

No. 447

13 May 2005

**SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)**

In accordance with regulation 24(c) of the Standard Generating Bodies Regulations of 28 March 1998, the Standards Generating Body (SGB) for

WATER SECTOR

publishes the following unit standards for public comment.

This notice contains the titles, fields, subfields, NQF levels, credits, and purpose of the unit standards. The unit standards can be accessed via the SAQA web-site at www.saqqa.org.za. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, Haffield Forum West, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the qualification and unit standards should reach SAQA at the address below and no **later than 13 June 2005**. All correspondence should be marked **Standards Setting - SGB Water Sector** and addressed to

The Director: Standards Setting and Development
SAQA

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DUGMORE MPHUTHING

ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SAQA US ID	UNIT STANDARD TITLE		
116973	Read and interpret process, electrical, instrumentation and construction drawings		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	4	Level 4	Regular

SPECIFIC OUTCOME 1

Interpret basic drawings.

SPECIFIC OUTCOME 2

Identify and interpret construction drawings.

SPECIFIC OUTCOME 3

Define symbols and the principles of process drawings.

SPECIFIC OUTCOME 4

Demonstrate an understanding of instrumentation drawing.

SPECIFIC OUTCOME 5

Define symbols and concepts in an electrical circuit.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

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SAQA US ID	UNIT STANDARD TITLE		
116967	Demonstrate an understanding of national water related authorisation procedures		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	4	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of national water related authorisations.

SPECIFIC OUTCOME 2

Demonstrate an understanding of the General Authorisation Procedures.

SPECIFIC OUTCOME 3

Demonstrate an understanding of the Water Use licensing process.

SPECIFIC OUTCOME 4

Demonstrate an understanding of the reserve determination process.



SAQA US ID	UNIT STANDARD TITLE		
116998	Demonstrate knowledge of advanced processes for treating water		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	16	Level 5	Regular

SPECIFIC OUTCOME 1

Explain the theory and application of Dissolved Air Flotation (DAF) Processes.

SPECIFIC OUTCOME 2

Demonstrate knowledge and application of ozonation processes in water treatment.

SPECIFIC OUTCOME 3

Explain the applications of membrane processes.

SPECIFIC OUTCOME 4

Demonstrate knowledge and application of fluoridation and de-fluoridation techniques.

SPECIFIC OUTCOME 5

Explain the application of activated carbon in water treatment and the processes used.

SPECIFIC OUTCOME 6

Demonstrate understanding of the theory and application of the water stabilisation processes.

SPECIFIC OUTCOME 7

Explain and apply the theory and practice of demineralisation in water treatment.



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UNIT STANDARD:

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SAQA US ID	UNIT STANDARD TITLE		
117005	Demonstrate knowledge of environmental management tools for permitting and auditing in the water services sector		
SGB NAME		NSB 12	PROVIDER NAME
SGB Water Sector		Physical Planning and Construction	
UNIT STANDARD TYPE		FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular		Physical Planning and Construction	Civil Engineering Construction
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	12	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of Best Available Technology (BAT) concept using case studies within own scope of work.

SPECIFIC OUTCOME 2

Demonstrate an understanding of Cleaner Production (CP) and Waste Minimisation using case studies in own scope of work.

SPECIFIC OUTCOME 3

Demonstrate knowledge of Environmental Management Systems (EMS) and the application of its elements using a case study in own scope of work.

SPECIFIC OUTCOME 4

Demonstrate the ability to set an Industrial Effluent Standards using case studies.

SPECIFIC OUTCOME 5

Demonstrate the ability to evaluate impact of a discharge on infrastructure and receiving water resource environment.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY



UNIT STANDARD:

5

Demonstrate knowledge of good financial management practices

SAQA US ID	UNIT STANDARD TITLE		
116969	Demonstrate knowledge of good financial management practices		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	6	Level 5	Regular

SPECIFIC OUTCOME 1

Conduct work in an ethical and professional manner in accordance with workplace policies and procedures and relevant legislation.

SPECIFIC OUTCOME 2

Investigate alternative vendors and / or products to improve current cost and quality.

SPECIFIC OUTCOME 3

Demonstrate 'value chain' concepts and the principles of 'just in time' procurement.

