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GOVERNMENT NOTICES

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

No. 945 **13 August 2004**

Established in terms of Act 38 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Chemical Industries

Registered by NSB 06, Manufacturing, Engineering and Technology, publishes the following unit standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the unit standard. The unit standard 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 unit standards should reach SAQA at the address ***below and no later than 13 September 2004.*** All correspondence should be marked **Standards Setting – SGB for Chemical Industries** and addressed to

The Director: Standards Setting and Development
SAQA
Attention: Mr. D Mphuthing
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JOE SAMUELS
DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

Further Education and Training Certificate: Manufacturing and Assembly Operations Supervision

SAQA QUAL ID	*QUALIFICATION TITLE*	
48915	Further Education and Training Certificate: Manufacturing and Assembly Operations Supervision	
SGB NAME	Chemical Industries SGB	
ABET BAND	*PROVIDER NAME*	
Undefined		
QUALIFICATION CODE	*QUAL TYPE*	*SUBFIELD*
MET-4-National Certificate	National Certificate	Manufacturing and Assembly
MINIMUM CREDITS	*NQF LEVEL*	*QUALIFICATION CLASS*
150	Level 4	Regular-Unit Stds Based
SAQA DECISION NUMBER	*REGISTRATION START DATE*	*REGISTRATION END DATE*

PURPOSE OF THE QUALIFICATION

A person acquiring this qualification will be able to lead a team of people, schedule resources; monitor quality control practices within a specialized manufacturing or other engineering related industries.

This qualification will allow a person to advance to learning in a variety of manufacturing, engineering and management equivalent types of qualifications at NQF 5. This qualification will contribute to the full development of the learner within the manufacturing of engineering domains by providing recognition, further mobility and transportability within the manufacturing and engineering fields.

The skills, knowledge and understanding demonstrated within this qualification are essential for social and economic transformation and contribute to the progression and economic growth within the manufacturing and engineering fraternities.

Rationale of the qualification

This qualification reflects the workplace-based needs of employers and employees within various manufacturing disciples, both now and for the future.

The range of typical learners are individuals with specialised manufacturing or engineering competencies, planning of production resources, monitoring of quality control practices in the manufacturing environment whilst advising and leading team members in the workplace.

A qualifying learner could operate as a valuable leader within any manufacturing process. This will provide valuable training, embedded knowledge and fundamental experience towards a career within manufacturing, engineering and management that will be beneficial to an individual and also to the economy/ industry.

This qualification provides the learner with accessibility to be employed within the manufacturing and related industries and will provide portability and articulation possibilities within the broad manufacturing and engineering domains.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

A context and specialty related manufacturing qualification at NQF 3.

Recognition of prior learning

This qualification may be achieved in part or completely through the recognition of prior learning, which includes formal, informal and non-formal learning and work experience. A learner wishing to be assessed towards this qualification may arrange to do so without attending any further training or education. The assessor and the learner will jointly decide on the most appropriate method to be taken.

QUALIFICATION RULES

N/A

EXIT LEVEL OUTCOMES

The outcomes are specified in terms of specific and critical cross-field outcomes.

1. Interpret and use knowledge regarding manufacturing, safety and quality control principles and practices.
2. Organise and lead a work team to ensure achievable objectives
3. Organise and control production scheduling and planning in a manufacturing plant
4. Implement performance management tools to optimise individual and team functioning in the place of work.

ASSOCIATED ASSESSMENT CRITERIA

1.
> Compare and interpret available information to solve problems related to the manufacturing performance.
> Report findings and recommendations according to safety, legislative and standard operating procedures.

2.
> Lead a team by allocating work and related team outputs to ensure project successes.
> Manage time and deadlines in a department or division or section.
> Provide constructive feedback to the team to enhance performance and outputs.
> Analyse and evaluate information in unfamiliar problem situations.

3.
> Conduct a formal meeting to ensure consistency and flow during shift or project handovers.
> Maintain production efficiencies and safety in a manufacturing plant.
> Ensure that utilising resources to satisfy demand meet production targets.
> Organise manufacturing or production related planning and scheduling supporting the supply & demand system.

4.
> Develop a plan of action to enhance performance of a team.
> Use a variety of strategies to deal with conflict in the team.
> Control the coaching or training intervention of a fellow colleague.

The assessment criteria of the qualification are embodied in the unit standards. The knowledge, skills and understanding will be assessed across several specialised contexts and are clearly defined within the relevant specific outcomes, assessment criteria and range statements within these unit standards.

Integrated Assessment

The applied competence (practical, foundational and reflexive competencies) of this qualification will be achieved if a candidate is able to achieve all the exit level outcomes of this qualification.

Iidentifying and solving of problems, team work, organising one-self, using applied science, acknowledgement of actions and reactions in the world as a set of related systems must be assessed during any combination of practical, foundational and reflexive competencies assessment methods and tools to determine the whole person development and integration of applied knowledge and skills.

Applicable assessment tool(s) are developed that ensure that foundational, reflective and embedded knowledge, problem solving and the application of the world as a set of related systems within the manufacturing and supervision fields are assessed to ensure integrative assessment.

A detailed portfolio of evidence is required to prove practical, applied and foundational competencies of the learner.

Assessors and moderators should develop and conduct their own integrated assessment by making use of a range of formative and summative assessment methods. Assessors should assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.

Unit standards in the qualification must be used to assess specific and critical cross-field outcomes. During integrated assessments the assessor should make use of formative and summative assessment methods and should assess combinations of practical, applied, foundational and reflective competencies.

INTERNATIONAL COMPARABILITY

Benchmarking was done against international standards and qualifications from the NVQ from Britain, New Zealand Qualification Authority, the American Qualification Curriculum and Assessment Authority Frameworks and the US Manufacturing Skills Standards.

A vast range of manufacturing management qualifications could be found. The level, qualification outcomes, notional learning time and degree of difficulty do compare favourable.

Comparability with the current South African framework (SA NQF), eight (8) comparable qualifications were found. All of these qualifications reflect a specific specialty area such as, food service, front office, house keeping, building or civil engineering construction. The three (3) Civil engineering supervision qualifications refer to a further focus area being road works and water & wastewater. It is clear that better synergy could be reflected within some of these qualifications. Other industries cannot make use of these qualifications due to the titles and industry recognition. We hereby recommend a generic approach towards the manufacturing related supervision to facilitate future coherence and recognition.

A qualification "National Certificate in Manufacturing Supervision: NQF Level 4", as currently being developed by the MERSETA stakeholder grouping, were evaluated. This qualification has elements of manufacturing related aspects, but the main focus as reflected in the core component of the qualification refers to generic supervision.

Therefore the proposed qualification as presented by Further Education and Training Certificate in Manufacturing and Assembly Operations Supervision NQF 4 speaks to the FETC policy criteria and provides a clear vertical progression from operator related qualifications, into manufacturing and assembly supervision qualification.

ARTICULATION OPTIONS

This qualification will allow a person to advance to learning for manufacturing or engineering management qualifications at NQF level 5 or a similar qualification at this level. The qualification provides the learner with flexibility to pursue different careers in the manufacturing industry and articulation within the engineering industries. The level of flexibility with the range of electives will allow the individual to pursue further learning within the engineering or manufacturing industry.

MODERATION OPTIONS

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor 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; in terms of agreements reached around assessment and moderation between ETQAs (including professional bodies); and in terms of the moderation guideline detailed immediately below.

> Moderation should also encompass achievement of the competence described both in individual unit standards, exit level outcomes 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 by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

For an applicant to register as an assessor, the applicant needs:

> Interpersonal skills, subject matter expertise and assessment experience.

> The assessor needs to be competent in the planning and conducting assessment of learning outcomes as described in the unit standards Plan and conduct assessment of learning outcomes NQF level5.

> The subject matter experience must be well developed within the field of materials manufacturing and quality assurance practices.

> The assessor must have completed:
- A similar qualification or from the same family of qualifications, at or above NQF 5, or
- The subject matter experience of the assessor can be established by recognition of prior learning.

> Assessors need to be registered with the relevant Education and Training Quality Assurance Body.

