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Board in Occupational Safety
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NEBOSH Environmental Management Certificate

Qualification guide for Learning Partners

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Qualification overview

Qualification overview

Qualification key features

Unit prefixes and title/s	Unit EMC1: Environmental management Unit EMC2: Assessing environmental aspects and associated impacts	
Assessment	Assessment Type	Assessment Time
Unit EMC1	Open book examination	5 hours*
Unit EMC2	Practical application	3 hours
	*Learners will have a 24 hour window in which to download the examination paper, complete their answers and then upload their answer sheets	
Modes of study	Taught (face-to-face), open and distance learning Part-time Block release e-learning	
Notional learning hours	Taught hours: 34 Private study: 25 Assessment: 8 Total hours: 67	
Qualification level and number of credits	SCQF Level 6 with 6 credits (comparable to RQF Level 3)	
Entry requirements	None	
Recommended minimum standards of English	International English Language Testing System 6.0 or higher	
Languages available	English	
Pass standards	Unit EMC1: The provisional pass mark for Unit EMC1 is 45%. Further information on how provisional pass marks are set can be found in our FAQs: https://www.nebosh.org.uk/faqs/how-does-nebosh-set-the-pass-mark-for-each-assessment/ Unit EMC2: Pass standard contained in guidance A 'Pass' must be achieved in both units to achieve the Environmental Management Certificate	
Qualification grades	The qualification grade is based on the result from Unit EMC1. Distinction: 75 marks or higher Credit: 65 - 74 marks Pass: 45 - 64 marks	

Qualification summary

Qualification summary

Introduction

This qualification is designed for anyone who has responsibilities for managing environmental issues as part of their work. The qualification is designed to be globally relevant and benefit companies in all industry sectors who are seeking to implement effective environmental management systems, increase positive environmental impacts, and reduce negative environmental impacts. On completion of the qualification, your learners will be able to:

- understand a range of environmental issues in order to improve performance and reduce harm;
- work with an environmental management system and contribute to continual improvement;
- recognise environmental aspects and evaluate current controls;
- support decision-making with ethical, legal, and financial arguments;
- Understand the links between your organisation's activities and wider environmental issues.

Syllabus development and review

The syllabus has been developed by NEBOSH following extensive consultation with key stakeholders, notably Learning Partners, employers, standards setting organisations, past and present learners and subject experts. NEBOSH would like to take this opportunity to thank all those who participated in the development of the EMC.

Tim Compton - Environmental Health and Safety (EHS) Lead – Marchwood Power Ltd



Tim Compton had worked in compliance since he left university. After initially working off-shore in the North Sea he embarked on a long-term career in the environmental services industry.

It was in 2015 when he got the call about a vacancy at Marchwood Power Ltd, a company which operates a £400million natural gas combined cycle gas turbine (CCGT) power station in Southampton, UK. The site is strictly regulated by the Environmental Agency and operates under the stringent conditions of an Environmental Permit.

While it was Tim's academic qualifications and background in environmental services that secured him the role of Environmental Health and Safety (EHS) Engineer, the preceding job search prompted him to look at what was missing from his CV; vocational qualifications.

It was important to Tim that he was able to gain vocational qualifications that would reflect the competence and skills built up over an accomplished career. He began with the NEBOSH Certificate in Environmental Management: "Marchwood is very supportive of training and it was important to me to bring myself up to date from a qualifications perspective. I think this is an excellent qualification for people, like me, looking to formalise their experience in environmental management or for those embarking on a career in the field."

Qualification summary

Notional learning hours

A programme of study needs to be based around a minimum of **34 taught hours** and approximately **25 self-study hours**.

A full-time block release course would take approximately 5 days and a part-time day release course would be spread over approximately 5 weeks. For learners studying by open or distance learning, the tuition hours should be added to the recommended private study hours to give the minimum number of hours that this mode of study will require.

Teaching of syllabus content

Although the syllabus sets out the elements in a specific order, you can teach the elements in any order you feel is appropriate. You will need to reflect this in the timetables which are submitted for approval as part of the accreditation/re-accreditation process.

All elements (1 - 9) are assessed by an open book examination. The practical assessment requires learners to review environmental aspects and impacts in their own workplace. It draws on the various environmental issues in elements 4 - 9, as well as the process of assessing environmental aspects and impacts covered in element 3. Both assessments will be marked by NEBOSH.

