

# Level 3 IVQs in Oil and Gas Operations (8510)

## Level 3 IVQ Advanced Diploma in Oil and Gas Operations

- Mechanical Maintenance Technician (8510-03) (500/6071/5)
- Electrical Maintenance Technician (8510-05) (500/6071/5)
- Instrumentation Maintenance Technician (8510-07) (500/6071/5)
- Process Technician (8510-10) (500/6071/5)

Qualification handbook for Centres



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# 1 About this document

This document contains the information that centres need to offer the following International Vocational Qualifications (IVQs):

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<b>Qualification Title</b>	<b>Level 3 IVQ Advanced Diploma in Oil and Gas Operations (Mechanical Maintenance Technician)</b>
<b>City &amp; Guilds qualification number</b>	<b>8510-03</b>
<b>Accreditation number</b>	<b>500/6071/5</b>
<b>Qualification Title</b>	<b>Level 3 IVQ Advanced Diploma in Oil and Gas Operations (Electrical Maintenance Technician)</b>
<b>City &amp; Guilds qualification number</b>	<b>8510-05</b>
<b>Accreditation number</b>	<b>500/6071/5</b>
<b>Qualification Title</b>	<b>Level 3 IVQ Advanced Diploma in Oil and Gas Operations (Instrumentation Maintenance Technician)</b>
<b>City &amp; Guilds qualification number</b>	<b>8510-07</b>
<b>Accreditation number</b>	<b>500/6071/5</b>
<b>Qualification title</b>	<b>Level 3 IVQ Advanced Diploma in Oil and Gas Operations (Process Technician)</b>
<b>City &amp; Guilds qualification number</b>	<b>8510-10</b>
<b>Accreditation number</b>	<b>500/6071/5</b>

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This document includes details and guidance on:

- centre resource requirements and approval process
- candidate entry requirements
- course design and delivery
- links with and progression to other qualifications
- qualification standards and specifications
- assessment requirements



- recording and submitting candidate performance
- learning support resources

This document should be used in conjunction with the *Centre Guide – Delivering International Qualifications (WP-UK-0015)*, which contains additional information and documentation required for the Level 3 IVQs in Oil and Gas Operations (8510)

## 1.1 The levels of City & Guilds qualifications

All City & Guilds qualifications are part of an integrated progressive structure of awards arranged over eight levels, allowing people to progress from foundation to the highest level of professional competence. Senior awards, at levels 4 to 8, recognise outstanding achievement in industry, commerce and the public services. They offer a progressive vocational, rather than academic, route to professional qualifications. An indication of the different levels and their significance is given below.

<b>NQF level</b>	<b>City &amp; Guilds qualification/programmes</b>	<b>Other qualifications*</b>
8	Fellowship (FCGI)	Doctorate
7	Membership (MCGI) Master Professional Diploma Level 5 vocational awards NVQ/SVQ Level 5	Master's Degree Postgraduate Diploma Postgraduate Certificate
6	Graduateship (GCGI) Associateship (ACGI)**	Bachelor's Degree Graduate Certificate and Diploma
5	Level 5 IVQ Advanced Technician Diploma Full Technological Diploma	Higher National Diplomas Foundation Degree Diplomas of Higher and Further Education
4	Licentiate (LCGI) Higher Professional Diploma Level 4 vocational awards NVQ/SVQ Level 4	Certificate of Higher Education
3	Level 3 IVQ Advanced Diploma Level 3 IVQ Specialist Advanced Diploma*** Level 3 IVQ Technician Diploma Level 3 vocational awards NVQ/SVQ Level 3	A Level Scottish Higher Advanced National Certificate in Education BTEC National Certificate/Diploma
2	Level 2 IVQ Diploma Level 2 IVQ Specialist Diploma*** Level 2 IVQ Technician Certificate Level 2 vocational awards NVQ/SVQ Level 2	GCSE grades A*-C Scottish Intermediate 2/Credit 5 Grade BTEC First Certificate
1	Level 1 IVQ Certificate Level 1 vocational awards NVQ/SVQ Level 1	GCSE grades D-G Scottish Intermediate 1/General 5 Grade Scottish Access 1 and 2

\* Broad comparability in level.

\*\* Only graduates of the City & Guilds College, Imperial College of Science, Technology and Medicine, are awarded the Associateship (ACGI).

- \*\*\* Part of a new qualification structure which is being introduced across the IVQ provision.
- NVQ National Vocational Qualifications.
- IVQ International Vocational Qualifications.

## **2 About the qualification**

### **2.1 Aim of the qualification**

The Level 3 IVQ Advanced Diploma in Oil and Gas Operations (8510) focuses on the development of the underlying principles and practical skills required in the oil and gas industry. The qualification is designed to deliver a high level of occupational capability and provide a sound foundation for progression.

The aims of this qualification are to:

- meet the needs of learners who work or want to work in the oil and gas industry
- provide a broad background understanding of the oil and gas industry and the practical skills and knowledge required
- allow learners to learn, develop and practice the skills required for employment and/or career progression in the oil and gas industry
- provide an awareness of the range of jobs and work settings in the oil and gas industry
- introduce learners to the disciplines of the workplace
- enable learners to make an informed assessment of their own aptitude for work in the oil and gas industry and to make informed decisions about careers, returning to work, career development options or possible career change
- encourage learners to reach a level of knowledge and skills that will facilitate progress in employment in the oil and gas industry or to further learning
- encourage learners to value continued learning and to remain in the learning process.

## 2 About the qualification

### 2.2 The structure of the qualification

This section provides information about the structure of the qualification and the unit combinations required.

#### Full qualifications

The Level 3 IVQ Advanced Diploma in Oil and Gas Operations qualification will be awarded to candidates on successful completion of the required units for the chosen pathway as shown in the diagrams on the following pages.

There are four pathways available to candidates, depending on candidate requirements and experience:

- Accreditation number - 500/6071/5 (8510-03) Mechanical Maintenance Technician
- Accreditation number - 500/6071/5 (8510-05) Electrical Maintenance Technician
- Accreditation number - 500/6071/5 (8510-07) Instrumentation Maintenance Technician
- Accreditation number - 500/6071/5 (8510-10) Process Technician

#### Advanced Awards

A certificate will be issued to candidates for each successfully completed Advanced Award. An Advanced Award is made up of a cluster of units as illustrated on the following pages.

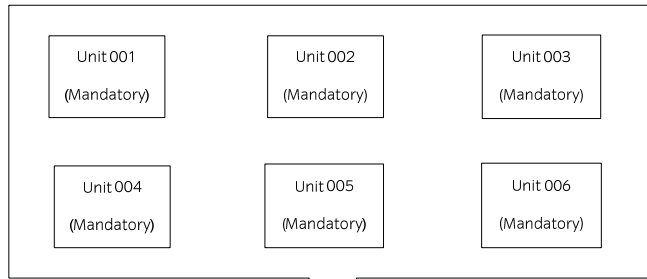
Candidates will receive a certificate for each Advanced Award they achieve and the Level 3 IVQ Advanced Diploma in Oil and Gas Operations certificate for the relevant pathway on completion of the final stage.

#### Guided Learning Hours

City & Guilds defines Guided Learning Hours (GLH) as the amount of contact time, including assessment, which is likely to be required for a candidate to complete all the knowledge and practical requirements for the qualification for which he or she is studying. Additional time may be required by candidates for self study, research and unsupervised practice and by Tutors for day-to-day marking of assignments or homework where the candidate is not present.

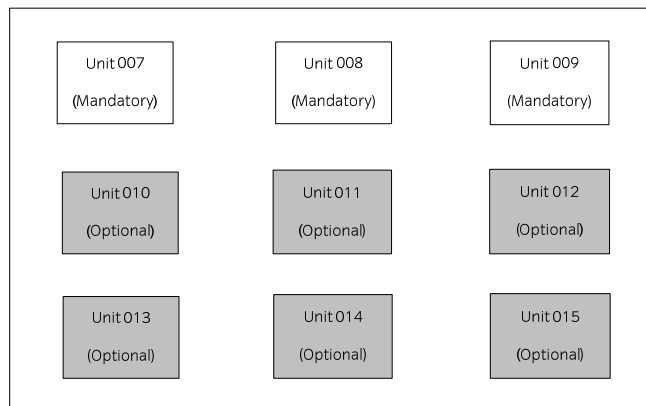
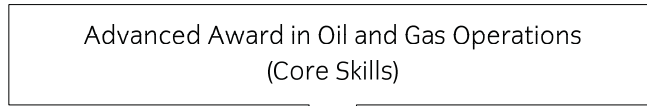
The recommended GLH for candidates to complete any of the four pathways available is 270 hours per pathway.

Level 3 IVQ  
Advanced Diploma  
in Oil and Gas  
Operations  
(Mechanical  
Maintenance  
Technician)

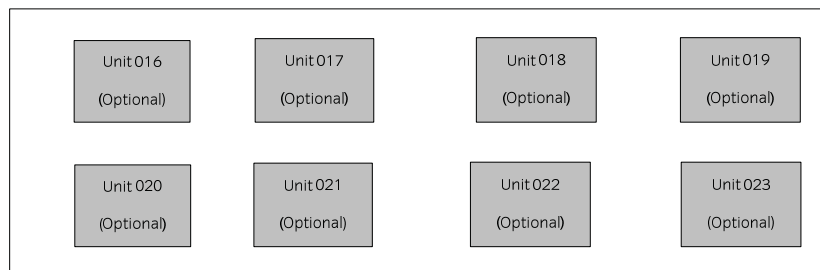
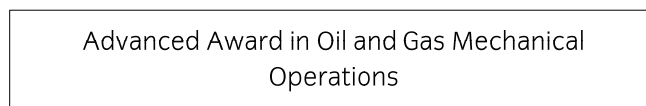


Candidates must complete Stage one  
and then Stage two before  
completing Stage three of this  
pathway.

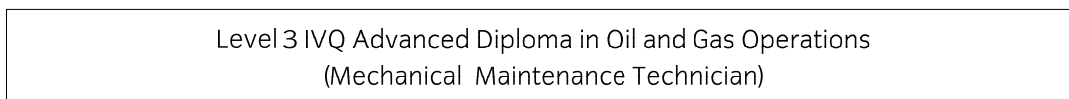
**Stage one**



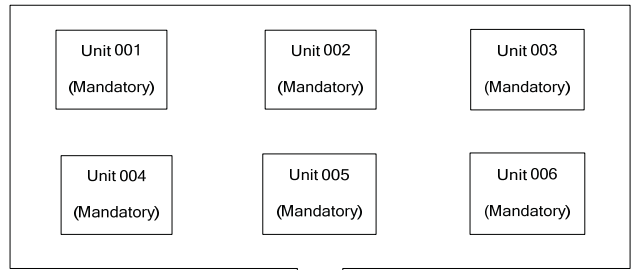
**Stage two**  
Choose two  
optional units



**Stage three**  
Choose two  
optional units

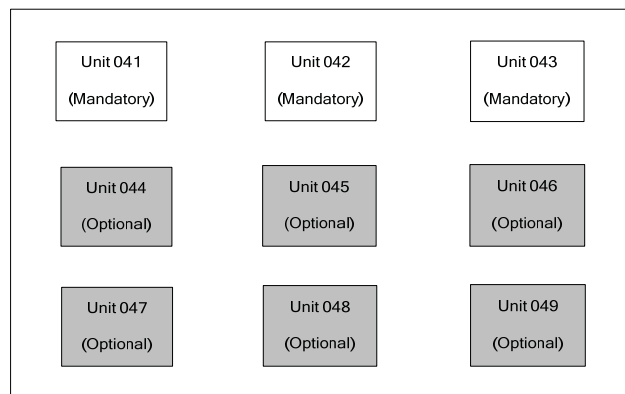
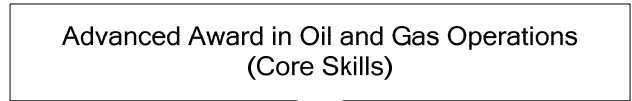


Level 3 IVQ  
Advanced Diploma  
in Oil and Gas  
Operations  
(Electrical  
Maintenance  
Technician)

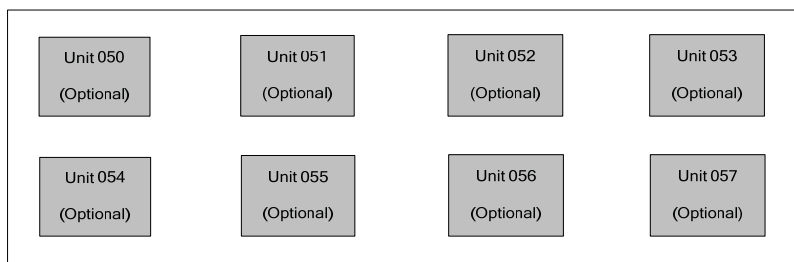
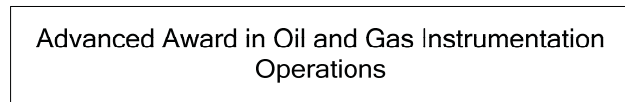


Candidates must complete Stage one and then Stage two before completing Stage three of this pathway.

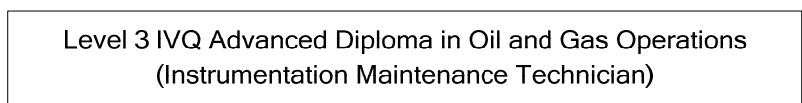
**Stage one**

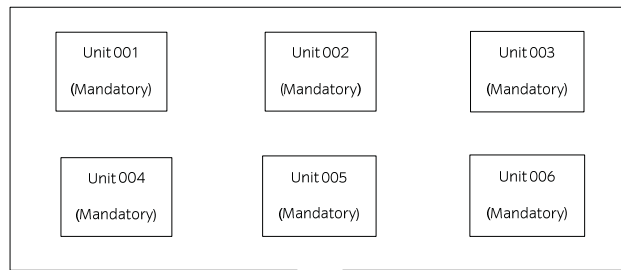


**Stage two**  
Choose two optional units



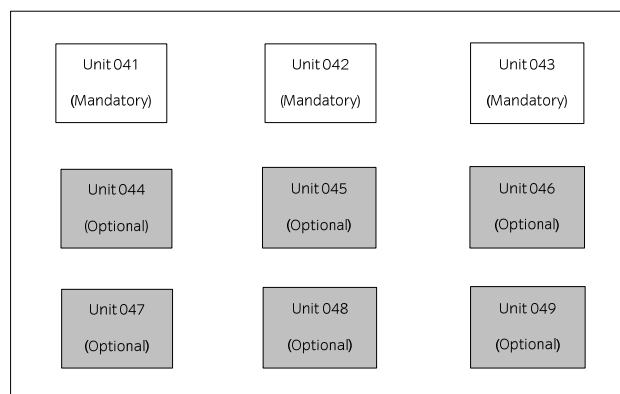
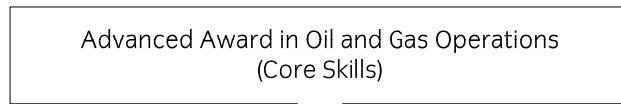
**Stage three**  
Choose two optional units



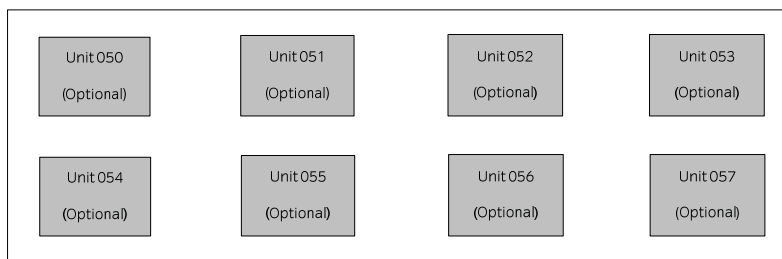


Candidates must complete Stage one and then Stage two before completing Stage three of this pathway.

**Stage one**



**Stage two**  
Choose two optional units

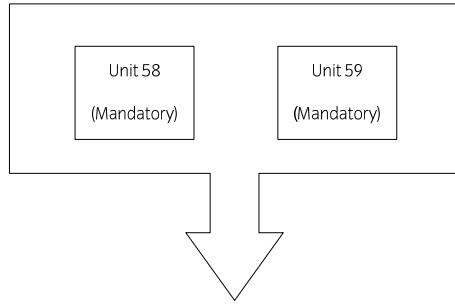


**Stage three**  
Choose two optional units



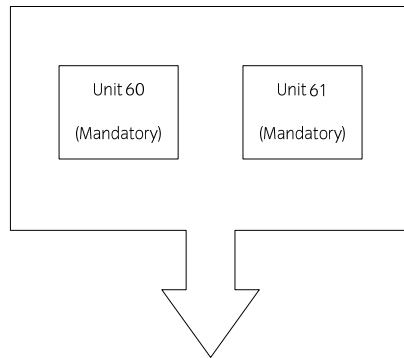
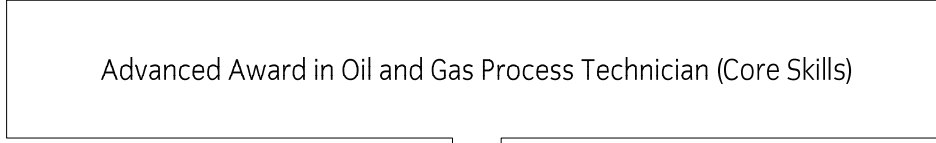


Level 3 IVQ  
Advanced Diploma  
in Oil and Gas  
Operations  
(Process  
Technician)

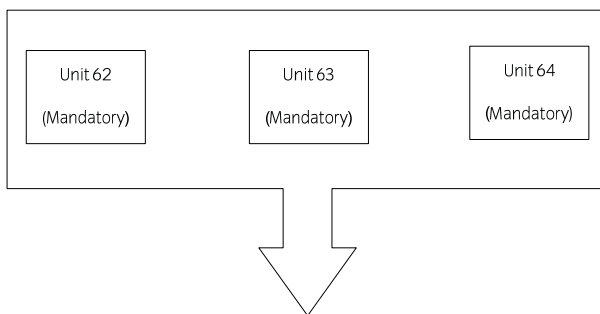
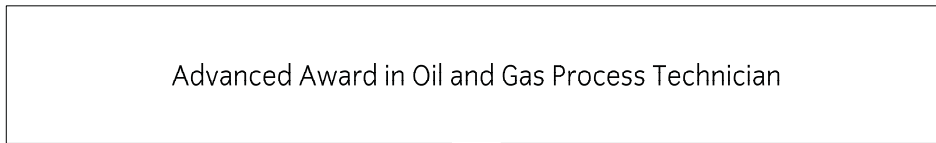


**Candidates must complete Stage one  
and then Stage two before  
completing Stage three of this  
pathway.**

**Stage one**



**Stage two**



**Stage three**



## 2 About the qualification

### 2.3 Publications, sources of information and assistance

#### Related publications

City & Guilds also provides the following documents specifically for this qualification:

Publication	Available from
Assessment Guide (EN008510)	City & Guilds website
Equipment List (FR008510)	City & Guilds website

#### Other essential documents

There are other City & Guilds documents which contain general information on City & Guilds qualifications:

- **Centre guide – Delivering International Qualifications (WP-UK-0015)**  
This guide contains detailed information about the processes which must be followed and requirements which must be met for a centre to achieve ‘approved centre’ status, or to offer a particular qualification.
- **International catalogue (CD-00-1112)**  
The international catalogue provides approved centres with details of general regulations, dated examinations, registration and certification procedures, and fees. This information is also available online.
- **International Handbook**  
Information on City & Guilds’ international portfolio of qualifications designed to help centres identify the right qualifications and levels for their candidates. This brochure is also available to download from our website.
- **International Guide to Qualifications**  
Information on City & Guilds’ international portfolio of qualifications designed to help candidates choose the right programme. This brochure is also available to download from our website.
- **Preparing projects and portfolios for international qualifications (FR-00-0008)**  
This guide contains useful general information for centre staff and for candidates.
- **Guide to the assessment of practical skills in international vocational qualifications (GP-00-0004)**  
This guide offers advice for centre staff on planning and conducting practical assessments for IVQs.