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	13914 Conduct a formal meeting	Level 3	3	Registered
Core	10981 Supervise work unit to achieve work unit objectives (individuals and teams)	Level 4	12	Registered
Core	11473 Manage individual and team performance	Level 4	8	Registered
Core	13952 Demonstrate basic understanding of the Primary labour legislation that impacts on a business unit	Level 4	8	Registered
Core	14586 Monitor and control quality control practices in a manufacturing/engineering environment	Level 4	8	Registered
Core	10631 Demonstrate an understanding of manufacturing, principles, methodologies and processes	Level 5	7	Registered
Core	12665 Control production and resource scheduling and planning in a manufacturing environment	Level 5	8	Registered
Elective	9889 Set up production machines	Level 4	30	Registered
Elective	9890 Anticipate and troubleshoot machine malfunctioning	Level 4	16	Registered
Elective	9950 Plan learning events	Level 4	10	Reregistered
Elective	10388 Interpret basic financial statements	Level 4	3	Registered
Elective	12455 Perform the role of a safety, health and environmental protection representative	Level 4	3	Registered
Elective	116002 Conduct explosives environmental testing and interpret the results	Level 4	8	Draft - Prep for P Comment
Elective	116007 Conduct explosives performance testing and interpret results	Level 4	10	Draft - Prep for P Comment
Elective	7818 Conduct on-the-job coaching	Level 5	5	Reregistered
Elective	7978 Plan and conduct assessment of learning outcomes	Level 5	15	Reregistered
Elective	11286 Institute disciplinary action	Level 5	8	Registered
Elective	14609 Participate in management of conflict	Level 5	4	Registered
Elective	10985 Conduct a disciplinary hearing	Level 6	5	Registered
Fundamental	8968 Accommodate audience and context needs in oral communication	Level 3	5	Registered
Fundamental	8969 Interpret and use information from texts	Level 3	5	Registered
Fundamental	8970 Write texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	8973 Use language and communication in occupational learning programmes	Level 3	5	Registered
Fundamental	7468 Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues	Level 4	2	Registered
Fundamental	8974 Engage in sustained oral communication and evaluate spoken texts	Level 4	5	Registered
Fundamental	8975 Read analyse and respond to a variety of texts	Level 4	5	Registered
Fundamental	8976 Write for a wide range of contexts	Level 4	5	Registered
Fundamental	8979 Use language and communication in occupational learning programmes	Level 4	5	Registered

Fundamental	9015 Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	5	Registered
Fundamental	9016 Represent analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 4	4	Registered

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Know and apply technology in the storage, blending and distribution of petroleum and chemical products

SAQA US ID	*UNIT STANDARD TITLE*
116040	Know and apply technology in the storage, blending and distribution of petroleum and chemical products

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 2	20

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe technology and equipment used in transfer, storage and blending operations carried out.

SPECIFIC OUTCOME 2

Carry out calculations used in storage, blending and distribution facilities and operations.

SPECIFIC OUTCOME 3

Contribute to achievement of safety, health and environmental goals applicable at a tank farm.

SPECIFIC OUTCOME 4

Contribute to the achievement of productivity and economic goals of a particular facility.

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Operate an effluent treatment plant

SAQA US ID	*UNIT STANDARD TITLE*
116024	Operate an effluent treatment plant

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 2	12

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of chemical effluents and their treatment.

SPECIFIC OUTCOME 2

Operate an effluent treatment plant.

SPECIFIC OUTCOME 3

Conduct supporting activities related to effluent treatment.

SPECIFIC OUTCOME 4

Demonstrate knowledge of operating an effluent treatment plant during upset or emergency situation.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Transfer liquids and/or gases between tanks

SAQA US ID	*UNIT STANDARD TITLE*
116027	Transfer liquids and/or gases between tanks

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 2	12

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare to transfer liquids and/or gases.

SPECIFIC OUTCOME 2

Transfer liqid and/or gas between tanks or between tanks (containers) and process operations.

SPECIFIC OUTCOME 3

Carry out the post transferring activities.

SPECIFIC OUTCOME 4

Monitor and maintain tanks used to store liquids and/or gases.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Transfer of liquids and/or gases between tanks and road/rail vehicles

SAQA US ID	*UNIT STANDARD TITLE*
116035	Transfer of liquids and/or gases between tanks and road/rail vehicles

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 2	12

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare to transfer liquids and/or gases to or from fixed tanks and vehicle mounted tanks.

SPECIFIC OUTCOME 2

Transfer liquids and/or gases to or from fixed tanks and vehicle mounted tanks.

SPECIFIC OUTCOME 3

Monitor and maintain tanks during transportation.

SPECIFIC OUTCOME 4

Take action during non-routine or dangerous conditions.

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Transfer petroleum and/or chemical products from ship to shore or shore to ship

SAQA US ID	*UNIT STANDARD TITLE*
116036	Transfer petroleum and/or chemical products from ship to shore or shore to ship

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 3	15

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of transferring liquids and/or gases to or from ships/tankers.

SPECIFIC OUTCOME 2

Prepare to transfer bulk liquids and/or gases to or from ships/tankers.

SPECIFIC OUTCOME 3

Transfer liquids and gases to or from ships/tankers.

SPECIFIC OUTCOME 4

Carry out the post-transferring activities.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Chemical Liquid, Gas Storage and Transfer

SAQA QUAL ID	*QUALIFICATION TITLE*	
48890	National Certificate: Chemical Liquid, Gas Storage and Transfer	
SGB NAME	Chemical Industries SGB	
ABET BAND	*PROVIDER NAME*	
Undefined		
QUALIFICATION CODE	*QUAL TYPE*	*SUBFIELD*
MET-2-National Certificate	National Certificate	Manufacturing and Assembly
MINIMUM CREDITS	*NQF LEVEL*	*QUALIFICATION CLASS*
120	Level 2	Regular-Unit Stds Based
SAQA DECISION NUMBER	*REGISTRATION START DATE*	*REGISTRATION END DATE*

PURPOSE OF THE QUALIFICATION

The knowledge and skills described in this qualification could empower the learner to contribute to the effective blending, storage and distribution of chemical products (typically hazardous liquids and gases), as is done in tank farms, depots and distribution outlets. This includes activities such as storing, transferring, sampling, blending, drumming and loading/off loading of these products.

The understanding of relevant technology is also required to empower the learner to make decisions and take responsibility for work in the execution of storing, handling (moving/loading/drumming) of chemical products (typically flammable/hazardous liquids and gases).

An understanding of the context in which the particular tasks are to be performed will also enable the learner to conform to safety, health, and environmental and quality criteria in the execution of the particular jobs. It also forms the basis for more advanced learning and could contribute to the full development of the learner, providing recognition within the chemical environment. It offers potential mobility and transportability to other careers, such as chemical manufacturing and the distribution of chemical products.

The skills, knowledge and understanding demonstrated within this qualification are essential to achieve the increased employability and productivity needed for personnel, as well as potential social and economic transformation and economic growth in the chemical industries.

The approach in which this is to be achieved is described in the exit level outcomes.

Rationale for the qualification:

This qualification reflects the need in the chemical industries for personnel with the knowledge, skills and understanding to perform storage, blending and distribution of chemical products (typically flammable/hazardous liquids or gases). This is a need expressed by employers and employees to address current and future needs. This qualification enables learners to access employment within the petroleum and related sub-sectors of the chemical industries.

The qualification is appropriate for people who have an understanding of the chemical industry and intend to follow a career in chemical liquid, gas storage and transfer fields.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

The following knowledge and skills at NQF Level 1 or the equivalent would be required:

> Knowledge, comprehension and application of communication, mathematics and natural science.
> A basic understanding of the chemical or related industries.
> Industry related technology, safety, health and environmental knowledge, as well as issues concerning quality, housekeeping, hygiene practices and procedures will contribute to the learner's achievement of this qualification.
> Performing inspections, lubrication and basic maintenance on equipment is also required.

Additional learning interventions will be needed should a diagnostic assessment indicate that there are areas related to the above where knowledge and skills are lacking.

Recognition of Prior Learning:

This qualification may be achieved through the recognition of prior learning, which includes formal, informal and non-formal learning, and work experience.

Appropriate evidence of competence may include work records, testimonials, records of learning and assessment prior to the NQF, which maybe included in a portfolio of evidence.

QUALIFICATION RULES

The following table is a summary of attributes of the unit standards listed below, which indicates that the qualification is at Level 2.

Attribute, Level, Justification

> Skills: Level 2: Moderate in range
> Procedures: Level 2: Established and familiar
> Context: Level 2: Established and routine
> Knowledge: Level 2: Some relevant theoretical
> Information processing: Level 2: Basic processing of readily available information
> Problem Solving: Level 2: Known solutions to familiar problems
> Orientation of activities: Level 2: Directed, with limited autonomy
> Application of responsibility: Level 2: Under general supervision and quality control
> Orientation of scope of responsibility: Level 2: Some responsibility for the quantity and quality of output, and possible responsibility for the output of others.

