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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

Physical, Mathematical, Computer and Life Sciences

publishes the following qualifications and unit standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the qualifications and unit standards. The qualifications and unit standards can be accessed via the SAQA web-site at **www.saqa.org.za**. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, Hatfield 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 15 August 2005.*** All correspondence should be marked **Standards Setting – SGB Environmental Science, Environmental Management and Waste Management** and addressed to

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DUGMORE MPHUTHING
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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Environmental Practice

SAQA QUAL ID	*QUALIFICATION TITLE*		
49752	National Certificate: Environmental Practice		
SGB NAME		*NSB 10*	*PROVIDER NAME*
SGB Environmental Sc/ Mgt & Waste Mgt		Physical, Mathematical, Computer and Life Sciences	
QUAL TYPE		*FIELD*	*SUBFIELD*
National Certificate		Physical, Mathematical, Computer and Life Sciences	Environmental Sciences
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUALIFICATION CLASS*
Undefined	122	Level 3	Regular-Unit Stds Based

PURPOSE AND RATIONALE OF THE QUALIFICATION

Purpose:

This qualification is the third in a series for practitioners in the field of environmental science, environmental management and waste management. This series of qualifications will equip practitioners with the skills, knowledge and values to contribute towards the wise and effective use and management of our natural resources and ecological systems.

The specific purpose of this qualification represents the skills, knowledge and understanding required by competent practitioners to:
> Operate and maintain complex machinery and equipment in an environmentally responsible manner
> Apply appropriate environmental principles to prevent, correct or remedy negative environmental impacts
> Lead a team and work together with others to promote sound environmental practices.

With this understanding, learners will be able to engage productively and responsibly in work or community-related activities in the field of environmental science, environmental management and waste management. This qualification will also serve as a basis for further learning, and will equip learners with the knowledge, skills and values to participate meaningfully in society and contribute towards developing sustainable communities.

This qualification is applicable to a range of contexts within the field of environmental science, environmental management and waste management, such as local government, public and private waste management enterprises, cultural or natural heritage sites, community projects, recycling and recovery of resources, controlling and eradication of invasive and alien species, rural development and site preparation or rehabilitation. It is also suitable for workers with environmental functions in a range of industries such as mining and chemical industry or manufacturing. The following are typical contexts in which this qualification can be assessed:
> Waste management related activities, eg
  > Materials recovery and buy-back centres
  > Waste reception
  > Landfill operations
> Water course cleaning, care and maintenance
> Care of public places, open areas, cultural and natural heritage sites
> Maintenance of parks and sports fields
> Community projects and job creation schemes relating to environmental practice
> General industrial and extraction, ie activities with an environmental care or improvement focus.

Rationale:

South Africa has a need to manage and protect its natural resources and ecological systems, while simultaneously using its resources in a sustainable manner to promote social, physical and economic development.

There is also a need for people as individuals, and as members of social or workplace communities, to become aware of their responsibilities towards the environment and to be empowered to make informed choices regarding their own activities and the impact that these activities have on the environment. There is also a need for people to develop practices which will ensure that their activities, individually and collectively, result in the sustainable use of resources and minimise impact on the environment.

Recent developments in environmental legislation have resulted in an increased demand for practitioners with the necessary skills, knowledge and values to fulfil these legislative requirements.

Such practitioners - as learners, as workers and as members of social communities - need to be equipped to engage with the complexities and challenges which arise from this need to ensure that use and development is socially, ecologically and economically sustainable.

This qualification will enable providers, assessors and learners to plan, implement and measure the outcomes of suitable learning programmes, or to recognize prior learning. It will recognise the skills, knowledge and values of learners who engage actively in activities relevant to the field of environmental science, environmental management and waste management. The qualification is suitable for learners who:

> Have attended environment related courses and then apply the knowledge gained to activities in a workplace or in a community, or
> Are already workers and have acquired the skills and knowledge without attending formal courses, or
> Are already active in the community and have acquired the skills and knowledge without attending formal courses, or
> Participate in skills programmes and the appropriate work experience or community work, or
> Are part of a learnership programme which integrates structured learning and work experience, or
> Acquire their learning through any combination of the above.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

It is assumed that the learner is competent in Communication and Mathematical Literacy at NQF level 2.

Recognition of prior learning:

This qualification may be obtained through the process of RPL. The learner should be thoroughly briefed prior to the assessment and support should be provided to assist the learner in the process of developing a portfolio. While this is primarily a context-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the Exit Level Outcomes.

