate and relevant persons
- f authorisation of the blast specification is arranged in accordance with operational and organisational rules and procedures and comply with legislative requirements
- g the blast specifications are agreed and communicated with all relevant persons in accordance with operational and organisational rules and procedures
- h work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i types of explosive materials, their strengths and characteristics
- ii types of shotfiring systems
- iii the candidate's responsibilities under relevant parts of the legislation applying to the extractive industries
- iv responsibilities to vary the blast specification
- v effects on blast performance of variations in blast specification

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Unit 10.10 Produce profiles of rock faces and landforms (BL10)

Unit Overview

This unit is designed for the candidate to demonstrate competence to accurately take measurements of rock faces, including and in relation to designated fixed points. These would typically be quarry rock faces requiring blasting, but could be any rock free face, or landform. It involves correctly evaluating information and instruction, accurate positioning, taking accurate measurements (of the rock face, its height inclination and profile, and of fixed points including associated bore/shotholes, azimuth and inclination) using specialised equipment, and presenting information based on these measurements and observation

During this work the candidate must take account of the relevant operational requirements and safe working practices.

Note: Safety and security are paramount to these operations. Procedures need to be followed habitually to ensure maximum safety for all within the site, and in the immediate surrounding area, reviewed, and improved to meet changing situations.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. Approved procedures and practices in the context of the operations, the work activity and the workplace environment (organisational; environmental; regulatory; emergency; operational)
2. Responsibilities under the Health and Safety Statutory Requirements

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Unit 10.10 Produce profile of faces (BL10)

10.10.1 Prepare and set up equipment

Contexts

Criteria

In achieving this element you will have ensured that:

- a work requirements are confirmed with relevant person(s) as to the extent and detail of the work to be undertaken.
- b the area to be measured is identified accurately in accordance with the work specification.
- c hazards and conditions that affect the work activity are identified and actions agreed with relevant person(s).
- d the equipment to be used is confirmed as available, suitable and applicable to the work activity.
- e the equipment is prepared, located, set up and adjusted for the work activity in accordance with instructions, safety and work requirements.
- f defects and damage of the equipment are recorded and appropriate action taken for any correction.
- g problems and conditions outside the responsibility of the jobholder are referred to relevant person(s).
- h work is carried out to approved procedures and practices and in compliance with statutory requirements.

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii hazards and conditions that affect the work activity
- iii types of equipment in relation to the work activity
- iv surveying Techniques and equipment
Capability and limitations of equipment
- v setting up equipment for the work activity
- vi types of defects in the equipment
- vii format and procedures for recording and communicating information/data

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Unit 10.10 Produce profile of faces (BL10)

10.10.2 Produce profile data

Contexts

Criteria

In achieving this element you will have ensured that:

- a clarification and understanding of the information and instructions are confirmed with the relevant person(s).
- b any relevant physical features of the survey site are identified visually and recorded.
- c work instructions to relevant person(s) are issued according to operational requirements.
- d dimensional information is collected and recorded in accordance with the work activity.
- e data produced is processed and evaluated.
- f results are reported to relevant person(s) according to organisational procedures.
- g problems and conditions outside the responsibility of the job holder are referred to relevant person(s)
- h work is carried out to approved procedures and practices and in compliance with statutory requirements.

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii specifications for blasting
- iii the physical features of rock faces that affect the blast specification
- iv plans, profiles and terminology
- v measuring instrumentation and techniques.
- vi techniques to confirm accuracy of equipment.
- vii capability and limitations of equipment
- viii methods of locating position(s), including shot/bore holes
- ix data processing systems
- x use and significance of information produced
- xi the relevant persons, as appropriate to site, associated with the activity (ie Operator; Manager; Explosives Supervisor; Blasting Designer; Profiler's Assistant)
- xii hazards associated with the use of measuring equipment and technology.

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Unit 10.11 Supervise the blasting operation (BL11)

Unit Overview

This unit is designed for the candidate to demonstrate competence to organise and supervise all work at a quarry involving the use of explosives. It covers the day-to-day use of explosives at a quarry, and the activities of those involved in blast design, shotfiring, explosives storage and transportation. As such it covers the role of “The Explosives Supervisor” as required by “The Quarries Regulations 1999, Regulation 25”.