Average Level: 2
Actual Level Assigned: 2

Estimated Learning Time (notional hours)

The estimated total hours required by the learner to achieve the required outcomes:

> Classroom Teaching: 360-480 hours
> On-The-Job Training: 360-840 hours
> Other (Simulate working environment such as a training centre): 0 -240 hours
Total: 1200 hours

EXIT LEVEL OUTCOMES

1. Operate equipment in a chemical manufacturing environment.

2. Understand and apply appropriate technology.

3. Transfer bulk liquids and/or gases in a chemical manufacturing environment.
□
4. Demonstrate an understanding of fundamental knowledge as applicable in a chemical industrial environment.

ASSOCIATED ASSESSMENT CRITERIA

1.
> Start up, shut down and monitor manual and semi-automated equipment according to Company standard operating procedures.

> Clean and perform changeovers in bulk liquid and/or gas storage operations.
> Explain and apply safety, health and environmental practices that are relevant to the storage and transfer of bulk liquids and/or gases where learning takes place with reference to the equipment used.

2.
> Apply technology that is appropriate within a chemical manufacturing operation.
> Demonstrate knowledge of products transferred, stored and/or blended at a specific site.
> Handle and use chemicals safely in a manufacturing environment with reference to the techniques and equipment used.
> Use computers/computer-based systems in the processes related to the storage and transfer of bulk liquids and/or gases.

3.
> Apply sampling theory & practice in the chemical industry.
> Apply safety and quality principles in the transfer of bulk liquids and/or gases.

4.
> Use mathematics within the chemical manufacturing context.
> Communicate within the chemical manufacturing context.

Integrated Assessment:

Some of the knowledge, skills and understanding specified in the unit standards that make up this qualification are applicable and necessary across more than one unit standard. Further to this, the relationships between unit standards require integrated assessment to ensure that competency is achieved.

The applied competence of this qualification will be achieved if a candidate is able to operate equipment in a chemical manufacturing environment, maintain quality control practices, demonstrate knowledge of chemical operations technology and perform basic maintenance functions.

Assessors should develop, conduct, and ensure integration of assessment by making use of a range of formative and summative assessment methods against the unit standards that make up the qualification.

Moderators should ensure that assessment is valid, consistent and integrated into work or learning, and that there is sufficient and authenticated evidence of learner competence against the whole qualification.

INTERNATIONAL COMPARABILITY

Benchmarking was done against the VQA from the United Kingdom, SVQ from Scotland as well as and New Zealand qualifications. This qualification provides for more comprehensive expertise than that described in similar qualifications in the UK.

ARTICULATION OPTIONS

This qualification will enable the qualifying candidate to progress to learning for manufacturing-related National Certificates at NQF Levels 3 and 4, and further, on to relevant National Diplomas and degrees as indicated below.

Process related engineering artisans:

NQF Level 5/6:
> NC (NQF 5) or ND (NQF 5/6) in Engineering
NQF Level 4:
> Various engineering artisan related qualifications to be developed in conjunction with other SGBs

Explosives Glass Specific Qualifications:

NQF Level 5/6:
> NC in Ceramic Technology or new diploma
> NC in Explosives Technology
NQF Level 4:
> NC in glass production
> NC in Explosives plant operation III

NQF Level 3:
> NC in molten glass production
> NC in Explosives plant operation II
NQF Level 2:
> NC in batch mixing
> NC in Explosives plant operation I
NQF Level 1:
> National Certificate in chemical operations

Chemical Process Operations:

NQF Level 5/6:
> NC in Chemical Process development or chemical product development or chemical process supervision (not yet mandated)
NQF Level 4:
> NC in chemical process operations
NQF Level 3:
> NC in chemical systems operation
NQF Level 2:
> NC in chemical equipment operation
NQF Level 1:
> National Certificate in chemical operations

Chemical Manufacturing:

NQF Level 5/6:
> National Diploma in Chemical Engineering
NQF Level 4:
> NC in Chemical Manufacturing Supervision
NQF Level 3:
> NC in Chemical Manufacturing Processes
NQF Level 2:
> NC in Chemical Process Storage & Transfer
NQF Level 1:
> National Certificate in chemical operations

Production Management:

NQF Level 5/6:
> ND Production Management from Management SGB
NQF Level 4:
> NC in Chemical Manufacturing Supervision
NQF Level 3:
> NC in Chemical Manufacturing Processes
NQF Level 2:
> NC in Chemical Manufacturing Operations
NQF Level 1:
> National Certificate in chemical operations

Pharmaceuticals:

NQF Level 5/6:
> ND Pharmacy developed in Pharmacy SGB
NQF Level 4:
> NC Pharmacist's Assistant - post basic
NQF Level 3:
> NC Pharmacist's Assistant - Basic
NQF Level 2:
> NC in Chemical Manufacturing Operations
NQF Level 1:
> National Certificate in chemical operations

Laboratory Assistant (Chemical analysis):

NQF Level 5/6:
> National Diploma in Analytical Chemistry
NQF Level 4:
> NC in laboratory practice 3
NQF Level 3:
> NC in laboratory practice 2
NQF Level 2:
> NC in laboratory practice 1
NQF Level 1:
> National Certificate in chemical operations

Technical (chemical related) sales/distribution:

NQF Level 4:
> Various sales/marketing related qualifications to be developed in conjunction with other SGBs

Articulation is also practical between this qualification and manufacturing environments outside the chemical industries, such as the food and beverage environments and chemical analysis.

MODERATION OPTIONS

> Anyone moderating the assessment of learners against this qualification must be registered as a moderator with the relevant ETQA.
> Assessment and moderation will be overseen by the relevant ETQA according to the ETQA's policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQAs (including professional bodies); and in terms of the moderation guideline.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

In order to assess this qualification, the assessor needs:

> Well developed interpersonal skills, personal credibility, and a record of ethical behaviour

> Registration with the Education, Training and Development Practitioners' ETQA as a generic assessor.

> Competence against the unit standard "Plan and conduct assessment of learning outcomes."

> Detailed documentary proof of educational qualification, practical training undergone, and/or experience gained at an appropriate level of manufacturing operations, as per the relevant ETQA policies and guidelines. The subject matter expertise of the assessor can be established through the recognition of prior learning.

> Registration with, or recognition by, the Chemical Industries Education and Training Quality Assurance Body or any other ETQA that may be nominated for this purpose.

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	12484 Perform basic fire fighting	Level 2	4	Reregistered
Core	14782 Apply process chemistry and related technology in the chemical industry	Level 2	10	Registered
Core	110011 Handle and use chemicals safely in a manufacturing environment	Level 2	5	Registered
Core	110012 Operate Equipment	Level 2	10	Registered
Core	116040 Know and apply technology in the storage, blending and distribution of petroleum and chemical products	Level 2	20	Draft - Prep for P Comment
Elective	7547 Operate a personal computer system	Level 2	6	Reregistered
Elective	9599 Lift and move material and equipment by means of a forklift	Level 2	3	Registered

Elective	12202 Package products in a manual or semi-automated packaging operation	Level 2	6	Registered
Elective	14784 Apply sampling theory and practice	Level 2	5	Registered
Elective	110005 Fill and cap containers using automated filling equipment	Level 2	8	Registered
Elective	110016 Hand over responsibility for a manufacturing operation	Level 2	5	Registered
Elective	110300 Clean inspect and lubricate a production machine, and repair minor faults	Level 2	9	Registered
Elective	116024 Operate an effluent treatment plant	Level 2	12	Draft - Prep for P Comment
Elective	116027 Transfer liquids and/or gases between tanks	Level 2	12	Draft - Prep for P Comment
Elective	116035 Transfer of liquids and/or gases between tanks and road/rail vehicles	Level 2	12	Draft - Prep for P Comment
Elective	8038 Operating lift trucks	Level 3	6	Reregistered
Elective	116036 Transfer petroleum and/or chemical products from ship to shore or shore to ship	Level 3	15	Draft - Prep for P Comment
Fundamental	7467 Collect and use data to establish basic statistical and probability models and solve related problems	Level 2	5	Reregistered
Fundamental	7479 Describe, represent and informally analyse shape and motion in 2- and 3-dimensional space	Level 2	4	Reregistered
Fundamental	7480 Demonstrate understanding of rational and irrational numbers and number systems	Level 2	3	Registered
Fundamental	8962 Maintain and adapt oral communication	Level 2	5	Registered
Fundamental	8963 Access and use information from texts	Level 2	5	Registered
Fundamental	8964 Write for a defined context	Level 2	5	Registered
Fundamental	8967 Use language and communication in occupational learning programmes	Level 2	5	Registered
Fundamental	9007 Work with a range of patterns and functions and solve problems	Level 2	2	Registered
Fundamental	12444 Measure, estimate and calculate physical quantities and explore, describe and represent geometrical relationships in 2-dimensions in different life or workplace contexts	Level 2	3	Registered

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Explosives Manufacturing Operations

SAQA QUAL ID	*QUALIFICATION TITLE*	
48916	National Certificate: Explosives Manufacturing Operations	
SGB NAME	Chemical Industries SGB	
ABET BAND	*PROVIDER NAME*	
Undefined		
QUALIFICATION CODE	*QUAL TYPE*	*SUBFIELD*
MET-3-National Certificate	National Certificate	Manufacturing and Assembly
MINIMUM CREDITS	*NQF LEVEL*	*QUALIFICATION CLASS*
120	Level 3	Regular-Unit Stds Based
SAQA DECISION NUMBER	*REGISTRATION START DATE*	*REGISTRATION END DATE*

PURPOSE OF THE QUALIFICATION

A person acquiring this qualification will be able to:
> Communicate in a variety of ways
> Use Mathematics in a variety of ways
> Adjust and maintain production processes
> Perform first line maintenance procedures
> Manufacture explosives products within a specialty area of propellants, explosives accessories, initiating systems and ammonium nitrate based explosives or small arms ammunition manufacturing processes
> Adhere to safety, risk, quality and environmental requirements and specifications.