Minimum standard of English required for learners

The standard of English required by learners studying for the EMC must be such that they can both understand and articulate the concepts contained in the syllabus. It is important to stress that the onus is on you to determine your learners' standards of proficiency in English.

Qualification type

NEBOSH qualifications are categorised as 'Other' qualifications by SQA Accreditation in Scotland. These are categorised as Vocationally-Related Qualifications (VRQs) in England, Wales and Northern Ireland.

VRQs provide the knowledge and practical skills required for particular job roles through a structured study-based training programme, which combines the assessment of knowledge and understanding in written examinations with practical application of learning in the workplace.

VRQs are a popular type of qualification because they are nationally recognised, flexible and offer routes for progression to employment or further study..

Qualification summary

Achieving the qualification

The EMC has two unit assessments (see 'Qualification key features' for details on the assessments and the pass standards); your learners must achieve a 'Pass' in both units to be awarded the qualification.

Learners will have five years to complete their qualification. The five-year period starts from the date that they pass their first successful unit (we call this the 'declaration date'). Any unit that is five or more years old will not count towards the qualification and a learner will need to retake this/these unit(s) if they still want to complete the qualification.

Qualification grading and issue of qualification parchment

The qualification grade is based only on the result from the question paper (Unit EMC1). Learners need to achieve a 'Pass' in both units (EMC1 and EMC2) before the parchment can be issued. The grading boundaries are as follows:

75+	Distinction
65-74	Credit
45-64	Pass
0-44	Refer

When your learners have completed both units, they are normally considered to have completed the whole qualification. We will send out the qualification parchment within 40 working days of their final successful unit. We will only issue individual unit certificates on written request.

Once we issue the result of the second successful unit, your learners will have 20 working days to either:

- tell us in writing that they want to re-sit a successful unit to improve their grade (see 'Re-sitting unit(s)' for further information); or
- submit an Enquiry About Result (EAR) request; please see the EAR policy for further information: www.nebosh.org.uk/policies-and-procedures/enquiries-about-results-ears

Re-sitting unit(s)

Your learners can re-sit a unit for the following reasons:

- they have unit(s) with a 'Pass' that are five or more years old and the learner still wants to achieve the qualification;
- they were 'Referred'; or
- they want to retake Unit EMC1 to get a higher grade (Unit EMC2 is 'Pass' or 'Refer' and does not count towards the qualification grade).

Qualification summary

Re-sitting EMC1 to improve the grade

If a learner wants to try to improve their grade in Unit EMC1, they will need to tell us in writing within 20 working days of the declaration date of the second successful unit. Otherwise, a qualification parchment will automatically be issued showing the original declaration date. You and your learners should also be aware of the following:

- if the result of the re-sit unit is lower than the original mark, the learner will keep the original mark awarded for the unit;
- re-sit marks are not capped;
- there is no limit to the number of re-sits within the five-year period;
- a refund will not be given if a learner chooses to register to re-sit a unit before the result for that unit is known (especially where the result is higher than the learner expected).

Individual learner feedback

For more information on the assessment feedback provided for this qualification, please visit the NEBOSH website: <https://www.nebosh.org.uk/faqs/how-can-i-gain-feedback-on-my-performance-to-assist-with-future/>

Luke Strudley - Offshore Wind Turbine Technician - Innogy Renewables UK



When Luke Strudley, left the British Army he wanted to add a brand-new set of core skills that would be useful in any kind of working environment.

“Everyone recognises the importance of safety in the military and so NEBOSH

is something that’s talked about a lot when people start looking for a new career. That’s why, I chose to take four NEBOSH Certificates, the General, Fire, Construction and Environmental. It was because of the Environmental Certificate I realised that the renewables sector was where I really wanted to be.”

“Something my NEBOSH tutor told us really struck a chord. He said that to protect the planet people needed to ‘act locally, think globally’. It’s that idea that if everyone contributes in their own small way, then collectively we could avoid environmental catastrophe.”

Taking his NEBOSH qualifications at the end of his time in the Army really paid off for Luke. He is now an Offshore Wind Turbine Technician with Innogy Renewables UK, a company responsible for Â£4billion of new UK renewable energy investment in the last 5 years.

