No. 1835

19 December 2003

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

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

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the unit standards upon which qualifications are based. The unit standards can be accessed via the SAQA web-site at <u>www.saqa.org.za</u>. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield.

Comment on the unit standards should reach SAQA at the address *below and no later than 18 January 2004.* All correspondence should be marked **Standards Setting – SGB for Power Plant** 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: <u>mmphuthing@saqa.co.za</u>

DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Power Plant Auxiliary Systems Operation

SAQA QUAL ID	QUALIFICATION TITLE					
23677	National Cert	ificate: Power Plant Auxil	iary Sy	stems Operation		
SGB NAME	SGB Power F	Power Plant Operations				
ABET BAND		PROVIDER NAME				
Undefined						
QUALIFICATION CODE		QUAL TYPE	S	JBFIELD		
MET-3-National C	Certificate	National Certificate	Er	ngineering and Related Design		
MINIMUM CREDITS		NQF LEVEL	Q	UALIFICATION CLASS		
122		Level 3 Regular-Unit Stds Based		egular-Unit Stds Based		
SAQA DECISION NUMBER		REGISTRATION START	DATE	REGISTRATION END DATE		
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PURPOSE OF THE QUALIFICATION

Learners obtaining this qualification will be recognised on a national level in performing operational activities on power plant auxiliary systems/processes and related equipment as FIELD OPERATORS on all power utilities in South Africa. The qualification will ensure professionalism, proficiency and excellence in the operating of power plants on the entry level. It will also assist in changing perceptions on the status and functional levels of operators in the work place. The qualification will provide the operators with pride self worth and enhance their morale.

Worth to the employer will be manifested in the competence of the employee in terms of safe, sound and efficient operations performed by the operator. This qualification will provide for recognition of prior learning of existing operators' competence throughout the industry and allow credits to be obtained in cross-functional learning fields.

The qualification will provide the foundational requirements for mobility and vertical progression in various power utilities. (Fossil, hydro or nuclear)

A person acquiring this qualification will have skills, knowledge and behavioural competence in the following areas:

- > Energy conversion process understanding
- > Theories and application of mechanical, electrical and process instrumentation understanding
- > Regulatory knowledge (OHSA, Introduction to High Voltage Regulations, Permit to Work Systems)
- > Dangers of chemicals used on power plants understood
- > Planning skill
- > Organizing skill
- > Decision making
- > Big Picture thinking (micro level)
- > Process plant configuration
- > Process plant integration
- > Self management
- > Team work
- > Communication (written and verbal)
- > Problem solving
- > Process plant operation in one of Fossil, Nuclear or Hydro plant.

Rationale of the qualification

03/12/11

Qual ID: 23677

SAQA: NLRD Report "Qualification Detail"

This qualification forms the foundation for Power Plant Operation in the Power Generation industry in South Africa and is therefore mandatory for all Power utilities.

This qualification is based on industry needs in building competences in the workplace for Power Plant Operations. The qualification therefore sets national standards for Power Plant Operators in Auxiliary Plant Operations.

This qualification provides the learner with accessibility to be employed within the functional areas that include nuclear, hydro and fossil power plants.

Other considerations in national interest addressed by this Qualification are:

- > Setting national standards of practice in this specific learning field
- > Building individual capacity in foundational Operating competence.
- > Ensure entry, progression and mobility into Life Long Learning in this specific learning field
- > Addressing Power Plant Operations Industry specific employment requirements.
- > Enhancing of professional competence on a national level
- > Providing 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 NQF Level 2

> Mathematical Literacy NQF Level 2

Recognition of prior learning (RPL)

This qualification will be achieved in part or in full through recognition of prior learning. (E.g. for those qualifications previously issued by the ESKOM AND ALLIED INDUSTRIES TRAINING BOARD (EAITB)), i.e. Power Plant Operator Certificate. (Currently been issued by the ENERGY SETA).

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 power plant auxiliary systems operation

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 Power Plant Operations.

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:

- > Fossil Power Plant: 131
- > Nuclear Power Plant: 133
- > Hydro Power Plant: 122

This Qualification is made up of unit standards at NQF levels 2 to 4, with the qualification satisfying the requirements for registration at level 3.

The majority of unit standards relate directly to the purpose of the qualification with maximum portability between the various power generating utilities (Nuclear, Hydro and Fossil Power Stations).

EXIT LEVEL OUTCOMES

1. Solve problems through the application of mathematics in a variety of contexts.

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- 2. Communicate effectively in the workplace.
- 3. Demonstrate knowledge and understanding of the fundamentals of Power Plant Engineering concepts.
- 4. Demonstrate knowledge of occupational introductory requirements.
- 5. Operate Auxiliary Power Plant Systems.

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 Standards, 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(s) 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.