Rationale for the qualification

National Certificate in Explosives Manufacturing Operations: NQF Level 3 is designed to contribute towards developing explosives manufacturing competence. The qualification focuses on the manufacturing of explosives products within a specialty area of propellants, explosives accessories, initiating systems and ammonium nitrate based explosives or small arms ammunition manufacturing processes.

Different organisations within chemical industry produce diverse range of products, which leads to further different components per explosives product. Manufacturing skills using both machinery and equipment skills and specialised hand skills are important with the exception of ammonium nitrate based explosives. The chemical industry has to respond to ongoing development of new products, safety, health, environmental issues which are incorporated into the qualification.

National Certificate in Explosives Manufacturing Operations: NQF Level 3 is a second qualification in a series for learners who want to follow a career as operators within the explosives industry. The majority of learners for this qualification are likely to be operators and senior operators working independently and as a team within an organisation in the explosives industry. The qualification allows learners to advance to learning in a variety of manufacturing related qualifications or to learning in the Further Education and Training Certificate in Manufacturing and Assembly Supervision NQF 4.

Explosives Operations is a field that serves the needs of the society and the economy. The qualification will enhance the status, productivity and employability of the learner within the chemical industry, in particular, explosives operations.
This qualification will contribute to the full development of the learner within the manufacturing fraternity by providing recognition, further mobility and transportability within manufacturing fields. The skills, knowledge and understanding demonstrated within this qualification are essential for social and economic transformation and contribute to the progression and economic growth within the manufacturing fraternity.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

> National Certificate in Explosives Operations NQF 2 or
> Knowledge of monitoring and operating machinery
- Range: Post production operations, using and caring of tools and equipment, adherence to safety requirements in the explosives manufacturing operations.

Recognition of prior learning

This qualification may be achieved in part or completely through the recognition of prior learning, which includes formal, informal and non-formal learning and work experience. A learner wishing to be assessed towards this qualification may arrange to do so without attending any further training or education. The assessor and the learner will jointly decide on the most appropriate method to be taken.

QUALIFICATION RULES

Choose at least 1 specialisation from the ones identified in the electives component of the qualification, and a further 12 credits from the additional electives provided.

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 outcomes have been advanced through the learning required for this qualification is embedded in the unit standards, i.e. how it is reflected and assessed in the context of the specific outcomes.

1. Communicate and solve problems in a variety of ways.

2. Solve problems related to explosives manufacturing conversion processes.
- Range: Manufacturing of propellants or explosives accessories, or initiating systems or small arms ammunition or ammonium nitrate based explosives.

3. Control, adjust and maintain specialised explosives manufacturing processes by using relevant science and technology.
- Range: Propellants, explosives accessories, initiating systems, ammonium nitrate based explosives or small arms ammunition manufacturing processes.

4. Maintain safety, good manufacturing principles and quality assurance practices in an explosives manufacturing environment.

5. Demonstrate a familiarity with first line maintenance procedures and operations in explosives operations.

6. Lead a team to enhance performance towards meeting organisation's standards.

ASSOCIATED ASSESSMENT CRITERIA

1.
> Oral and written communication is successfully engaged in a business environment
> Problems are understood and solved to indicate critical and creative thinking
> Business principles are understood and applied to business environment

2.
> Problems are identified and solved using known solutions to familiar and complex problems.
> Understanding is demonstrated regarding explosive manufacturing and conversion processes.
> Information is collected, analysed, organised and critically evaluated for explosives manufacturing processes.
> Understanding is demonstrated of the uses of common explosives accessories.

3.
> Compare and interpret available information to solve problems during the explosives manufacturing processes.
> Adjust and maintain production processes and systems according to standard operating procedures.
> Apply self management practices during the controlling, adjusting and maintaining of specialised

explosives manufacturing processes.

4.
> Apply knowledge and comprehension of occupational health, safety and environmental legislation relevant to the explosives manufacturing industry according to standard operating procedures.
> Quality assurance practices are monitored and controlled according to standard operating procedures.

5.
> First line maintenance is performed regularly and consistently in explosive operations.
> Problems relating to explosives operations are solved using sector acceptable processes and procedures.

6.
> The role of a leader is indicated to ensure that the team meets an organisation standard.
> New member is inducted into a team for familiarity with explosive operations.
> Knowledge of self and team is applied to develop a plan to enhance team performance.

The assessment criteria of the qualification are embodied in the unit standards. The knowledge, skills and understanding will be assessed across several specialised contexts and are clearly defined within the relevant specific outcomes, assessment criteria and range statements within these unit standards.

Integrated Assessment

The applied competence (practical, foundational and reflexive competencies) of this qualification will be achieved if a candidate is able to achieve all the exit level outcomes of this qualification.

Identifying and solving problems, team work, organising one-self, using of applied science, the implication of actions and reactions in the world as a set of related systems must be assessed during any combination of practical, foundational and reflexive competencies assessment methods and tools to determine the whole person development and integration of applied knowledge and skills.

Applicable assessment tool(s) are developed that ensure that foundational, reflective and embedded knowledge, problem solving and the application of the world as a set of related systems within the manufacturing and maintenance fields are assessed to ensure integrative assessment.

A detailed portfolio of evidence is required to prove practical, applied and foundational competencies of the learner.
Assessors and moderators should develop and conduct their own integrated assessment by making use of a range of formative and summative assessment methods. Assessors should assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.

Unit standards in the qualification must be used to assess specific and critical cross-field outcomes. During integrated assessments the assessor should make use of formative and summative assessment methods and should assess combinations of practical, applied, foundational and reflective competencies.

INTERNATIONAL COMPARABILITY

Benchmarking for similar was qualifications was done against international standards and qualifications from the NVQ from:

> Britain
> New Zealand Qualification Authority
> The American Qualification Curriculum and Assessment Authority Frameworks
> The US Manufacturing Skills Standards

The following was found:

> The New Zealand National Certificate in Extraction Industries Level 2-4 (Land operations using explosives) has 5 comparable unit standards on handling of explosives.

> The newly designed South African unit standards compare fairly well with the existing New Zealand unit standards.

No comparable qualifications were found in the US and Britain. This is not surprising given South Africa's competitive edge and leader in this field worldwide.

ARTICULATION OPTIONS

This qualification will allow a person to advance to learning of other manufacturing related qualifications and even supervision-based qualifications at NQF level 4. This qualification would also provide the necessary foundation to articulate vertically to National Higher Certificate in Explosives Management NQF 5. The qualification provides the learner with flexibility to pursue careers in the explosives material manufacturing industry and articulation within chemical and related manufacturing environments.

MODERATION OPTIONS

> Anyone assessing a learner or moderating the assessment of a learner against this qualification must be registered as an assessor 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; in terms of agreements reached around assessment and moderation between ETQAs (including professional bodies); and in terms of the moderation guideline detailed immediately below.

> Moderation should also encompass achievement of the competence described both in individual unit standards, exit level outcomes 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 by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

For an applicant to register as an assessor, the applicant needs:

> Interpersonal skills, subject matter expertise and assessment experience.

> The assessor needs to be competent in the planning and conducting assessment of learning outcomes as described in the unit standard "Plan and conduct assessment of learning outcomes" NQF level 5. The subject matter experience must be well developed within the field of explosives operations and quality assurance practices.

> The assessor must have completed:
- A similar qualification or from the same family of qualifications, at or above NQF 4, or
- National Higher Certificate in Explosives Management NQF 5 or
- "Explosive Technology For Supervision And Management" course

> The subject matter experience of the assessor can be established by recognition of prior learning.

> Assessors need to be registered with the relevant Education and Training Quality Assurance Body.