For the latest updates on our publications and details of how to obtain them and other City & Guilds resources, please refer to the City & Guilds website.

## City & Guilds websites

Website	Address	Purpose and content
City & Guilds' international website	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>	This is the main website for finding out about the City & Guilds group and accessing qualification information and publications.
SmartScreen	<a href="http://www.smartscreen.co.uk">www.smartscreen.co.uk</a>	SmartScreen is the City & Guilds online learning support website. It gives registered subscribers access to qualification-specific support materials.
Walled Garden	<a href="http://www.walled-garden.com">www.walled-garden.com</a>	The Walled Garden is a qualification administration portal for approved centres, enabling them to register candidates and claim certification online.

## Contacting City & Guilds by e-mail

The following e-mail addresses give direct access to our Customer Relations team.

e-mail	Query types
<a href="mailto:intcg@cityandguilds.com">intcg@cityandguilds.com</a>	International Customer Relations team: <ul style="list-style-type: none"><li>• all candidate enquiries</li><li>• centre enquiries relating to centre approval</li><li>• ordering publications.</li></ul>
<a href="mailto:intops@cityandguilds.com">intops@cityandguilds.com</a>	Centre enquiries relating to: <ul style="list-style-type: none"><li>• entries</li><li>• results</li><li>• invoices</li><li>• examination materials.</li></ul>
<a href="mailto:walledgarden@cityandguilds.com">walledgarden@cityandguilds.com</a>	All enquiries relating to the Walled Garden, including: <ul style="list-style-type: none"><li>• setting up an account</li><li>• resetting passwords</li><li>• technical queries and problems.</li></ul>

## 3 Candidate entry and progression

### Candidate entry requirements

There are no formal entry requirements for candidates undertaking this qualification. However, centres must ensure that candidates have the potential and opportunity to successfully gain the qualification.

Candidates must have an adequate level of English speaking, reading, listening and writing skills to competently cover aspects of this qualification such as answering underpinning knowledge questions orally and/or in writing, and reading assessor notes regarding their observations.

Aids or appliances which are designed to alleviate disability may be used during assessment providing they do not compromise the standard required.

### Accreditation of Prior Learning and Experience

Accreditation of Prior Learning (APL) and Accreditation of Prior Experience and Learning (APEL) are approaches used to recognise the contribution a person's previous experience might contribute to a qualification.

Accreditation of prior experience and learning for the Level 3 IVQ Advanced Diploma in Oil and Gas Operations (8510) may be available where a candidate entering for the IVQ can provide appropriate evidence of prior learning to the outcomes with the same organisation within the last two years.

### Accreditation on the National Qualifications Framework

The Level 3 IVQ Advanced Diploma in Oil and Gas Operations (8510) is accredited at level 3 of the National Qualifications Framework of England, Wales and Northern Ireland (NQF).

### Other legal considerations

Other legal considerations may apply to this qualification. It is the responsibility of the training provider to ensure compliance with all local, regional and national legislation which may affect delivery of the qualification, and to ensure that candidates are fully aware of any requirements.

## 4 Centre requirements

### 4.1 Obtaining centre and qualification approval

Only approved organisations can offer City & Guilds qualifications. Organisations approved by City & Guilds are referred to as **centres**.

This section provides an outline of the process of applying for approval.

Centres must meet a set of quality criteria including:

- provision of adequate resources, both physical and human
- clear management information systems
- effective assessment and quality assurance procedures including candidate support and reliable recording systems.

An organisation that has not previously offered City & Guilds qualifications must apply for approval to become a centre. This is known as the **Centre Approval Process (CAP)**. Centres also need approval to offer a specific qualification. This is known as the **Qualification Approval Process (QAP)**, (previously known as **Programme Approval**). In order to offer this qualification, organisations which are not already City & Guilds centres must apply for centre and qualification approval at the same time. Existing City & Guilds centres will only need to apply for qualification approval for these particular qualifications.

Full details of the procedures and forms for applying for centre and qualification approval are given in *Centre guide – Delivering International Qualifications*, which is available from City & Guilds' international Branch offices, the City & Guilds website or the International Customer Relations team in our London office.

In countries where City & Guilds has a Branch office, support will be available for new centres. They will appoint an External Verifier. They will also provide details of fees applicable for approvals. The Branch office will be the point of contact for all enquiries for these qualifications and will be responsible for monitoring the delivery and assessments through reports submitted by External Verifiers.

In all other countries, centres wishing to apply for centre or qualification approval should contact the Customer Relations Team in our London office.

Assessments must not be undertaken until qualification approval has been obtained. Centres that wish to deliver the following units must have the equipment units specified. If this requirement is not adhered to, the centre may not gain approval to deliver this qualification (for further details refer to Level 3 IVQ Advanced Diploma in Oil and Gas (8510) Equipment List available at [www.cityandguilds.com](http://www.cityandguilds.com)).

Unit	Equipment required
007	Mechanical equipment required for maintenance and assessing performance
008	Defective equipment required to analyse defects and faults
009	Fault-finding tools to use on faulty equipment/machinery
013	Tools for removing mechanical components

023	Mechanical equipment/plant for maintenance
024	Electrical equipment/plant for maintenance
041	Instrumentation equipment/plant for maintenance
061 and 062	Mechanical equipment/plant for isolating and de-isolating equipment

City & Guilds reserves the right to withdraw qualification or centre approval for reasons of debt, malpractice or non-compliance with City & Guilds' policies, regulations, requirements, procedures and guidelines, or for any reason that may be detrimental to the maintenance of authentic, reliable and valid qualifications or that may prejudice the name of City & Guilds.

Further details of reasons for suspension and withdrawals, procedures and timescales, are contained in *Centre guide – Delivering International Qualifications*.

## 4 Centre requirements

### 4.2 Resource requirements

#### Physical resources

Centres must provide access to a sufficient range of services, professional products, tools, materials and equipment in the centre or workplace to ensure candidates have the opportunity to cover all of the practical activities of this qualification. The learning and assessment setting should incorporate a real, or simulated but realistic, workplace. The setting should take account of any by-laws, legislation or legal authority requirements that would affect commercial establishments.

#### Human resources

To meet the quality assurance criteria for this qualification, the centre must ensure that the following internal roles are undertaken:

- Examinations Secretary
- Assessment Manager
- Internal Verifier
- Assessor

#### Centre staff

Staff delivering must satisfy the requirements for occupational expertise for this qualification. They should be technically capable in the areas for which they are delivering training and have experience of providing training.

Assessors should also:

- hold the Level 3 IVQ Advanced Diploma in Oil and Gas Operations (8510), or an equivalent qualification
- have at least two years' recent relevant experience in the specific area they will be assessing
- have relevant current industrial experience at or above the level they will be assessing
- be able to read, write, listen and speak English, to the equivalent level of IESOL (common B1/B2).

City & Guilds recommends that staff delivering the qualification should hold or be working towards units from the Level 3 IVQ Advanced Diploma in Teaching, Training and Assessing Learning (1106) which are relevant to their role.

#### Continuing Professional Development (CPD)

Centres are expected to support their staff in ensuring that their knowledge of the occupational area and of best practice in delivery, mentoring, assessment and verification remains current, and takes account of any national or legislative developments.

Further details of centre staff roles are provided under Section 2 Key Roles in *Centre guide – Delivering International Qualifications*.

## 4 Centre requirements

### 4.3 Registration and certification

#### Administration

Full details of City & Guilds' administrative procedures for this qualification are provided in the *International Catalogue (CD-00-1112)*, and online to City & Guilds approved centres via the Walled Garden. This information includes:

- registration procedures
- enrolment numbers
- fees
- entry for examinations
- claiming certification.

Centres should follow all guidance carefully, particularly noting that fees, registration and certification end dates for the qualification are subject to change.

Centres should be aware of time constraints regarding the registration and certification periods for the qualification, which are specified in the *International catalogue*.

#### Registration

Candidates should be registered with City & Guilds for a qualification as soon as possible after enrolment at the centre.

This enables the External Verifier to plan effective verification strategies based on accurate details of the number of candidates at a centre. Registration details of all candidates must be made available to the External Verifier at the first verification visit after centre approval is confirmed.

Registration and certification details provided by City & Guilds will alert External Verifiers to instances of candidates being both registered and certificated between centre visits. This process ensures that these candidates are considered for inclusion in the sampling plan for the next centre visit.

City & Guilds require that centres maintain at least ten weeks between candidate registration and certification and will reject any certificate claims for candidates not registered accordingly.

Please note that the effective date for registration is the date candidate details are processed through the computer system at City & Guilds.

#### Results and certification

The administrative arrangements for registering and certificating are clearly outlined in the *Centre guide – Delivering International Qualifications*.

After completion of assessment, all candidates will receive, via their centre, a **Notification of candidate results**, giving details of how they performed. It is not a certificate of achievement.



The Notification of candidate results and certificates will be issued by City & Guilds to the centre for award to successful candidates. Any enquiries about results and certification must be conducted through the candidate's centre.

Centres will also receive a consolidated results list detailing the performance of all candidates they enter, whether they are successful or not.

Further information about the issue of results and certification for centres is available online at **[www.cityandguilds.com](http://www.cityandguilds.com)** or by contacting the nearest City & Guilds office.

### **Advanced Awards**

Centres can apply for a certificate on behalf of a candidate as soon as they have achieved the units required for an Advanced Award. They do not need to wait until the full programme of study has been completed. However, candidates who complete a full qualification will receive a certificate for each Advanced Award achieved and the Level 3 IVQ Advanced Diploma certificate on completion of the final stage as described in section 2.2 The structure of the qualification.

### **Full certificates**

Full certificates are only issued to candidates who have met the full requirements of the qualification, as described in section 2.2 The structure of the qualification.

## 4 Centre requirements

### 4.4 Quality assurance

For this qualification international standards and rigorous quality assurance are maintained by use of:

- City & Guilds practical activities, assessed by the centre according to externally set evidence requirements
- internal (centre) quality assurance
- City & Guilds external verification.

Quality assurance includes initial centre approval, qualification approval and the centre's own internal procedures for monitoring quality. Centres are responsible for internal quality assurance, and City & Guilds is responsible for external quality assurance.

City & Guilds' *Centre guide – Delivering International qualifications* contains detailed guidance on:

- regulations and procedures for internal and external quality assurance
- roles and responsibilities of quality assurance staff.

#### Internal quality assurance

Approved centres must have effective quality assurance systems to ensure optimum delivery and assessment of qualifications. In order to fully support candidates, centres are required to retain copies of candidates' assessment and internal verification records for **three** years after certification.

#### Assessors

Assessors are required to make accurate and objective decisions as to whether the candidate's performance meets the standards laid out in units of capability.

The requirements of the Assessor are to:

- hold the Level 3 IVQ Advanced Diploma in Oil and Gas (8510), or an equivalent qualification
- have at least two years' recent relevant experience in the specific area they will be assessing
- have relevant current industrial experience at or above the level they will be assessing
- demonstrate continuing professional development to ensure that their knowledge of the occupational area and of best practice in delivery, mentoring, assessment and verification remains current, and takes account of any national/international or legislative developments
- be able to read, write and speak English, to the equivalent level of IESOL (common B1/B2).

The role of the Assessor is to:

- plan, manage and assess the qualification
- devise a suitable assessment for the mandatory and optional units
- ensure that each candidate is aware of the assessment requirements throughout their programme of learning
- provide guidance and support to candidates on the assessment and evidence requirements for each unit
- ensure that the assessment and evidence requirements have been met by the candidate
- observe delivered sessions or nominate a suitable observer, maintaining details of all Nominated Observers
- complete relevant records and pro formas.

Further details of centre staff roles are provided under Section 2 Key Roles in *Centre guide – Delivering international qualifications*.

## **Expert witness**

Where observation of process is used to obtain the performance evidence, this observation must be carried out against the standards. Best practice would require that such observation is carried out by a qualified Assessor. If this is not practicable then alternative sources of evidence may be used.

This could be a supervisor, mentor or manager, who may be regarded as a suitable witness to the candidate's capability. However, the witness must be technically capable in the process or skills that they are providing testimony for to at least the same level of expertise as that required of the candidate and also understand the requirements of the standards. It is the responsibility of the Assessor to ensure that any witness testimonies accepted as evidence of a candidate's capability are valid to the standards by which the candidate is being assessed.

## **Nominated Observer**

The role of the Nominated Observer is to:

- ensure that they are familiar with the requirements of the units
- observe delivered sessions according to the evidence requirements
- complete and maintain relevant records and pro formas and pass to the Assessor
- liaise with the Assessor.

## **Internal Verifier (IV)**

An IV's role is to ensure consistency and quality of assessment within the centre. The IV will monitor assessment activities, co-ordinate standardisation and provide guidance to Assessors. IVs should demonstrate sufficient and current understanding of the qualification to be internally verified and know how they are applied in the sector area(s) concerned, to the satisfaction of the EV (External Verifier).

The requirements of the IV are to:

- hold the Level 3 IVQ Advanced Diploma in Oil and Gas Operations (8510), or an equivalent
- have at least four years' recent relevant experience in the specific area they will be verifying within a senior role
- have relevant current industrial experience at or above the level they will be verifying
- demonstrate continuing professional development to ensure that their knowledge of the occupational area and of best practice in delivery, mentoring, assessment and verification remains current, and takes account of any national/international or legislative developments
- know where and when to access specialist industry advice (where additional specialist or technical knowledge relating to assessment and verification decisions)
- be able to read, write and speak English to the equivalent level of IESOL (common B1/B2).

The role of the IV is to liaise with City & Guilds and ensure that:

- there are adequate resources, both staff and materials
- each candidate undergoes an initial assessment and induction, leading to an agreed Individual Learning Plan (ILP)/action plan
- the work of all personnel contributing to the delivery and assessment of the programme is sampled by a range of methods
- records of all sampling activities are monitored and maintained
- where several members of staff are involved in the delivery and assessment of the qualifications, there is a consistent interpretation of the requirements through standardisation activities and that these are documented
- all staff carrying out delivery and assessment are familiar with and understand the unit requirements
- an appropriate referral policy is in place.

Further details of centre staff roles are provided under Section 2 Key Roles in *Centre guide – Delivering International Qualifications*.

## **External quality assurance**

External quality assurance for the qualification will be provided by the City & Guilds external verification process.

External Verifiers are appointed by City & Guilds to approve centres, and to monitor the assessment and internal quality assurance carried out by centres. External verification is carried out to ensure that assessment is valid and reliable, and that there is good assessment practice in centres.

To carry out their quality assurance role, External Verifiers must have appropriate occupational and verifying knowledge and expertise. They attend training and development designed to keep them up-to-date, facilitate standardisation between Verifiers and share good practice.

## **External Verifier (EV)**

The role of the EV is to:

- make approval visits/recommendations to confirm that centres can satisfy the approval criteria
- help centres to develop internal assessment and evidence evaluation systems that are fair, reliable, accessible and non-discriminatory
- ensure that IVs are undertaking their duties satisfactorily
- monitor internal quality assurance systems and sampling, including direct observation, assessment activities, methods and records
- approve centre-set assessment questions
- sample knowledge answers, reports and evidence requirements
- check claims for certification to ensure they are authentic, valid and supported by auditable records
- act as a source of advice and support to centres, including help with interpretation of standards
- promote best practice
- provide prompt, accurate and constructive feedback to all relevant parties on the operation of centres' assessment systems
- confirm that centres have implemented any corrective actions required
- report back to City & Guilds' Head office or the relevant Branch office
- maintain records of centre visits and make these available for auditing purposes.

## **5 Course design and delivery**

### **5.1 Initial assessment and induction**

Centres will need to make an initial assessment of each candidate prior to the start of their programme to ensure they are entered for an appropriate type and level of qualification.

The initial assessment will assist centres and tutors with the design and delivery of courses for both the theoretical and practical aspects of the course. It should identify any specific training needs the candidate has, and the support and guidance they may require when working towards their qualification.

City & Guilds recommends that centres provide an induction programme to ensure the candidate fully understands the requirements of the qualification they will work towards, their responsibilities as a candidate, and the responsibilities of the centre. It may be helpful to record the information on a learning contract/Individual Learning Plan.

## 5 Course design and delivery

### 5.2 Recommended delivery strategies

Centre staff should familiarise themselves with the structure, content and assessment requirements of the qualification before designing a course programme.

Provided that the requirements for the qualifications are met, centres may design course programmes of study in any way that they feel best meets the needs and capabilities of their candidates.

For further information to assist with the planning and development of the course programme, please refer to the following:

- material available to download from the City & Guilds website.

#### **Relationship to other qualifications and the wider curriculum**

City & Guilds recommends centres address the wider curriculum, where appropriate, when designing and delivering the course.

Areas that centres should consider are:

- language skills
- literacy skills
- numeracy skills
- ICT skills
- professional values and practice
- relevant cultural, social, local, moral and spiritual issues.

#### **Equal opportunities**

It is a requirement of centre approval that centres have an equal opportunities policy. Further information is provided in the *Centre guide – Delivering International Qualifications*. City & Guilds' equal opportunities policy is also available to download from the City & Guilds website.

#### **Access to assessment**

City & Guilds provides guidance and regulations to facilitate fair access to assessments and qualifications for candidates who are eligible for adjustments to assessment arrangements. Access arrangements are designed to allow attainment to be demonstrated. For further information, please see *Access to assessment and qualifications*, available on the City & Guilds website.

#### **Appeals**

Centres must have their own, auditable, appeals procedure that must be explained to candidates during their induction. Appeals must be fully documented by the Quality Assurance Co-ordinator and made available to the EV or City & Guilds.

Further information on appeals is given in *Centre guide – Delivering International Qualifications*. There is also appeals information for centres and candidates on the City & Guilds website or available from the Customer Relations department.

## **5 Course design and delivery**

### **5.3 Health and safety, data protection, confidentiality and legal requirements**

#### **Health and safety**

Safe working practice is an integral part of all City & Guilds qualifications and assessments. It is the responsibility of centres to ensure that all relevant health and safety requirements are in place before candidates start practical assessments.

Should a candidate fail to follow health and safety practice and procedures during an assessment, the assessment must be stopped and the candidate advised of the reasons why. The candidate should be informed that they have failed the assessment. Candidates may retake the assessment at a later date, at the discretion of the centre. In any cases of doubt, guidance should be sought from the EV.

#### **Data protection and confidentiality**

Data protection and confidentiality must not be overlooked when planning the delivery of this qualification. Detailed guidance is provided in *Centre guide – Delivering International Qualifications*.

Centres offering this qualification may need to provide City & Guilds with personal data for staff and candidates. In doing so, centres will need to comply with applicable local data protection laws and regulations.

## 5 Course design and delivery

### 5.4 Learning and support resources

City & Guilds provides the following resources for this qualification:

<b>Resource</b>	<b>How to access</b>
List of resource requirements	Appendix 1
Reading list	Appendix 2
Evidence reference sheet	Appendix 3
Knowledge evidence recording form	Appendix 4
Verification declaration form	Appendix 5
Frequently Asked Questions (FAQs)	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>
Assessment guide	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>
Equipment List	<a href="http://www.cityandguilds.com">www.cityandguilds.com</a>

City & Guilds will provide the following learning and support resources which will be posted on our website.