Note: Safety and security are paramount to these operations. Procedures need to be followed habitually to ensure maximum safety for all within the quarry, and in the immediate surrounding are, reviewed, and improved to meet changing situations.

Candidates will require knowledge across a range of specialisms, which includes: blast calculation and design; ground vibration and air blast overpressure; shotfiring.

During this work the candidate must take account of the relevant operational requirements and safe working practices.

Unit-wide Underpinning Knowledge and Understanding

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

1. Controlling, recording and analysis of ground vibration/air over pressure
2. Recording aspects of blast performance
3. Responsibilities under the Health and Safety Statutory Requirements
4. Site Shotfiring rules
5. Relevant legislation and standards
6. Types and use of communication systems
7. Approved procedures and practices in the context of the operations, the work activity and the workplace environment (organisational; environmental; regulatory; emergency; operational)
8. Powers and duties of sentries
9. Quarries Regulations 1999
10. Safe and secure storage of explosive substances
11. Maintenance of Explosive storage facilities
12. Recording of explosives/explosive materials in storage and use
13. Transportation methods for explosive substances
14. Blasting specifications; their purpose content and interpretation
15. Emergency procedures
16. External Third party agencies regulations
17. Practical requirements of HSE and Local Authority licences
18. Recognition, handling and safe disposal of deteriorated, waste, recovered and surplus explosive materials
19. The duties and responsibilities of the explosive supervisor
20. Types and use of ground vibration and air overpressure monitoring equipment
21. Site security in relation to blasting operations
22. Prohibited Persons
23. Relevant Literature

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Unit 10.11 Supervise the blasting operation (BL11)

10.11.1 Supervise the preparation for the blast

Contexts

Criteria

In achieving this element you will have ensured that:

- a blast specification(s) are authorised and approved according to approved procedures and practices
- b changes to the blast specification are approved and authorised.
- c effective communication is established and maintained with relevant person(s)
- d arrangements are made for the delivery and receipt of sufficient, suitable materials to meet the blast specification.
- e adequate security measures for on-site explosives are maintained and records completed
- f explosives are issued to relevant person(s) in accordance to approved practices and procedures
- g checks are carried out to ensure activities involving the use, transportation and storage of explosives or explosive substances are carried out by relevant person(s)
- h arrangements are made to ensure environmental controls are set up and monitored to meet local requirements
- i blast sites are identified and established according to approved procedures and practices.
- j potential risks are identified and appropriate action taken to eliminate or minimise.
- k requirements for safety and security of the blast operations are clearly identified and communicated to all relevant person(s)
- l problems and conditions referred by others are dealt with appropriately
- m problems and conditions outside the responsibility of the candidate are referred to relevant person(s)
- n work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii how to interpret the blast specification
- iii reasons for post blast slippage of ground and its effects
- iv effects of adverse environmental and site conditions
- v causes of and dangers from flyrock
- vi public roads and rights of way
- vii the relevant persons, as appropriate to site, associated with the activity
- viii the appropriate environmental controls
- ix types of detonating devices and explosives used
- x types of approved circuit testers for use in surface operations
- xi blast patterns
- xii types and uses of shotfiring tools and equipment
- xiii determination of danger zones
- xiv drilling methods and equipment
- xv methods of production and interpretation of survey information
- xvi setting up, aligning and measuring drill holes
- xvii recognition of relevant information from drill holes and drilling records
- xviii recognition of natural joints, cavities and other geological features
- xix methods of testing initiation systems
- xx hazards associated with, and methods to minimize premature ignition

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10.11.2 Supervise the firing of the blast

Contexts

Criteria

In achieving this element you will have ensured that:

- a checks are established and conducted to confirm the blast site conforms to the blast specification.
- b limits of the danger zone are confirmed and approved according to approved procedures and practices
- c tools and equipment are approved as safe and suitable to meet the blast specification
- d arrangements are made to ensure the removal of surplus explosives and the disposal of packaging.
- e position and form of the blast initiation site are confirmed and approved according to site operational procedures
- f checks are carried out to confirm warning and security arrangements are in place and operating according to approved procedures and practices
- g procedures are implemented to confirm evacuation of the danger area, and that visitors and contractors are in designated areas.
- h authorisation to the Shotfirer to blast at an agreed time is given when operating and environmental conditions are confirmed as suitable, according to approved procedures and practices
- i problems and conditions referred by others are dealt with appropriately
- j Problems and conditions outside the responsibility of the candidate are referred to relevant person(s)
- k Work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii how to interpret the blast specification
- iii effects of adverse environmental and site conditions
- iv types of warning systems
- v methods of testing initiation systems
- vi the relevant persons, as appropriate to site, associated with the activity

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Unit 10.11 Supervise the blasting operation (BL11)

10.11.3 Confirm the conclusion of the blast

Contexts

Criteria

In achieving this element you will have ensured that:

- a records are maintained and stored in accordance with operational and organisational rules and procedures
- b post-blast inspection is carried out according to approved procedures and practices
- c post-blast remedial work is approved according to operational procedures
- d on completion of the blasting operation, approval is given for the removal of warning and security arrangements, and to signal that the area is returned to normal operational status, according to approved procedures and practices
- e overpressure and vibration are monitored and recorded, and checked to ensure they conform to local requirements
- f site-specific shottfiring rules and procedures are monitored and reviewed, and recommendations made.
- g problems and conditions referred by others are dealt with appropriately
- h problems and conditions outside the responsibility of the candidate are referred to relevant person(s)
- i work is carried out to approved procedures and practices and in compliance with statutory requirements

Knowledge

Within the limits of your responsibility you must be able to demonstrate that you know and understand:

- i health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives and their implications for your area of work
- ii hazards associated with misfires and unexploded charges
- iii recognition of misfires
- iv reasons for post blast slippage of ground and its effects
- v dangerous effects of fumes created by blasting
- vi site examination after firing
- vii recognition of natural joints, cavities and other geological features

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10.12 Design the complex explosive display

Contexts

- 1 Factors affecting the design: spatial constraints; secondary hazards; negative environmental consequences; resources
- 2 Nature of display: moving people; inter-related phases; combination of explosives/delivery systems
- 3 Information: complete; incomplete; incorrect

Criteria

You need to:

- a work safely at all times, complying with health, safety and environmental and other relevant regulations, legislation and guidelines
- b validate the information
- c identify the factors applicable to the design of the explosive display
- d design the display within technical and safety constraints
- e determine the hazards inherent in your design
- f develop a plan, complete with specified resources, allocated responsibilities and timetable
- g identify risk controls and develop a safe system of work
- h develop contingency plans that are capable of addressing changing situations
- i ensure that your design is developed within the timescale and budget
- j record the design in the appropriate format

Knowledge

You need to know and understand:

- i health, safety and environmental legislation, regulations and safe working practices governing explosives in your area of work
- ii the relevance of PPE
- iii the nature, characteristics, hazards and risks of the explosive substance and/or article
- iv the actions to be taken in response to an unplanned event
- v the initiation of the explosive substances and/or articles being used
- vi your customer's requirements and expectations
- vii the requirements of any relevant industry standards and codes of practice
- viii the duration of the display, the available budget and any constraints attached
- ix the proposed location, environment and any associated constraints
- x how the factors affect the design
- xi sources of information
- xii the importance of evaluating previous designs, devices and materials
- xiii the roles, responsibilities and authorities of those involved
- xiv when approval to your design is necessary

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10.13 Design the explosives display

Contexts

- 1 Factors affecting the design: secondary hazards; negative environmental consequences; resources
- 2 Nature of display: single phase; single explosive device/delivery system
- 3 Information: complete; incomplete

Criteria

You need to:

- a work safely at all times, complying with health, safety and environmental and other relevant regulations, legislation and guidelines
- b identify the factors applicable to the design of the explosive display
- c validate the information
- d design the display within technical and safety constraints
- e determine the hazards inherent in your design
- f develop a plan, complete with specified resources, allocated responsibilities and timetable
- g identify risk controls and develop a safe system of work
- h develop contingency plans that are capable of addressing changing situations
- i ensure that your design is developed within the timescale and resource constraints
- j record the design in the appropriate format