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	14776 Apply self-management practices in the work place	Level 2	8	Registered
Core	9913 Perform first line maintenance	Level 3	14	Registered
Core	9922 Adjust and maintain production process	Level 3	30	Registered
Elective	9599 Lift and move material and equipment by means of a forklift	Level 2	3	Registered

Elective	7567	Produce and use spreadsheets for business	Level 3	5	Reregistered
Elective	13911	Induct a new member into a team	Level 3	3	Registered
Elective	13912	Apply knowledge of self and team in order to develop a plan to enhance team performance	Level 3	5	Registered
Elective	13917	Indicate the role of a team leader ensuring that a team meets an organisation's standards	Level 3	4	Registered
Elective	116009	Control propellant manufacturing processes	Level 3	20	Draft - Prep for P Comment
Elective	116011	Control explosives accessories manufacturing processes	Level 3	20	Draft - Prep for P Comment
Elective	116012	Control initiating devices manufacturing processes in an explosives manufacturing environment	Level 3	20	Draft - Prep for P Comment
Elective	116013	Control small arms ammunition manufacturing processes	Level 3	20	Draft - Prep for P Comment
Elective	116014	Control ammonium nitrate based explosives manufacturing processes	Level 3	20	Draft - Prep for P Comment
Fundamental	7456	Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	2	Registered
Fundamental	8968	Accommodate audience and context needs in oral communication	Level 3	5	Registered
Fundamental	8969	Interpret and use information from texts	Level 3	5	Registered
Fundamental	8970	Write texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	8973	Use language and communication in occupational learning programmes	Level 3	5	Registered
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	Registered
Fundamental	9012	Investigate life and work related problems using data and probabilities	Level 3	5	Registered
Fundamental	9013	Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4	Registered
Fundamental	14086	Work with a wide range of patterns and basic functions and solve related problems	Level 3	3	Registered

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Control propellant manufacturing processes

SAQA US ID	*UNIT STANDARD TITLE*
116009	Control propellant manufacturing processes

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 3	20

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of propellant manufacturing processes control.

SPECIFIC OUTCOME 2

Prepare to control propellants manufacturing processes.

SPECIFIC OUTCOME 3

Control propellants manufacturing processes.

SPECIFIC OUTCOME 4

Perform end of propellant controlling procedures.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Control explosives accessories manufacturing processes

SAQA US ID	*UNIT STANDARD TITLE*
116011	Control explosives accessories manufacturing processes

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 3	20

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of explosives accessories manufacturing processes control.

SPECIFIC OUTCOME 2

Prepare to control explosives accessories manufacturing processes.

SPECIFIC OUTCOME 3

Control explosives accessories manufacturing processes.

SPECIFIC OUTCOME 4

Perform end of explosives accessories controlling procedures.

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Control initiating devices manufacturing processes in an explosives manufacturing environment

SAQA US ID	*UNIT STANDARD TITLE*
116012	Control initiating devices manufacturing processes in an explosives manufacturing environment

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 3	20

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of initiating devices manufacturing processes control.

SPECIFIC OUTCOME 2

Prepare to control initiating devices manufacturing processes.

SPECIFIC OUTCOME 3

Control initiating devices manufacturing processes.

SPECIFIC OUTCOME 4

Perform end of initiating devices controlling procedures.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Control small arms ammunition manufacturing processes

SAQA US ID	*UNIT STANDARD TITLE*
116013	Control small arms ammunition manufacturing processes

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 3	20

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of small arms ammunition manufacturing processes control.

SPECIFIC OUTCOME 2

Prepare to control small arms ammunition manufacturing processes.

SPECIFIC OUTCOME 3

Control small arms ammunition manufacturing processes.

SPECIFIC OUTCOME 4

Perform end of small arms ammunition controlling procedures.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Control ammonium nitrate based explosives manufacturing processes

SAQA US ID	UNIT STANDARD TITLE
116014	Control ammonium nitrate based explosives manufacturing processes

SGB NAME	ABET BAND	PROVIDER NAME
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	SUBFIELD DESCRIPTION
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB Chem	Regular	Level 3	20

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of ammonium nitrate based explosives manufacturing processes control.

SPECIFIC OUTCOME 2

Prepare to control an ammonium nitrate based explosives manufacturing processes.

SPECIFIC OUTCOME 3

Control an ammonium nitrate based explosives manufacturing processes.

SPECIFIC OUTCOME 4

Perform end of ammonium nitrate based explosives controlling procedures.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 6

Conduct explosives environmental testing and interpret the results

SAQA US ID	*UNIT STANDARD TITLE*
116002	Conduct explosives environmental testing and interpret the results

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 4	8

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate an understanding of environmental testing.

SPECIFIC OUTCOME 2

Conduct environmental testing procures.

SPECIFIC OUTCOME 3

Analyse and interpret the environmental testing results.

SPECIFIC OUTCOME 4

Report and recommend findings.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 7

Conduct explosives performance testing and interpret results

SAQA US ID	*UNIT STANDARD TITLE*
116007	Conduct explosives performance testing and interpret results

SGB NAME	*ABET BAND*	*PROVIDER NAME*
Chemical Industries SGB	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB Chem	Regular	Level 4	10

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate an understanding of performance testing.

SPECIFIC OUTCOME 2

Conduct performance testing procedures.

SPECIFIC OUTCOME 3

Analyse and interpret the performance testing results.

SPECIFIC OUTCOME 4

Report and recommend findings.

No. 946 **13 August 2004**

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

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

Power Plant Operations

Registered by NSB 06, Manufacturing, Engineering and Technology, publishes the following unit standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the unit standard. The unit standard 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 unit standards should reach SAQA at the address ***below and no later than 13 September 2004.*** All correspondence should be marked **Standards Setting – SGB for Power Plant Operations** and addressed to

The Director: Standards Setting and Development
SAQA
Attention: Mr. D Mphuthing
Postnet Suite 248
Private Bag X06
Waterkloof
0145
or faxed to 012 – 431-5144
e-mail: dmphuthing@saqa.co.za

JOE SAMUELS
DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

Further Education and Training Certificate: Electrical Network Control

SAQA QUAL ID	QUALIFICATION TITLE	
48978	Further Education and Training Certificate: Electrical Network Control	
SGB NAME	SGB Power Plant Operations	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
MET-4-National Certificate	National Certificate	Manufacturing and Assembly
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
196	Level 4	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

Learners obtaining this qualification will be recognised on a National level for operating and controlling of radial and integrated power generating and transmission systems. This qualification will ensure professionalism, proficiency and excellence in the control of integrated networks. The qualification will address a previous shortcoming and provide network controllers with self worth and pride.

Safe, sound and efficient network control principles will be manifested in the competence of the learners throughout the qualification and enhance worthwhile employment opportunities in the electrical network industry.

A person acquiring this qualification will have practical, foundational and reflective competence in the following areas:

> Theories and application of electrical apparatus
> Regulatory Knowledge in - Occupational Health and Safety Act and Permit Work System
> Problem solving and decision making
> Planning and organising
> Electrical network configuration and integrated systems
> Big picture thinking
> Self management within a team context
> Written and verbal communication

Rationale of the Qualification

This qualification is based on the Power Generation and Transmission industry needs and forms the foundation for Electrical Network Controllers on Radial and Integrated Electrical Networks. The qualification therefore sets the standards for Controllers of Electrical Power Generation and Transmission systems.

Accessibility and employment with this qualification are possible within the Local, Regional and National Integrated Electrical Systems.

The qualification also focuses on:

> Setting national standards of practice in this specific learning field
> Building individual capacity in foundational electric power control
> Ensure entry progression and mobility into life long learning in this specific learning field
> Addressing the electrical industries employment requirements
> Enhancement of professional competence on a National level
> Provide an avenue of upliftment for the previously disadvantaged into this discipline
> Providing a qualification to be used in a learnership in this field

> Enhance social and economic development

RECOGNIZE PREVIOUS LEARNING?

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LEARNING ASSUMED TO BE IN PLACE

Learners should be competent in:
> Communication and Language at NQF Level 3
> Mathematical Literacy at NQF Level 3

Recognition of prior learning (RPL)

This qualification will be achieved in part through recognition of prior learning in other related Electrical qualifications such as electrical Engineering NQF 1-4.
Any other evidence of prior learning should be assessed through formal RPL processes to recognise achievement thereof.

QUALIFICATION RULES

Level, credits and learning components assigned to the qualification in Electrical Network Control

This Certificate is made up of a planned combination of learning outcomes that has a defined purpose and will provide the learner with applied competence and a strong basis for further learning in Electrical Network Control.

The Qualification is made up of unit standards that are classified as fundamental, core and elective.