ACCESS TO THE QUALIFICATION

Access to this qualification is open.

However, it is preferable that learners first complete the National Certificate: Environmental Practice: Level 2 or equivalent before accessing this qualification. The learner will need access to suitable specialised vehicles and/or complex machinery and equipment.

QUALIFICATION RULES

All Fundamental (40) credits and Core (70) credits are compulsory. Then a learner has to chose 12 elective credits from the elective component to make up the minimum required credits of 122. If a learner selects First Aid as an elective all 3 first aid standards should be done.

EXIT LEVEL OUTCOMES

The Exit Level Outcomes for this qualification reflect a combination of Specific Outcomes and Critical Cross-Field Education and Training Outcomes. The way in which the Critical Cross-Field Outcomes have been advanced through the learning required for this qualification is embedded in the way in which the unit standards have been constructed. Critical Cross-Field Outcomes form the basis for acquiring skills, knowledge and values. The application of these in a specific context results in the achievement of Specific

Outcomes. The integration of Specific Outcomes from a variety of unit standards results in the ability to achieve the Exit Level Outcomes.

Exit level outcome 1
> Operate and maintain specialised vehicles and/or complex machinery and equipment.

> Range: Includes movable and static equipment for material treatment and processing functions which include consolidating, packaging (collection and handling), transferring and transporting materials, waste treatment and recycling, waste disposal, etc.

Exit level outcome 2
> Apply principles of environmental monitoring to identify anomalies and report on conditions and incidents related to the learner's area of responsibility, and implement appropriate action.

Exit level outcome 3
> Use and handle resources in a sustainable way within the framework of applicable standards

> Range: Resources include natural resources, materials, energy, waste, etc.Handle includes transporting, storing, disposing of, classifying, etc. This outcome also includes an awareness of primary or fundamental pollution control equipment for soil, air, water, noise and energy. Standards are levels of performance set by the organisation, by legislation or by regulations.

Exit level outcome 4
> Provide input for environmental management processes.

> Range: Environmental management processes refer to planning, trend analysis, monitoring, auditing and reporting in terms of statutory requirements, etc. Input refers to collected data such as measurements, maintenance records, samples, material usage, etc

Exit level outcome 5
> Interact with supervisor and lead a team within an operational context.

> Range: Lead includes coordinating, scheduling, planning, organising, and evaluating operational activities. The team is led to complete routine tasks.

Exit level outcome 6
> Communicate with supervisors, the public, customers and colleagues to pass on information and to resolve problems or complaints.

ASSOCIATED ASSESSMENT CRITERIA

Assessment criteria associated with Exit level outcome 1

> Operations related to the process are monitored and controlled in terms of safety, health and environmental considerations.
> Range: The process includes activities such as operating an incinerator; handling effluent; using truck-mounted materials handling and compacting equipment; operating forklifts; liquid bulk loading; baling, compacting and shredding waste; checking and testing samples; monitoring and checking the quality of materials; mixing and preparing ingredients and chemicals; monitoring the flow and quality of materials and ingredients; monitoring and controlling the use of consumables.

> Operational incidents, events and problems are identified and addressed appropriately.

> The process is monitored and adjustments are made to maintain operational standards.

> Procedures are followed and enforced correctly.

> The product produced or service delivered meets operational requirements specified.
> Range: Product refers to results of an action or process, eg compacted materials. Service refers to work done to prevent, correct or remedy environmental impacts, eg operating an incinerator. Operational requirements refer to those standards set at the site by the team, by the organisation and by legislation or regulation.

Assessment criteria associated with Exit level outcome 2

> Basic principles of environmental monitoring and inspection are demonstrated in practice.
> Range: Awareness of monitoring and measuring techniques for environmental parameters.

> Appropriate tools and protocols are used to measure conformance to quality standards and to identify deviations.
> Range: Conformance and deviations relate to components and interrelationships between components of the environment and include the impact of human activities on the components of the environment. (All references to the impact of human activities on the environment implicitly include the subsequent impact of the degraded environment on human health and well-being in accordance with accepted definitions of the environment.) Used: where applicable, includes selecting appropriate tools and protocols.

> Action plans to address the deviations are developed and implemented, and their outcomes evaluated.

> Deviations from set standards are prevented, corrected, or remedied
> Range: Prevented, corrected, or remedied includes early detection and appropriate solutions (ie within the learner's capacity and authority) Standards are levels of performance set by the organisation, by legislation or by regulations.