Critical cross-field outcomes:

This qualification addresses the following critical cross-field outcomes, as detailed in the assessment criteria for each exit level outcome and within the unit standards associated with each exit level outcome:

> Identifying and solving problems in which responses indicate that responsible decisions using critical and creative thinking have been made.

> Working effectively with others as a member of a team, group, organisation or community.

> Organising and managing oneself and one's activities responsibly and effectively.

> Collecting, analysing, organising and critically evaluating information.

> Communicating effectively using visual, mathematical and/or language skills in the modes of oral/written persuasion.

> Using science and technology effectively and critically, showing responsibility towards the environment and health of others.

> Demonstrating and understanding of the world as a set of related systems by recognising that problemsolving contexts do not exist in isolation.

Learning programmes directed towards this qualification will also contribute to the full personal development of each learner and the social and economic development of the society at large, by making individuals aware of the importance of:

> Reflecting on and exploring a variety of strategies to learn more effectively.

- > Participating as responsible citizens in the life of local, national and global communities.
- > Being culturally and aesthetically sensitive across a range of social contexts.
- > Exploring education and career opportunities; and developing entrepreneurial opportunities.

ASSOCIATED ASSESSMENT CRITERIA

1.1 Problem solving strategies are appropriate to the problems at hand.

1.2 Solutions derived are appropriate to the problems.

1.3 Problem solving approach is communicated in a clear and structured manner using appropriate terminology.

1.4 Solutions are validated in terms of the problem situation.

1.5 Technology is used effectively to assist in problems solving as required.

2.1 Language is applied to accommodate workplace requirements.

2.2 Communication is clear and structured as per the situation at hand.

2.3 Media used for communications contributes to effective communication.

2.4 Communication barriers are identified and addressed as appropriate to the situation.

3.1 Knowledge is demonstrated of the application of power plant engineering concepts within the context of plant operations.

3.2 Applications of knowledge are suited for problem solving on process plant.

3. Explanations provided of Power Plant Engineering concepts are consistent with established literature and engineering conventions.

3.4 Applications of knowledge contribute towards the safe and effective operation of plant processes.

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4.1 Organisational understanding is demonstrated to an extent that the employee can function effectively in

the workplace.

- 4.2 Safety principles are applied in a holistic manner that protects plant and people.
- 5.1 Plant operations are performed safely and efficiently according to operating standards.
- 5.2 Out of normal emergency conditions are identified and acted upon using Power Plant Engineering Principles.
- 5.3 Interrelation of Auxiliary Systems are interpreted and contextualised within Power Generation.
- 5.4 Principles of teamwork are applied according to operational requirements.

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

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 as per the rules specified. 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

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

Assessors and moderators

Work place assessors should develop and conduct integrated assessments by using appropriate methods and techniques. Moderation to be done according to laid down requirements.

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.

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 NQF 4.
- > Certificates in Electrical Network Control NQF 4.
- > Certificate in Power Plant Operation NQF 4(Nuclear, Hydro and Fossil).

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 SETA.

> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant SETA.

> Assessment and moderation of assessment will be overseen by the relevant SETA according to the SETAs policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between SETAs (including professional bodies); and in terms of the moderation guideline.

> Moderation must include both internal and external moderation of assessments at exit points of the qualification. 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 which the assessment is conducted.
- > At least one year on the job experience.
- > Registered with the relevant SETA.