Knowledge

You need to know and understand:

- i health, safety and environmental legislation, regulations and safe working practices governing explosives in your area of work
- ii the relevance of PPE
- iii the nature, characteristics, hazards and risks of the explosive substance and/or article
- iv the actions to be taken in response to an unplanned event
- v the initiation of the explosive substances and/or articles being used
- vi your customer's requirements and expectations
- vii the requirements of any relevant industry standards and codes of practice
- viii the duration of the display, the available resources and any constraints attached
- ix the proposed location, environment and any associated constraints
- x how the factors affect the design
- xi sources of information
- xii the importance of evaluating previous designs, devices and materials
- xiii the roles, responsibilities and authorities of those involved
- xiv when and to whom to refer matters beyond your authority or competence

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10.14 Prepare and position explosive effects

Contexts

- 1 Factors affecting the preparation and positioning: spatial constraints; secondary hazards; negative environmental consequences; electrostatic conditions; atmospheric conditions; radio frequency transceivers
- 2 Nature of display: moving people; inter-related phases; combination of explosives/delivery systems
- 3 Resources: personnel; equipment; consumables; services

Criteria

You need to:

- a work safely at all times, complying with health, safety and environmental and other relevant regulations, legislation and guidelines
- b confirm the suitability of the area and resources to meet the design requirements
- c prepare the area in accordance with the plan
- d prepare and set up the equipment and explosive effects in accordance with the plan and confirm their serviceability
- e ensure that safety arrangements are in place in accordance with the plan
- f respond to developing events and priorities in accordance with procedures
- g amend the plan in the light of changing circumstances and/or information
- h ensure the safety and security of the area and explosive effects in accordance with the plan
- i communicate unambiguously to those who need to know that the explosive effects have been positioned and are ready to be initiated
- j ensure the security of the firing device at all times in accordance with procedures

Knowledge

You need to know and understand:

- i health, safety and environmental legislation, regulations and safe working practices governing explosives in your area of work
- ii the relevance of PPE
- iii the nature, characteristics, hazards and risks of the explosive substance and/or article
- iv the actions to be taken in response to an unplanned event
- v the initiation of the explosive substances and/or articles being used
- vi the importance of ensuring the safety and security of firing devices
- vii how to implement contingency plans
- viii the requirements of any relevant manufacturers' instructions and industry codes of practice
- ix the location and any associated constraints
- x who needs to be informed of the proposed initiation
- xi the importance of unambiguous communication
- xii the roles, responsibilities and authorities of those involved

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10.15 Contribute to the preparation and positioning of explosive effects

Contexts

- 1 Factors affecting the preparation and positioning; secondary hazards; electrostatic conditions; atmospheric conditions; radio frequency transceivers
- 2 Nature of display: single phase; single explosive device/delivery system
- 3 Resources: equipment; consumables

Criteria

You need to:

- a work safely at all times, complying with health, safety and environmental and other relevant regulations, legislation and guidelines
- b confirm the suitability of the area and resources to meet the design requirements
- c prepare the area in accordance with the plan
- d prepare and set up the equipment and explosive effects in accordance with the plan and confirm their serviceability
- e ensure that safety arrangements are in place in accordance with the plan
- f respond to developing events and priorities in accordance with procedures
- g recommend amendments to the plan in the light of changing circumstances and/or information
- h ensure the safety and security of the area and explosive effects in accordance with the plan
- i report matters beyond your competence or authority to the right person
- j communicate unambiguously to those who need to know that the explosive effects have been positioned and are ready to be initiated

Knowledge

You need to know and understand:

- i health, safety and environmental legislation, regulations and safe working practices governing explosives in your area of work
- ii the relevance of PPE
- iii the nature, characteristics, hazards and risks of the explosive substance and/or article
- iv the actions to be taken in response to an unplanned event
- v the initiation of the explosive substances and/or articles being used
- vi the importance of ensuring the safety and security of firing devices
- vii how to implement your role in contingency plans
- viii the requirements of any relevant manufacturers' instructions and industry codes of practice
- ix the location and any associated constraints
- x who needs to be informed that your effect has been prepared
- xi the importance of unambiguous communication
- xii the roles, responsibilities and authorities of those involved