Assessment criteria associated with Exit level outcome 3

> Preventive measures are applied to control the impact of incorrectly used and handled resources on the environment.
> Range: Includes management of impacts.

> Safety, health, security and environmental safeguards are applied, monitored and controlled at all times.

> Use of resources is monitored and controlled on an on-going basis.
> Range: Includes application of relevant environmental management tools and protocol.

> Resources are used in a sustainable manner.
> Range: Includes identifying opportunities for, and optimising, wise use of resources.

Assessment criteria associated with Exit level outcome 4

> Data input equipment is selected, used and maintained.
> Range: Data input equipment can range from hand held data recording equipment to weighbridges, etc.

> Relevant, accurate data is collected, recorded and managed.
> Range: Includes sample collection, taking measurements, reporting, etc.

> The purpose of the environmental management processes and the relevance of the data is explained.
> Range: Includes basic knowledge and understanding of EMS audit principles and of the requirements of the information system as defined in relevant environmental standards.

Assessment criteria associated with Exit level outcome 5

> Tasks and resources are allocated, and productivity and quality of work is monitored and controlled on an on-going basis.
> Range: Includes knowledge of employment conditions, job descriptions, time sheets, etc.

> Interpersonal skills are demonstrated at all times.
> Range: Includes approachability, leadership skills, establishing and maintaining relationships, resolving conflict.

> Health, safety and environmental standards are ensured at all times.

> Team targets are met within quality standards.

Assessment criteria associated with Exit level outcome 6

> Appropriate responses are made to public and customer comments.
> Range: Public and customer includes the community.
Appropriate responses include recording, providing information, referring to supervisor, etc, and include knowledge of the type of communication which should be referred to a higher level of authority.

> Correct information is communicated to relevant parties.
> Range: Parties include supervisors, customers, team members, the public (eg hand out pamphlets, make announcements, answer queries).

> Participation in meetings is constructive and contributes to the overall purpose.

Integrated Assessment

In order to achieve the aims of integrated assessment it is recommended that the assessor assesses all components of the learning in an integrated way and that credits are awarded for the unit standards during this assessment.

It is recommended that learning components (ie fundamental and core) are combined into assignments and projects which are then included in the portfolio of evidence. This will form the basis for the bulk of the assessment. The assessor can then focus on specific areas for further probing and verification.

The assessment process should:

> Cover the explicit activities required for the qualification as well as the understanding of the concepts and principles which underpin the activities
> Establish how the Critical Cross-Field Outcomes have been advanced by the learning process.

The integrated assessment must be based on a summative assessment guide. The guide will spell out how the assessor will assess different aspects of the performance and will include:

> Looking at records and reports in the portfolio and reviewing previous assessments
> Asking questions and initiating short discussions to test understanding
> Observing the learner at work (in the primary activity as well as in other interactions).

The learner may choose in which language s/he wants to be assessed. This should be established as part of a process of preparing the learner for assessment and familiarising the learner with the approach being taken.

While this is primarily a context-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the Exit Level Outcomes.

Assessors should also evaluate evidence that the learner has been performing consistently to standard over a period of time.

INTERNATIONAL COMPARABILITY

Qualifications which are directly comparable with this one in terms of level and scope have not been identified. The fact that this is a generic qualification that must serve the diverse needs of the broad field of environmental science, environmental management and waste management, puts it in a class of its own. Internationally, qualifications related to environmental science and environmental management fall into the sphere of higher education, apart from a few isolated examples at supervisory and first-tier management level. There are a limited number of qualifications which focus on waste management, such as the Scottish Vocational Qualifications and the National Vocational Qualifications of England, Wales and Northern Ireland. The approach taken in these qualifications aligns broadly with the approach taken here: qualifications are standards-based, learning is workplace-based, assessment is observation- and portfolio-based, and skills and knowledge are acquired, practiced and assessed within contexts relevant to the learner. However, this (ie the South African) qualification places a greater requirement on the learner to demonstrate successful integration of the knowledge and skills acquired. Another recent development has been the initiative by the International Solid Waste Association to develop qualifications and promote training internationally. Developments are also taking place in other parts of the world, notably South America.

ARTICULATION OPTIONS

This qualification articulates with the National Certificate in Environmental Practice: NQF 4.

This qualification has been designed and structured so that qualifying learners can move from one context to another. Employers or institutions should be able to evaluate the outcomes of this qualification against the needs of their context and structure top-up learning appropriately. Equally, holders of other qualifications

may be evaluated against this qualification for the purpose of RPL.