NOTES

N/A

UNIT STANDARDS

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

Core Core	UNIT STANDARD ID AND TITLE 13961 Demonstrate Knowledge and Use of Hand Operated Fire Fighting Equipment		CREDITS	STATUS
Core Core	13961 Demonstrate Knowledge and Use of Hand Operated Fire Fighting Equipment	l evel 2		
Core		201012	4	Draft - Prep for P Comment
L	13962 Demonstrate Knowledge and Understanding of The Organisation	Level 2	2	Draft - Prep for P Comment
Core	13963 Demonstrate Knowledge and Understanding Towards Occupational health and safety Regulatory Requirements	Level 2	2	Draft - Prep for P Comment
Core	13963 Demonstrate Knowledge and Understanding Towards Occupational health and safety Regulatory Requirements	Level 2	2	Draft - Prep for P Comment
Core	10195 Apply Engineering Principles and concepts in a Power Generation Process Plant	Level 3	5	Draft - Prep for P Comment
Core	10488 Interpret liquid transfer theories in a process plant	Level 3	3	Draft - Prep for P Comment
Core	10582 Describe lubrication methods and applications associated with process plants	Level 3	2	Draft - Prep for P Comment
Core	10585 Describe bearing types, designs and application theories associated with process plants	Level 3	2	Draft - Prep for P Comment
Core	10587 Describe the working principle of compressed air systems associated with process plant	Level 3	2	Draft - Prep for P Comment
Core	10598 Differentiate between valve designs and application theories associated with process plants	Level 3	1	Draft - Prep for P Comment
Core	10613 Describe power transmission designs and application theories associated with process plants	Level 3	3	Draft - Prep for P Comment
Core	11893 Operate Fossil Fired Steam Generator Water and Steam Systems	Level 3	11	Draft - Prep for P Comment
Core	13703 Perform operational communicational activities	Level 3	2	Draft - Prep for P Comment
Core	13713 Operate Support Plant Water Supply Systems	Level 3	1	Draft - Prep for P Comment
Core	13957 Operate Fire Extinguishing System	Level 3	4	Draft - Prep for P Comment
Core	14036 Describe plant instrumentation and process measurement used on Power Generation plant	Level 3	3	Draft - Prep for P Comment
Core	14038 Interpret the operation of internal combustion engines used in power plants	Level 3	3	Draft - Prep for P Comment
Core	114463 Operate Cooling Water Systems	Level 3	11	Draft - Prep for P Comment
Elective	114464 Operate nuclear reactor building air lock system	Level 2	2	Draft - Prep for P Comment
Elective	10522 Interpret solid transfer system theories in a process plant	Level 3	2	Draft - Prep for P Comment
Elective	11957 Operate Waste Handling Systems Associated with Power Plant Processes	Level 3	16	Draft - Prep for P Comment
Elective	12023 Operate hydrogen production plants	Level 3	9	Draft - Prep for P Comment
Elective	12096 Operate Demineralised Water Systems on Fossil Power Plants.	Level 3	4	Draft - Prep for P Comment
Elective	13704 Demonstrate knowledge and understanding of Hydro power generation concepts and theories	Level 3	15	Draft - Prep for P Comment
Elective	13711 Operate nuclear support plant gas production and supply systems	Level 3	3	Draft - Prep for P Comment
Elective	13712 Operate nuclear liquid waste monitoring and discharge systems	Level 3	4	Draft - Prep for P Comment
Elective	13959 Operate nuclear support plant system chlorination system	Level 3	1	Draft - Prep for P Comment
Elective	14037 Demonstrate knowledge and understanding of heat exchange equipment used in a process plant	Level 3	2	Draft - Prep for P Comment
Elective	14217 Operate Bulk Lubrication Oil Systems	Level 3	5	Draft - Prep for P Comment
Elective	114455 Operate nuclear support plant steam production system	Level 3	2	Draft - Prep for P Comment

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Elective	114456 Operate coal handling systems	Level 3	11	Draft - Prep for P
Elective	114458 Operate bulk fuel oil systems	Level 3	8	Draft - Prep for P Comment
Elective	114459 Operate liquid petroleum gas systems on fossil power plants	Level 3	1	Draft - Prep for P Comment
Elective	114462 Operate bulk flue gas conditioning systems on fossil fired steam generators	Level 3	5	Draft - Prep for P Comment
Elective	114465 Operate Compressed Air Systems	Level 3	8	Draft - Prep for P Comment
Elective	114469 Operate Nuclear Support Plant Water Supply Systems	Level 3	1	Draft - Prep for P Comment
Elective	13708 Apply engineering principles related to the operation of demineralisers and ion exchangers in nuclear power generating plant	Level 4	3	Draft - Prep for P Comment
Fundamental	7454 Collect and use data to establish statistical and probability models and solve related problems	Level 3	5	Registered
Fundamental	7455 Identify and work with simple forms of complex numbers	Level 3	1	Registered
Fundamental	7457 Work with a wide range of patterns and transformations of functions and solve related problems	Level 3	8	Registered
Fundamental	7460 Use structured models to describe, represent and analyse shape and motion in 2- and 3-dimensional space	Level 3	4	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

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Fossil Power Plant Operation

SAQA QUAL ID	QUALIFICAT	QUALIFICATION TITLE						
23678	National Cert	ificate: Fossil Power Plan	icate: Fossil Power Plant Operation					
SGB NAME	SGB Power F	lant Operations						
ABET BAND		PROVIDER NAME						
Undefined			· · ·					
QUALIFICATION CODE		QUAL TYPE	SUBFIELD					
MET-4-National (Certificate	National Certificate	Engineering and Related Design					
MINIMUM CREDITS		NQF LEVEL	QUALIFICATION CLASS					
183		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 recognized on a national level for performing operational activities on Fossil Steam Generator (boiler) and Steam driven Turbo generator auxiliary systems/processes and related equipment. The qualification will ensure professionalism, proficiency and excellence in the operating of fossil power plants. It will also assist in changing perceptions on the status and functional levels of operators in the work place. The qualification will provide the operators with pride, self worth and enhance their morale.

Worth to the employer will be manifested in the competence of the employee in terms of safe, sound and efficient operations performed by the operator. This qualification will provide for recognition of prior learning of existing operators' competence throughout the industry and allowed credits to be obtained in cross-functional learning fields.