“It’s great, because I really wanted to use my skills as an electrician to do something that would benefit the environment. At the interview stage, as well as talking about the environment, I faced a lot of questions about safety procedures, so all of my NEBOSH qualifications were invaluable. NEBOSH turned out to be a big foot in the door for me.”

Conflict of interest

Your employees (eg head of Learning Partner, tutors, administrators, examinations officers, invigilators, etc) must declare in writing to NEBOSH any employee and/or family, spouse or other close personal relationship with any person undertaking a NEBOSH examination or assessment. Further information can be found in the 'Instructions for conducting examinations' document.

Available resources

In addition to this guide, the following resources are downloadable from the NEBOSH website:

- EMC2 Guidance for Learning Partners and Learners;
- Assessment pack for Unit EMC2;
- Leaflet.

Syllabus

Syllabus

Syllabus summary

Element		Recommended Tuition hours	Suggested Self-Study hours	Assessment
1	Foundations in environmental management	6	25	Unit EMC1: Environmental management Open book examination
2	Environmental management systems	5		
3	Assessing environmental aspects and impacts	6		
4	Planning for and dealing with environmental emergencies	3		
5	Control of emissions to air	2		Unit EMC2: Assessing environmental aspects and associated impacts Practical assessment
6	Control of environmental noise	2		
7	Control of contamination of water sources	3		
8	Control of waste and land use	4		
9	Sources and use of energy and energy efficiency	3		

Syllabus

Learning outcomes and assessment criteria

Learning outcome The learner will be able to:	Related content	Assessment criteria
Justify environmental management in the workplace using ethical, legal and financial arguments, linking these to wider environmental issues including sustainable development	1.1 – 1.3	<p>Explain the scope and nature of environmental management and key environmental issues</p> <p>Discuss the ethical, legal and financial reasons for maintaining and promoting environmental management</p> <p>Summarise sustainability, its importance, and its relationship with corporate social responsibility</p>
Recognise workplace activities which may be subject to environmental legislation or enforcement	1.4	Understand the influence of international agreements on national environmental laws and standards, and the potential consequences of non-compliance
Understand the requirements of, and work within, an environmental management system, whilst contributing to continual improvement	2.1-2.3	<p>Recognise the key features and appropriate content of an effective EMS (based on the requirements of ISO 14001)</p> <p>Discuss the benefits and limitations of introducing a formal EMS into the workplace</p>
Assess environmental aspects and associated impacts, determining significant aspects and evaluating current controls	3.1-3.4	<p>Recognise different types of environmental impact</p> <p>Review and use sources of environmental information</p> <p>Apply the principles and practice of environmental aspect and impact assessment</p>
Support environmental emergency planning	4.1-4.2	<p>Explain the importance of environmental emergency planning</p> <p>Describe suitable emergency preparation and responses</p>
Understand the importance of reducing environmental harm; identify sources of noise, air, and water pollution; and suggest suitable control measures	5-7	<p>Demonstrate awareness of the environmental impacts of noise, air, and water pollution</p> <p>Identify sources of environmental harm and suggest suitable control measures for noise and emissions</p>
Understand the issues associated with waste and support responsible waste management.	8.1 – 8.5	<p>Demonstrate awareness of common waste types, the outlets available for waste, and environmental issues associated with waste and contaminated land</p> <p>Suggest suitable waste management measures, applying the waste hierarchy</p>
Understand the benefits and limitations of a range of energy sources, and suggest suitable measures to increase energy efficiency	9.1 - 9.2 9.3	<p>Discuss the benefits and limitations of a range of renewable and non-renewable energy sources</p> <p>Explain how energy efficiency can be increased</p>

Element 1: Foundations in environmental management

1.1 The scope and nature of environmental management

- Definition of the environment as “the surroundings in which an organisation operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation”. ‘Surroundings’ can extend from within an organisation to the global system
- The multi-disciplinary nature of environmental management and the barriers to good standards of environmental management within an organisation (complexity, competing and conflicting demands, behavioural issues)
- The size of the environmental ‘problem’ in terms of the key environmental issues:
 - > local effects of pollution (air quality, noise, waste, lighting, odour)
 - > carbon emissions and the greenhouse effect/global warming
 - > water resources and ocean pollution
 - > deforestation, soil erosion and land quality
 - > material resources, land despoliation, supply chain, inequal distribution of impacts
 - > energy supplies, innovations in food and fuel
 - > waste disposal and international waste trade
 - > agricultural issues arising from global trade
 - > climate change and extreme weather events
 - > biodiversity loss.