This qualification has been designed as a generic qualification which will serve the diverse needs of the field of environmental science, environmental management and waste management. While a certain amount of the learning is applicable across the field, the balance will be related to the learner's context. Each context will have a different focus and this will determine what qualifications, both horizontally and vertically, will articulate with this one.

MODERATION OPTIONS

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor or moderator with the relevant ETQA.
> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA.
> Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQAs policies and guidelines for assessment and moderation.
> Moderation must include both internal and external moderation of assessments at exit points of the qualification, unless ETQA policies specify otherwise.
> Moderation should also encompass achievement of the competence described both in individual unit standards as well as the integrated competence described in the qualification.
> Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited for assessment by the relevant ETQA.
> To ensure that national standards are maintained, the final assessment should be conducted on the following basis, which will be under the control of the relevant ETQAs. National assessment of written papers and/or practical assignments needs to be undertaken, by the relevant ETQA. This must include the necessary assessment tools (e.g. marking schemes) to ensure consistent assessment. The ETQA itself or a nominated body or bodies can perform this function.
> Assessment can be institutional or workplace based and must be done by a registered assessor.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

The following criteria should be applied by the relevant ETQA:

> Appropriate qualification in a relevant field of environmental science, environmental management and waste management at NQF Level 4 with a minimum of 2 years' experience in a relevant context.
> Appropriate experience and understanding of assessment theory, processes and practices.
> Good interpersonal skills and ability to balance the conflicting requirements of:
  > Maintaining national standards
  > The interests of the learner
  > The need for transformation and redressing the legacies of the past
  > The cultural background and language of the learner.
> Registration as an assessor with a relevant ETQA.

NOTES

N/A

UNIT STANDARDS
(Note: A blank space after this line means that the qualification is not based on Unit Standards.)

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	13223 Apply safety, health and environmental protection procedures	Level 3	6	Reregistered
Core	13912 Apply knowledge of self and team in order to develop a plan to enhance team performance	Level 3	5	Registered
Core	14019 Plan team work functions and complete reports	Level 3	4	Registered
Core	14050 Care for customers in a community environment	Level 3	5	Registered
Core	115093 Control workplace hazardous substances	Level 3	4	Registered
Core	116257 Explain human resource policies and procedures	Level 3	3	Registered
Core	116275 Apply routine maintenance and servicing plans and procedures	Level 3	3	Registered
Core	119821 Implement lean work practices to ensure sound environmental management practices	Level 3	10	Draft - Prep for P Comment
Core	119822 Collect data for environmental management purposes	Level 3	8	Draft - Prep for P Comment

Core	119829	Use appropriate environmental management tools and protocols to detect and respond to specific impacts	Level 3	10	Draft - Prep for P Comment
Core	119830	Operate specialised vehicles and/or complex static or moving machinery and equipment	Level 3	12	Draft - Prep for P Comment
Elective	117924	Use a Graphical User Interface (GUI)-based word processor to format documents	Level 2	5	Registered
Elective	11498	Attend and give evidence in court	Level 3	6	Registered
Elective	14534	Apply knowledge of community issues in relation to development projects	Level 3	4	Registered
Elective	14578	Erect palisade fencing	Level 3	4	Registered
Elective	14581	Repair/replace minor structures	Level 3	10	Registered
Elective	113909	Coach a team member in order to enhance individual performance in work environment	Level 3	5	Registered
Elective	114952	Apply problem-solving techniques to make a decision or solve a problem in a real life context	Level 3	2	Registered
Elective	116496	Provide primary emergency care for bleeding and wounds	Level 3	1	Registered
Elective	116497	Provision of primary emergency care intervention for shock, unconsciousness and fainting in the working place	Level 3	1	Registered
Elective	116524	Measure environmental factors and take appropriate action	Level 3	15	Registered
Elective	116534	Carry out basic first aid treatment in the workplace	Level 3	2	Registered
Elective	116940	Use a Graphical User Interface (GUI)-based spreadsheet application to solve a given problem	Level 3	6	Registered
Elective	117085	Conduct basic forestry map reading	Level 3	2	Registered
Fundamental	7456	Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5	Reregistered
Fundamental	8968	Accommodate audience and context needs in oral communication	Level 3	5	Reregistered
Fundamental	8969	Interpret and use information from texts	Level 3	5	Reregistered
Fundamental	8970	Write texts for a range of communicative contexts	Level 3	5	Reregistered
Fundamental	8973	Use language and communication in occupational learning programmes	Level 3	5	Reregistered
Fundamental	9010	Demonstrate an understanding of the use of different number bases and measurement units and an awareness of error in the context of relevant calculations	Level 3	2	Reregistered
Fundamental	9012	Investigate life and work related problems using data and probabilities	Level 3	5	Reregistered
Fundamental	9013	Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4	Reregistered
Fundamental	114941	Apply knowledge of HIV/AIDS to a specific business sector and a workplace.	Level 3	4	Registered