The qualification will provide the foundational requirements for mobility and vertical progression into fossil power plant control.

A person acquiring this qualification will have skills, knowledge and behavioural competence in the following areas:

- > Energy conversion process and the impact of specific plant on this process.
- > Planning and organising of own job requirements
- > Legislation regarding safety, health and environment on the specific plant area.
- > Technical understanding of mechanical, electrical and instrumentation components.
- > Dangers of chemicals used in his/her direct work environment.
- > Lessons learned from trends/incidents related to his/her specific plant.
- > Problem solving and decision making.
- > Big Picture Thinking.
- > Process plant operating philosophies and configuration.
- > Communication, structures, procedures and processes.
- > Duties and responsibilities of persons within the functional area
- 7. Rationale of the qualification

This qualification is based on the industry needs in building competences in the workplace for Fossil Power Plant Operator. The qualification therefore sets national standards for field operators on Steam Generators (Boiler) and Steam driven Turbo Generators on Fossil fired Power Plants.

This qualification provides the learner with accessibility primarily to be employed within the functional areas

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of fossil fired power plants but does not exclude horizontal movement to other power utilities.

Other considerations in national interest addressed by this Qualification are:

- > Setting national standards of practice in this specific learning field
- > Building individual capacity in this specialised profession
- > Ensure entry, progression and mobility into Life Long Learning in this specific learning field
- > Addressing Power Plant Operations Industry specific employment requirements
- > Enhancing of professional competence on a national level
- > Providing an avenue of upliftment for the previously disadvantaged into this professional 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

> National Certificate in Power Plant Auxiliary System Operation NQF 3.

Learners should also be competent in:

- > Communication and language studies NQF 3.
- > Mathematical literacy NQF 3.

Recognition of prior learning (RPL)

This qualification will be achieved in part through recognition of prior learning for those qualifications for previously issued by the ESKOM AND ALLIED INDUSTRIES TRAINING BOARD (EAITB), i.e. Power Plant Operator Certificate. (Currently being issued by the ENERGY SETA)

Any other evidence of prior learning should be assessed through formal RPL processes to recognise achievement thereof.

QUALIFICATION RULES

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 continuous process plant operations.

Minimum credits required to complete this qualification are 183 which is the sum of fundamental and core credits. Electives may be selected to meet specific industry needs, but are not required for award of this qualification.

The credits relate directly to the purpose of the Qualification with maximum portability between power utilities.

EXIT LEVEL OUTCOMES

1. Solve complex problems through the application of mathematics in a variety of contexts.

2. Communicate effectively in first and second language in the workplace.

3. Display understanding of leadership concepts related to Power Plant Operations.

4. Demonstrate knowledge and understanding of the fundamentals of Power Plant Engineering Concepts related to steam and power generation.

- 5. Demonstrate knowledge of regulatory requirements associated with power plant operation.
- 6. Operate Steam and Turbo generator processes within safe operating parameters.
- 7. Perform basic functions on a stand alone computer.

Exit points for learners who do not complete the Qualifications

> Learners will be credited with Unit Standards in which they have proved competence

Critical cross-field outcomes:

This qualification addresses the following critical cross-field outcomes, as detailed in the assessment criteria for each exit level outcome and within the unit standards associated with each exit level outcome:

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1. Identifying and solving problems in which responses indicate that responsible decisions using critical and creative thinking have been made.

2. Working effectively with others as a member of a team, group, organisation or community.

3. Organising and managing oneself and one's activities responsibly and effectively.

4. Collecting, analysing, organising and critically evaluating information.

5. Communicating effectively using visual, mathematical and/or language skills in the modes of oral/written persuasion.

6. Using science and technology effectively and critically, showing responsibility towards the environment and health of others.

7. Demonstrating and understanding of the world as a set of related systems by recognising that problemsolving contexts do not exist in isolation.

Learning programmes directed towards this qualification will also contribute to the full personal development of each learner and the social and economic development of the society at large, by making individuals aware of the importance of:

1. Reflecting on and exploring a variety of strategies to learn more effectively.

2. Participating as responsible citizens in the life of local, national and global communities.

3. Being culturally and aesthetically sensitive across a range of social contexts.

4. Exploring education and career opportunities; and developing entrepreneurial opportunities.

ASSOCIATED ASSESSMENT CRITERIA

1.1 Problems identified using appropriate techniques.

1.2 Problem solving strategies are appropriate to the problems at hand in real work situations.

1.3 Root causes identified and solutions derived are appropriate to the problems.

1.4 Problem solving approach is communicated in a clear and structured manner using appropriate terminology.

1.5 Solutions are validated in terms of the problem situation.

1.6 Technology is used effectively to assist in problems solving as required

First Language:

2.1 Language structure and features are applied effectively to accommodate workplace requirements.

2.2 Appropriate media is used to communicate in a clear and structured manner.

2.3 Media used for communications contributes to effective communication.

2.4 Communication barriers are identified and addressed as appropriate to the situation

Second language:

2.5 Text in written and oral communication interpreted against set standards.

3.1 The role of self management is explained within the context of transformational leadership.

3.2 The role of management practices is explained within the context of transformational leadership.

3.3 Leadership attributes are integrated to meet the strategic intent within the organisation.

3.4 Understanding of leadership concepts contributes to the safe, efficient and effective operation of power plants.

4.1 Knowledge is demonstrated of the application of power plant engineering concepts within the context of steam and power generation plant operations.

