No. 946 **13 August 2004**

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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

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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 environment
> 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?

Y

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

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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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.

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