Minimum credits required to complete this qualification is as follows:

In this qualification the credits are allocated as follows:
Local Control Centres
Gas Turbines Systems

Fundamental: 57 Credits, 32 %
Core: 110 Credits, 56 %
Elective: 29 Credits, 12 %
Total: 196 Credits, 100 %

This Qualification is made up of unit standards at NQF levels 2, 3,4 and 5.

The majority of unit standards related directly to the purpose of the qualification with maximum portability between the various control centres (local, regional, national).

Motivation for the Number of credits, assigned to:
Fundamental, core and elective requirements.

This certificate is made up of a combination of learning outcomes that have a defined purpose and will provide the learner with applied competence and a good foundation for further personal development in Electrical Network Control.

Fundamental Requirements
There are eight unit standards for communication in the first language at NQF Level 4, totalling 20 credits and there are four Second Language unit standards at NQF level 3 totalling 20 credits.
Unit Standards to the value of 17 credits on Mathematical literacy are also included.
All Unit Standards for this requirement are compulsory.

Core Requirements
Unit Standards to the value of 110 credits have been allocated as core requirement to this qualification. The core requirements of this qualification form the foundation of applied competence in controlling Electrical Networks. A broad range of technical concept and principles related to Electrical Network Control are covered within requirement of the qualification, which have portability towards credits within all Electrical Network Systems (Local, Regional and National Control).
All Unit Standards for this requirement are compulsory.

Elective Requirement

Learners are required to select elective standards for learning according to the type of control environment they are engaged with. All controllers apart from Hydro and Nuclear Power utilities must complete the standards for Steam generator and Turbo generator design and application.(A total of 12 credits) Controllers functioning on Gas turbines generating systems must complete the unit standards associated with this specific utility. Other Standards include 7 credits on Leadership development and must be taken together plus a further 22 credits from the options provided in the elective component. Minimum of 29 credits are required.

EXIT LEVEL OUTCOMES

Fundamental Learning:

1. Accommodate audience and context needs in oral communication when performing operational outcomes.
2. Interpret and use information from text
3. Use Language and communication in occupational learning programmes.
4. Write for a wide range of content.
5. Engage and sustain oral communication and evaluate spoken text.
6. Read analyse and respond to a variety of text
7. Use Language and communication in occupational learning programs.

Core Learning:

8. Apply Mathematical Literacy in the Electrical Network Industry in the following way
9. Demonstrate knowledge on the following Electrical Network Fundamentals used as the foundation to perform operating outcomes on the Electrical Network
Range: this includes operating on all radial and integrated electrical networks

Learners will be regarded "not yet competent" should they jeopardise the safety of people/plant during any stage of the assessment.

Exit points for learners who do not complete the Qualifications:
> Learners will be credited with Unit Standards in which they have proved competence.
> Learners who complete individual Unit Standard, but do not complete this Qualification retain their credits, however, should the substance of the unit Standard change in future the validity of the credit towards the Qualification may be reviewed.
> Learners who change their provider before completing the Qualification may transfer their credits to the new provider/learning site.

ASSOCIATED ASSESSMENT CRITERIA

1.1 Report plant system conditions to the following role players:
> National Control
> Field Services
> Multi disciplinary functions (in house)
1.2 Evaluate outage requests from Authorised officials (field operators)
1.3 Instruct safe operating to Authorised officials (field operators)
1.4 Define electrical network processes and equipment used in the electrical networks

2.1 Read and contextualise the information as requested by Authorised officials (field operators)
2.2 Read and contextualise the information as stipulated from Operating regulation for High Voltage Systems

3.1 Interpret terminology and concepts by means of specified occupational language use in programmes and courses during electrical network training
3.2 Define electrical network concepts, terms and theories used in Power Generation and Control

4.1 Compile reports on system conditions consisting of:
> Trip reports
> Shift events
> Incident notifications
> System conditions
> Flash reports
> Hazardous conditions

5.1 Formulate safe operating instructions

5.2 Evaluate feedback received

6.1 Read and contextualise the information stipulated in Standards and Procedures containing system dynamics
6.2 Interpret operating requests/instructions received
6.3 Read and contextualise statistical and operational data (includes text with numerical data)

7.1 Interpret terminology and concepts by means of specified occupational language use in programmes and courses during electrical network training
7.2 Define electrical network processes and equipment used in the electrical network

8.1 Solve technical problems in the workplace.
8.2 Differentiate between complex and non-complex problems in this technical environment
8.3 Identify a variety of problem solving techniques when working with technical equipment and processes
8.4 Compile statistical data used to build historical data to manage re-occurrence of typical problems

9.1 Control electrical networks from a Control Centre
9.2 Operate breakers on electrical networks
9.3 Operate isolators on electrical networks
9.4 Operate converters on electrical networks
9.5 Operate on transformers within electrical networks
9.6 Operate on earthing devices on electrical networks
9.7 Perform operations on electrical networks
9.8 Phasing and or synchronising on electrical networks
9.9 Demonstrate knowledge of safe entry into controlled prohibited and restricted networks
9.10 Demonstrate knowledge of regulatory requirements for permit to work systems
9.11 Operate stand alone computer systems
9.12 Comply with electrical safety standards in a process plant
9.13 Understand the principal of alternating current (AC) motor operation and application in a process plant
9.14 Demonstrate knowledge and understanding of electrical power generation
9.15 Interpret electrical circuits
9.16 Interpret basic electronic theories in process plant control
9.17 Demonstrate knowledge and understanding of earthing practices on alternating current power systems
9.18 Understand the principals of magnetism
9.19 Interpret electrical theories
9.20 Understand the operating principals of transformers
9.21 Demonstrate knowledge and understanding of electrical systems and related concepts
9.22 Explain transformer characteristics applied on power systems
9.23 Apply engineering principals and concepts in a power generation process plant
9.24 Describe plant instrumentation and process measurement
9.25 Control frequency and voltages in and islanding condition on electrical networks
9.26 Demonstrate knowledge and understanding of and produce computer spreadsheets using basic functions
9.27 Produce word processing documents for business
9.28 Demonstrate knowledge and understanding of the electrical technology associated with the control of electrical energy on a power generating unit in the power plant
9.29 Demonstrate the ability to use electronic mail software to send and receive messages

Integrated Assessment

The applied competence (practical, foundational and reflective competencies) of this qualification will be achieved if a learner is able to achieve all exit level outcomes of the qualification. Applicable critical cross field outcomes must be assessed during any combination of practical, foundational and reflexive competencies. Assessment methods and tools used must determine the whole person's development and integration of applied knowledge and skills.

> Certain exit level outcomes are measurable and verifiable through assessment criteria assessed in one application.
> Applicable assessment tools to assess the foundational, reflective and practical competencies within the power plant operations environment.
> A detailed portfolio of evidence is required of the practical, foundational and reflective competencies of the learner.
> Assessors and moderators should develop and conduct integrated assessment by making use of a range of formative and summative methods. Assessors should assess and give credit for the evidence of learning

that has already been acquired by recognition of prior learning (RPL) through any form of learning.
> Unit standards associated with this qualification must be used to assess specific and critical cross -field outcomes. During integrated assessment, the assessor should make use of formative and summative assessment methods and should assess combinations of practical, foundational and reflective competencies.

Formative assessment

Assessment criteria for formative assessment are described in the various unit standards. Formative assessment takes place during the process of learning and assessors should use a range of appropriate assessment methods and tools that assess competence holistically. These methods include but are not limited to the following:
> On-the-job observations
> Role-play and/or simulations
> Knowledge tests, exams, case studies, projects, logbooks, workbooks
> Verbal report backs (presentations)
> Portfolios of evidence (RPL)
> Working in teams (360 degrees evaluations)
> Scenario sketching
> Incident reports

The assessment tools and methods used by the assessor must be:
> Fair, not to hinder or disadvantage the learner in any way
> Valid, to measure what is intended to measure
> Reliable, consistent and delivers the same output across a range of learners and assessors

Summative assessment

Summative assessment is carried out at the end of each meaningful competence level achieved by the learner. A detailed portfolio of evidence is required to prove the practical, foundational and reflective competencies of the learner.

INTERNATIONAL COMPARABILITY

The qualification is based on a study conducted by ESKOM on various European countries with leading power producers. The German model (with minor changes) was adopted as the basis for this qualification. Operator qualifications after this were registered under the manpower-training act and accredited by the ESKOM and Allied Industries Training Board (EAITB). This qualification was further developed to meet the SAQA requirements for registration.