4.2 Applications of knowledge are suited for problem solving on the process plant.

4.3 Equipment design and application theories are described within the context of their application.

4.4 Explanations provided of Power Plant Engineering concepts are consistent with established literature and engineering conventions.

4.5 Applications of knowledge contribute towards the safe and effective operation of plant processes.

5.1 Regulatory requirements in workplace procedures are described and interpreted within the context of the Occupational Health and Safety Act

5.2 Non-compliance to statutory requirements is described in terms of the potential impact on the micro environment.

5.3 Interrelations between related regulatory requirements are described in terms of standard operating procedures.

6.1 Plant operations are performed according to operating standards.

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6.2 Out of normal emergency conditions are identified and acted upon using Power Plant Engineering Principles.

6.3 Interrelation of Steam and Turbo generator processes are interpreted and contextualised within Power Generation.

6.4 Principles of teamwork are applied according to operational requirements.

7.1 Basic functions on a stand alone computer support Power Plant operational communication activities.

7.2 Structure and format of communications via computer meet organisational standards.

7.3 Basic functions are performed in line with manufacturer's guidelines.

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 as per the rules specified. Applicable critical cross field outcomes 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.

> 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 (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 assesses competence holistically.

These methods include but 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.

Assessors and moderators:

03/12/11

Qual ID: 23678

SAQA: NLRD Report "Qualification Detail"

Work place assessors should develop and conduct integrated assessments by using appropriate methods and techniques.

Moderation to be done according to laid down requirements.

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.

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: human resource development, process engineering, functional supervision, system specialization, quality assurance and health and safety.

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 SETA.

> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant SETA.

> Assessment and moderation of assessment will be overseen by the relevant SETA according to the SETA's policies and guidelines

> Moderation must include both internal and external moderation of assessments at exit points of the qualification. 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 on the standard at which the assessment is conducted

- > At least 12 months experienced in performing the outcomes for which she/he is registered.
- > Recognised as a subject matter expert in the specific industry
- > Registered with the relevant SETA

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	10574 Demonstrate knowledge of Steam Generator design and application	Level 3	6	Draft - Prep for P Comment
Core	14037 Demonstrate knowledge and understanding of heat exchange equipment used in a process plant	Level 3	2	Draft - Prep for P Comment
Core	14062 Demonstrate Knowledge of Safe Entry into Prohibited and or Restricted Areas	Level 3	2	Draft - Prep for P Comment
Core	14065 Demonstrate knowledge of steam turbines design and application	Level 3	6	Draft - Prep for P Comment

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Core	11944 Operate Steam Turbine Condensate System	Level 4	8	Draft - Prep for P Comment
Core	13720 Operate Turbo-Generator Oil Systems	Level 4	9	Draft - Prep for P Comment
Core	13721 Operate Turbo-Generator Cooling Systems	Level 4	12	Draft - Prep for P Comment
Core	13724 Operate Turbo-Generator Auxiliary Systems	Level 4	3	Draft - Prep for P Comment
Core	14059 Operate Steam Turbine Condenser Air Evacuation Systems	Level 4	6	Draft - Prep for P Comment
Core	14880 Operate Steam Turbine Feedwater Storage, Heating and Pumping Systems	Level 4	12	Draft - Prep for P Comment
Core	14881 Operate Steam Turbine Steam Systems	Level 4	10	Draft - Prep for P Comment
Core	14896 Operate Fossil Fired Steam Generator Water and Steam System	Level 4	11	Draft - Prep for P Comment
Core	14898 Operate Fossil Fired Steam Generator and Combustion Air and Flue Gas Systems	Level 4	8	Draft - Prep for P Comment
Core	14901 Operate Fossil Fired Steam Generator for Fuel Firing System	Level 4	13	Draft - Prep for P Comment
Core	14903 Operate Fossil Fired Steam Generator Spray Water System	Level 4	2	Draft - Prep for P Comment
Соге	14905 Operate Fossil Fired Steam Generator Auxiliary Systems	Level 4	9	Draft - Prep for P Comment
Elective	7547 Operate a personal computer system	Levei 2	6	Reregistered
Elective	7572 Demonstrate knowledge of and produce computer spreadsheets using basic functions	Level 2	3	Registered
Elective	14061 Understand Management Practices	Level 3	7	Draft - Prep for P Comment
Elective	14064 Understands Constructive Thinking	Level 3	12	Draft - Prep for P Comment
Elective	13600 Demonstrate knowledge of regulatory requirements for permit to work systems	Level 5	10	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	14060 Understands transformational leadership	Level 3	5	Draft - Prep for P Comment
Fundamental	14063 Apply Self Management through the Concepts of Positive Self-esteem and Resiliency	Level 3	2	Draft - Prep for P Comment
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	Levei 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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23678