## 6 Relationships to other qualifications

### 6.1 Links to the National Qualifications Framework of England, Wales and Northern Ireland (NQF) and National Occupational Standards (NOS)

This qualification is accredited at Level 3 on the National Qualifications Framework of England, Wales and Northern Ireland (NQF).

The units within the qualification are broadly related to the UK's National Occupational Standards (NOS) as outlined in the table below. This mapping is provided as guidance and suggests areas of overlap and commonality with the NOS

<b>Unit</b>	<b>Most relevant NOS</b>
001	C3.1 Hand over process engineering plant and equipment in oil and gas operations
002	C3.2 Reinststate the work area after completing the maintenance of process plant and equipment
003	C3.3 Minimise risks to life, property and the environment
004	C3.4 Work safely, minimise risk and comply with emergency procedures
005	C3.5 Contribute to effective working relationships
006	M3.1 Prepare work areas for the maintenance of process plant and equipment
007	M3.1 Carry out planned maintenance procedures on mechanical plant and equipment
008	M3.2 Deal with variations and defects in mechanical plant and equipment
009	M3.3 Diagnose and determine the causes of faults in mechanical plant and equipment
010	M3.4 Prepare equipment in support of engineering activities
011	M3.5 Prepare materials for the maintenance of mechanical plant and equipment
012	M3.6 Adjust mechanical plant and equipment to meet operational requirements
013	M3.7 Remove components from mechanical plant and equipment
014	M3.8 Replace components in mechanical plant and equipment
015	M3.9 Determine the feasibility of repair of components from mechanical plant and equipment
016	M3.10 Interpret detailed mechanical information from technical sources

017	M3.11 Read and extract information from mechanical engineering drawings and specifications
018	M3.12 Identify and suggest improvements to working practices and procedures whilst maintaining mechanical plant and equipment
019	M3.13 Establish that an engineering process has been completed to specification
020	M3.14 Test and monitor the performance and condition of mechanical plant and equipment
021	M3.15 Monitor the performance and condition of mechanical plant and equipment
022	M3.16 Assess the performance and condition of mechanical plant and equipment
023	M3.17 Inspect mechanical plant and equipment
024	E3.1 Carry out planned maintenance procedures on electrical plant and equipment
025	E3.2 Deal with variations and defects in electrical plant and equipment
026	E3.3 Diagnose and determine the cause of faults in electrical plant and equipment
027	E3.4 Prepare equipment in support of electrical engineering activities
028	E3.5 Prepare materials for the maintenance of electrical plant and equipment
029	E3.6 Adjust electrical plant and equipment to meet operational requirements
030	E3.7 Remove components from electrical plant and equipment
031	E3.8 Replace components in electrical plant and equipment
032	E3.9 Determine the feasibility of repair of components from electrical plant and equipment
033	E3.10 Interpret detailed electrical information from technical sources
034	E3.11 Read and extract information from electrical engineering drawings and specifications
035	E3.12 Identify and suggest improvements to working practices and procedures on electrical plant and equipment
036	E3.13 Establish that an electrical engineering process has been completed to specification.
037	E3.14 Test the performance and condition of electrical plant and equipment
038	E3.15 Monitor the performance and condition of electrical plant and equipment
039	E3.16 Assess the performance and condition of electrical plant and equipment
040	E3.17 Inspect electrical plant and equipment
041	I3.1 Carry out planned maintenance procedures on instrument and control systems

042	I3.2 Deal with variations and defects in instrumentation and control systems
043	I3.3 Diagnose and determine the cause of faults in instrumentation and control systems
044	I3.4 Prepare equipment required for maintaining instrument and control systems
045	I3.5 Prepare materials required for maintaining instrument and control systems
046	I3.6 Adjust instrument control systems to meet operational requirements
047	I3.7 Remove components from instrument and control systems
048	I3.8 Replace components from instrument and control systems
049	I3.9 Determine the feasibility of repair of components from instrument and control systems
050	I3.10 Interpret detailed instrument and control information from technical sources
051	I3.11 Read and extract information from instrument and control engineering drawings and specifications
052	I3.12 Identify and suggest improvements to working practices and procedures whilst maintaining instrument and control systems
053	I3.13 Establish that an engineering maintenance process has been completed to specification
054	I3.14 Test the performance and condition of instrument and control systems
055	I3.15 Monitor the performance and condition of instrument and control systems
056	I3.16 Assess the performance and condition of instrument and control systems
057	I3.17 Inspect instrument and control systems
058	PT3.1 Prepare integrated process systems for start up in oil and gas operations
059	PT3.2 Operate and monitor integrated process systems
060	POHPT2.3 Prepare integrated process systems for shutdown
061	POHPT2.4 Isolate and reinstate process plant and equipment
062	POHC3.2 Monitor and maintain health and safety systems
063	POHC3.5 Control emergencies and critical situations
064	POHC3.7 Create, maintain and enhance productive working relationships

## 7 Assessment

### 7.1 Summary of assessment requirements

For this qualification, candidates will be required to complete the following assessments:

- all practical tasks described in **each** unit
- all underpinning knowledge in **each** unit.

#### Time constraints

The following time constraints must be applied to the assessment of this qualification:

- the full award should be achieved within three years.

#### Grading and marking

Assessments will be graded pass or fail.

#### Accreditation of Prior Learning (APL)

Accreditation of Prior Learning (APL) and Accreditation of Prior Experience and Learning (APEL) recognise the contribution a person's previous experience might contribute to a qualification.

APEL for the level 3 IVQ Advanced Diploma in Oil and Gas Operations (8510) may be available where a candidate is able to provide appropriate evidence of prior learning to the outcomes with the same organisation within the last two years.

#### Simulation

Evidence for this award should be obtained from the workplace where the activities or outcomes can be assessed and are clearly attributable to the candidate. However, in certain circumstances, replication of work activities may be acceptable. Simulation is allowed for any of the units in this qualification, and if deemed necessary, Assessors must be confident that the environment replicates the workplace to such an extent that skills gained will be fully transferable to the workplace.

Assessors must clearly identify those aspects of the workplace that are critical to performance, and make sure that they have been replicated satisfactorily. Where replication is involved, Assessors must obtain agreement with IVs and EVs before assessing any candidates.

Examples of critical aspects include:

- environmental conditions such as noise levels, lighting conditions and the presence of hazards
- the use of industrial equipment and procedures
- pressure of work, such as time constraints and repetitive activities
- carrying out work on actual products and the consequences of making mistakes
- customer/supplier/departmental relationships.

#### Performance evidence requirements

Usually evidence of candidate performance will be derived from Assessor observation and/or testimony from an expert witness of the candidate carrying out work activities in the workplace.

Practical evidence must be the main form of evidence gathered. In order to demonstrate consistent, capable performance for a unit, a minimum of two separate practical observations will be required to show that the tasks reflected by the unit have been carried out to the stated standards. The

knowledge and outcomes specified for each unit must be covered (e.g. four from a choice of six). It is possible that some of the outcomes in each unit are covered more than once. If, however, the two examples of practical evidence are not sufficient to cover all the specified outcomes, then further examples of practical evidence will be required to ensure that coverage is achieved.

Assessors must make sure that the evidence provided reflects the candidate's capability and not just the achievement of the training programme.

In cases of emergency, a breach of confidentiality/privacy or a dangerous working environment the following evidence can be used with agreement from the EV:

- products of the candidate's work, such as items that have been produced or worked on, documents produced as part of a work activity, records or photographs of the product.

If there is any doubt as to what constitutes suitable evidence, the EV should be consulted.

## **Knowledge evidence**

In addition to the knowledge requirements being positively inferred from an Assessor or expert witness observing the practical tasks the candidate must be formally questioned on knowledge and understanding, using either short written answer or oral types of questions. The questions and answers must be recorded using the Underpinning knowledge recording form (Appendix 4). The questions should only relate to the specific areas defined by the outcomes for the unit.

Assessors must carefully plan all types of questioning procedures beforehand. The actual questions (oral and written) must be kept under secure conditions and only made available to the candidates during the assessment process. Assessors should ask enough questions to be able to determine that the candidate has an appropriate level of knowledge and understanding as required by the unit. Examples of these questions can be found below:

### **Example 1**

Unit 003

Element: Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.

Question: What are your health and safety responsibilities? What regulations and legislation are relevant to your role?

### **Example 2**

Unit 041

Element: Explain the suitable processes and waste disposal procedures in relation to procedures, legislation and regulation for waste removal.

Question: What are the processes and controls related to waste disposal? What legislation affects these processes?

### **Example 3**

Unit 054

Element: Explain engineering illustrations and all related specifications.

Question: What are the purposes of engineering illustrations? Can you explain their related specifications?

The candidates will retain a copy of their results, including comments made by the Assessor during oral questioning. Assessors must make the questions available to Verifiers so that the latter can compare them against the results sheets held by the candidates.

The knowledge evidence should be referenced in a similar fashion to that used for practical evidence.

Oral questions need to be recorded with their answers within the candidate's file/portfolio of evidence. An Evidence reference sheet (Appendix 3) must be completed to identify which unit evidence is referenced to, and to ensure quality for verification purposes.

## Completing the unit checklists

The candidate must carry out **at least two separate assessment tasks**. All evidence of the candidate meeting the practical and knowledge requirements for each unit must be clearly recorded and referenced on the Evidence reference sheet (Appendix 3). In addition to the unit checklist, the required evidence must also contain:

actual product evidence where practicable – e.g. if it is an actual product for customer use. Photographs or videos may be used in lieu provided they show the skill areas in sufficient detail for the Verifiers (Internal and External) to make a decision regarding the practical standards achieved

- a worksheet (centre-set) that clearly lays down the required product specification in terms of materials, tolerances and any time restrictions, plus a drawing.

**Note:** in cases of industrial confidentiality or sensitivity then it may be permissible to exclude certain items from the evidence, but a description of the general nature of the work/activity must be provided. In cases of doubt the EV should be consulted about the validity of a proposed assessment before the candidate commences any such work.

- A report that clearly identifies that the product has been reliably tested against the specification. If there are any discrepancies of a non-critical nature then the assessment may be deemed acceptable provided that there is a statement to this effect signed by a duly appointed and responsible person.
- A **brief** report, prepared by the candidate, that identifies any hazards or difficulties associated with the work and how these were dealt with. It should also highlight any specific requirements or special skill areas that were involved e.g. non-standard tools, tool- and work-holding methods (use of jigs and fixtures etc.). Note that, where relevant, some aspects of this report could also form part of the required knowledge evidence and should be signed and dated by the candidate.

## **8 Units**

### **8.1 About the units**

#### **Availability of units**

The units for this qualification follow.

They may also be obtained from the centre resources section of the City & Guilds website, or are available on a CD-ROM (stock order code CD-0111-12).

#### **Structure of units**

The units in this qualification are written in a standard format and comprise the following:

- unit title
- unit reference
- rationale
- list of learning outcomes
- detailed description of the requirements of each learning outcome expressed as practical skills and/or underpinning knowledge.

## 8.2 The units

<b>City &amp; Guilds number</b>	<b>Unit reference</b>	<b>Unit title</b>
001	K/502/2884	Handing over processes, plant and equipment in oil and gas operations
002	M/502/2885	Restoring the workplace after completing the maintenance procedures of plant and equipment
003	T/502/2886	Minimising and reducing risks to life, property and the environment at work
004	A/502/2887	Operating safely at work, minimising risks and complying with emergency procedures
005	F/502/2888	Participating in activities to develop effective working relationships
006	J/502/2889	Arranging and preparing the workplace for the maintenance of plant and equipment
007	A/502/2890	Performing maintenance procedures on mechanical plant and equipment
008	F/502/2891	Assessing and dealing with defects and variations in mechanical plant and equipment
009	J/502/2892	Identifying and analysing the causes of defects in mechanical plant and equipment
010	L/502/2893	Arranging equipment in preparation for mechanical engineering activities
011	R/502/2894	Preparing materials for the maintenance of mechanical plant and equipment
012	Y/502/2895	Modifying mechanical plant and equipment to meet operational requirements
013	D/502/2896	Removing components from mechanical plant and equipment
014	H/502/2897	Replacing components in mechanical plant and equipment
015	K/502/2898	Establishing the viability of repairing components from mechanical plant and equipment
016	M/502/2899	Understanding and analysing detailed mechanical information from technical sources
017	Y/502/2900	Obtaining information from mechanical engineering diagrams and specifications
018	D/502/2901	Analysing and recommending improvements to maintenance procedures for mechanical plant and equipment
019	H/502/2902	Verifying that mechanical engineering processes have been completed to required specifications



020	K/502/2903	Examining the performance and state of mechanical plant and equipment
021	M/502/2904	Monitoring the performance and state of mechanical plant and equipment
022	T/502/2905	Assessing the performance and state of mechanical plant and equipment
023	A/502/2906	Examining mechanical plant and equipment
024	F/502/2907	Performing maintenance procedures on electrical plant and equipment
025	J/502/2908	Assessing and dealing with defects and variations in electrical plant and equipment
026	L/502/2909	Identifying and analysing the causes of defects in electrical plant and equipment
027	F/502/2910	Arranging equipment in preparation for electrical engineering activities
028	J/502/2911	Preparing materials for the maintenance of electrical plant and equipment
029	L/502/2912	Modifying electrical plant and equipment to meet operational requirements
030	R/502/2913	Removing components from electrical plant and equipment
031	Y/502/2914	Replacing components in electrical plant and equipment
032	D/502/2915	Establishing the viability of repairing components from electrical plant and equipment
033	H/502/2916	Understanding and analysing detailed electrical information from technical resources
034	K/502/2917	Obtaining information from engineering diagrams and specifications
035	M/502/2918	Analysing and recommending improvements to maintenance procedures for electrical plant and equipment
036	T/502/2919	Verifying that electrical engineering processes have been completed to required specifications
037	K/502/2920	Examining the performance and state of electrical plant and equipment
038	M/502/2921	Monitoring the performance and state of electrical plant and equipment
039	T/502/2922	Assessing the performance and state of electrical plant and equipment
040	A/502/2923	Examining electrical plant and equipment
041	F/502/2924	Performing maintenance procedures on instrumentation and control plant and equipment
042	J/502/2925	Assessing and dealing with defects and variations in instrumentation and control plant and equipment
043	L/502/2926	Identifying and analysing the causes of defects in instrumentation and control plant and equipment
044	R/502/2927	Arranging equipment in preparation for instrumentation and control engineering activities
045	Y/502/2928	Preparing materials for the maintenance of instrumentation and control plant and equipment
046	D/502/2929	Modifying instrumentation and control plant and equipment to meet operational requirements

047	R/502/2930	Removing components from instrumentation and control plant and equipment
048	Y/502/2931	Replacing components in instrumentation and control plant and equipment
049	D/502/2932	Establishing the viability of repairing components from instrumentation and control plant and equipment
050	H/502/2933	Understanding and analysing detailed instrumentation and control information from technical resources
051	K/502/2934	Obtaining information from instrumentation and control engineering diagrams and specifications
052	M/502/2935	Analysing and recommending improvements to maintenance procedures for instrumentation and control plant and equipment
053	T/502/2936	Verifying that instrumentation and control engineering processes have been completed to the required specifications
054	A/502/2937	Examining the performance and state of instrumentation and control plant and equipment
055	F/502/2938	Monitoring the performance and state of instrumentation and control plant and equipment
056	J/502/2939	Assessing the performance and state of instrumentation and control plant and equipment
057	A/502/2940	Examining instrumentation and control plant and equipment
058	F/502/2941	Setting up systems for start up in oil and gas operations
059	J/502/2942	Functioning, operating and checking integrated systems
060	L/502/2943	Organising integrated systems for shutdown
061	R/502/2944	Isolating and restoring plant and equipment in oil and gas maintenance
062	Y/502/2945	Checking and upholding health and safety processes
063	D/502/2946	Managing emergencies and critical circumstances
064	H/502/2947	Developing, sustaining and improving productive working relationships

# Unit 001            **Handing over processes, plant and equipment in oil and gas operations**

## Overview

### **Rationale**

The aim of this unit is to enable the candidate to safely complete the handover of processes, plant and equipment. This unit is common to the electrical, mechanical and instrumentation pathways.

### **Assessment and grading**

This unit will be assessed by observation and oral or written questioning.

### **Learning outcomes**

There are **two** outcomes to this unit. The candidate will be able to:

- 1        Hand over processes, plant and equipment.
- 2        Acknowledge and confirm responsibility for the control of processes, plant and equipment.

## **Unit 001            Handing over processes, plant and equipment                                  in oil and gas operations**

Outcome 1            Hand over processes, plant and equipment..

### **Practical skills**

#### **The candidate will be able to:**

- 1        Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2        Check and describe the condition of all products or resources in agreement with specifications.
- 3        Clearly define and get agreement on the exact time of transfer of responsibility.
- 4        Communicate handover of control as specified.
- 5        Update records, following appropriate organisational procedures.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1        Explain the handover procedures for products or assets. This must include the details of when the handover should take place and how to confirm the exact time of transfer, and why it is vital to detail the exact time of transfer.
- 2        Explain all record-keeping procedures and relevant systems in place. This must include the level of detail on the actual condition of all engineering products as needed by various people. It should also include ways to verify information valid at the handover and to ensure it is all precise and complete. The candidate must also be aware of such situations where further details and explanations may be required.

## **Unit 001                    Handing over processes, plant and equipment in oil and gas operations**

Outcome 2                    Acknowledge and confirm responsibility for the control of processes, plant and equipment.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Check conditions of all engineering products and ensure all are in satisfactory condition to hand over.
- 3            Ensure that the details the candidate is handing over are correct and current.
- 4            Find more information if anything is unclear.
- 5            Ensure enough support is provided to those individuals transferring control.
- 6            Confirm acceptance of responsibility and control, keeping in mind all procedures.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain the handover process for all goods and assets. This must include when the handover will take place, how to ensure all transfer times can be confirmed and the reason it is vital that we know the exact time of transfer.
- 2            Explain record-keeping, systems and procedures. This must include a detailed indication of the condition of the products wanted by others.

## Unit 002

# Restoring the workplace after completing the maintenance procedures of plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to restore the workplace to a safe state before returning to operations. This must include the need to check and separate waste materials for disposal and identify and divide materials suitable for storage and future use. This unit is common to the electrical, mechanical and instrumentation pathways.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Restore the workplace to a safe state before returning to operations.

## **Unit 002            Restoring the workplace after completing the maintenance procedures of plant and equipment**

Outcome 1            Restore the workplace to a safe state before returning to operations.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Divide equipment, components and materials for reuse from waste products and materials.
- 3            Store reusable equipment and materials in a suitable area.
- 4            Organise the disposal of waste materials in line with organisational policy and environmental safe procedures.
- 5            Ensure the workplaces are returned to a safe state in agreement with contracted requirements and schedules.
- 6            Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Describe the workplace restoration requirements and all health and safety and organisational safe working practices and procedures.
- 3            Explain all material and equipment storage procedures. This must include knowledge of organisational procedures which the candidate must follow.
- 4            Describe the correct waste disposal methods and procedures for various types of waste, in accordance with health and safety regulations, all applicable legislation and organisational practices.
- 5            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 003

# Minimising and reducing risks to life, property and the environment at work

## Overview

### Rationale

The aim of this unit is to enable the candidate to minimise risks to life, property and the environment. The candidate will be required to recognise hazards, assess the risks involved, minimise the risks by implementing measures to control and provide ongoing monitoring. This unit is common to the electrical, mechanical and instrumentation pathways.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Assess and minimise risks and hazards.