International Benchmark Matrix: Power Plant Operations

Criteria: SA- NZ - UK - Ger

Utility: Fossil Hydro Nuclear - FossilNuclear - Fossil Hydro Nuclear - Fossil Nuclear
Roles: Electrical Network Controller - Operator Maintainer - Operator Maintainer - Operator Maintainer
Frameworklevels: 1-8 - 1-10 - 1-5 - n/a
Credits: 247 - 532 -□n/a - n/a
Accreditation / Quality assurance: SETA - NZQA - C&G/ETA - VGB
Entry level: NQF 3 Related Technical Qualification - NQF 2 - □NVQ 1 - ?
Operators in fields: 614 - Not available - Not available - Not available
Number of Unit Standards: 46 - 61 - 18 - Not available

The following information based on the matrix:

> Roles: Electrical Network Controller is the person performing duties by controlling and monitoring the electrical network from a control room.
> Framework: Qualifications obtained in this learning field for nuclear, hydro and fossil power plants consist of a certificate, a diploma and a higher diploma.
> Controllers in the field: This figure represents controllers in Fossil, Hydro, Nuclear, National and Regional control centres.

ARTICULATION OPTIONS

This qualification provides the learner with the flexibility to pursue different careers

in the power generation industry. The level of flexibility within the range of elective utilities (hydro, nuclear, fossil and electrical control) will allow the individual to pursue further learning within those development areas. Other articulation fields could be the following:
> Certificate in occupational directed Education Training and Development at NQF Level 4.
> Diploma in Electrical Network Control (Still under development).

MODERATION OPTIONS

> Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor 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 policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQA's (including professional bodies); and in terms of the moderation guideline detailed immediately below.
> Moderation must include both internal and external moderation of assessments at exit points of the qua
> Verification. Moderation should also encompass achievement of the competence described both in individual unit standards, exit level outcomes as well as the integrated competence described in the qualification.
> A learner wishing to be assessed for this Qualification can only be assessed through an accredited assessment provider/centre.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

The assessor must be:
> Competent in the standard at or above the level at which the assessment is conducted.
> At least one year on the job experience.
> Registered with the 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	10195 Apply Engineering Principles and concepts in a Power Generation Process Plant	Level 3	5	Registered
Core	10677 Interpret electrical theories	Level 3	3	Registered
Core	10707 Understanding the principles of magnetism	Level 3	2	Registered
Core	10719 Understand the operating principles of transformers	Level 3	3	Registered
Core	10893 Demonstrate knowledge and understanding of electrical power generation	Level 3	5	Registered
Core	10894 Interpret electrical circuits	Level 3	2	Registered
Core	14062 Demonstrate Knowledge of Safe Entry into Prohibited and/ or Restricted Areas	Level 3	2	Registered
Core	14204 Interpret basic electronic theories in power plant process control	Level 3	2	Registered
Core	116436 Operate breakers on radial and integrated networks	Level 3	3	Draft - Prep for P Comment
Core	116438 Operate earthing devices on electrical networks	Level 3	5	Draft - Prep for P Comment
Core	116439 Operate electrical converters on electrical networks	Level 3	2	Draft - Prep for P Comment
Core	116440 Operate high voltage breakers on radial feeders	Level 3	6	Draft - Prep for P Comment
Core	116451 Operate on transformers within electrical networks	Level 3	7	Draft - Prep for P Comment
Core	10897 Explain transformer characteristics applied on power systems	Level 4	2	Registered
Core	10933 Understand the principles of alternating current (AC) motor operation and application in a process plant	Level 4	5	Registered
Core	13803 Phasing and or synchronising on high voltage intergrated systems	Level 4	3	Registered

Core	14056 Demonstrate knowledge and understanding of earthing practices on alternating current power systems	Level 4	2	Registered
Core	14057 Demonstrate knowledge and understanding of electrical systems and related concepts	Level 4	6	Registered
Core	14059 Operate Steam Turbine Condenser Air Evacuation Systems	Level 4	6	Registered
Core	116407 Control frequency and voltages in an Islanding condition on electrical networks	Level 4	6	Draft - Prep for P Comment
Core	116434 Control electrical networks from a control centre	Level 4	10	Draft - Prep for P Comment
Core	116453 Perform operations on high voltage integrated systems	Level 4	4	Draft - Prep for P Comment
Core	13600 Demonstrate knowledge of regulatory requirements for permit to work systems	Level 5	10	Registered
Core	14041 Demonstrate Knowledge and Understanding of the Electrical Technology Associated with the Control of Electrical Energy on a Power Generating Unit in the Power Plant	Level 5	6	Registered
Elective	7571 Demonstrate the ability to use electronic mail software to send and receive messages	Level 2	3	Reregistered
Elective	7567 Produce and use spreadsheets for business	Level 3	5	Reregistered
Elective	7570 Produce word processing documents for business	Level 3	5	Reregistered
Elective	7786 Operate a Computer	Level 3	8	Reregistered
Elective	10574 Demonstrate knowledge of Steam Generator design and application	Level 3	6	Registered
Elective	14060 Understand transformational leadership	Level 3	5	Registered
Elective	14063 Apply Self Management through the Concepts of Positive Self-esteem and Resiliency	Level 3	2	Registered
Elective	14065 Demonstrate knowledge of steam turbines design and application	Level 3	6	Registered
Elective	116416 Control load variations on a gas turbine power generating system from a control room	Level 4	4	Draft - Prep for P Comment
Elective	116454 Shutdown a gas turbine power generator unit from a control room for maintenance outage	Level 4	4	Draft - Prep for P Comment
Elective	116457 Stabilise transient conditions on a gas power generating system from a control room	Level 4	6	Draft - Prep for P Comment
Elective	116459 Start up a gas turbine power generator system from a control room	Level 4	4	Draft - Prep for P Comment
Elective	116462 Sustain plant operability of a gas turbine power generating unit	Level 4	4	Draft - Prep for P Comment
Fundamental	8968 Accommodate audience and context needs in oral communication	Level 3	5	Registered
Fundamental	8969 Interpret and use information from texts	Level 3	5	Registered
Fundamental	8970 Write texts for a range of communicative contexts	Level 3	5	Registered
Fundamental	8972 Interpret a variety of literary texts	Level 3	5	Registered
Fundamental	7465 Collect and use data to establish complex statistical and probability models and solve related problems	Level 4	5	Registered
Fundamental	7466 Represent and operate on complex numbers in non-trivial situations	Level 4	2	Registered
Fundamental	7470 Work with a wide range of patterns and inverses of functions and solve related problems	Level 4	6	Registered
Fundamental	7484 Describe, represent, analyse and explain changes in shape and motion in 2- and 3-dimensional space with justification	Level 4	4	Registered
Fundamental	8974 Engage in sustained oral communication and evaluate spoken texts	Level 4	5	Registered
Fundamental	8975 Read analyse and respond to a variety of texts	Level 4	5	Registered
Fundamental	8976 Write for a wide range of contexts	Level 4	5	Registered
Fundamental	8979 Use language and communication in occupational learning programmes	Level 4	5	Registered

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 1

Operate breakers on radial and integrated networks

SAQA US ID	*UNIT STANDARD TITLE*
116436	Operate breakers on radial and integrated networks

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 3	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Operate electrical apparatus.

SPECIFIC OUTCOME 2

Stabilised transient and or emergency conditions.

SPECIFIC OUTCOME 3

Service electrical apparatus.

SPECIFIC OUTCOME 4

Monitor electrical apparatus.

SPECIFIC OUTCOME 5

Maintain regulatory requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of national or operating electrical apparatus.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 2

Operate earthing devices on electrical networks

SAQA US ID	*UNIT STANDARD TITLE*
116438	Operate earthing devices on electrical networks

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 3	5

Specific Outcomes:

SPECIFIC OUTCOME 1

Operate electrical apparatus.

SPECIFIC OUTCOME 2

Stabilise transient emergency conditions.

SPECIFIC OUTCOME 3

Sustain testing equipment operability.

SPECIFIC OUTCOME 4

Maintain safety and regulatory requirements.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of earthing devices.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 3

Operate electrical converters on electrical networks

SAQA US ID	*UNIT STANDARD TITLE*
116439	Operate electrical converters on electrical networks

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 3	2

Specific Outcomes:

SPECIFIC OUTCOME 1

Operate electrical converter associated equipment.

SPECIFIC OUTCOME 2

Stabilised transient and or emergency conditions.

SPECIFIC OUTCOME 3

Service electrical apparatus.

SPECIFIC OUTCOME 4

Monitor electrical apparatus.

SPECIFIC OUTCOME 5

Maintain regulatory requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of operating electrical apparatus.

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 4

Operate high voltage breakers on radial feeders

SAQA US ID	*UNIT STANDARD TITLE*
116440	Operate high voltage breakers on radial feeders

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 3	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Operate electrical breakers.