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Diploma: Fossil Power Plant Process Control

SAQA QUAL ID	QUALIFICAT	QUALIFICATION TITLE					
23679	National Diple	National Diploma: Fossil Power Plant Process Control					
SGB NAME	SGB Power F	wer Plant Operations					
ABET BAND	ABET BAND PROVIDER NAME						
Undefined			· ••				
QUALIFICATIO	N CODE	QUAL TYPE	SUBFIELD				
MET-5-National Diploma		National Diploma	Engineering and Related Design				
MINIMUM CREDITS		NQF LEVEL	QUALIFICATION CLASS				
248		Level 5 Regular-Unit Stds Based					
SAQA DECISIO	N NUMBER	REGISTRATION START	DATE REGISTRATION END DATE				

PURPOSE OF THE QUALIFICATION

Learners obtaining this qualification will be recognised on a national level for performing process control activities on a fossil fired power plant. This qualification will ensure professionalism, proficiency and excellence in the control of fossil power generation units. It will also assist in changing perceptions on the status and functional levels of process controllers in fossil power generation. The qualification will provide the incumbent with pride, self worth and enhance their morale.

Worth to the employer will be manifested in the competence of the employee in terms of safe, sound and efficient operations performed by the process controller. This qualification will provide standards for recognition of prior learning of existing process controller competence throughout the industry and allow credits to be obtained in cross- functional learning fields.

A person acquiring this qualification will have skills, knowledge and behavioural competence to perform the following:

> To objectively recognise what is happening in or across situations with people, plant and materials.

> To recognise the direct impact of decisions and actions and the effects on plant and people in the direct work environment.

> The most appropriate action is decided upon after problems were recognised, analysed and the options evaluated.

> The person can listen, question, observe, describe accurately and align with the senders' needs

> The person can order resources, ideas, events, people and plant to enable required events to realise at organisation and system level.

> The energy flow through the conversion process is known and the key conversion process concepts are understood.

> The theory of application of mechanical, electrical and instrumentation plant components and their interrelation to the plant are known and understood.

Interrelated plant processes and safety equipment are operated and controlled safely and efficiently.
Relevant documentation is completed accurately and processed correctly according to operating procedures, service notifications and authorisation requirements.

> The trends/incidents related to the specific plant are understood.

> Concepts, terms and theory of the specified technical field as for the prescribed subjects are known.

> Operation of the plant is controlled to stay within the set limits for environmental impact.

> Process chemistry fundamentals applicable to process plant and the implications of operating outside of chemical specifications are known and understood.

> The relevant regulatory requirements are known, understood and complied with, and subordinates are

trained and controlled in their adherence to the Regulations.

> The Organisation's purpose, values it subscribes to and it's vision are known and staff are led in accordance with this.

> The computer is utilised to manage/control the plant processes and analyses plant and conditions.
> Production targets are met by planning, organising, leading and controlling of staff, and motivating and influencing their behaviour create effective working relationships.

Rationale

This qualification is designed for learners who will be responsible for controlling integrated processes on Power plants from remote located control centres.

This qualification is based on the power generation industry needs in building competence in the workplace for Fossil Power Plant Process Operations. The qualification therefore sets national standards for Power Plant Controllers in Fossil Fired Power Plant Process Control.

This qualification provides the learner with accessibility to be employed within the process control function on fossil fired power plant units.

Other considerations in national interest addressed by this Qualification are:

- > Setting national standards of practice in this specific learning field.
- > Building individual capacity in this specialised profession.
- > Ensure entry, progression and mobility into Life Long Learning in this specific learning field.
- > Addressing Power Plant Operations Industry specific employment requirements.
- > Enhancing of professional competence on a national level.
- > Providing an avenue of upliftment for the previously disadvantaged into this professional 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

> National Certificate in Fossil Power Plant Operations NQF Level 4.

Learners should also be competent in:

> Communication and Language studies NQF 4.

> Mathematics NQF 4.

Recognition of prior learning (RPL)

This qualification will be achieved wholly or in part through recognition of prior learning for those qualifications previously issued by the ESKOM AND ALLIED INDUSTRIES TRAINING BOARD (EAITB), i.e. Power Plant Controller Certificate. (Currently been issued by the ENERGY SETA).