## Unit 003

# Minimising and reducing risks to life, property and the environment at work

## Outcome 1

Assess and minimise risks and hazards.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Assess the level of risk involved, by identifying hazards.
- 3 Minimise the risks by introducing control measures in the minimum agreed timescales.
- 4 Inform all those who are affected by the risk control measures being in place and clarify any implications for them as needed.
- 5 Ensure that information given for safety systems is clear, precise and current.
- 6 Monitor the efficiency of the risk control measures and take prompt further action where necessary.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain the types of hazards involving processes, equipment, tools and materials that are likely to occur whilst maintenance is taking place of electrical plant and equipment.
- 3 Explain safety assessment methods and techniques to be used.
- 4 Explain precautions that can be taken to minimise risks from hazards.
- 5 Explain the safety reporting procedures and documentation for the workplace.
- 6 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 004

# Operating safely at work, minimising risks and complying with emergency procedures

## Overview

### Rationale

The aim of this unit is to enable the candidate to work safely, taking action to limit risks and where needed complying with emergency procedures. This unit is common to the electrical, mechanical and instrumentation pathways.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Reduce risks and comply with emergency procedures.

## **Unit 004            Operating safely at work, minimising risks and complying with emergency procedures**

Outcome 1            Reduce risks and comply with emergency procedures.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Call for specialist assistance in the event of contingencies taking place, using warning systems as required.
- 3            Undertake immediate and suitable action to limit risk of personal and third party injury as a primary priority followed by damage to property and equipment.
- 4            Carry out shutdown and evacuation procedures quickly and accurately.
- 5            Take safety precautions with dangers that can be contained using correct equipment and materials, in line with organisational policy and procedures.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Explain the First Aid procedures. This must include the sources of First Aid support including knowing the location of local First Aid facilities and First Aiders and procedures for alerting appropriate professional authorities.

## Unit 005

# Participating in activities to develop effective working relationships

## Overview

### Rationale

The aim of this unit is to enable the candidate to create and maintain effective working relationships with others. This may include colleagues, supervisors and frequent or infrequent visitors. This unit is common to the electrical, mechanical and instrumentation pathways.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Create and maintain effective working relationships with others.

## Unit 006

# Arranging and preparing the workplace for the maintenance of plant and equipment

## Outcome 1

Prepare the workplace for maintenance to be carried out.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Make sure the workplace is suitable for the work activities to be carried out.
- 3 Make sure all essential service supplies are ready and connected for immediate use.
- 4 Organise the workplaces so that they are prepared for the engineering activities to be undertaken.
- 5 Ensure that necessary safety arrangements are in place in order to protect other workers from activities that could possibly disrupt day-to-day working.
- 6 Report completion of arrangements in line with organisational procedures.
- 7 Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.

### Underpinning knowledge

#### The candidate will be able to:

- 1 explain the specific safe working practices that need to be observed whilst carrying out the preparations
- 2 explain what material preparations may be required and how they will be carried out
- 3 explain what preparation checks need to be taken on the tools and/or equipment that they will use
- 4 explain what to do if their work area, equipment and/or materials are unsuitable for the planned operations
- 5 explain what checks are needed to make sure materials meet the required specification
- 6 explain how to check that preparation is complete and correct
- 7 explain what actions they can take within the limits of their responsibility to solve the problems
- 8 explain who to report unsolvable problems to, or problems that are not within the limits of their responsibility
- 9 explain what their personal responsibilities are with regard to health, safety and environmental issues

## Unit 006

# Arranging and preparing the workplace for the maintenance of plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to prepare the workplace so that all maintenance of plant and equipment can be carried out. Activities such as clearing materials and equipment from the workplace, providing service supplies and completing isolations will form part of the candidate's role.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Prepare the workplace for maintenance to be carried out.

## **Unit 006                    Arranging and preparing the workplace for the maintenance of plant and equipment**

Outcome 1                    Prepare the workplace for maintenance to be carried out.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Make sure the workplace is suitable for the work activities to be carried out.
- 3            Make sure all essential service supplies are ready and connected for immediate use.
- 4            Organise the workplaces so that they are prepared for the engineering activities to be undertaken.
- 5            Ensure that necessary safety arrangements are in place in order to protect other workers from activities that could possibly disrupt day-to-day working.
- 6            Report completion of arrangements in line with organisational procedures.
- 7            Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Describe ways to develop and maintain working relationships, and why it is imperative to do so.
- 2            Describe the kinds of issues that can affect relationships, and what actions can be taken to deal with particular complications.
- 3            Describe their own responsibilities and those of others with regards to lines of communication.

## Unit 007

# Performing maintenance procedures on mechanical plant and equipment

### Overview

#### **Rationale**

The aim of this unit is to enable the candidate to maintain mechanical equipment in line with manufacturer and organisational practices and procedures. This includes following maintenance procedures in a suitable manner and completing the correct documentation.

#### **Assessment and grading**

This unit will be assessed by observation and oral or written questioning.

#### **Learning outcomes**

There is **one** outcome to this unit. The candidate will be able to:

- 1 Maintain equipment in line with practices and procedures.



## Unit 007

# Performing maintenance procedures on mechanical plant and equipment

## Outcome 1

Maintain equipment in line with practices and procedures.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Follow the appropriate maintenance schedules to carry out the necessary work.
- 3 Carry out all maintenance activities within the restrictions of the candidate's personal authority.
- 4 Carry out all maintenance activities within the particular sequence and in a fixed timescale.
- 5 Report any instances where the maintenance activities cannot be wholly met or where there are known external defects from the planned schedule.
- 6 Complete appropriate maintenance records accurately and pass them on to the correct person.
- 7 Dispose of waste materials in accordance with safe working practices and standard procedures.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain the maintenance schedules and related specifications to which the candidate is expected to work. This must include safe working practices, authorisation procedures, method statements, product worksheets, tests, internal maintenance schedules and records and timescales.
- 3 Explain which maintenance methods and procedures are standard during maintenance and how they can be adapted to optimise the work.
- 4 Explain documentation procedures and the maintenance of records.
- 5 Describe the responsibilities for the care and control of equipment that is used.
- 6 Describe the maintenance authorisation procedures, limitations of responsibility and authority in line with manufacturer and organisational standard procedures.
- 7 Explain the suitable methods and waste disposal procedures with regards to legislation, regulation and procedures for waste division.
- 8 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 008

# Assessing and dealing with defects and variations in mechanical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to identify, assess and deal with defects and variations in mechanical products or assets. This includes the reporting of recommendations to the appropriate individuals. The equipment required to complete this unit includes defective equipment needed to analyse defects and faults.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Identify, assess and deal with defects and variations in products or assets.

## Unit 008

# Assessing and dealing with defects and variations in mechanical plant and equipment

## Outcome 1

Identify, assess and deal with defects and variations in products or assets.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Identify defects in line with product or asset specification.
- 3 Assess defects and establish action necessary to return the products and assets to a specified condition.
- 4 Report recommendations for action to the suitable people immediately and in accordance with standard organisational procedures.
- 5 Confirm and record details of defects in accordance with control systems, quality assurance and procedures.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain engineering drawings and their related specifications. This must include the specifications to which the candidate will be expected to work, such as technical drawings (component, assembly, general arrangements, isometrics and first and third angle projections), method statements, product worksheets and tolerances.
- 3 Explain the recognition of defects in products and assets. This must include observation and using all senses, operations logs, reporting faults and maintenance logs.
- 4 Explain the methods of dealing with defects as stated by organisational procedures.
- 5 Explain the methods of dealing with defects and variations and what factors determine the actions to be taken. This must include why it is imperative to maintain records of the checks carried out and the assessments that result from those checks, what information must be input on those records and where they should be retained.
- 6 Explain the quality control systems and documentation procedures that are clearly stated by the organisation.
- 7 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 009

# Identifying and analysing the causes of defects in mechanical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to analyse and find faults within mechanical plant and equipment. The candidate will be required to select the most effective fault-finding technique and tools and on completion inform the correct individuals and record these according to organisational procedures.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Analyse and find faults within mechanical plant and equipment.

## Unit 009

# Identifying and analysing the causes of defects in mechanical plant and equipment

## Outcome 1

Analyse and find faults within mechanical plant and equipment.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Check and use all appropriate information on the symptoms and problems associated with the products or assets.
- 3 Examine and establish the most likely causes of the faults.
- 4 Select, utilise and apply diagnostic techniques, tools and aids to find faults.
- 5 Complete the fault diagnosis within the agreed time and notify the appropriate individuals when this cannot be achieved.
- 6 Establish the implications of the fault for other work and for safety considerations.
- 7 Use the evidence gained to make valid conclusions about the nature and possible cause of the fault.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain fault diagnostic aids including mechanical test equipment, schematic drawings and historical data.
- 3 Explain fault-finding methods and techniques. This must include ways to investigate problems, how to recognise the extent and location of problems, what to do when causes are hard to find and what actions can be taken to deal with the problems.
- 4 Explain analysis method and techniques. This must include historical data, comparison and circuit measurements.
- 5 Describe the manufacturer guidelines and organisational procedures for the operating and care of test equipment and control procedures.
- 6 Describe assessing the possible risks arising from faults such as fire, electric shock and damage to plant.
- 7 Explain maintenance reporting documentation and control procedures and how descriptions should be presented, why it is imperative to record results of the diagnosis and the reason it is important to communicate conclusions to others within duration appropriate to the type of problem.
- 8 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 010

# Arranging equipment in preparation for mechanical engineering activities

### Overview

#### Rationale

The aim of this unit is to enable the candidate to organise equipment so that all maintenance of plant and equipment can be carried out. The candidate will be required to obtain and arrange the mechanical equipment, ensuring that safety arrangements are in place, and report to the appropriate authority when completed.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Organise equipment for the maintenance of plant and equipment to take place.

## Unit 010

### Arranging equipment in preparation for mechanical engineering activities

#### Outcome 1

Organise equipment for the maintenance of plant and equipment to take place.

#### Practical skills

##### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Acquire all the necessary equipment and make sure that it is in safe working condition.
- 3 Carry out the essential preparations to equipment in line with work requirements.
- 4 Ensure that the necessary safety arrangements are in place to protect other staff from activities expected to disrupt normal working.
- 5 Report completion of arrangements in line with organisational procedures.
- 6 Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.

#### Underpinning knowledge

##### The candidate will be able to:

- 1 Describe equipment preparation methods and procedures. This must include checking the working condition and operation of standard equipment, safety checks and inspections.
- 2 Explain the different types of equipment which can be used. This must include fixed (machine) and/or portable (hand or machine).
- 3 Explain what the responsibilities are for ensuring the security of tools and equipment that are used. This must include portable appliance testing, explosion protection rating equipment, ingress protection ratings, corrosion, heating and ventilation, and permit systems.
- 4 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 011

# Preparing materials for the maintenance of mechanical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to organise the materials so that the maintenance of mechanical plant and equipment may be carried out. The candidate will be required to ensure that the quality and quantity of the materials are to the correct standard. The candidate must also decide how the materials should be organised and report on completion.

### Assessment and grading

This unit will be assessed by observation and oral questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Organise materials for maintenance of plant and equipment to take place.



## **Unit 011                    Preparing materials for the maintenance of mechanical plant and equipment**

Outcome 1                    Organise materials for maintenance of plant and equipment to take place.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Obtain the required materials and check them for quantity and quality.
- 2            Decide how the materials need to be organised.
- 3            Complete the preparations using appropriate equipment.
- 4            Report completion of preparations in line with organisational procedures.
- 5            Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain equipment preparation methods and procedures. This must include checking the working condition and operation of standard equipment, including safety checks and inspections.
- 2            Describe ways to recognise the materials to be used and identify defects in their quality.
- 3            Explain the types of handling and preparation methods and techniques essential for different materials.
- 4            Explain what the responsibilities are for ensuring the security of tools and equipment and the control procedures that are used. This must include portable appliance testing, ingress protection ratings, heating and ventilation, permit systems, corrosion and explosion protection rating equipment.
- 5            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 012

# Modifying mechanical plant and equipment to meet operational requirements

### Overview

#### **Rationale**

The aim of this unit is to enable the candidate to modify mechanical equipment in line with the manufacturer and organisational parameters. The candidate will be required to identify equipment to be modified, perform the adjustment and complete the appropriate documentation.

#### **Assessment and grading**

This unit will be assessed by observation and oral questioning.

#### **Learning outcomes**

There is **one** outcome to this unit. The candidate will be able to:

- 1 Modify equipment in line with manufacturer and organisational parameters.

## **Unit 012            Modifying mechanical plant and equipment to meet operational requirements**

Outcome 1            Modify equipment in line with manufacturer and organisational parameters.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Follow the correct operating specifications for the equipment to be maintained.
- 3            Perform adjustments within the limitations of the candidate's personal authority.
- 4            Carry out the necessary adjustments in the specified order and in an agreed timescale.
- 5            Verify that the adjusted equipment meets the essential operating specifications.
- 6            Report any instances where the equipment fails to meet the compulsory performance requirements following adjustments or where there are acknowledged defects outside the required adjustments.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Describe the maintenance schedules and related specifications. This must include where to access operating requirements, and what the specified operating requirements are of specific assets, as well as internal maintenance schedules.
- 3            Explain maintenance methods and procedures. This must include how different kinds of adjustments should be carried out, and how much time is permitted for different types of adjustment. Also which tools, materials and methods should be used for maintenance and how to keep disruption to other activities to a minimum.
- 4            Explain maintenance of records and documentation procedures in line with the manufacturer and organisational procedures.
- 5            Explain the operating, care and control procedures of the equipment used.
- 6            Explain maintenance authorisation procedures and restrictions of personal responsibility and authority in line with manufacturer and organisational procedures.
- 7            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 013

# Removing components from mechanical plant and equipment

### Overview

#### **Rationale**

The aim of this unit is to enable the candidate to eliminate components from mechanical equipment using manufacturers' procedures. The candidate will be required to ensure appropriate precautions are taken to prevent the escape of liquids or gases and that components are labelled and stored in accordance with manufacturer and organisational procedures. The equipment required to complete this unit includes tools for removing mechanical components.

#### **Assessment and grading**

This unit will be assessed by observation and oral or written questioning.

#### **Learning outcomes**

There is **one** outcome to this unit. The candidate will be able to:

- 1 Remove components from mechanical equipment using manufacturers' procedures.

## **Unit 013            Removing components from mechanical plant and equipment**

Outcome 1            Remove components from mechanical equipment using manufacturers' procedures.

### **Practical skills**

#### **The candidate will be able to:**

- 1        Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2        Establish, and where necessary mark, component orientation for re-assembly.
- 3        Make sure that any substances and stored energy are released safely and correctly.
- 4        Remove the necessary components using approved tools and techniques.
- 5        Take appropriate precautions to avoid damage to components, tools and equipment during removal.
- 6        Confirm the condition of removed components and record those that will need replacing.
- 7        Label and store removed components in a suitable area.
- 8        Store or dispose of removed components in accordance with standard procedures.
- 9        Maintain all documentation, adhering to organisational procedures and essential requirements.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1        Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2        Explain the engineering drawings and related specifications. This must include technical drawings (component, assembly, isometrics, first and third angle projections and general arrangements), product worksheets, method statements and tolerances.
- 3        Describe component removal methods and techniques. This must include the types of isolations and connections that have to be made and which tools, equipment and methods can be used to remove particular components from specific plant and equipment.
- 4        Describe the identification of component defects that have been removed.
- 5        Explain the labelling and storage of components for recycling and what the obtainable marking systems are for particular components and connections.
- 6        Describe the disposal of unwanted components and substances. This must include what substances may be released during the removal of components, what risks are linked with the release of substances and where to obtain information from on environmental standards.
- 7        Explain the care and control procedures for tools and equipment. This must include what their responsibilities are for ensuring the security of tools and equipment that are used.
- 8        Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 014

# Replacing components in mechanical plant and equipment

### Overview

#### Rationale

The aim of this unit is to enable the candidate to replace components from mechanical equipment using manufacturers' procedures. The candidate will be required to ensure appropriate precautions are taken to prevent the escape of liquids or gases and that components are labelled and stored in accordance with manufacturer and organisational procedures.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Ensure appropriate precautions are in place whilst replacing components from mechanical equipment.

## **Unit 014            Replacing components in mechanical plant and equipment**

Outcome 1            Ensure appropriate precautions are in place whilst replacing components from mechanical equipment.

### **Practical skills**

#### **The candidate will be able to:**

- 1        Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2        Collate all the relevant components and ensure that they are in a suitable condition and fit for purpose.
- 3        Make sure that any components used meet the relevant necessary specification.
- 4        Take necessary steps to avoid damage to components and tools during replacement.
- 5        Take appropriate precautions to avoid damage to components, tools and equipment during the removal.
- 6        Replace the components using correct techniques, tools and methods.
- 7        Make necessary modifications and apply correct settings and ensure they will function properly.
- 8        Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.
- 9        Maintain all documentation, keeping in mind organisational procedures and essential requirements.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1        Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2        Explain the engineering drawings and related specifications. This must include technical drawings (component, assembly, isometrics, first and third angle projections and general arrangements), product worksheets, method statements and tolerances.
- 3        Explain the component replacement methods and techniques. This must include the types of reconnection and connections that have to be made and which tools, equipment and methods can be used to replace particular components from specific plant and equipment.
- 4        Explain the handling of equipment, methods and techniques. This experience could include, if necessary, manual handling pressure and thermal methods and techniques.
- 5        Explain their responsibilities for tool and equipment care and control procedures. This must include, where necessary, ingress protection ratings, explosion protection rating, corrosion, and portable appliance testing, heating and ventilation and permit systems.
- 6        Explain their responsibilities with regard to the reporting lines and procedures in the workplace.





## Unit 015

# Establishing the viability of repairing components from mechanical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to establish deviation from the necessary tolerances and what action has to be taken to get the component back into service.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Establish deviation from tolerances and decide actions to be taken.

## Unit 015

# Establishing the viability of repairing components from mechanical plant and equipment

### Outcome 1

Establish deviation from tolerances and decide actions to be taken.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Follow the applicable specifications for the component to be repaired.
- 3 Consider the amount and level of wear or damage to the component and establish what work is essential to return the component back to the specified condition.
- 4 Report on results and conclusions on the achievability and cost-effectiveness of repairs.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate should have experience of the relevant regulations, safe working practices and procedures needed within the work area.
- 2 Explain the engineering specifications to which the candidate will be expected to work. This must include product worksheets, maintenance schedules, method statements, manufacturers' data sheets and technical drawings (components, assembly, general arrangement and isometrics).
- 3 Explain the assessing of conditions of components for future use. This may possibly include mechanical integrity.
- 4 Explain the possibility and feasibility of repairs. This must include, where necessary, mechanical integrity.
- 5 Explain component replacement methods and techniques. This must include manufacturers' data and sources of information.
- 6 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 016

# Understanding and analysing detailed mechanical information from technical sources

### Overview

#### Rationale

The aim of this unit is to enable the candidate to interpret information from drawings, diagrams and technical manuals. The candidate will be required to make sure the information is precise, current and contains all relevant data. The candidate will also be required to recognise and deal with any problems that may occur.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Interpret information from drawings, diagrams and technical manuals.