1.2 The ethical, legal and financial reasons for maintaining and promoting environmental management

- The rights and expectations of interested parties (internal and external, including local residents, supply chain, regulators, customers and workers)
- Outcomes of incidents in terms of environmental and human harm
- The actions and implications of pressure groups and campaigning; growing public awareness of environmental issues

Element 1: Foundations in environmental management	
	<ul style="list-style-type: none">• Overview of compliance issues including breaches of local or national law, breaching individuals' legal rights, agreements with NGOs, agreements with public authorities, voluntary codes of practice etc.• Requirements for reporting on environmental management• The business case for environmental management: direct and indirect costs of environmental accidents: insured and uninsured costs; potential legal and financial penalties• Different levels of standards and enforcement in many jurisdictions; the role of responsible business• Business value of environmental achievements and voluntary standards
1.3	Supporting sustainable development <ul style="list-style-type: none">• Definition of sustainability such as: "the right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations" (with reference to Rio Earth summit)• Importance of sustainable development as a means of ensuring:<ul style="list-style-type: none">> effective protection of the environment> prudent use of natural resources> economic development whilst maintaining stable levels of growth> social progress.• The business case for sustainable development• Relationship of environmental performance and sustainability to Corporate Social Responsibility• The role of the United Nations' Sustainable Development Goals (SDGs).
1.4	The role of national governments and international bodies in formulating a framework for the regulation of environmental management <ul style="list-style-type: none">• International agreements governing the environment (e.g. Paris Agreement, OSPAR Convention, Montreal Protocol, Basel Convention) and their role in influencing national environmental laws and standards• The importance of knowing and understanding local legislation, including for organisations operating in multiple locations• Meaning of Best Available Technique (BAT), Best Practicable Environmental Option (BPEO)

Element 1: Foundations in environmental management

- The role of enforcement agencies and the consequences of non-compliance, including:
 - > authorising activities (e.g. authorisations, permits, licences)
 - > inspection and sampling
 - > serving of notices
 - > prosecution.

Element 2: Environmental management systems

2.1 Reasons for implementing an environmental management system (EMS)

- Reasons for implementing an environmental management system (EMS)
 - > demonstrates management commitment
 - > demonstrates commitment to pollution prevention and control/protection of the environment
 - > provides a framework for setting objectives and targets
 - > compliments Corporate Social Responsibility and sustainability policies and strategies
 - > sharing of common management system principles with quality and health and safety management - enabling integration
 - > pressure from interested parties.

2.2 The key features and appropriate content of an effective EMS (based on the requirements of ISO 14001)

- The context of the organisation i.e., understanding the internal and external issues that can, either positively or negatively, affect or be affected by the way an organisation manages its environmental responsibilities
 - > understanding the context of the organisation
 - > determining the needs and expectations of interested parties
 - > determining the scope of the EMS

Element 2: Environmental management systems

- Leadership and commitment
 - > environmental policy:
 - appropriate for the purpose and context of the organisation
 - provides the framework for setting and reviewing objectives and targets
 - commitment to the protection of the environment
 - commitment to fulfil compliance obligations
 - commitment to continual improvement
 - communicated to all relevant parties
 - > responsibilities and authorities of roles assigned and communicated
 - > appropriate resource allocation
 - > ongoing input and review of the EMS
- Planning
 - > consideration of life cycle perspective
 - > actions to address risks (potential adverse effects) and opportunities (potential beneficial effects)
 - > identifying environmental aspects and associated impacts **cross reference element 3**
 - > overview of legal compliance issues including breaches of local or national law, breaching individuals' legal rights, agreements with NGOs, agreements with public authorities, voluntary codes of practice etc. **cross reference Element 1.2**
 - > environmental objectives (including plans to achieve them)
- Support
 - > resources
 - > competence
 - > awareness
 - > communication (internal and external)
 - > documented information