SPECIFIC OUTCOME 4

Verify and recommend information from source documents, store and retrieve information.

SPECIFIC OUTCOME 5

Record cost information and prepare reports and returns in accordance with workplace procedures.

SPECIFIC OUTCOME 6

Describe the responsibilities, functions and qualities of the audit function.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

6

Demonstrate knowledge of industrial effluent permitting

SAQA US ID	UNIT STANDARD TITLE		
116985	Demonstrate knowledge of industrial effluent permitting		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 2

Demonstrate an understanding of permit administrative systems and processes in own scope of work.

SPECIFIC OUTCOME 3

Explain how standards are set.

SPECIFIC OUTCOME 4

Demonstrate an ability to collect and assess company information.

SPECIFIC OUTCOME 5

Demonstrate an ability to define monitoring requirements and assess company monitoring programme for the permit.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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SAQA US ID	UNIT STANDARD TITLE	
116971	Demonstrate knowledge of pollution Incident management and remediation	
SGB NAME	NSB 12	PROVIDER NAME
SGB Water Sector	Physical Planning and Construction	
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular	Physical Planning and Construction	Civil Engineering Construction

SPECIFIC OUTCOME 1

Explain the procedures for the management of a pollution incident prior to going on site using relevant legislation.

SPECIFIC OUTCOME 2

Manage the source of a pollution incident.

SPECIFIC OUTCOME 3

Manage the clean up of the receiving environment in a pollution incident when the source can be traced.

SPECIFIC OUTCOME 4

Manage the clean up of the receiving environment in a pollution incident when the source cannot be traced.

SPECIFIC OUTCOME 5

Demonstrate an understanding of post incident management.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

8

SAQA US ID	UNIT STANDARD TITLE		
116968	Demonstrate knowledge of the principles and processes of environmental costs and water service charges		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	4	Level 5	Regular

SPECIFIC OUTCOME 1

...he legal principles underpinning...
 environmental costs and water service charges.

SPECIFIC OUTCOME 2

Explain the principles of pollution and service charges.

SPECIFIC OUTCOME 3

Explain the different ways in which the cost of pollution affects industry and the problems associated with implementing the Polluter Pays Principle.

SPECIFIC OUTCOME 4

Demonstrate an understanding of the Waste Discharge Charge System.

SPECIFIC OUTCOME 5

Complete administration tasks related to industrial effluent charges in accordance with own work procedures.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

9

SAQA US ID	UNIT STANDARD TITLE		
116982	Demonstrate knowledge of water quality control		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	7	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate knowledge and understanding of the content of SABS 241 of 2001: Drinking Water.

SPECIFIC OUTCOME 2

Explain the health related aspects of water quality.

SPECIFIC OUTCOME 3

Explain the need for and methods of achieving the stabilisation of water.

SPECIFIC OUTCOME 4

Demonstrate the use of software packages to control water quality.

SPECIFIC OUTCOME 5

Explain the protection of the reticulation system against corrosion and scaling.



SAQA USID	UNIT STANDARD TITLE		
116979	Demonstrate knowledge of water related legislation and the responsibilities of management in terms of the acts		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate knowledge and understanding of the basic principles of the Act and Regulations in terms of own sector.

SPECIFIC OUTCOME 2

Explain the requirements for minimum compliance stipulated in the Acts.

SPECIFIC OUTCOME 3

Interpret the management controls required to achieve compliance.

SPECIFIC OUTCOME 4

Keep records in accordance with the requirements of the Acts and the Regulations.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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SAQA US ID	UNIT STANDARD TITLE		
116984	Demonstrate knowledge of water resources management		
SGB NAME		NSB 12	PROVIDER NAME
SGB Water Sector		Physical Planning and Construction	
UNIT STANDARD TYPE		FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular		Physical Planning and Construction	Civil Engineering Construction
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	7	Level 5	Regular

SPECIFIC OUTCOME 1

Explain catchment management and catchment management strategies.

SPECIFIC OUTCOME 2

Demonstrate an understanding of hybrid pollution control methodology.

SPECIFIC OUTCOME 3

Demonstrate knowledge of integrated pollution control in the water sector.

SPECIFIC OUTCOME 4

Analyse risk and make recommendations.