## **Unit 016            Understanding and analysing detailed mechanical information from technical sources**

Outcome 1            Interpret information from drawings, diagrams and technical manuals.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Use up-to-date, precise and significant information on technical requirements.
- 2            Make sure that the information contains all vital data.
- 3            Identify and interpret the necessary details.
- 4            Identify and deal quickly and efficiently with any problems taking place with the requirements and their interpretation.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain the information and document systems relating to the maintenance of mechanical plant and equipment.
- 2            Explain the document care and control procedures bearing in mind manufacturer and organisational procedures.
- 3            Explain the specification structure and content.
- 4            Explain the conventions, symbols and abbreviations as used within the oil and gas, chemicals manufacturing and petroleum industries. This must include international standards, codes of practice and manufacturer and organisational specific conventions.
- 5            Explain the standards and regulations that relate directly to the maintenance of mechanical plant and equipment.
- 6            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 017

# Obtaining information from mechanical engineering drawings and specifications

### Overview

#### **Rationale**

The aim of this unit is to enable the candidate to extract information from technical drawings and publications just before starting mechanical maintenance work.

#### **Assessment and grading**

This unit will be assessed by observation and oral or written questioning.

#### **Learning outcomes**

There is **one** outcome to this unit. The candidate will be able to:

- 1 Extract information from technical drawings and publications before starting mechanical work.

## Unit 017

# Obtaining information from mechanical engineering drawings and specifications

## Outcome 1

Extract information from technical drawings and publications before starting mechanical work.

### Practical skills

#### The candidate will be able to:

- 1 Employ the approved source to get the required drawings and specifications.
- 2 Accurately interpret the drawings and specifications.
- 3 Recognise, extract and interpret the necessary information.
- 4 Utilise the information obtained to make sure that work output meets the specification.
- 5 Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.
- 6 Report any inaccuracies or discrepancies in drawings and specification.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain the information and documentation systems relating to the maintenance of plant and equipment.
- 2 Define current types of engineering drawing and specifications. This must include schematic diagrams, manufacturers' specifications, as-built drawings and Processing and Instrumentation Diagrams (P&IDs).
- 3 Explain the conventions, symbols and abbreviations used within the organisation. This must include international standards, codes of practice and organisation-specific conventions.
- 4 Describe the sources of information available.
- 5 Explain identification and selection of data, including ensuring that the data is up-to-date and applicable to the location.
- 6 Explain document care and control procedures that are organisation-specific.
- 7 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 018

# Analysing and recommending improvements to maintenance procedures for mechanical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to classify and recommend improvements. The candidate will be required to gather and assess information on existing practices and recommend opportunities for improvement by following established organisational procedures.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Classify and recommend opportunities for improvements.

## **Unit 018            Analysing and recommending improvements to maintenance procedures for mechanical plant and equipment**

Outcome 1            Classify and recommend opportunities for improvements.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Gather information and feedback on existing working practices and procedures.
- 3            Assess existing working practices and procedures alongside agreed standards.
- 4            Identify opportunities that will improve working practices and procedures.
- 5            Offer suggestions for development that are realistic and which specify the benefits that may be achieved.
- 6            Ensure that recommended improvements meet organisational requirements.
- 7            Present suggestions for improvements in accordance with organisational procedures.
- 8            Participate in discussions about work practices and quality.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Explain the sources of information that are available from organisational procedures, organisational records, clients, toolbox talks and personal experience.
- 3            Explain the methods and techniques for work improvement in place in the organisation.
- 4            Describe the organisational structure and procedures in place within the organisation.
- 5            Explain the methods of presenting information as stipulated by organisational procedures.
- 6            Explain working relationships with regards to organisational structure, individuals and external factors.
- 7            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.



## Unit 019

# Verifying that mechanical engineering processes have been completed to required specifications

## Overview

### Rationale

The aim of this unit is to enable the candidate to ensure that work has been completed to manufacturer and/or organisational standards. During this work, the candidate must keep records of relevant workplace operational needs, procedures and safe working practices as they apply in the candidate's role.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Ensure that work has been completed to manufacturer and organisational standards.

## **Unit 019            Verifying that mechanical engineering processes have been completed to required specifications**

Outcome 1            Ensure that work has been completed to manufacturer and organisational standards.

### **Practical skills**

#### **The candidate will be able to:**

- 1        Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2        Follow and make appropriate use of the specifications for the product or asset being checked.
- 3        Use all the appropriate tools and inspection equipment and ensure that they are in working condition.
- 4        Make all checks in an appropriate sequence using agreed methods and procedures.
- 5        Recognise and assess any defects or variations from the specification and take appropriate action.
- 6        Take account of completion of compliance activities in line with organisational procedures.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1        Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2        Explain engineering drawings and related specifications to which the candidate will be expected to work. This must include technical drawings (component, assembly, general arrangements, isometrics, and first and third angle projections), method statements, product worksheets and tolerances.
- 3        Explain how to make a satisfactory check of compliance against criteria. This must include equipment and data sheets, commissioning procedures, manufacturers' data and local procedures.
- 4        Explain the identification of defects in plant and equipment. This must include what the usual defects and variations are that occur and how to identify them.
- 5        Explain the quality control systems and documentation procedures. This must include how defects and variations should be dealt with and what factors decide the actions to be taken. Also why it is important to maintain records of the checks completed and the assessments that result from those checks, what information should be input on those records and their exact location.
- 6        Explain the inspection of equipment care and control procedures including the personal responsibilities for ensuring the security of tools and equipment that are used. This must include ingress protection ratings, corrosion, portable appliance testing, explosion protection equipment, heating and ventilation and permit systems.
- 7        Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 020

# Examining the performance and state of mechanical plant and equipment

### Overview

#### **Rationale**

The aim of this unit is to enable the candidate to test mechanical plant and equipment. The candidate will be expected to refer to manufacturer manuals and follow organisational procedures. During this work the candidate must keep records of the relevant workplace operational needs, procedures and safe working practices as they apply in the candidate's role.

#### **Assessment and grading**

This unit will be assessed by observation and oral or written questioning.

#### **Learning outcomes**

There is **one** outcome to this unit. The candidate will be able to:

- 1 Test mechanical plant and equipment following manufacturer and organisational procedures.

## Unit 020

# Examining the performance and state of mechanical plant and equipment

## Outcome 1

Test mechanical plant and equipment following manufacturer and organisational procedures.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Follow the correct procedures for use of tools and equipment to perform the required tests.
- 3 Set up and perform tests using the correct procedures and within agreed timescales.
- 4 Record the results of the tests in the correct format.
- 5 Check the results and perform further tests if required.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Describe engineering test specifications. This must include the latest manufacturers' data sheets and test specifications for particular equipment.
- 3 Explain the various types of test equipment and their applications.
- 4 Explain the calibration of equipment and authorisation procedures. This must include how to ensure that test equipment is set up and calibrated correctly.
- 5 Explain testing methods and procedures. This must include which tests relate to different aspects of performance and conditions specifications. Also what procedures are followed in different testing contexts, and what the usual timescales are for conducting tests, including individual organisational procedures.
- 6 Describe the analysis methods and techniques. This must include what data is provided from tests and which methods can confirm data. Also the importance of reliability, validity and conclusiveness of data before analysis takes place and which analysis methods and procedures may be applied to test results.
- 7 Explain environmental controls relating to testing. This must include the organisational health and safety policy.
- 8 Explain the test reporting documentation and procedures, including what the formats are for recording the test procedures and results in line with organisational procedures.
- 9 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 021

# Monitoring the performance and state of mechanical plant and equipment

### Overview

#### Rationale

The aim of this unit is to enable the candidate to complete performance condition monitoring on working and static mechanical plant and equipment. The candidate will be required to set up, monitor and record the results in accordance with organisational procedures.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Complete performance condition monitoring on working and static mechanical plant and equipment.

## **Unit 021                    Monitoring the performance and state of mechanical plant and equipment**

Outcome 1                    Complete performance condition monitoring on working and static mechanical plant and equipment.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Accurately set up and check/calibrate the equipment necessary for the monitoring taking place.
- 3            Complete the monitoring activities efficiently with minimum disruption to usual activities.
- 4            Record and re-examine the results and take suitable actions.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Describe the performance requirements of plant and equipment. This must include manufacturer and organisational stipulation on performance requirements.
- 3            Explain the monitoring methods and procedures for plant and equipment and which data is necessary to make decisions.
- 4            Explain the importance of the need for equipment calibration and authorisation procedures. This must include making sure that the monitoring equipment is set up and calibrated correctly.
- 5            Explain monitoring equipment setting, operating and care and control procedures, the various disruptions that can occur during monitoring and how to minimise diverse types of disruptions.
- 6            Explain the correct formats for recording and monitoring results in line with organisational procedures.
- 7            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 022

# Assessing the performance and state of mechanical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to assess the performance and condition of mechanical plant and equipment using all obtainable sources of information. The candidate will be required to make sure that they have all the essential data, complete the assessment and investigate the results by making comparisons with norms and previous records.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Assess the performance and condition of mechanical plant using all information available.

## Unit 022

# Assessing the performance and state of mechanical plant and equipment

## Outcome 1

Assess the performance and condition of mechanical plant using all information available.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Ensure that all essential test data on which to carry out the assessment is available.
- 3 Conduct the assessment using all relevant data and suitable methods.
- 4 Ensure that the assessment provides clear and precise information.
- 5 Compare existing performance and condition data with results from previous assessments.
- 6 Classify and report the implications arising from the assessments.
- 7 Record the findings of the assessments in the correct format.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Describe the equipment operating and test specifications including manufacturer and organisational specifications.
- 3 Explain the equipment monitoring methods and procedures. This must include the different types of data provided from monitoring, which methods can confirm data and why it is imperative to do so.
- 4 Explain assessment methods and techniques for certain data, plant and equipment and the factors that have to be considered when assessing performance of specific plant and equipment.
- 5 Describe the reporting documentation and control procedures. This must include appropriate presentation of the results of the assessment, and who should receive the results and implications of assessments.
- 6 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.



## Unit 023

# Examining mechanical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to ensure that the work has been completed to manufacturer and/or organisational standards. The equipment required to complete this unit includes mechanical equipment/plant for maintenance.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Ensure that the work has been completed to manufacturer and/or organisational standards.

## Unit 023

### Outcome 1

## Examining mechanical plant and equipment

Ensure that the work has been completed to manufacturer and/or organisational standards.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Follow the right specification for the product or equipment being inspected.
- 3 Use the appropriate equipment to perform the inspection.
- 4 Identify and confirm the inspection checks to be made and acceptance criteria to be used.
- 5 Complete all necessary inspections as specified.
- 6 Identify any defects or variations from the specification.
- 7 Record the results of the inspection in a suitable format.
- 8 Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.
- 9 Take account of the completion of compliance activities in line with organisational procedures.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain engineering drawings and related specifications to which the candidate will be expected to work. This must include technical drawings (component, assembly, general arrangements, isometrics and first and third angle projections), method statements, product worksheets and tolerances.
- 3 Describe the inspection methods and techniques that are agreed by the organisation.
- 4 Explain the calibration of equipment and authorisation procedures that are accepted by the organisation. This must include the procedure for recertification and how to interpret the calibration certificate.
- 5 Describe how to inspect equipment care and control procedures that are accepted by the organisation. This must include storage, both in situ and in transit, and the checking of calibration certificates.
- 6 Explain the identification of defects in products, equipment or systems, including what the typical defects are that occur and how to recognise them, such as weathering, corrosion and general wear and tear.
- 7 Explain the quality control systems and documentation procedures. This must include how defects and variations should be dealt with and what factors determine the actions to be taken. It should also include why it is imperative to maintain records of the checks completed and the assessments that result from those checks, what information should be input on those records and the location of the records.

- 8 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 024

# Performing maintenance procedures on electrical plant and equipment

### Overview

#### **Rationale**

The aim of this unit is to enable the candidate to maintain electrical equipment in line with the manufacturer and organisational practices and procedures. The candidate will be required to perform and complete the maintenance procedures in a timely manner, follow procedures and complete the relevant documentation. The equipment required to complete this unit includes electrical equipment/plant for maintenance.

#### **Assessment and grading**

This unit will be assessed by observation and oral or written questioning.

#### **Learning outcomes**

There is **one** outcome to this unit. The candidate will be able to:

- 1 Maintain electrical equipment in line with the manufacturer and organisational procedures and practices.

## Unit 024

# Performing maintenance procedures on electrical plant and equipment

### Outcome 1

Maintain electrical equipment in line with the manufacturer and organisational procedures and practices.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Follow the applicable maintenance schedules to complete the required work.
- 3 Perform maintenance activities within the limits of personal authority.
- 4 Perform maintenance activities in the specified sequence and to an agreed timescale.
- 5 Report any instances where the maintenance activities cannot be fully completed or where there are acknowledged defects outside the planned schedule.
- 6 Complete appropriate maintenance records correctly and hand them over to the right person.
- 7 Dispose of waste materials in line with safe working practices and approved procedures.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain the maintenance schedules and relevant specifications to which the candidate is expected to work. This must include safe working practices, product worksheets, authorisation procedures, method statements, records, tests, internal maintenance schedules and timescales.
- 3 Explain which maintenance methods and procedures are standard throughout maintenance and how they can be improved to optimise the work.
- 4 Describe the procedures for the maintenance of records and documentation.
- 5 Explain their personal responsibilities for the care and control of equipment used.
- 6 Explain what the maintenance authorisation procedures and limitations of responsibility and authority are in accordance with manufacturer and organisational and procedures.
- 7 Explain the correct methods of waste disposal procedures in relation to legislation, regulation and procedures for waste segregation.
- 8 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 025

# Assessing and dealing with defects and variations in electrical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to recognise, assess and deal with defects and variations in electrical products or assets. The reporting of recommendations to the right people will be required.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Recognise, assess and deal with defects and variations in electrical products or assets.

## Unit 025

# Assessing and dealing with defects and variations in electrical plant and equipment

## Outcome 1

Recognise, assess and deal with defects and variations in electrical products or assets.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Identify defects, keeping in mind product or asset specification.
- 3 Assess defects and decide on the action required to return the products and assets to the original specifications.
- 4 Report all suitable recommendations for action to the right people quickly and in line with organisational procedures.
- 5 Record particulars of defects in line with quality assurance and control systems and procedures.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain engineering drawings and their relevant specifications. This must include the specifications to which the candidate will be expected to work. This must include technical drawings (component, assembly, general arrangements, isometrics and first and third angle projections), method statements and product worksheets and tolerances.
- 3 Describe the recognition of defects in products and assets. This must include maintenance logs, operations logs, observation and using all sense and fault reports.
- 4 Explain the proper methods of dealing with defects as stipulated by organisational procedures.
- 5 Explain the methods of dealing with defects and variations, which factors determine the actions to be taken and why it is imperative to maintain records of the checks made and the assessments that result from those checks. This must include what information should be entered on those records and their location.
- 6 Explain the quality control systems and documentation procedures that are specified by the organisation.
- 7 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 026

# Identifying and analysing the causes of defects in electrical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to identify and analyse faults within electrical plant and equipment. The candidate will be required to choose the most suitable fault-finding technique and tools to locate the fault, and on completion inform the appropriate people.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Identify and analyse faults within electrical plant and equipment.



## Unit 026

# Identifying and analysing the causes of defects in electrical plant and equipment

## Outcome 1

Identify and analyse faults within electrical plant and equipment.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Review and use all applicable information on the symptoms and problems connected with the products or assets.
- 3 Describe and establish the most probable causes of the faults.
- 4 Select and apply diagnostic techniques, tools and aids to establish faults.
- 5 Complete the fault diagnosis within the agreed time and notify the appropriate people when this cannot be achieved.
- 6 Determine the implications of the fault for other work and for safety considerations.
- 7 Utilise the evidence gained to draw convincing conclusions about the nature and probable cause of the fault.
- 8 Record details on the degree and location of the faults in a suitable format.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Describe fault diagnostic aids. This must include electrical test equipment, historical data and schematic drawings.
- 3 Describe effective fault-finding methods and techniques. This must include how to investigate problems, how to recognise the extent and location of problems and what to do when causes are challenging to locate. Also which actions could be taken to deal with the fault.
- 4 Explain an analysis method and techniques. This must include historical data, comparison and circuit measurements.
- 5 Explain manufacturer guidelines and organisational procedures for the proper operating and care of test equipment and control procedures.
- 6 Describe assessing the possible risks arising from faults such as fire, electric shock and damage to plant.
- 7 Describe what maintenance reporting documentation and control procedures are and how descriptions should be presented, why it is vital to record results of the diagnosis and why it is important to relay conclusions on to others in a timeframe appropriate to the nature of the problem.
- 8 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 027

# Arranging equipment in preparation for electrical engineering activities

### Overview

#### Rationale

The aim of this unit is to enable the candidate to organise equipment in order to carry out the maintenance of plant and equipment. The candidate will be required to obtain and prepare the electrical equipment including making sure the safety arrangements are ready and report to the appropriate authority when completed.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Organise equipment in order to carry out the maintenance of plant and equipment.

## Unit 027

# Arranging equipment in preparation for electrical engineering activities

## Outcome 1

Organise equipment in order to carry out the maintenance of plant and equipment.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Obtain all necessary equipment and make sure that it is in safe and working condition.
- 3 Carry out essential preparations to equipment in line with work requirements.
- 4 Ensure that vital safety arrangements are in place to protect other workers from activities that may disrupt normal working.
- 5 Report final completion of preparations in line with organisational procedures.
- 6 Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.
- 7 Complete the fault diagnosis within the agreed time and notify the appropriate people when this cannot be achieved.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain equipment preparation methods and procedures. This must include checking the operational condition and operation of standard equipment including safety checks and inspections.
- 3 Explain the various types of equipment that can be used including fixed (machine) and/or portable (hand or machine).
- 4 Explain what their personal responsibilities are for ensuring the security of tools and equipment that are used. This must include ingress protection ratings, explosion protection rating equipment, corrosion, portable appliance testing, heating and ventilation and permit systems.
- 5 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 028

# Preparing materials for the maintenance of electrical plant and equipment

### Overview

#### **Rationale**

The aim of this unit is to enable the candidate to organise materials in order to carry out the maintenance of electrical plant and equipment. The candidate will be required to check the quality and quantity of the materials, determine how the materials ought to be prepared and report on completion.

#### **Assessment and grading**

This unit will be assessed by observation and oral or written questioning.

#### **Learning outcomes**

There is **one** outcome to this unit. The candidate will be able to:

- 1 Organise materials in order to carry out the maintenance of electrical plant and equipment.

## Unit 028

# Preparing materials for the maintenance of electrical plant and equipment

### Outcome 1

Organise materials in order to carry out the maintenance of electrical plant and equipment.

#### Practical skills

##### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Obtain the necessary materials and check them for quantity and quality.
- 3 Establish how the materials need to be organised.
- 4 Complete the preparations using appropriate equipment.
- 5 Report completion of arrangements in line with the organisational procedures.
- 6 Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.

#### Underpinning knowledge

##### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Describe ways to identify the materials to be used and identify defects in the quality of them.
- 3 Explain the various types of handling and preparation methods and techniques essential for diverse materials.
- 4 Explain what their personal responsibilities are for ensuring the security of the tools and equipment and their control procedures that are used. This must include explosion protection rating equipment, ingress protection ratings, corrosion ratings, portable appliance testing, heating and ventilation and permit systems.
- 5 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 029

# Modifying electrical plant and equipment to meet operational requirements

### Overview

#### Rationale

The aim of this unit is to enable the candidate to adjust electrical equipment in line with the manufacturer and organisational parameters. The candidate will be required to identify the equipment to be adjusted, perform the adjustment and complete the suitable documentation.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Adjust electrical equipment in line with manufacturer and organisational parameters.

## Unit 029

# Modifying electrical plant and equipment to meet operational requirements

### Outcome 1

Adjust electrical equipment in line with manufacturer and organisational parameters.