Element 2: Environmental management systems

- Operation
 - > operational planning and control
 - > emergency preparedness and response *cross reference Element 4*
- Performance evaluation
 - > monitoring, measurement, analysis and evaluation
 - active monitoring measures including the monitoring of performance standards of all relevant parties and the systematic inspection of plant and premises, monitoring of emissions, waste, water and energy data; use of environmental inspections and tours and their roles within a monitoring regime
 - reactive monitoring considerations including: data on near misses, complaints or suggestions by workforce and neighbours, and enforcement action(s)
 - review of environmental performance:
 - » gathering information to review environmental performance
 - » incident data
 - » inspections
 - » control and monitoring of emissions
 - » energy and raw material management
 - » waste management
 - » surveys, tours and sampling
 - » quality assurance reports, audits, monitoring data/records/reports, complaints
 - » investigating environmental incidents and reporting requirements internally and externally
 - » reporting on environmental performance
 - » feeding into action and development plans as part of continuous improvement
 - > evaluation of compliance
 - requirements for evaluating compliance
 - monitoring compliance and taking action where necessary

Element 2: Environmental management systems

- > internal audit programme
 - criteria, scope and purpose of auditing environmental management systems; distinction between audits and inspections
 - pre-audit preparations (including selection of suitable auditors), information gathering, notifications and interviews
 - responsibility for audits
 - audit results reported to management
 - advantages and disadvantages of external and internal audits
- > management review
 - formal and informal review
 - communication of inputs and outputs of reviews
- Improvement
 - > nonconformity and corrective action
 - > continual improvement.

2.3 Benefits and limitations of introducing a formal EMS into the workplace

- Definition of accreditation and certification
- Benefits of using a formal EMS in an organisation:
 - > increased compliance with legislative requirements
 - > savings from reduced noncompliance with environmental regulations
 - > competitive edge over non-certified businesses
 - > improved management of environmental risk
 - > increased credibility that comes from independent assessment
 - > heightened worker, interested party and supply chain satisfaction and morale
 - > increased involvement and consultation with internal and external interested parties
 - > meeting modern environmental ethics

Element 2: Environmental management systems

- > streamlining and reducing environmental assessments and audits
- > increased resource productivity
- > standards can be applied to any organisation, industry, or risk level
- Limitations of using a formal EMS in an organisation:
 - > prescriptive environmental performance levels are not necessarily included within a standard
 - > improvements in environmental performance can be negligible
 - > differing requirements for public reporting
 - > potential inconsistency of external auditors
 - > implementing an EMS may have costs that are too high for small and medium-sized enterprises

Element 3: Assessing environmental aspects and impacts

3.1 Reasons for carrying out environmental aspect and impact assessments

- Meaning of aspects and impacts (ref ISO: 14001:2015)
- Aims and objectives of impact assessments
- Life cycle analysis.

3.2 Types of environmental impact

- Direct, indirect, and cumulative impacts
- Positive and negative effects to:
 - > air and atmosphere
 - > land
 - > water and oceans
 - > ecosystems and species
 - > human communities.

Element 3: Assessing environmental aspects and impacts

3.3 Nature and key sources of environmental information

- Internal to the organisation:
 - > audit and investigation reports
 - > maintenance records
 - > inspections
 - > job/task analysis
 - > incident data
 - > environmental monitoring data
 - > raw material usage and supply
- External to the organisation:
 - > data from manufacturers, suppliers, and partner organisations
 - > legislation
 - > Government or regulatory bodies
 - > trade associations, industry publications
 - > national, regional, and international standards
 - > published media, academic journals.

Element 3: Assessing environmental aspects and impacts

3.4 Identification of environmental aspects and associated impacts

- Identifying environmental aspects
 - > inputs and outputs associated with past, current, and planned activities
 - > normal and abnormal conditions, incidents and accidents, potential emergency situations
 - > aspects either controlled by the organisation or that the organisation can influence
 - > using a life cycle perspective e.g. including activities of suppliers, distribution, and disposal
- Determining associated environmental impacts
 - > using the 'source, pathway, receptor' model
 - > normal and abnormal conditions, incidents and accidents, potential emergency situations
 - > considering positive and negative, direct, indirect, and cumulative impacts [cross reference 3.2](#); consideration of subsequent impacts to the organisation; evaluating adequacy of current controls
- Determining which aspects and impacts are 'significant'
 - > risk level (scale and severity of the impact, likelihood of occurrence)
 - > duration of impact and sensitivity of receptor
 - > business concerns, consideration of legal or contractual requirements, and the needs and expectations of interested parties
- How to determine risks and opportunities associated with significant environmental aspects
- Recording significant aspects and impacts
- Reviewing
- Reasons for review.