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 for Fossil Power Plant Process Controller.

This Diploma consists of a planned combination of outcomes preparing the learner to perform outcomes directly linked to the safe and sound operation of power generating on a fossil power plant and also developing leadership competence needed to lead subordinates to the strategic intent of the organization.

This qualification consists of unit standards that are classified as fundamental, core and elective.

EXIT LEVEL OUTCOMES

1. Demonstrate understanding of leadership concepts related to the function of first line supervision.

2. Demonstrate understanding of the fundamentals of Fossil Power Plant Engineering Concepts related to

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the control of power generating units.

3. Demonstrate knowledge of regulatory requirements associated with the control of fossil power generating units.

4. Control fossil power generating processes within safe operating parameters.

5. Perform basic functions on a stand-alone computer.

6. Perform continuous improvement activities on Fossil Power Plant Processes.

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 Standards, 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(s) 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.

Critical cross-field outcomes:

This qualification addresses the following critical cross-field outcomes, as detailed in the assessment criteria for each exit level outcome and within the unit standards associated with each exit level outcome:

1. Identifying and solving problems in which responses indicate that responsible decisions using critical and creative thinking have been made.

2. Working effectively with others as a member of a group, organisation or community.

3. Organising and managing oneself and one's activities responsibly and effectively.

4. Collecting, analysing, organising and critically evaluating information.

5. Communicating effectively using visual, mathematical and/or language skills in the modes of oral/written persuasion.

6. Using science and technology effectively and critically, showing responsibility towards the environment and health of others.

7. Demonstrating and understanding of the world as a set of related systems by recognising that problemsolving contexts do not exist in isolation.

Learning programmes directed towards this qualification will also contribute to the full personal development of each learner and the social and economic development of the society at large, by making individuals aware of the importance of:

1. Reflecting on and exploring a variety of strategies to learn more effectively.

- 2. Participating as responsible citizens in the life of local, national and global communities.
- 3. Being culturally and aesthetically sensitive across a range of social contexts.
- 4. Exploring education and career opportunities; and developing entrepreneurial opportunities.

ASSOCIATED ASSESSMENT CRITERIA

1.

> The role of self-management is described within the context of first line supervision.

> The role of management practices is explained within the context of first line supervision.

> Leadership attributes are integrated to meet the strategic intent within the organisation.

> Understanding of leadership concepts contributes to the safe, efficient and effective control of power plants.

2.

> Knowledge is demonstrated of the application of fossil power plant engineering concepts within the context of power plant process control.

> Applications of knowledge are suited for solving control problems on the fossil process plant.

> Equipment design and application theories are described within the context of their application.

> Thermal and cycle efficiency are interpreted correctly within power generating processes.

> Knowledge is demonstrated of the technology associated with the control of power generating plants.

> Theories related to the generation of electricity and related apparatus are interpreted within the context of their application.

> Water treatment principles are described within power plant thermal processes.

> Explanations provided of Power Plant Engineering concepts are consistent with established literature and

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engineering conventions.

> Applications of knowledge contribute towards the safe and effective control of plant processes.

3.

> Regulatory requirements in workplace procedures are described and interpreted within the context of the Occupational Health and Safety Act

> Non-compliance to statutory requirements is described in terms of the potential impact on the micro environment.

> Interrelations between related regulatory requirements are described in terms of standard operating procedures.

4.

> Plant operations and control activities are performed according to operating standards.

> Out of normal emergency conditions are identified and acted upon using Power Plant Engineering Principles.

> Interrelation of Steam and Turbo generator processes are interpreted and contextualised within a Power Generating unit.

> Teamwork activities are facilitated to meet operational requirements.

> Power generating processes are controlled to meet system demand.

- > Thermal efficiency attained meets design specifications.
- > Tasks assigned to respective staff meet operational requirements.

5.

> Basic functions on a stand-alone computer support Power Plant operational communication activities.

> Structure and format of communications via computer meet organisational standards.

> Basic functions are performed in line with manufacturer's guidelines.

6.

> Corrective actions identified and suggested for improvement of activities on Fossil Power Plant Processes.

> Corrective actions disseminated to appropriate individuals.

> Corrective actions implemented to improve quality of activities on Fossil Power Plant Processes.

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 as per the rules specified. Applicable critical cross field outcomes 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.

> 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 control 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 the range of formative and summative methods. Assessors should assess and give credit for the evidence of learning that has already been acquired 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:

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- > On-the-job observations.
- > Role-play 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 competence level to assess the achievement of the learner. A detailed portfolio of evidence is required to prove the practical, foundational and reflective competencies of the learner.

Assessors and moderators

Work place assessors should develop and conduct integrated assessments by using appropriate methods and techniques.

Moderation to be done according to laid down requirements.

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.