#### Practical skills

##### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Follow the correct operating specifications for the equipment to be maintained.
- 3 Carry out adjustments within the limitations of personal authority.
- 4 Make the necessary adjustments in the specified sequence and in an arranged timescale.
- 5 Verify that the adjusted equipment meets the necessary operating specification.
- 6 Report any instances where the equipment fails to meet the required performance after adjustments or where there are acknowledged defects outside the essential adjustments.
- 7 Maintain documentation in accordance with organisational requirements.

#### Underpinning knowledge

##### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain the maintenance schedules and related specifications. This must include where to access operating requirements and what the specified operating requirements are of particular assets, including internal maintenance schedules.
- 3 Explain the maintenance methods and procedures. This must include how different types of adjustments should be made, how much time is permitted for various types of adjustment, which tools, materials and methods should be used for maintenance and how to reduce disruption to other activities.
- 4 Describe maintenance records and documentation procedures in line with manufacturer and organisational procedures.
- 5 Explain the operating equipment, and care and control procedures of the equipment that is used.
- 6 Explain procedures concerning maintenance authorisation and limits of personal responsibility and authority in accordance with manufacturer and organisational guidelines.
- 7 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 030

# Removing components from electrical plant and equipment

### Overview

#### Rationale

The aim of this unit is to enable the candidate to remove components from electrical equipment using manufacturers' procedures. The candidate will be required to make sure appropriate precautions are taken to prevent the escape of liquids or gases. Following removal, the components must be labelled and stored according to organisational procedures.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Remove components from electrical equipment using manufacturers' procedures.



## **Unit 030                    Removing components from electrical plant and equipment**

Outcome 1                    Remove components from electrical equipment using manufacturers' procedures.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Establish, and where necessary mark, component orientation for re-assembly.
- 3            Make sure that any stored energy or substances are released carefully and correctly.
- 4            Remove the necessary components with approved tools and techniques.
- 5            Take appropriate precautions to stop further damage to components, tools and equipment during removal.
- 6            Confirm the condition of the removed components and record those that will need to be replaced.
- 7            Label and store the removed components in a suitable location.
- 8            Store or dispose of the removed components in line with standard procedures.
- 9            Maintain all relevant documentation in accordance with organisational requirements.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Explain the engineering drawings and related specifications to which the candidate will be working, including technical drawings (component, assembly, general arrangements, isometrics and first and third angle projections), method statements and product worksheets and tolerances.
- 3            Explain the component removal methods and techniques. This must include what kind of isolations and connections have to be made, and which tools, equipment and methods may be used to remove certain components from specific plant and equipment.
- 4            Explain the identification of component defects that have been removed.
- 5            Describe the labelling and storage of components for reuse and what the obtainable marking systems are for particular components and connections.
- 6            Explain the disposal of unwanted components and substances. This must include what substances might be released during the removal of components, what risks are linked with the release of substances and where to access information on environmental standards, including an appreciation of COSHH, SEPA and organisational procedures.
- 7            Explain tool and equipment care and control procedures including what their personal responsibilities are for ensuring the security of tools and equipment that are used.
- 8            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 031

# Replacing components in electrical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to replace components in electrical plant and equipment. The candidate will be required to make sure the replaced components are in line with the required specifications, protect them from damage and replace them using the appropriate tools and techniques and making any final adjustments.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Replace components from electrical plant and equipment.

## **Unit 031            Replacing components in electrical plant and equipment**

Outcome 1            Replace components from electrical plant and equipment.

### **Practical skills**

#### **The candidate will be able to:**

- 1        Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2        Obtain all the necessary components and make sure that they are in suitable condition for replacement and fit for purpose.
- 3        Make sure that any replacement components used meet the required specification.
- 4        Take adequate precautions to prevent damage to components, tools and equipment during replacement.
- 5        Replace the components in the correct sequence using suitable tools and techniques.
- 6        Make any essential settings or adjustments to the components to make certain they will function perfectly.
- 7        Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.
- 8        Maintain all relevant documentation in accordance with organisational requirements.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1        Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2        Explain the engineering drawings and related specifications to which the candidate will be working, including technical drawings (component, assembly, general arrangements, isometrics and first and third angle projections), method statements and product worksheets and tolerances.
- 3        Explain component replacement methods and techniques. This must include the types of reconnections that have to be made and which tools, equipment and methods may be used to replace certain components from specific plant and equipment.
- 4        Describe the handling equipment, methods and techniques. This must include manual handling pressure and thermal methods and techniques.
- 5        Explain what the responsibilities are for the tool and equipment care and control procedures, thus ensuring the security of tools and equipment that is used. This must include ingress protection ratings, explosion protection rating, corrosion, portable appliance testing, heating and ventilation and permit systems.
- 6        Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 032

# Establishing the viability of repairing components from electrical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to establish and deviate from the required acceptances and know what action should be carried out to ensure that the component is put back into service.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Establish and deviate from the required acceptances and identify action to put components back into service.

## **Unit 032            Establishing the viability of repairing components from electrical plant and equipment**

Outcome 1            Establish and deviate from the required acceptances and identify action to put components back into service.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Rigorously follow the required specifications for the component to be fixed.
- 3            Determine the level of damage to the component and assess how much work is needed to ensure that the component is returned to its original condition.
- 4            Describe outcomes and results dependent on the viability and cost-efficiency of repairs.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Explain engineering specifications. This must include product worksheets, technical drawings, maintenance schedules, data sheets and method statements.
- 3            Explain assessing the conditions of components for reuse. This must include electrical integrity.
- 4            Explain establishing the viability of repairs. This must include electrical integrity.
- 5            Explain the methods and techniques of component replacement. This must include sources of information and manufacturers' data.
- 6            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 033

# Understanding and analysing detailed electrical information from technical resources

## Overview

### Rationale

The aim of this unit is to enable the candidate to interpret information from drawings, technical manuals and diagrams. This must include the candidate ensuring that the information is correct, up-to-date and includes all the data, as well as having to recognise and handle any difficulties which may come up.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Interpret information from drawings, technical manuals and diagrams.

## Unit 033

# Understanding and analysing detailed electrical information from technical resources

### Outcome 1

Interpret information from drawings, technical manuals and diagrams.

### Practical skills

#### The candidate will be able to:

- 1 Use contemporary, correct and relevant information on technical requirements.
- 2 Make sure that the information includes all necessary data.
- 3 Recognise and transcribe the required details.
- 4 Recognise and handle any difficulties which may come up.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain the information and document systems that are to do with the maintenance of electrical plant and equipment.
- 2 Explain the document care and control procedures in accordance with the manufacturer and organisational procedures.
- 3 Explain the specification structure and content.
- 4 Explain the conventions, abbreviations and symbols which are employed by the gas, chemicals manufacturing, oil and petroleum industries. This must include codes of practice and international standards (manufacturer- or organisation-specific).
- 5 Explain the standards and regulations that are associated with the maintenance of electrical plant and equipment.
- 6 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 034

# Obtaining information from engineering diagrams and specifications

## Overview

### Rationale

The aim of this unit is to enable the candidate to extract information from engineering illustrations before carrying out any maintenance of electrical components.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Extract information from engineering illustrations.



## Unit 034

# Obtaining information from engineering diagrams and specifications

## Outcome 1

Extract information from engineering illustrations.

### Practical skills

#### The candidate will be able to:

- 1 Use the accepted resource to extract the necessary illustrations and specifications.
- 2 Accurately interpret the specifications and illustrations.
- 3 Recognise, interpret and obtain the necessary information.
- 4 Use the information obtained to make sure that labour output meets the required specifications.
- 5 Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.
- 6 Report anything wrong in the drawings or specifications.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain the information and documentation systems that correlate to the maintenance of plant and equipment.
- 2 Explain the types of engineering drawings and specifications currently used. This must include schematic diagrams, manufacturers' specifications, as-built drawings and Processing and Instrumentation Diagrams (P&IDs).
- 3 Explain the abbreviations, symbols and conventions used within the organisation. This must include organisation specific, codes of practice and international standards.
- 4 Explain the available sources of information.
- 5 Explain how to recognise and select data, and how to ensure that the data is up-to-date and specific to the location.
- 6 Explain the measures for document care and control that are specified with the organisation.
- 7 Explain their responsibility with regard to the reporting lines and procedures in their surroundings.

## Unit 035

# Analysing and recommending improvements to maintenance procedures for electrical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to propose improvements. This must include collecting and analysing current practices and proposing ways of improvement in accordance with organisational procedures.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Propose improvements in accordance with organisational procedures.

## Unit 035

# Analysing and recommending improvements to maintenance procedures for electrical plant and equipment

## Outcome 1

Propose improvements in accordance with organisational procedures.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Accumulate information and feedback on existing working practices and procedures.
- 3 Test currently used practices and procedures against organisational standards.
- 4 Recognise opportunities for improving working practices and measures.
- 5 Contribute ideas for possible improvements that are practical and show the possible benefits.
- 6 Ensure that ideas contributed comply with organisational standards.
- 7 Put forward suggestions in compliance with organisational measures.
- 8 Offer suggestions during discussions about work quality.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Describe the resources of information that are available from organisational records, personal experience, toolbox talks, clients and organisational procedures.
- 3 Explain work improvement approaches and practices that are standardised by the organisation.
- 4 Describe organisational structure, improvement systems and methods that are standardised by the organisation.
- 5 Explain presentation or information as noted in organisational procedures.

## Unit 036

# Verifying that electrical engineering processes have been completed to required specifications

## Overview

### Rationale

The aim of this unit is to enable the candidate to ensure that all work has been carried out in compliance with manufacturers' standards.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Ensure work is completed in compliance with manufacturers' standards.

## **Unit 036            Verifying that electrical engineering processes have been completed to required specifications**

Outcome 1            Ensure work is completed in compliance with manufacturers' standards.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Work closely to the specifications concerning the asset being checked.
- 3            Ensure that all correct tools are used and that they are in good condition.
- 4            Perform checks using approved methods and measures.
- 5            Recognise that checks have been completed in compliance with organisational standards.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Explain engineering illustrations and all related specifications.
- 3            Explain how to carry out satisfactory checks of compliance against criteria.
- 4            Explain the identification of defects in plant and equipment, including the common defects that could occur and how to recognise them.
- 5            Explain quality control systems and how to document the procedures, including how to deal with defects and variations.
- 6            Describe a case of inspection equipment and control measures. This must include the candidate's responsibilities for ensuring the security of the tools that are used.
- 7            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 037

# Examining the performance and state of electrical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to test electrical plant and equipment. The candidate will be expected to refer to manufacturers' manuals and follow organisational procedures.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Test electrical plant and equipment.

## **Unit 037            Examining the performance and state of electrical plant and equipment**

Outcome 1            Test electrical plant and equipment.

### **Practical skills**

#### **The candidate will be able to:**

- 1        Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2        Adhere to the appropriate measures when using tools and equipment.
- 3        Set up and perform the tests using the right procedures and within the right timescales.
- 4        Document the results in a suitable format.
- 5        Analyse the results and perform additional tests where necessary.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1        Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2        Explain engineering test specifications.
- 3        Explain a range of types of test equipment and their uses.
- 4        Explain the standardisation of equipment and authorisation measures.
- 5        Explain testing practices and measures.
- 6        Explain analysis methods and techniques. This must include data given from tests.
- 7        Describe environmental controls with regard to testing. This must include organisational HSE policy.
- 8        Explain how to report test documentation and measures, including what formats should be used to record the data.
- 9        Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 038

# Monitoring the performance and state of electrical plant and equipment

### Overview

#### Rationale

The aim of this unit is to enable the candidate to complete condition observations on operational and inactive electrical plant and equipment. The candidate will need to set up, observe and document the data in compliance with organisational policies.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Complete condition observations on operational and inactive electrical plant and equipment.



## Unit 038

# Monitoring the performance and state of electrical plant and equipment

### Outcome 1

Complete condition observations on operational and inactive electrical plant and equipment.

#### Practical skills

##### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Accurately set up and inspect the equipment necessary for the observation being carried out.
- 3 Proceed with the observation activity effectively with as little interference to normal activities as possible.
- 4 Document and analyse the data and take appropriate action.

#### Underpinning knowledge

##### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain the performance needs of plant and equipment.
- 3 Explain the observation methods and measures for plant and equipment, and which data is needed to make the necessary decisions.
- 4 Explain the significance of the need for the standardisation of equipment and authorisation measures.
- 5 Explain monitoring equipment setting, utilisation and control measures.
- 6 Explain the formats for documentation and analysing the results in accordance with organisational standards.
- 7 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 039

# Assessing the performance and state of electrical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to weigh up the performance and form of electrical plant and equipment using all the available sources of information. The candidate must check that all the required data is collected, complete the task and analyse the results through comparison with previous data.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Weigh up the performance and form of electrical plant and equipment using all sources of information.

## Unit 039

# Assessing the performance and state of electrical plant and equipment

### Outcome 1

Weigh up the performance and form of electrical plant and equipment using all sources of information.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Ensure that they have all the necessary test data on which to conduct the assessment.
- 3 Carry out the assessment using all relevant data and valid methods.
- 4 Check that the assessment provides clear and accurate information.
- 5 Compare current performances and condition data with previous assessments.
- 6 Identify and report the implications arising from the assessments.
- 7 Record the results of the assessments in the appropriate format.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain the relevant regulations, safe working practices and procedures required within their workplace.
- 3 Explain how equipment operates and test specifications including manufacturer and organisational specifications.
- 4 Explain the equipment monitoring methods and procedures. This must include the types of data provided from monitoring, which methods can verify data and why it is important to do so.
- 5 Explain the assessment methods and techniques for specific data and plant and equipment, and the factors that have to be taken into account when assessing performance of specific plant and equipment.
- 6 Explain the reporting documentation and control procedures including how to present results of the assessment, and who should receive the results and implications of assessments.
- 7 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 040

# Examining electrical plant and equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to complete checks on electrical plant and equipment in accordance with organisational measures.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Complete checks on electrical plant and equipment.

## Unit 040

### Outcome 1

## Examining electrical plant and equipment

Complete checks on electrical plant and equipment.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Adhere to the right specifications for the equipment being examined.
- 3 Utilise the right equipment to carry out the examination.
- 4 Recognise and verify the examination checks and acceptance criteria to be used.
- 5 Perform all the necessary examinations as specified.
- 6 Identify any problems or changes from the specification.
- 7 Document the results of the examination in the correct format.
- 8 Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain engineering illustrations and all related specifications.
- 3 Explain the examination practices and techniques that are approved with the organisation.
- 4 Explain the standardisation of equipment and authorisation measures which are approved within the organisation.
- 5 Explain the equipment used to carry out the examination and control measures which are approved within the organisation.
- 6 Explain recognition of faults in products, equipment or systems.
- 7 Explain the quality control systems and recording procedures. This must include how problems are to be dealt with and how action should be taken.
- 8 Explain the reporting lines and procedures in the working atmosphere.

## Unit 041

# Performing maintenance procedures on instrumentation and control plant and equipment

### Overview

#### Rationale

The aim of this unit is to enable the candidate to maintain instrumentation and control equipment in accordance with the manufacturer and organisational practices and procedures. The candidate will need to complete the maintenance procedures in a suitable way and complete the necessary documents.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Maintain instrumentation and control equipment in line with manufacturer and organisational practices.

## **Unit 041      Performing maintenance procedures on instrumentation and control plant and equipment**

Outcome 1      Maintain instrumentation and control equipment in line with manufacturer and organisational practices.

### **Practical skills**

#### **The candidate will be able to:**

- 1      Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2      Adhere to the appropriate maintenance schedules to perform the required work.
- 3      Perform the maintenance tasks in the correct order and within the agreed timescale.
- 4      Report any times when the required maintenance cannot be carried out or when there are faults.
- 5      Complete any required documentation accurately and deliver it to the right person.
- 6      Remove any waste materials in compliance with safe working practices.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1      Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2      Explain the maintenance schedules and interrelated specifications to which they are expected to work.
- 3      Explain which maintenance processes and procedures are standard during maintenance and how they can be changed to aid the work.
- 4      Explain maintenance records and documentation methods.
- 5      Explain their responsibilities for the care and control of the equipment.
- 6      Explain the maintenance authorisation procedures and the limits of their responsibility and power in accordance with organisational methods.
- 7      Explain the suitable processes and waste disposal procedures in relation to procedures, legislation and regulation for waste removal.

## Unit 042

# Assessing and dealing with defects and variations in instrumentation and control plant equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to recognise, analyse and manage problems and changes in instrumentation and control products or assets. The candidate must report the recommendations to the appropriate person.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Recognise, analyse and manage problems and changes in instrumentation and control products or assets



## **Unit 042      Assessing and dealing with defects and variations in instrumentation and control plant equipment**

Outcome 1      Recognise, analyse and manage problems and changes in instrumentation and control products or assets

### **Practical skills**

#### **The candidate will be able to:**

- 1      Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2      Recognise problems with regard to the product specification.
- 3      Analyse the problems and decide on the action necessary to repair the products to their specified condition.
- 4      Document recommendations for action to the correct person in compliance with organisational methods.
- 5      Note specifics of the problems in compliance with quality assurance and control systems and methods.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1      Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2      Explain engineering illustrations and their related specifications, including technical drawings, method statements and product worksheets.
- 3      Explain the recognition of problems in assets and products. This must include maintenance logs, operations logs and fault reports.
- 4      Explain the ways of handling problems as specified by organisational procedures.
- 5      Explain how to deal with problems that arise with products, what aspects determine the action to take and why it is necessary to maintain documentation of checks made.
- 6      Explain the quality control systems and documentation methods that are specific to their organisation.
- 7      Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 043

# Identifying and analysing the causes of defects in instrumentation and control plant equipment

## Overview

### Rationale

This unit is about the candidate's capabilities in establishing and detecting faults with instrumentation and control plant equipment. The candidate will be required to choose the most appropriate problem-finding technique and tools to locate the problem, and notify the correct person where necessary.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Establish and detect faults with instrumentation and control plant equipment.

## **Unit 043**      **Identifying and analysing the causes of defects in instrumentation and control plant equipment**

Outcome 1      Establish and detect faults with instrumentation and control plant equipment.

### **Practical skills**

#### **The candidate will be able to:**

- 1      Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2      Evaluate and use all necessary information on the diagnosis of problems associated with the products.
- 3      Examine and determine the most likely reasons behind the faults.
- 4      Correctly choose and apply diagnostic techniques, tools and aids to find faults.
- 5      Complete the fault diagnosis within the specified timeframe and notify the correct people when this cannot be achieved.
- 6      Establish the implications of the problem for other work and safety factors.
- 7      Use the data acquired to come to valid conclusions about the cause of the problem.
- 8      Document information on the extent of the faults in a suitable format.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1      Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2      Explain fault diagnostic aids. This must include electrical test equipment, past data and schematic illustrations.
- 3      Explain fault-finding procedures and techniques, including how to identify the extent and the location of the problem.
- 4      Explain analysis methods and techniques. This must include circuit measurements, past data and comparisons.
- 5      Explain the manufacturer guidelines and organisational procedures for the operating care of test equipment and control methods.
- 6      Describe how to calculate the possible risks from faults such as electric shock, damage to plant and fire.
- 7      Explain the maintenance reporting notation and control methods and how to present descriptions, within the given timescale, and why it is important to relay this information to the appropriate person.
- 8      Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 044

# Arranging equipment in preparation for instrumentation and control engineering activities

## Overview

### Rationale

The aim of this unit is to enable the candidate to organise instrumentation and control equipment so that the maintenance of plant equipment can be carried out. The candidate will need to acquire all the necessary equipment, ensuring that the safety arrangements are in order and the appropriate people are reported to on completion.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Organise instrumentation and control equipment for maintenance of plant equipment to be conducted.