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UNIT STANDARD: 1

Implement lean work practices to ensure sound environmental management practices

SAQA US ID	*UNIT STANDARD TITLE*		
119821	Implement lean work practices to ensure sound environmental management practices		
SGB NAME		*NSB 10*	*PROVIDER NAME*
SGB Environmental Sc/ Mgt & Waste Mgt		Physical, Mathematical, Computer and Life Sciences	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Environmental Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	10	Level 3	Regular

SPECIFIC OUTCOME 1

Explain and describe concepts related to lean work practices.

SPECIFIC OUTCOME 2

Identify opportunities for introducing lean work practices.

SPECIFIC OUTCOME 3

Develop an action plan to implement new or modified practices.

SPECIFIC OUTCOME 4

Assess, evaluate and report the impact of new or modified practices.

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UNIT STANDARD: 2

Collect data for environmental management purposes

SAQA US ID	*UNIT STANDARD TITLE*		
119822	Collect data for environmental management purposes		
SGB NAME		*NSB 10*	*PROVIDER NAME*
SGB Environmental Sc/ Mgt & Waste Mgt		Physical, Mathematical, Computer and Life Sciences	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Environmental Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	8	Level 3	Regular

SPECIFIC OUTCOME 1

Demonstrate understanding of the data collection requirements and plan the sequence of actions required to collect the data.

SPECIFIC OUTCOME 2

Obtain and prepare equipment and documentation required for data collection.

SPECIFIC OUTCOME 3

Collect and record data.

SPECIFIC OUTCOME 4

Care for and store tools and equipment used.

SPECIFIC OUTCOME 5

Complete and process all applicable documentation.

SPECIFIC OUTCOME 6

Explain why the data is required.

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UNIT STANDARD: 3

Use appropriate environmental management tools and protocols to detect and respond to specific impacts

SAQA US ID	*UNIT STANDARD TITLE*		
119829	Use appropriate environmental management tools and protocols to detect and respond to specific impacts		
SGB NAME		*NSB 10*	*PROVIDER NAME*
SGB Environmental Sc/ Mgt & Waste Mgt		Physical, Mathematical, Computer and Life Sciences	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Environmental Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	10	Level 3	Regular

SPECIFIC OUTCOME 1

Monitor and evaluate activities and processes.

SPECIFIC OUTCOME 2

Use data from monitoring process to identify key activities and processes impacting on the environment.

SPECIFIC OUTCOME 3

Select and use appropriate tools and protocols to assess impact on the environment.

SPECIFIC OUTCOME 4

Develop and implement an appropriate plan to address the deviations and evaluate results.

SPECIFIC OUTCOME 5

Record and report interventions and results achieved.

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UNIT STANDARD: 4

Operate specialised vehicles and/or complex static or moving machinery and equipment

SAQA US ID	*UNIT STANDARD TITLE*		
119830	Operate specialised vehicles and/or complex static or moving machinery and equipment		
SGB NAME		*NSB 10*	*PROVIDER NAME*
SGB Environmental Sc/ Mgt & Waste Mgt		Physical, Mathematical, Computer and Life Sciences	
UNIT STANDARD TYPE		*FIELD DESCRIPTION*	*SUBFIELD DESCRIPTION*
Regular		Physical, Mathematical, Computer and Life Sciences	Environmental Sciences
ABET BAND	*CREDITS*	*NQF LEVEL*	*UNIT STANDARD TYPE*
Undefined	12	Level 3	Regular

SPECIFIC OUTCOME 1

Monitor condition and operation of vehicles, machinery or equipment and resolve problems.

SPECIFIC OUTCOME 2

Operate vehicles, machinery or equipment according to workplace standards and with regard to their impact on the environment.

SPECIFIC OUTCOME 3

Record and report information related to the condition and operation of the vehicle, machine or equipment.

SPECIFIC OUTCOME 4

Discuss and explain concepts and principles related to the operation of equipment.