SAQA US ID	UNIT STANDARD TITLE		
116977	Demonstrate the use of simulation software to understand the principal mechanisms in wastewater treatment and sludge production processes		
SGB NAME		NSB 12	PROVIDER NAME
SGB Water Sector		Physical Planning and Construction	
UNIT STANDARD TYPE		FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular		Physical Planning and Construction	Civil Engineering Construction
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	7	Level 5	Regular

SPECIFIC OUTCOME 1

~~Use activated sludge process simulation programs.~~

SPECIFIC OUTCOME 2

Interpret activated sludge process simulation data.

SPECIFIC OUTCOME 3

Use secondary clarifier simulation programs.

SPECIFIC OUTCOME 4

Predict the affect of specific industrial effluents on the effluent discharged from a specific treatment works.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

13

Demonstrate understanding of sections of the occupational health and safety act (act 85 of 1993) applicable to the water sector

SAQA US ID		UNIT STANDARD TITLE	
117003		Demonstrate understanding of sections of the occupational health and safety act (act 85 of 1993) applicable to the water sector	
SGB NAME		NSB 12	PROVIDER NAME
SGB Water Sector		Physical Planning and Construction	
UNIT STANDARD TYPE		FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular		Physical Planning and Construction	Civil Engineering Construction
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	6	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate an understanding of the structure of the Act and the Regulations and the basic principles of the Act.

SPECIFIC OUTCOME 2

Explain the relevance of Section 16 and 37 of the Occupational Health and Safety Act and their application in the workplace.

SPECIFIC OUTCOME 3

Explain the relevance of Section 8,9,13, and 14 of the Occupational Health and Safety Act and their application in the workplace.

SPECIFIC OUTCOME 4

Demonstrate knowledge of the General Administrative Regulations and compliance with these regulations in terms of own workplace.

SPECIFIC OUTCOME 5

Demonstrate knowledge of health and safety representatives and health and safety committees in terms of section 17, 18, 19 and 20.

SPECIFIC OUTCOME 6

Evaluate if the applicable sections of the General Safety Regulations and Major Hazard Regulations are correctly interpreted and applied in the workplace.

SPECIFIC OUTCOME 7

Evaluate the application of General Machinery Regulations in own workplace.

SPECIFIC OUTCOME 8

Explain the applicable sections of the Construction Regulations.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY



SAQA US ID	UNIT STANDARD TITLE		
116972	Implement water reticulation and sanitation systems at the customer interface		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	6	Level 5	Regular

SPECIFIC OUTCOME 1

Explain different levels of water and sanitation services and evaluate services with respect to both the consumer and the service provider.

SPECIFIC OUTCOME 2

Explain and evaluate various financial models and resources for implementing water and sanitation services.

SPECIFIC OUTCOME 3

Explain the implementation and monitoring of institutional and social development programmes.

SPECIFIC OUTCOME 4

Evaluate performance and success of water and sanitation scheme.



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SAQA US ID		UNIT STANDARD TITLE	
116974		Manage and maintain water or wastewater reticulation	
SGB NAME		NSB 12	PROVIDER NAME
SGB Water Sector		Physical Planning and Construction	
UNIT STANDARD TYPE		FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Regular		Physical Planning and Construction	Civil Engineering Construction
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	18	Level 5	Regular

SPECIFIC OUTCOME 1

Plan resources for water / wastewater reticulation management.

SPECIFIC OUTCOME 2

Plan and monitor water / wastewater network maintenance programme.

SPECIFIC OUTCOME 3

Manage new and existing reticulation and maintenance operations.

SPECIFIC OUTCOME 4

Evaluate and analyse water / wastewater reticulation systems.

SPECIFIC OUTCOME 5

Monitor compliance of operations with established criteria at own.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

16

Manage the disposal of effluents, solids and sludge from a wastewater treatment works in terms of relevant legislation and guidelines

SAQA US ID	UNIT STANDARD TITLE		
116970	Manage the disposal of effluents, solids and sludge from a wastewater treatment works in terms of relevant legislation and guidelines		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	5	Level 5	Regular

SPECIFIC OUTCOME 1

Manage effluent re-use in accordance with relevant legislation and guidelines.

SPECIFIC OUTCOME 2

Manage effluent disposal to a water resource in accordance with relevant legislation.