## **Unit 044            Arranging equipment in preparation for instrumentation and control engineering activities**

Outcome 1            Organise instrumentation and control equipment for maintenance of plant equipment to be conducted.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Acquire all the required equipment and make sure that it is in usable condition.
- 3            Perform all the necessary preparations to the equipment in compliance with work requirements.
- 4            Ensure that there are safety requirements in place to protect other workers whilst carrying out their own tasks.
- 5            Document accomplishment of the preparations in compliance with organisational procedures.
- 6            Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Explain equipment preparation methods and procedures. This must include checking working conditions and ensuring all equipment is operational.
- 3            Explain the types of equipment which could be used. This must include fixed (machine) and/or portable (hand or machine).
- 4            Explain what their responsibilities are for ensuring the security of the tools and equipment being used. This must include explosion protection rating equipment, corrosion, heating and ventilation systems and ingress protection ratings.
- 5            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 045

# Preparing materials for the maintenance of instrumentation and control plant equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to organise all necessary resources so that the maintenance of instrumentation and control plant equipment can be carried out. The candidate will be required to check the quality and quantity of the resources, establish how they should be organised and report once completed.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Organise resources so maintenance of instrumentation and control plant equipment can be conducted.

## **Unit 045            Preparing materials for the maintenance of instrumentation and control plant equipment**

Outcome 1            Organise resources so maintenance of instrumentation and control plant equipment can be conducted.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Acquire the necessary resources and check their quality and quantity.
- 3            Establish how the resources need to be prepared.
- 4            Use suitable equipment to carry out the preparations.
- 5            Document and report completion of preparations in compliance with organisational procedures.
- 6            Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Explain how to identify the resources that they will use and identify possible faults in quality.
- 3            Explain the different ways of preparing and handling resources and the techniques needed for different resources.
- 4            Explain what their responsibilities are for ensuring the security of the tools and equipment being used. This must include explosion protection rating equipment, corrosion, heating and ventilation systems and ingress protection ratings.
- 5            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 046

# Modifying instrumentation and control plant equipment to meet operational requirements

### Overview

#### Rationale

The aim of this unit is to enable the candidate to modify instrumentation and control equipment in compliance with manufacturer and organisational specifications. The candidate will need to recognise which equipment needs to be modified, perform the modification and complete all appropriate documentation.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Modify instrumentation and control equipment in line with manufacturer and organisational procedures.



## Unit 046

# Modifying instrumentation and control plant equipment to meet operational requirements

### Outcome 1

Modify instrumentation and control equipment in line with manufacturer and organisational procedures.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Adhere to the operating specifications for the equipment being maintained.
- 3 Perform the modifications within the limits of their authority.
- 4 Perform the required modifications in the correct sequence and within the timescale.
- 5 Verify that the modified equipment meets the required operating specifications.
- 6 Report any times where the equipment fails to meet the required operational specifications after adjustments or when there are defects which cannot be modified.
- 7 Maintain documentation in compliance with organisational requirements.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain the maintenance schedules and related specifications. This must include where to access operating requirements.
- 3 Explain maintenance methods and procedures. This must include how different modifications should be made, how much time is allowed for each modification and which tools and resources should be used.
- 4 Explain maintenance records and documentation processes in compliance with manufacturer and organisational procedures.
- 5 Explain how to use equipment and care and control procedures of the equipment used.
- 6 Explain the maintenance authorisation processes and limits of their responsibility and authority in compliance with manufacturer and organisational procedures.
- 7 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 047

# Removing components from instrumentation and control plant equipment

### Overview

#### Rationale

The aim of this unit is to enable the candidate to remove components from instrumentation and control equipment using specified manufacturers' procedures. The candidate will need to make sure that suitable safety measures are taken to prevent the escape of liquids or gases. All components, once removed, shall have their parts labelled and stored in compliance with organisational procedures.

#### Assessment and grading

This unit will be assessed by observation and oral questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Remove components from instrumentation and control equipment within manufacturer guidelines.

## Unit 047

# Removing components from instrumentation and control plant equipment

## Outcome 1

Remove components from instrumentation and control equipment within manufacturer guidelines.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Determine, and where needed mark, component orientation for re-assembly.
- 3 Make sure that any stored energy is dealt with safely.
- 4 Use approved tools to remove required components.
- 5 Ensure that suitable measures are taken to prevent damage to components.
- 6 Check the state of the removed component and note those that will need to be replaced.
- 7 Ensure that all removed components are labelled and stored in the correct location.
- 8 Store or discard the removed components in compliance with accepted procedures.
- 9 Maintain documentation in compliance with organisational requirements.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain the engineering illustrations and related specifications to which they are expected to work, including technical illustrations.
- 3 Explain component removal processes and methods including the types of isolations and connections that have to be made, and that all components have specific tools and methods to remove them.
- 4 Explain the recognition of faults with removed components.
- 5 Explain how to store and label reusable components, and what markings should be used.
- 6 Explain the removal of unwanted components and substances. This must include what substances may be released during the removal of components
- 7 Explain the tool and equipment care and control processes including what their responsibilities are for ensuring the security of equipment used.
- 8 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 048

# Replacing components in instrumentation and control plant equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to replace components in instrumentation and control plant equipment. The candidate will need to make sure that the replaced components meet organisational specifications, protect them from any damage and use the correct tools to replace them.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Replace components from instrumentation and control plant equipment.

## **Unit 048**      **Replacing components in instrumentation and control plant equipment**

Outcome 1      Replace components from instrumentation and control plant equipment.

### **Practical skills**

#### **The candidate will be able to:**

- 1      Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2      Acquire all the necessary components and make sure that they are in a suitable condition.
- 3      Ensure that any components meet organisational specifications.
- 4      Ensure that precautions are taken to prevent damage to components, tools and equipment.
- 5      Replace components in the correct sequence, using the correct tools and methods.
- 6      Make any necessary modifications to the components to ensure that they will work correctly.
- 7      Deal quickly and efficiently with issues within the candidate's control and report those that cannot be resolved.
- 8      Maintain documentation in compliance with organisational requirements.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1      Explain their duties with regard to health, safety and the working atmosphere.
- 2      Explain the engineering illustrations and related specifications to which they are expected to work, including technical illustrations.
- 3      Explain component replacement processes and methods including the types of reconnections that have to be made, and that all components have specific tools and methods to replace them.
- 4      Describe handling equipment, techniques and processes. This must include manual handling pressure and thermal processes and techniques.
- 5      Explain the tool and equipment care and control processes including what their responsibilities are for ensuring the security of equipment used.
- 6      Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 049

# Establishing the viability of repairing components from instrumentation and control plant equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to establish and deviate from the required tolerances and know what action needs to be taken for the component to be brought back into service.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Establish and deviate from required tolerances and identify relevant action.

## **Unit 049                    Establishing the viability of repairing components from instrumentation and control plant equipment**

Outcome 1                    Establish and deviate from required tolerances and identify relevant action.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Rigorously follow the required specifications for the component to be fixed.
- 3            Determine the level of damage to the component and assess how much work is needed to ensure that it is returned to its original condition.
- 4            Describe outcomes and results dependent on the viability and cost-efficiency of repairs.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Explain engineering specifications including product worksheets, technical drawings, maintenance schedules, data sheets and method statements.
- 3            Describe assessing the conditions of components for reuse. This must include electrical integrity.
- 4            Describe how to establish the viability of repairs. This must include electrical integrity.
- 5            Explain the methods and techniques of component replacement, including sources of information and manufacturers' data.
- 6            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 050

# Understanding and analysing detailed instrumentation and control information from technical resources

## Overview

### Rationale

The aim of this unit is to enable the candidate to interpret information from drawings, technical manuals and diagrams. The candidate will need to ensure that the information is correct, up-to-date and includes all the data. They will also have to recognise and handle any difficulties which may come up.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Interpret information from drawings, technical manuals and diagrams.



## **Unit 050                    Understanding and analysing detailed instrumentation and control information from technical resources**

Outcome 1                    Interpret information from drawings, technical manuals and diagrams.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Use contemporary, correct and relevant information on technical requirements.
- 2            Ensure that the information includes all necessary data.
- 3            Recognise and transcribe the required details.
- 4            Recognise and handle any difficulties which may come up.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain information and document systems that are to do with the maintenance of electrical plant equipment.
- 2            Explain the document care and control procedures in accordance with the manufacturer and organisational procedures.
- 3            Explain the specification structure and content.
- 4            Explain the conventions, abbreviations and symbols which are employed by the gas, chemicals manufacturing, oil and petroleum industries; this may comprise of codes of practice and international standards (organisation- or manufacturer-specific).
- 5            Explain the standards and regulations which are associated with the maintenance of electrical plant equipment.
- 6            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 051

# Obtaining information from instrumentation and control engineering diagrams and specifications

## Overview

### Rationale

The aim of this unit is to enable the candidate to interpret information from drawings, technical manuals and diagrams. The candidate will need to ensure that the information is correct, up-to-date and includes all the data. They will also have to recognise and handle any difficulties which may come up.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Extract information from engineering illustrations.

## **Unit 051                    Obtaining information from instrumentation and control engineering diagrams and specifications**

Outcome 1                    Extract information from engineering illustrations.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Use contemporary, correct and relevant information on technical requirements.
- 2            Ensure that the information includes all necessary data.
- 3            Recognise and transcribe the required details.
- 4            Recognise and handle any difficulties which may come up.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain the information and document systems that are to do with the maintenance of electrical plant equipment.
- 2            Explain the document care and control procedures in accordance with the manufacturer and organisational procedures.
- 3            Explain the specification structure and content.
- 4            Explain the conventions, abbreviations and symbols which are employed by the gas, chemicals manufacturing, oil and petroleum industries. This may comprise of codes of practice and international standards (manufacturer- or organisation-specific).
- 5            Explain the standards and regulations which are associated with the maintenance of electrical plant equipment.
- 6            Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 052

# Analysing and recommending improvements to maintenance procedures for instrumentation and control plant equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to propose improvements. They will need to collect and analyse current practices and propose ways of improvement in accordance with organisational procedures.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Recognise and propose improvements.

## **Unit 052            Analysing and recommending improvements to maintenance procedures for instrumentation and control plant equipment**

Outcome 1            Recognise and propose improvements.

### **Practical skills**

#### **The candidate will be able to:**

- 1        Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2        Accumulate information and feedback on existing working practices and procedures.
- 3        Test currently used practices and procedures against organisational standards.
- 4        Recognise opportunities for improving working practices and measures.
- 5        Contribute ideas for possible practical improvements and show the possible benefits.
- 6        Make sure that ideas contributed comply with organisational standards.
- 7        Put forward suggestions in compliance with organisational measures.
- 8        Offer suggestions during discussions about work quality.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1        Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2        Describe resources of information that are available from organisational records, personal experience, toolbox talks, clients and organisational procedures.
- 3        Explain work improvement approaches and practices that are standardised by the organisation.
- 4        Explain organisational structure, improvement systems and methods that are standardised by the organisation.
- 5        Explain presentation or information as noted in organisational procedures.
- 6        Explain working relationships, considering the organisation's structure, individuals and other external factors.
- 7        Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 053

# Verifying that instrumentation and control engineering processes have been completed to the required specifications

## Overview

### Rationale

The aim of this unit is to enable the candidate to ensure that all work has been carried out in compliance with manufacturers' standards.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Ensure all work is conducted in line with manufacturers' standards.

## Unit 053

# Verifying that instrumentation and control engineering processes have been completed to the required specifications

### Outcome 1

Ensure all work is conducted in line with manufacturers' standards.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Work closely to the specifications concerning the asset being checked.
- 3 Ensure that the correct tools are used and that they are in good condition.
- 4 Use the information obtained to ensure that labour output meets the required specifications.
- 5 Recognise that checks have been completed in compliance with organisational standards.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain engineering illustrations and all related specifications.
- 3 Explain how to carry out satisfactory checks for compliance against criteria.
- 4 Describe how to identify defects in plant equipment, including common defects that may occur and how to recognise them.
- 5 Explain the quality control systems and how to document the procedures, including how to deal with defects and variations.
- 6 Explain the case of inspection equipment and control measures. This must include their responsibilities for ensuring the security of the tools that are used.
- 7 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 054

# Examining the performance and state of instrumentation and control plant equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to test instrumentation and control plant equipment. The candidate will be expected to refer to manufacturer manuals and follow organisational procedures.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Test instrumentation and control plant equipment in line with manufacturer procedures.



<b>Unit 054</b>	<b>Examining the performance and state of instrumentation and control plant equipment</b>
Outcome 1	Test instrumentation and control plant equipment in line with manufacturer procedures.

### **Practical skills**

#### **The candidate will be able to:**

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Work closely to the specifications concerning the asset being checked.
- 3 Perform checks using approved methods and measures.
- 4 Recognise that checks have been completed in compliance with organisational standards.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain engineering illustrations and all related specifications.
- 3 Explain how to carry out satisfactory checks of compliance against criteria.
- 4 Explain how to identify defects in plant equipment, including common defects that may occur and how to recognise them.
- 5 Explain quality control systems and how to document the procedures, including how to deal with defects and variations.
- 6 Explain the case of inspection equipment and control measures. This must include their responsibilities for ensuring the security of the tools that are used.
- 7 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 055

# Monitoring the performance and state of instrumentation and control plant equipment

### Overview

#### Rationale

The aim of this unit is to enable the candidate to complete condition observations on operational and inactive instrumentation and control plant equipment. The candidate will need to set up, observe and document the data in compliance with organisational policies. The candidate will adhere to the organisation's safe working practices at all times.

#### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

#### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Complete condition observations on operational and inactive instrumentation and control plant equipment.

## Unit 055

# Monitoring the performance and state of instrumentation and control plant equipment

### Outcome 1

Complete condition observations on operational and inactive instrumentation and control plant equipment.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Accurately set up and inspect the equipment necessary for the observation being carried out.
- 3 Proceed with the observation activity effectively with as little interference to normal activities as possible.
- 4 Document and analyse the data and take appropriate action.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their duties with regards to health, safety and the working atmosphere.
- 2 Explain the performance needs of plant equipment.
- 3 Explain the observation methods and measures for plant equipment, and which data is needed to make the necessary decisions.
- 4 Explain the significance of the need for the standardisation of equipment and authorisation measures.
- 5 Explain the monitoring equipment setting, utilisation and control measures.
- 6 Explain the formats for documentation and analysing the results in accordance with organisational standards.
- 7 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 056

# Assessing the performance and state of instrumentation and control plant equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to weigh up the performance and form of instrumentation and control plant equipment using all the available sources of information. They will need to check that they have all the data required, completed the task and analysed the results through comparison with previous data.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Weigh up the performance and form of instrumentation and control plant equipment.

## Unit 056

# Assessing the performance and state of instrumentation and control plant equipment

## Outcome 1

Weigh up the performance and form of instrumentation and control plant equipment.

### Practical skills

#### The candidate will be able to:

- 1 Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2 Ensure that they have all the necessary test data on which to conduct the assessment.
- 3 Carry out the assessment using all relevant data and valid methods.
- 4 Check that the assessment provides clear and accurate information.
- 5 Compare current performances and condition data with previous assessments.
- 6 Identify and report the implications arising from the assessments.
- 7 Record the results of the assessments in the appropriate format.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2 Explain how to operate equipment and use test specifications including manufacturer and organisational specifications.
- 3 Explain what the equipment monitoring methods and procedures are. This must include the types of data provided from monitoring, which methods can verify data and why it is important to do so.
- 4 Explain the assessment methods and techniques for specific data and plant equipment, and the factors that have to be taken into account when assessing the performance of specific plant equipment.
- 5 Explain the reporting documentation and control procedures including how to present results of the assessment, and who should receive the results and implications of assessments.
- 6 Explain their responsibilities with regard to the reporting lines and procedures in the workplace.

## Unit 057

# Examining instrumentation and control plant equipment

## Overview

### Rationale

The aim of this unit is to enable the candidate to complete checks on instrumentation and control plant equipment in accordance with organisational measures.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There is **one** outcome to this unit. The candidate will be able to:

- 1 Complete checks on instrumentation and control plant equipment.

## **Unit 057            Examining instrumentation and control plant equipment**

Outcome 1            Complete checks on instrumentation and control plant equipment.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Work safely at all times, complying with health and safety and other relevant regulations and guidelines.
- 2            Adhere to the right specifications for the equipment being examined.
- 3            Utilise the right equipment to carry out the examination.
- 4            Recognise and verify the examination checks and acceptance criteria to be used.
- 5            Perform all the necessary examinations as specified.
- 6            Identify any problems with or changes to the specifications.
- 7            Document the results of the examination in the correct format.
- 8            Deal effectively with any problems within their control and report those that cannot be dealt with.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain their responsibilities where health, safety and the environment are concerned, including the limits of their personal and legal responsibility. The candidate must have experience of the relevant regulations, safe working practices and procedures needed within the workplace.
- 2            Explain engineering illustrations and all related specifications.
- 3            Explain the examination practices and techniques that are approved within the organisation.
- 4            Explain the standardisation of equipment and authorisation measures that are approved within the organisation.
- 5            Describe the equipment used to carry out the examination and control measures that are approved within the organisation.
- 6            Explain how to recognise faults in products, equipment or systems.
- 7            Explain the quality control systems and recording procedures. This must include how problems are to be dealt with and how action should be taken.
- 8            Explain the reporting lines and procedures in the working atmosphere.

## Unit 058

# Setting up systems for start up in oil and gas operations

### Overview

#### **Rationale**

The aim of this unit is to enable the candidate to set up and start up systems for operation.

#### **Assessment and grading**

This unit will be assessed by observation and oral or written questioning.

#### **Learning outcomes**

There are **two** outcomes to this unit. The candidate will be able to:

- 1 Plan and prepare in order to carry out a production process.
- 2 Set up and start up the system.



## Unit 058

## Setting up systems for start up in oil and gas operations

### Outcome 1

Plan and prepare in order to carry out a production process.

### Practical skills

#### The candidate will be able to:

- 1 Acquire operational instructions.
- 2 Arrange personal workload and the workload of others where appropriate.
- 3 Conduct a briefing to relevant personnel.
- 4 Identify difficulties with Permits to Work and take appropriate action(s).
- 5 Ensure that information supplied and recorded is accurate, complete and understandable.
- 6 Maintain the workplace, ensuring it is clean and risk-free.
- 7 Work safely in line with operational instructions and guidelines.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain workplace risks (including spillages, uncontrolled emissions, hydrogen sulphide and other toxic substances and extreme weather conditions).
- 2 Explain the layout of the plant and its association with other systems.
- 3 Explain methods used to obtain and understand drawings and manuals regarding the plant.
- 4 Explain the effects of changes in ambient conditions on plant operation.
- 5 Explain who to work with including co-workers, supervisors, managers and workers of other pathways.
- 6 Explain how to work alongside and within the Permit to Work system.

## Unit 058

# Setting up systems for start up in oil and gas operations

## Outcome 2

Set up and start up the system.

### Practical skills

#### The candidate will be able to:

- 1 Prepare plant and utilities accurately.
- 2 Satisfactorily start up the system.
- 3 Identify faults and take necessary action.
- 4 Facilitate best-possible processing.
- 5 Ensure that all data supplied and recorded is correct, complete and understandable.
- 6 Work safely in line with operational instructions.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain the boundaries and limits of their own responsibilities.
- 2 Explain how to recognise faults. This must include damage, wear and tear, malfunction, process deviations and service defects.
- 3 Explain the necessary action to take after recognition of faults in the plant and utilities.
- 4 Explain how to achieve best-possible processing.