Element 4: Planning for and dealing with environmental emergencies

4.1 The importance of environmental emergency planning

- General responsibility or duty not to pollute
- Requirement of Environmental Management System
- Need for prompt action to protect people, the environment, and organisational assets
- Immediate risks: loss of business, shutdown, clean-up costs
- Long term risks: prosecution, reputational issues.

4.2 Emergency preparedness and response

- Recognising risk situations and action to take [cross reference 3.4](#)
 - > to prevent or mitigate environmental damage from emergency situations
 - > inclusion of environmental risk in the organisation's other emergency plans and procedures
 - > environmental hazards associated with fire
- Emergency response plan(s)
 - > to include foreseeable internal causes (e.g. spillage, loss of containment, fugitive emissions) and foreseeable external causes (e.g. extreme weather events)
 - > materials to deal with spills
 - > emergency control centre
- Information and training for internal and external interested parties
 - > training, practices and drills
 - > access to site plans
 - > inventory of materials
 - > liaison with regulatory bodies and emergency services
 - > protecting and liaising with neighbours and local residents
 - > handling the press and other media (e.g., competency, assigned spokespersons)
- Review and continual improvement of emergency response plans.

Element 5: Control of emissions to air

5.1 Air quality standards

- Meaning, uses of, and the relationship between ppm and mg/m³
- The potential effects of poor air quality
- The role of air quality standards and controls on quality and impurities.

5.2 Main types of emissions to atmosphere

- Types and sources of emission:
 - > gaseous, vapour, odours, mist, fume, smoke, dust, grit, fugitive emissions and fibre and the associated hazards
 - > common pollutants: sulphur compounds, nitrogen compounds, halogens and their compounds, metals and their compounds, volatile organic compounds and the impacts associated with each
- Greenhouse gases and associated impacts
 - > Carbon dioxide (CO₂), Methane (CH₄), Nitrous oxide (N₂O), Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulphur hexafluoride (SF₆) (source: Kyoto protocol)
 - > common sources of greenhouse gas emissions
 - > meaning of 'Global Warming Potential (GWP).

5.3 Control measures to reduce emissions

- Control hierarchy: eliminate, minimise, render harmless
- Monitoring requirements and arrangements [cross reference 2.2](#)
- Technology available to control emissions
- The role of air quality standards and controls on quality and impurities.
 - > use of filters, cyclones or electrostatic charge to remove particulates
 - > use of scrubbers or adsorption to remove gaseous pollutants
 - > use of combustion or other reactions to render emissions harmless
- Difficulties in maintaining equipment in some locations or environments.

Element 6: Control of environmental noise

6.1 Sources and effects of environmental noise

- The characteristics of noise which lead to it being a nuisance
 - > low frequency
 - > speech (e.g. a tannoy/loudspeaker systems/public address systems)
 - > intermittent (e.g. sirens, explosives)
- The effects of noise: nuisance, stress, loss of sleep, disruption of wildlife
- Legal considerations (e.g. noise threshold limits)
- Common sources of environmental noise:
 - > 'neighbour noise' (e.g. public spaces, events, loud music)
 - > intruder and vehicle alarms
 - > transport noise
 - > noise from commercial activities (e.g. machinery, extraction systems, compressor systems, public address systems)
 - > noise from industrial activities including agriculture, construction, quarrying and mining
 - > wind farms.

6.2 Methods for the control of environmental noise

- Monitoring requirements and arrangements [cross reference 2.2](#)
- Basic noise control techniques:
 - > isolation, absorption, insulation, damping, silencing
- Management controls e.g.
 - > maintenance regimes
 - > hours of working
 - > preventing the use of radios and public address systems
 - > controlling vehicle routes.

Element 7: Control of contamination of water sources

7.1 Importance of the quality of water for life

- The meaning of safe drinking water, groundwater, surface water
- The water cycle
- Water usage in agriculture and industry
- The potential effects of water pollution to the environment
- Over abstraction, desalination, and the need for water conservation
- The potential effects of all types of pollution on water quality
- Main issues and impacts of ocean pollution.