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10.16 Initiate the explosive effect

Contexts

- 1 Changes in conditions: proximity of people/animals; other environmental conditions

Criteria

You need to:

- a work safely at all times, complying with health, safety and environmental and other relevant regulations, legislation and guidelines
- b confirm the correct functioning of the ignition system and sequences in accordance with the procedures
- c confirm that the firing preparations are complete
- d give necessary warnings of the imminent firing in accordance with procedures
- e fire only when all safety precautions have been taken and verified
- f inform unambiguously those who need to know of any problems in accordance with procedures
- g deal with misfires in accordance with procedures
- h maintain the security of the firing device at all times in accordance with procedures

Knowledge

You need to know and understand:

- i health, safety and environmental legislation, regulations and safe working practices governing explosives in your area of work
- ii the relevance of PPE
- iii the nature, characteristics, hazards and risks of the explosive substance and/or article
- iv the actions to be taken in response to an unplanned event
- v the initiation of the explosive substances and/or articles being used
- vi misfire procedures for the device being used
- vii emergency stop procedures
- viii the requirements of the firing plan
- ix how to implement contingency plans
- x the requirements of any relevant manufacturers' instructions and industry codes of practice
- xi the timescale and any constraints attached
- xii the location and any associated constraints
- xiii the roles and responsibilities of those involved in the firing
- xiv who needs to be informed of problems

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10.17 Modify explosive effects delivery systems

Contexts

- 1 Factors affecting the design: spatial constraints; secondary hazards; negative environmental consequences; resources; the appearance of historical accuracy
- 2 Nature of display: moving people; inter-related phases; combination of explosives/delivery systems
- 3 Information: complete; incomplete; incorrect

Criteria

You need to:

- a work safely at all times, complying with health, safety and environmental and other relevant regulations, legislation and guidelines
- b draw up a design that is capable of meeting the brief
- c determine the hazards inherent in your design
- d select explosive delivery systems that are best suited to being modified such that they are likely to meet the design specification
- e carry out modifications in accordance with good workshop practice
- f confirm the safe functioning of the modified explosive delivery system
- g document test/proof results in accordance with organizational procedures
- h ensure that the modified explosive delivery system is developed within the timescale and budget
- i identify risk controls and develop a safe system of work for the modified explosive delivery system
- j develop unambiguous operating instructions
- k record the design in the appropriate format

Knowledge

You need to know and understand:

- i health, safety and environmental legislation, regulations and safe working practices governing explosives in your area of work
- ii the relevance of PPE
- iii the nature, characteristics, hazards and risks of the explosive substance and/or article
- iv the actions to be taken in response to an unplanned event
- v the customer's requirements and associated constraints
- vi the requirements of any relevant industry standards and codes of practice
- vii the requirements of good workshop practice
- viii the constraints of existing explosive delivery systems
- ix proofing requirements relating to modifications
- x the available budget and any constraints attached
- xi how the factors affect the proposed modification
- xii sources of information
- xiii the importance of evaluating previous modifications, devices and materials
- xiv the roles, responsibilities and authorities of those involved
- xv when approval to your modification is necessary

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10.18 Use explosives for engineering purposes

This unit comprises the following elements:

- 10.18.1 Develop the technical design
- 10.18.2 Prepare and position charges for engineering purposes
- 10.18.3 Initiate the effect for engineering purposes

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10.18 Use explosives for engineering purposes

10.18.1 Develop the technical design

Contexts

- 1 Environmental considerations: meteorological conditions; proximity to people and property; other environmental considerations (eg hazards relating to the electro-magnetic environment, the location)

Criteria

You need to:

- a work safely at all times, complying with health, safety and environmental and other relevant regulations, legislation and guidelines
- b identify and analyse the factors applicable to the design of the explosive effects
- c ensure that your design meets the customer's requirements as far as possible
- d advise the customer when their brief cannot be met and suggest suitable alternatives
- e ensure that your design is developed within the timescale and budget
- f ensure that your design is practicable and minimizes impact on the environment
- g evaluate new or optimize existing designs, devices and materials where appropriate
- h determine any hazards inherent in your design
- i communicate risk controls to those involved