## Unit 059

# Functioning, operating and checking integrated systems

## Overview

### Rationale

The aim of this unit is to enable the candidate to function and check systems for operation.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There are **two** outcomes to this unit. The candidate will be able to:

- 1 Operate systems.
- 2 Check systems.

## **Unit 059                      Functioning, operating and checking integrated systems**

Outcome 1                      Operate systems.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Receive necessary system specifications through appropriate work processes and methods.
- 2            Ensure stable state conditions by appropriate system throughput.
- 3            Correctly recognise system faults and undertake necessary action.
- 4            Correctly identify critical situations and undertake necessary actions.
- 5            Ensure that all data and information recorded and recorded is correct, complete and understandable.
- 6            Work safely in adherence to operational guidelines and instructions.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain how to recognise and handle critical situations. This must include process deviations, extreme weather conditions, spillages and uncontrolled emissions.
- 2            Explain how to handle system throughput. This must include increase/decrease throughput, specified sequence and recommended rate.
- 3            Explain how to identify system faults. This must include lack of services and supply, variances in services, mechanical and electrical breakdown and process and utility setting deviations.
- 4            Explain the boundaries of their own responsibility.
- 5            Explain which actions are necessary to resolve critical situations. This must include quick shutdown, returning process within safe parameters and operating standby equipment.
- 6            Explain the form of data and information required (e.g. oral, written, equipment status, process status and handover reports).

## **Unit 059            Functioning, operating and checking integrated systems**

Outcome 2            Check systems.

### **Practical skills**

#### **The candidate will be able to:**

- 1        Sustain the system in the necessary steady state.
- 2        Correctly identify and resolve faults and issues.
- 3        Accurately obtain samples, carry out relevant tests and undertake comparative testing.
- 4        Promptly report issues outside the candidate's responsibility.
- 5        Ensure that data and information is recorded and is correct, complete and understandable.
- 6        Maintain the workplace, ensuring it is clean and risk-free.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1        Explain what is meant by 'steady state conditions' and how they are achieved.
- 2        Explain the boundaries of their own responsibility.
- 3        Explain the different types and causes of deviations and the relevant actions. This must include reporting and recording adjustments when they occur.
- 4        Explain handling oral and written information.
- 5        Explain performing leak testing and sampling, interpreting and understanding results.

## Unit 060

# Organising integrated systems for shutdown

## Overview

### Rationale

The aim of this unit is to enable the candidate to organise and prepare systems for shutdown.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There are **two** outcomes to this unit. The candidate will be able to:

- 1 Arrange systems for shutdown.
- 2 Practically shut down systems.

**Practical skills**

**The candidate will be able to:**

- 1 Acquire operational instructions.
- 2 Correctly assess shutdown time and make necessary arrangements for shutdown.
- 3 Brief the necessary personnel on shutdown procedures.
- 4 Correctly identify actual and possible risks and take precautions against them.
- 5 Ensure that data and information recorded is correct, complete and understandable.
- 6 Work safely in adherence to operational guidelines.

**Underpinning knowledge**

**The candidate will be able to:**

- 1 Explain how to obtain and understand (oral and written) shutdown instructions and procedures.
- 2 Explain how to access and understand operational instructions. This must include the sequence of shutdown and the recommended rate of shutdown.
- 3 Explain what the actual and possible shutdown risks are. (These must include standby equipment operational, vents, noise and heat.)

**Practical skills**

**The candidate will be able to:**

- 1 Correctly input and set shutdown settings, process variables and services.
- 2 Safely shut down the system.
- 3 Take protective measures against shutdown risks.
- 4 Check shutdown and correct faults and problems as appropriate.
- 5 Isolate plant and utilities from operating sources.
- 6 Work safely in adherence to operational guidelines.

**Underpinning knowledge**

**The candidate will be able to:**

- 1 Explain how to input and set shutdown controls, process variables and services.
- 2 Explain what the actual and possible shutdown risks are. (These must include standby equipment operational, vents, noise and heat.)
- 3 Explain how to isolate plant and utilities from operating sources.



## Unit 061

# Isolating and restoring plant equipment in oil and gas maintenance

## Overview

### Rationale

The aim of this unit is to enable the candidate to isolate and restore plant equipment. The equipment required to complete this unit includes mechanical equipment/plant for isolating and de-isolating equipment.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There are **three** outcomes to this unit. The candidate will be able to:

- 1 Make arrangements to ready the plant equipment for maintenance.
- 2 Isolate plant equipment.
- 3 Restore (de-isolate) plant equipment.

## **Unit 061            Isolating and restoring plant equipment in oil and gas maintenance**

Outcome 1            Make arrangements to ready the plant equipment for maintenance.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Obtain instructions and organise work accordingly.
- 2            Ensure that the Permit to Work system is operated effectively.
- 3            Brief necessary personnel and ensure work is allocated.
- 4            Accurately prepare plant and equipment.
- 5            Sustain a clean and risk-free workplace.
- 6            Ensure that data and information recorded is correct, complete and understandable.
- 7            Work safely in adherence to operational guidelines.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain how to obtain and understand instructions. This must include system specification and production schedule, covering different plant and equipment.
- 2            Explain how to handle oral and written information. This must include work activity briefing recorded to others, clarification of operational instructions and work activity recording.
- 3            Explain aspects that impact on optimising performance. This must include layout, tools and equipment required and the purging medium required.
- 4            Explain how to identify risks. This must include spillages, uncontrolled emissions and extreme weather conditions.

## **Unit 061            Isolating and restoring plant equipment in oil and gas maintenance**

Outcome 2            Isolate plant equipment.

### **Practical skills**

#### **The candidate will be able to:**

- 1        Observe pre-arrangements and minimise hazards to personnel, environment, process, plant and equipment.
- 2        Test for access of liquid and gas and confirm safety of the plant and equipment.
- 3        Check and sustain the status of the isolation.
- 4        Ensure that data and information recorded is correct, complete and understandable.
- 5        Work safely in adherence to operational guidelines.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1        Explain how to carry out tests for access of liquid and gas.
- 2        Explain how to obtain and understand operational guidelines on safety, downtime and tools and equipment being used.
- 3        Explain how to minimise hazards through relevant reporting, adjusting and recording.

## **Unit 061            Isolating and restoring plant equipment in oil and gas maintenance**

Outcome 3            Restore (de-isolate) plant equipment.

### **Practical skills**

#### **The candidate will be able to:**

- 1        De-isolate plant and equipment.
- 2        Check de-isolation and minimise hazards to personnel, environment, process and plant equipment.
- 3        Ensure that the Permit to Work system is operated effectively.
- 4        Carry out leak-finding tests and confirm that the plant and equipment are safely returned to service.
- 5        Ensure that the workplace is clean and risk-free.
- 6        Ensure that data and information recorded is correct, complete and understandable.
- 7        Work safely in adherence to operational guidelines.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1        Explain the principles of de-isolation.
- 2        Explain the boundaries of the candidate's own responsibilities.
- 3        Explain how to obtain and understand instructions. This must include safety, downtime and integration of processes.
- 4        Explain how to handle oral and written information. This must include re-instatement completion details and work activity details.

## Unit 062

# Checking and upholding health and safety processes

## Overview

### Rationale

The aim of this unit is to enable the candidate to check and uphold health and safety processes and understand the components involved, such as Permit to Work needs, which underpin those processes. The equipment required to complete this unit includes mechanical equipment/plant for isolating and de-isolating equipment.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There are **two** outcomes to this unit. The candidate will be able to:

- 1 Manage the implementation of the Permit to Work system.
- 2 Ensure the required conditions for an effective and safe workplace.

## Unit 062

## Checking and upholding health and safety processes

### Outcome 1

Manage the implementation of the Permit to Work system.

### Practical skills

#### The candidate will be able to:

- 1 Seek advice regarding the Permit to Work requirements from relevant staff.
- 2 Check information received and record fitting advice based on that information.
- 3 Effectively delegate requirements relating to work activities to relevant staff.
- 4 Accurately identify, record and respond to aspects likely to affect operations.
- 5 Accurately record all relevant operations and services information completely.
- 6 Work safely in adherence to operational processes.

### Underpinning knowledge

#### The candidate will be able to:

- 1 Explain how to implement organisational practices, policy and procedures.
- 2 Explain how to implement health, hygiene and safety laws.
- 3 Explain how to implement employment and other relevant legal requirements, including industry-specific laws, approved codes of practice and customer needs.
- 4 Explain how to handle different types of communication, including oral, written, computer-based and visual/pictorial.
- 5 Explain how to handle different types of information, including workload briefing recorded to others, clarification of operational instructions, workload recording and delegation to others and handing over duties and processes.

## **Unit 062            Checking and upholding health and safety processes**

Outcome 2            Ensure the required conditions for an effective and safe workplace.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Assess whether the working conditions and the utilisation of resources satisfy current legislation and policies.
- 2            Uphold all relevant maintenance procedures.
- 3            Uphold all relevant health and safety procedures.
- 4            Competently handle accidents and incidents.
- 5            Correctly and swiftly identify, and take necessary action on, possible or actual violations of requirements.
- 6            Identify and make suitable recommendations to relevant staff regarding the improvement of conditions.
- 7            Ensure the upkeep of maintaining clear (written and computer-based) records.
- 8            Communicate with all relevant staff effectively.
- 9            Take necessary action to increase system and process efficiency.
- 10          Work safely in adherence to operational requirements.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain how to uphold conditions relating to the work environment, equipment, materials, procedures and special requirements.
- 2            Explain how to put into practice relevant legislation, such as health, hygiene and safety legislation; industry-specific legislation; approved codes of practice; organisational policies, practices and procedures; and environmental legislation.
- 3            Explain how to initiate contact and liaise with the relevant staff. This must include line managers, staff representatives, colleagues, customers and suppliers.

## Unit 063

# Managing emergencies and critical circumstances

## Overview

### Rationale

The aim of this unit is to enable the candidate to manage emergencies and critical circumstances.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There are **three** outcomes to this unit. The candidate will be able to:

- 1 Uphold a state of readiness.
- 2 Control critical situations.
- 3 Organise the response to emergency situations.



## **Unit 063            Managing emergencies and critical circumstances**

Outcome 1            Uphold a state of readiness.

### **Practical skills**

#### **The candidate will be able to:**

- 1            Review current emergency procedures and identify and report all irregularities.
- 2            Identify circumstances that could affect an emergency response.
- 3            Hand over all safety-related critical information.
- 4            Actively participate in safety and emergency-related drills and exercises.
- 5            Work safely in adherence to operational requirements.

### **Underpinning knowledge**

#### **The candidate will be able to:**

- 1            Explain how to obtain and understand the status of the appropriate equipment and systems. This must include detection, protection, communications and evacuation.
- 2            Explain how to obtain and understand the status of operations and simultaneous operations.
- 3            Explain how to obtain and understand information regarding weather conditions.
- 4            Explain how to obtain and understand information regarding the availability of relevant emergency response staff.

## Unit 063

## Managing emergencies and critical circumstances

### Outcome 2

Control critical situations.

#### Practical skills

##### The candidate will be able to:

- 1 Identify developing and current critical circumstances.
- 2 Activate relevant alarms and take action necessary to the situation.
- 3 Observe the situation and minimise hazards to people, process and plant equipment.
- 4 Report the critical situation accurately.
- 5 Work safely in adherence to operational requirements.

#### Underpinning knowledge

##### The candidate will be able to:

- 1 Explain how to operate, and identify the potential implications of, the emergency shutdown control processes.
- 2 Explain how to operate, and identify the potential implications of, the fire and gas control processes.

## Unit 063

## Managing emergencies and critical circumstances

### Outcome 3

Organise the response to emergency situations.

#### Practical skills

##### The candidate will be able to:

- 1 Correctly identify and swiftly take the action necessary to make the situation safe.
- 2 Activate all necessary alarms and warning systems.
- 3 Communicate all necessary information and instructions.
- 4 Confirm, clarify and act upon information received.
- 5 Accurately record critical information.
- 6 Work safely in adherence to operational guidelines.

#### Underpinning knowledge

##### The candidate will be able to:

- 1 Explain how to react as necessary to the situation (specifically: make safe, isolate, shutdown and evacuate the workplace; alert connecting installations; choose to do nothing; activate internal emergency response teams; inform duty personnel; inform adjacent facilities; activate ESD; account for people).
- 2 Explain who will need to be contacted and how to get into contact with them.

## Unit 064

# Developing, sustaining and improving productive working relationships

## Overview

### Rationale

The aim of this unit is to enable the candidate to create, maintain and enhance productive working relationships with the candidate's line managers, staff representatives, colleagues, customers and suppliers.

### Assessment and grading

This unit will be assessed by observation and oral or written questioning.

### Learning outcomes

There are **three** outcomes to this unit. The candidate will be able to:

- 1 Create and enhance productive working relationships.
- 2 Develop productive working relationships with the immediate manager.
- 3 Conduct work handovers.

## Unit 064

## Developing, sustaining and improving productive working relationships

### Outcome 1

Create and enhance productive working relationships.

#### Practical skills

##### The candidate will be able to:

- 1 Take action to create and maintain effective working relationships.
- 2 Create opportunities to discuss work-related matters with people.
- 3 Create opportunities to discuss personal problems and issues.
- 4 Offer useful information, advice or guidance within the limits of their own responsibility and expertise.
- 5 Refer people to specialists when necessary.
- 6 Effectively deal with differences of opinions.
- 7 Communicate effectively any changes in operational requirements.
- 8 Encourage people to put forward ideas and views and give them due consideration.
- 9 Ensure clear reasons are given to people whenever ideas and suggestions are not progressed.
- 10 Work safely in adherence to operational requirements.

#### Underpinning knowledge

##### The candidate will be able to:

- 1 Describe the key aspects of productive working relationships.
- 2 Explain the boundaries of their own responsibility and expertise.
- 3 Explain how to handle differences of opinions.
- 4 Explain the principles of communicating effectively.
- 5 Explain progressing concepts and ideas on behalf of others.

## Unit 064

## Developing, sustaining and improving productive working relationships

### Outcome 2

Develop productive working relationships with the immediate manager.

#### Practical skills

##### The candidate will be able to:

- 1 Communicate all necessary information on activities, progress, results and achievements to the candidate's immediate manager.
- 2 Seek information, guidance and advice from the immediate manager.
- 3 Present clear, thought-out proposals and steps of action.
- 4 Accurately investigate rejected proposals and, where appropriate, make amendments and submit alternatives.
- 5 Take action to avoid harming the relationship with the immediate manager that may occur due to disagreements.
- 6 Seek ways of improving the relationship with the immediate manager.
- 7 Effectively carry out the job role.
- 8 Work safely and in adherence to operational requirements.

#### Underpinning knowledge

##### The candidate will be able to:

- 1 Explain their actual job role and the boundaries of their responsibilities.
- 2 Explain their immediate manager's job role and the boundaries of his or her responsibilities.
- 3 Explain the methods of presenting proposals and methods of investigating the outcomes of the discussions arising from these proposals.
- 4 Explain the steps to avoid harming working relationships.
- 5 Explain which techniques improve working relationships.

## Unit 064

## Developing, sustaining and improving productive working relationships

### Outcome 3

Conduct work handovers.

#### Practical skills

##### The candidate will be able to:

- 1 Record all necessary information.
- 2 Ensure information regarding the current operational status is correct and complete.
- 3 Ensure information provided by the candidate regarding current operational status is correct and complete.
- 4 Communicate relevant operating instructions and guidelines.
- 5 Leave workplaces clean and risk-free.
- 6 Work safely and in adherence to operational requirements.

#### Underpinning knowledge

##### The candidate will be able to:

- 1 Explain how to work alongside and within the Permit to Work system.
- 2 Explain how to identify, manage and minimise workplace risks.
- 3 Explain how to give and/or receive information to/from the candidate.

## Appendix 1 List of resource requirements

To offer this qualification successfully City & Guilds has identified a list of minimum requirements. The centre should use this list to make sure that all necessary resources are available to offer the programme.

The EV will also use this list to check that all candidates have access to the required resources.

Centres do not have to provide all the resources in one location – for example only one teaching room may be available in one location and the candidate may use a different location to gain access to resources that are not in the teaching rooms.

The list is intended to be appropriate to a wide range of location; for example a ‘machine’ may be manual, electronic or computerised.

### Accommodation requirements

- A commercial workplace (or simulated environment) of an appreciable size, meeting candidates’ and customers’ needs.
- Layout of premises to allow for good workflow.

### Equipment and tools

The equipment required to complete these units should be sufficient in the workplace; however, in simulation environments centres must ensure that adequate equipment is available to enable the candidate to demonstrate key capabilities.

Assessments must not be undertaken until qualification approval has been obtained. Centres that wish to deliver this qualification will require the equipment for the units specified as detailed below; if this not adhered to, the centre may not gain approval. (for further details refer to IVQ in Oil and Gas (8510) Equipment List available at [www.cityandguilds.com](http://www.cityandguilds.com)).

Unit	Equipment required
007	Mechanical equipment required for maintenance and assessing performance
008	Defective equipment required to analyse defects and faults
009	Fault-finding tools to use on faulty equipment/machinery
013	Tools for removing mechanical components
023	Mechanical equipment/plant for maintenance
024	Electrical equipment/plant for maintenance
041	Instrumentation equipment/plant for maintenance
061 and 062	Mechanical equipment/plant for isolating and de-isolating equipment



## Appendix 2      Reading list

### Books

#### ***Perry's Chemical Engineer's Handbook***

Green, D, W and Perry, R,H.

McGraw- Hill Education, ISBN-13 9780071422949,8<sup>th</sup> edition, 2007

#### ***The Chemistry and Technology of Petroleum (Chemical Industries)***

Speight, G, J.

Routledge, USA, 978-0-8493-9067-8, 2006, 4<sup>th</sup> Edition.

#### ***Oil and Gas Production in Non-technical Language***

Leffler, W, L and Raymond, M, S.

PennWell Corporation, ISBN-13: 9781593700522, 2005, 3<sup>rd</sup> Edition.

#### ***Surface Production Operations, Volume 2 (2nd Edition)***

Arnold, K. and Stewart, M.

Gulf Professional Publishing, ISBN-13: 9780884158226, 1999.

#### ***A Practical Guide to Compressor Technology***

Bloch, H.P

Wiley-Interscience, ISBN-13: 9780471727934, 2006, 2<sup>nd</sup> Edition.

### Appendix 3 Evidence reference sheet

Candidate name .....

City & Guilds enrolment number .....

Unit number/title .....

Unit /outcome	Evidence item no.	Practical skills (✓)										Unit /outcome	Evidence item no.	Evidence Type (W/O)	Underpinning knowledge (✓)									
		1	2	3	4	5	6	7	8	9	10				1	2	3	4	5	6	7	8	9	10

Key: W=Written questioning O=Oral questioning

Assessor name: ..... Assessor/Nominated Observer's signature: ..... Date:.....

Candidate name: ..... Candidate signature: ..... Date: .....

## Appendix 4 Underpinning knowledge recording form

Unit/outcome	Question	Answer

Assessor name: .....

Assessor/Nominated Observer's signature: ..... Date: .....

Candidate name: .....

Candidate signature: ..... Date: .....

## Appendix 5 Verification declaration form

I confirm that the evidence listed is authentic and a true representation of my own work.

**Candidate signature:** ..... **Date:** .....

I confirm that the candidate has achieved all the requirements with the evidence listed. Assessment was conducted under the specified conditions and context, and is valid, authentic, reliable, current and sufficient.

**Assessor/Nominated Observer's signature:** ..... **Date:**.....

I confirm that the candidate's sampled work meets the standards specified and may be presented for external verification and/or certification.

**Internal Verifier signature:** ..... **Date:** .....

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