7.2 Main sources of water pollution

- Spillages contaminating surface water drainage
- Spillages onto unmade ground reaching groundwater and controlled waters
- Drainage and effluent from industry: mining, quarrying and ore processing
- Agriculture runoff water (contains pesticides, sediment, metals and fertilizer nutrients such as phosphorous, nitrogen and potassium)
- Process water, sewage and cooling water, leakage
- Solids which are 'washed away', litter and waste
- Contamination from natural minerals (e.g. radon in Cornwall, arsenic in Bangladesh).

7.3 Main control measures that are available to reduce contamination of water sources

- Control hierarchy: eliminate, minimise, render harmless
- Monitoring requirements and arrangements [cross reference 2.2](#)
- Control methods:
 - > licences for discharge
 - > water quality indicators:
 - chemical oxygen demand (COD), biological oxygen demand (BOD), and total oxygen demand (TOD)
 - temperature

Element 7: Control of contamination of water sources

7.3

- pH
- metal content
- solids content.
- Controls for storage and spillage:
 - > preventing any spillages occurring (e.g. through operating procedures, maintenance)
 - > uses and risks of lagoons
 - > keeping systems separate
 - > appropriate storage of incompatible materials
 - > bunding of chemical and oil stores
 - > use of interceptors
 - > separation and marking of drain systems
 - > dealing with spillages [cross reference 4.2](#)
- Controls for waste water:
 - > use of screening, sedimentation, flotation, or centrifuges to separate out solids
 - > use of filters or chemical treatment to neutralise pH
- Difficulties in maintaining equipment in some locations or environments.

Element 8: Control of waste and land use

8.1 Waste types

- The meaning of hazardous, non-hazardous, and inert
- Waste types including:
 - > general waste
 - > municipal waste
 - > electronic waste
 - > organic waste
 - > clinical waste
 - > radioactive waste
 - > construction and demolition waste
 - > industrial waste
 - > agricultural waste
- Some waste types may be subject to specific legal requirements (local law or international treaty).

8.2 Minimising waste

- Impacts from waste – link to pollution of air, land, and water
- The problems of waste disposal due to increased volumes from growing population and higher levels of consumption
- The business case for minimising waste
- The waste hierarchy:
 - > prevent
 - > reduce
 - > re-use
 - > recover (re-cycle followed by other methods of recovery, e.g., energy recovery)
 - > disposal
- Applying the waste hierarchy at every stage [cross reference element 3.1 - life cycle analysis](#).

Element 8: Control of waste and land use

8.3 Managing waste

- Recognition of the key steps: on site separation, storage, transportation and disposal
- Responsible waste management
- Barriers to reuse and recycling in an organisation, and how they can be overcome
- Segregation, identification and labelling
- Legal requirements for specific waste types [cross reference 8.1](#)
- Regulatory documentation.

8.4 Outlets available for waste

- Concept of waste as a resource – circular economy
- Landfill and incineration as ultimate disposal routes; advantages and disadvantages
- Domestic waste sites, waste transfer stations, waste treatment facilities involving recovery operations
- Issues associated with global waste trade
- Costs and the impact of export, landfill, and aggregate taxes.

8.5 Risks associated with contaminated land

- The potential effects of contaminated land on the environment
- Liabilities of an organisation from contaminated land, i.e., remediation, costs [cross reference 1.2](#).

Element 9: Sources and use of energy and energy efficiency

9.1 Use of fossil fuels

- Examples of fossil fuels
- Benefits and limitations of their use as an energy source
- Benefits and limitations of carbon offsetting.

9.2 Renewable sources of energy

- Benefits and limitations of the use of: solar, wind, hydroelectric, wave and tidal power, geothermal, nuclear, combined heat and power (CHP), biodigesters, methane recovery
- Issues of energy supply and usage in remote locations and developing countries (e.g. availability, efficiency, pollution)
- On-site energy generation and storage
- Benefits and limitations of using emerging technologies for energy.

9.3 Energy efficiency

- Benefits of energy efficiency:
 - > reduced environmental impact
 - > reduced costs
 - > improved reputation
- Monitoring requirements and arrangements [cross reference 2.2 and 5.3](#)
- Control measures available to increase energy efficiency:
 - > building and site design, use of building management systems
 - > implementing an energy management system such as ISO 50001
 - > planning, 'peak load management'
 - > equipment selection and maintenance
 - > insulation
 - > fuel choice for transport, new vehicle technologies
 - > reduction and optimisation of travel.