Knowledge

You need to know and understand:

- i health, safety and environmental legislation, regulations and safe working practices governing explosives in your area of work
- ii the relevance of PPE
- iii the appropriate and timely actions to be taken in response to an unplanned event
- iv your customer's requirements
- v the requirements of any relevant industry standards and codes of practice
- vi the duration of the effect and the available budget and any constraints attached
- vii the proposed location and environment and any associated constraints
- viii the functioning, hazards and risks of the explosive substances and/or articles
- ix the factors affecting the design and how these might influence it
- x sources of information on existing designs
- xi how to determine the suitability of existing designs
- xii the roles and responsibilities of those involved

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10.18 Use explosives for engineering purposes

10.18.2 Prepare and position charges for engineering purposes

Contexts

- 1 Locations: confined; unconfined
- 2 Environmental considerations: meteorological conditions; proximity to people and property; other environmental considerations (eg hazards relating to the electro-magnetic environment, the location)

Criteria

You need to:

- a work safely at all times, complying with health, safety and environmental and other relevant regulations. legislation and guidelines
- b prepare the area in accordance with the plan
- c prepare the equipment and charges in accordance with the plan
- d set up the equipment and charges in accordance with the plan
- e ensure that safety contingency arrangements are in place
- f carry out safety and functionality checks and test firing equipment prior to use
- g implement the contingency plan in the event of problems arising
- h make any necessary adjustments to ensure safe firing to achieve the desired effect
- i minimize the impact on the environment
- j ensure the safety and security of the area and charges up to the time of initiation
- k communicate effectively to those who need to know that the charges have been positioned and are ready to be fired

Knowledge

You need to know and understand:

- i health, safety and environmental legislation, regulations and safe working practices governing explosives in your area of work
- ii the relevance of PPE
- iii the appropriate and timely actions to be taken in response to an unplanned event
- iv the requirements of the task
- v the requirements of the firing plan
- vi how to develop and implement contingency plans
- vii the requirements of any relevant manufacturers' instructions and industry codes of practice
- viii the timescale and any constraints attached
- ix the location and environment and any associated constraints
- x the functioning, hazards and risks of the explosive substances and/or articles
- xi the factors affecting the set up and firing and any special precautions needed
- xii the precautions and control measures to be taken to prevent unplanned initiation
- xiii who needs to be informed of the proposed firing
- xiv the roles and responsibilities of those involved

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10.18 Use explosives for engineering purposes

10.18.3 Initiate the effect for engineering purposes

Contexts

- 1 Locations: confined; unconfined
- 2 Environment: meteorological conditions; proximity to people and property; other environmental considerations (eg hazards relating to the electro-magnetic environment, the location)

Criteria

You need to:

- a work safely at all times, complying with health, safety and environmental and other relevant regulations, legislation and guidelines
- b check thoroughly the ignition system and sequences in accordance with the plan
- c make the final connections to the firing device correctly and check continuity
- d give any necessary warning of the imminent initiation
- e fire the charges only when all safety precautions have been taken and verified
- f inform those who need to know of any problems
- g maintain the security of the firing device at all times

Knowledge

You need to know and understand:

- i health, safety and environmental legislation, regulations and safe working practices governing explosives in your area of work
- ii the relevance of PPE
- iii the appropriate and timely actions to be taken in response to an unplanned event
- iv the requirements of the task
- v the requirements of the firing plan
- vi how to develop and implement contingency plans
- vii the requirements of any relevant manufacturers' instructions and industry codes of practice
- viii the timescale and any constraints attached
- ix the location and environment and any associated constraints
- x the functioning, hazards and risks of the explosive substances and/or articles
- xi how to operate the firing devices
- xii the factors affecting the set up and firing and any special precautions needed
- xiii the precautions and control measures to be taken to prevent unplanned initiation
- xiv the roles and responsibilities of those involved in the firing
- xv who needs to be informed of problems (eg emergency services, the customer)

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