SPECIFIC OUTCOME 3

Manage the disposal of solids (including screenings and grit/ detritus) in accordance with relevant legislation and guidelines.

SPECIFIC OUTCOME 4

Manage the beneficial disposal of sludge in accordance with relevant legislation and guidelines.



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UNIT STANDARD:

17

Manage water treatment processes

SAQA US ID	UNIT STANDARD TITLE		
116980	Manage water treatment processes		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	7	Level 5	Regular

SPECIFIC OUTCOME 1

Manage a raw water reservoir.

SPECIFIC OUTCOME 2

Manage the inlet of the works.

SPECIFIC OUTCOME 3

Monitor water balances and losses.

SPECIFIC OUTCOME 4

Plan routine and preventative maintenance and repairs.

SPECIFIC OUTCOME 5

Manage water reservoir.

SPECIFIC OUTCOME 6

Optimise operational costs.

SPECIFIC OUTCOME 7

Manage the disposal of waste products at own works.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

18

SAQA US ID	UNIT STANDARD TITLE		
116994	Monitor and control anaerobic and aerobic sludge digestion processes		
SGB NAME		NSB 12	PROVIDER NAME
SGB Water Sector		Physical Planning and Construction	
UNIT STANDARD TYPE	FIELD DESCRIPTION		SUBFIELD DESCRIPTION
Regular	Physical Planning and Construction		Civil Engineering Construction
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Explain and monitor the sludge digestion process.

SPECIFIC OUTCOME 2

Explain and monitor the heating process for anaerobic sludge digestion.

SPECIFIC OUTCOME 3

Explain and monitor biogas production and biogas usage.

SPECIFIC OUTCOME 4

Monitor and control digester performance.

SPECIFIC OUTCOME 5

Monitor maintenance and safety awareness of digestion process.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

19

Monitor and control the mechanisms and processes of sludge thickening, dewatering and drying

SAQA US ID	UNIT STANDARD TITLE		
117008	Monitor and control the mechanisms and processes of sludge thickening, dewatering and drying		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	15	Level 5	Regular

SPECIFIC OUTCOME 1

Describe and monitor the sludge thickening process.

SPECIFIC OUTCOME 2

Describe and monitor sludge dewatering process.

SPECIFIC OUTCOME 3

Describe and monitor sludge drying processes.

SPECIFIC OUTCOME 4

Describe and monitor the chemical dosing processes in the thickening, dewatering and drying of sludges.

SPECIFIC OUTCOME 5

Explain the effect of filtrate and centrate.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

20

SAQA US ID	UNIT STANDARD TITLE		
117000	Monitor and control the mechanisms of aerobic processes comprising of activated sludge, biofilter processes, ponds and wetlands		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	18	Level 5	Regular

SPECIFIC OUTCOME 1

Explain the theory of the activated sludge and biological filter processes.

SPECIFIC OUTCOME 2

Explain the theory of ponds and wetlands.

SPECIFIC OUTCOME 3

Evaluate and monitor the behaviour and design of secondary settling tanks.

SPECIFIC OUTCOME 4

Control nutrient removal using chemicals.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

21

Undertake regulatory environmental auditing in the water sector

SAQA US ID	UNIT STANDARD TITLE		
116975	Undertake regulatory environmental auditing in the water sector		
SGB NAME	NSB 12	PROVIDER NAME	
SGB Water Sector	Physical Planning and Construction		
UNIT STANDARD TYPE	FIELD DESCRIPTION	SUBFIELD DESCRIPTION	
Regular	Physical Planning and Construction	Civil Engineering Construction	
ABET BAND	CREDITS	NQF LEVEL	UNIT STANDARD TYPE
Undefined	8	Level 5	Regular

SPECIFIC OUTCOME 1

Demonstrate knowledge of administrative and legal framework for environmental auditing.

SPECIFIC OUTCOME 2

Demonstrate knowledge of communication, planning and audit tools using a simulation or a case study.

SPECIFIC OUTCOME 3

Demonstrate the ability to perform a regulatory environmental audit using simulation or a case study within own scope of work.

SPECIFIC OUTCOME 4

Demonstrate the ability to perform an in depth regulatory environmental audit using simulation or a case study within own scope of work.