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