SPECIFIC OUTCOME 2

Stabilise transient emergency conditions.

SPECIFIC OUTCOME 3

Sustain breaker operability.

SPECIFIC OUTCOME 4

Monitor electrical apparatus.

SPECIFIC OUTCOME 5

Maintain safety and regulatory requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of operating electrical apparatus.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 5

Operate on transformers within electrical networks

SAQA US ID	*UNIT STANDARD TITLE*
116451	Operate on transformers within electrical networks

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 3	7

Specific Outcomes:

SPECIFIC OUTCOME 1

Operate transformer-associated equipment.

SPECIFIC OUTCOME 2

Stabilise transient and or emergency conditions.

SPECIFIC OUTCOME 3

Sustain transformer operability.

SPECIFIC OUTCOME 4

Monitor electrical apparatus.

SPECIFIC OUTCOME 5

Maintain safety and regulatory requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of operating electrical apparatus.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 6

Control electrical networks from a control centre

SAQA US ID	*UNIT STANDARD TITLE*
116434	Control electrical networks from a control centre

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 4	10

Specific Outcomes:

SPECIFIC OUTCOME 1

Monitor electrical network.

SPECIFIC OUTCOME 2

Facilitate communication.

SPECIFIC OUTCOME 3

Stabilise network conditions.

SPECIFIC OUTCOME 4

Control electrical network conditions.

SPECIFIC OUTCOME 5

Maintain regulatory requirements.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 7

Control frequency and voltages in an Islanding condition on electrical networks

SAQA US ID	*UNIT STANDARD TITLE*
116407	Control frequency and voltages in an Islanding condition on electrical networks

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 4	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Control island frequency and voltage.

SPECIFIC OUTCOME 2

Monitor island conditions.

SPECIFIC OUTCOME 3

Control out of normal system conditions.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 8

Control load variations on a gas turbine power generating system from a control room

SAQA US ID	*UNIT STANDARD TITLE*
116416	Control load variations on a gas turbine power generating system from a control room

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 4	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Perform load variations in generating mode.

SPECIFIC OUTCOME 2

Perform load variations in synchronous compensation mode.

SPECIFIC OUTCOME 3

Select and perform operating in different modes.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding to perform load variations.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 9

Perform operations on high voltage integrated systems

SAQA US ID	*UNIT STANDARD TITLE*
116453	Perform operations on high voltage integrated systems

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 4	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Operate electrical apparatus.

SPECIFIC OUTCOME 2

Stabilise transient and or emergency conditions.

SPECIFIC OUTCOME 3

Sustain operability of operating equipment.

SPECIFIC OUTCOME 4

Monitor electrical apparatus.

SPECIFIC OUTCOME 5

Maintain safety and regulatory requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of operating electrical apparatus.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 10

Shutdown a gas turbine power generator unit from a control room for maintenance outage

SAQA US ID	*UNIT STANDARD TITLE*
116454	Shutdown a gas turbine power generator unit from a control room for maintenance outage

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 4	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Shutdown gas turbine generating unit.

SPECIFIC OUTCOME 2

Isolate shutdown plant.

SPECIFIC OUTCOME 3

Demonstrate knowledge and understanding to shutdown the gas turbine unit.

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 11

Stabilise transient conditions on a gas power generating system from a control room

SAQA US ID	*UNIT STANDARD TITLE*
116457	Stabilise transient conditions on a gas power generating system from a control room

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 4	6

Specific Outcomes:

SPECIFIC OUTCOME 1

Identify transient emergency condition.

SPECIFIC OUTCOME 2

Implement planned corrective actions.

SPECIFIC OUTCOME 3

Evaluate implemented actions.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding to stabilise transient emergency conditions.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 12

Start up a gas turbine power generator system from a control room

SAQA US ID	*UNIT STANDARD TITLE*
116459	Start up a gas turbine power generator system from a control room

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 4	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Run up, synchronise and load plant.

SPECIFIC OUTCOME 3

Monitor plant start up conditions.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding to start up a gas turbine power generator System.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 13

Sustain plant operability of a gas turbine power generating unit

SAQA US ID	*UNIT STANDARD TITLE*
116462	Sustain plant operability of a gas turbine power generating unit

SGB NAME	*ABET BAND*	*PROVIDER NAME*
SGB Power Plant Operations	Undefined	

FIELD DESCRIPTION	*SUBFIELD DESCRIPTION*
Manufacturing, Engineering and Technology	Manufacturing and Assembly

UNIT STANDARD CODE	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
MET-MNA-0-SGB PPO	Regular	Level 4	4

Specific Outcomes:

SPECIFIC OUTCOME 1

Perform service routines on available and running plant.

SPECIFIC OUTCOME 2

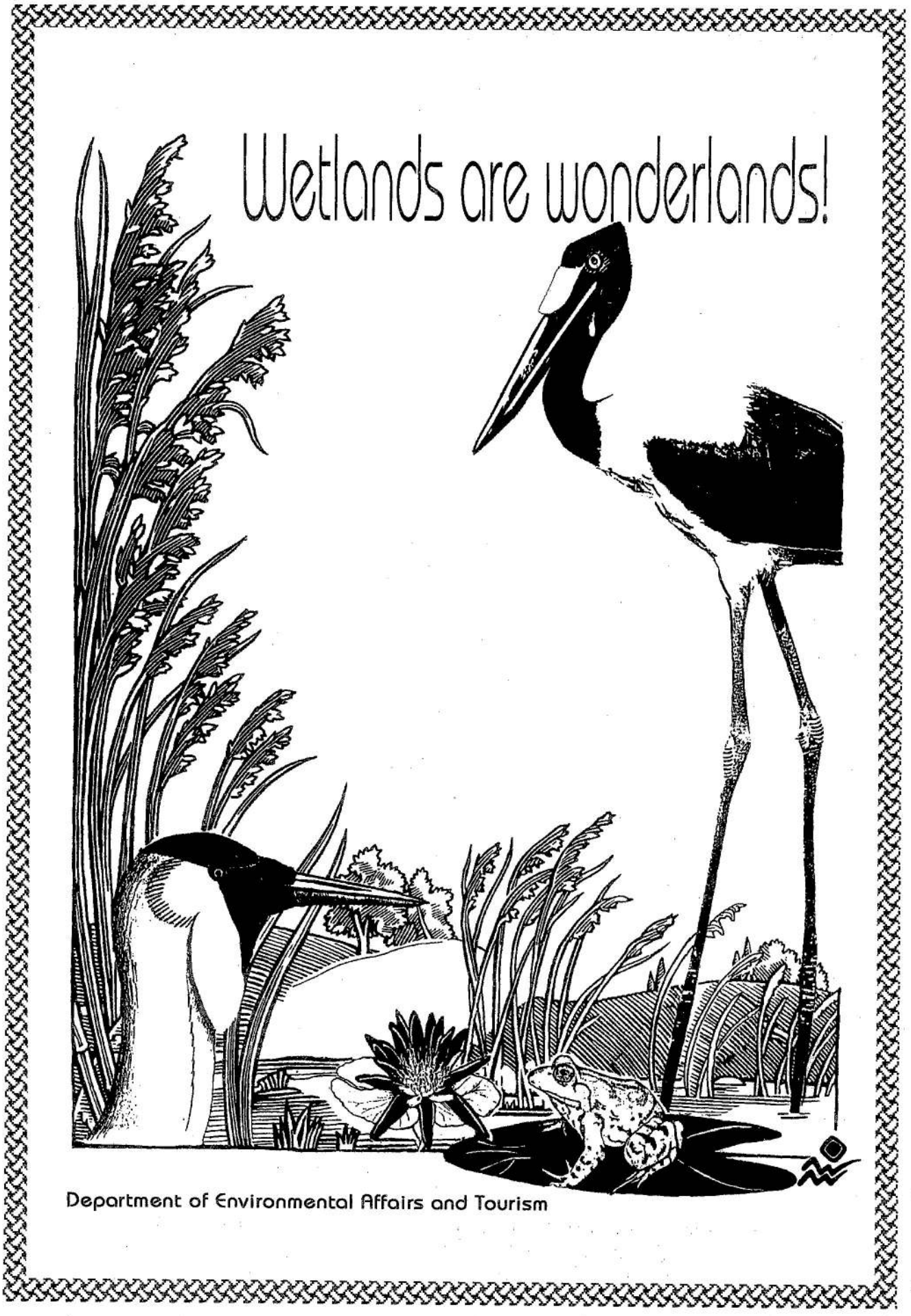
Monitor plant operating conditions.

SPECIFIC OUTCOME 3

Maintain raw material inventory.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding to sustain the operability of a gas turbine power-generating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