ARTICULATION OPTIONS

This qualification provides the learner with the flexibility to pursue different careers in power generation related industries. Possible articulation fields could be the following: human resource development, process engineering, functional supervision, system specialization, quality assurance and health and safety.

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 SETA.

> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant SETA.

> Assessment and moderation of assessment will be overseen by the relevant SETA according to the SETAs policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between SETAs (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 qualification. 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 be assessed through an accredited

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assessment provider/centre.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors need to be competent in the planning and conducting of assessment of learning outcomes and in the design and development of assessments as described in the unit standard: Plan and conduct assessment of learning outcomes (ID: 7978).

The assessor must be:

- > Competent on the standard at which the assessment is conducted.
- > At least 12 months experience in performing the outcomes for which he/she is registered for.
- > Recognised as a subject matter expert in the specific organisation/industry.
- > Registered with the relevant SETA.

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	10677 Interpret electrical theories	Level 3	3	Draft - Prep for P Comment
Core	10707 Understanding the principles of magnetism	Level 3	2	Draft - Prep for P Comment
Core	10719 Understand the operating principles of transformers	Level 3	3	Draft - Prep for P Comment
Core	10893 Demonstrate knowledge and understanding of electrical power generation	Level 3	5	Draft - Prep for P Comment
Core	10894 Interpret electrical circuits	Level 3	2	Draft - Prep for P Comment
Core	14204 Interpret basic electronic theories in power plant process control	Level 3	2	Draft - Prep for P Comment
Core	10689 Understand electrical protection systems associated with power generating processes	Level 4	6	Draft - Prep for P Comment
Core	10897 Explain transformer characteristics applied on power systems	Level 4	2	Draft - Prep for P Comment
Core	10933 Understand the principles of atternating current (AC) motor operation and application in a process plant	Level 4	5	Draft - Prep for P Comment
Core	13803 Phasing and or synchronising on high voltage intergrated systems	Level 4	3	Draft - Prep for P Comment
Core	14055 Understand water chemistry in a power plant environment	Level 4	3	Draft - Prep for P Comment
Core	14056 Demonstrate knowledge and understanding of earthing practices on alternating current power systems	Level 4	2	Draft - Prep for P Comment
Core	14057 Demonstrate knowledge and understanding of electrical systems and related concepts	Level 4	6	Draft - Prep for P Comment
Core	14058 Describe instrumentation control within a process control system	Level 4	9	Draft - Prep for P Comment
Core	13558 Startup a fossil fired steam generator from a control room	Level 5	32	Draft - Prep for P Comment
Core	13561 Startup a Steam Driven Turbo-Generator from a Control Room.	Level 5	21	Draft - Prep for P Comment
Core	13562 Control load variation on a fossil fired steam generator from a control room	Level 5	7	Draft - Prep for P Comment
Core	13564 Control load variations on a steam driven turbo-generator from a control room	Level 5	6	Draft - Prep for P Comment
Core	13566 Shut down a fossil fired steam generator from a control room	Level 5	12	Draft - Prep for P Comment
Core	13568 Shutdown a steam driven turbo-generator system from a control room	Level 5	11	Draft - Prep for P Comment
Core	13571 Monitor and Sustain Plant Operability on a Fossil Fired Steam Generator from a Control Room	Level 5	8	Draft - Prep for P Comment
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Core	13572 Monitor and Sustain Plant Operability of a Steam Driven Turbo-Generator System from a Control Room	Level 5	7	Draft - Prep for P Comment
Core	13573 Stabilise Out of Normal Emergency Conditions on a Fossil Fired Steam Generator from a Control Room	Level 5	15	Draft - Prep for P Comment
Core	13575 Stabilise Out of Normal Emergency Conditions on a Steam Driven Turbo- Generator System from a Control Room	Level 5	12	Draft - Prep for P Comment
Core	13596 Control load variations on a fossil fired power generation unit from a control room.	Level 5	9	Draft - Prep for P Comment
Core	13597 Shutdown a fossil fired power generating unit from a control room.	Level 5	22	Draft - Prep for P Comment
Core	13598 Monitor and Sustain Plant Operability on a Fossil Fired Power Generating Unit from a Control Room	Level 5	16	Draft - Prep for P Comment
Core	13599 Stabilise Out of Normal Emergency Conditions on a Fossil Fired Power Generating Unit from a Control Room	Level 5	28	Draft - Prep for P Comment
Core	13600 Demonstrate knowledge of regulatory requirements for permit to work systems	Level 5	10	Draft - Prep for P Comment
Core	13601 Preserve Plant and or Equipment on a Fossil Fired Steam Generator from a Control Room	Level 5	3	Draft - Prep for P Comment
Core	13602 Preserve Plant and or Equipment on a Steam Driven Turbo-Generator Plant	Level 5	3	Draft - Prep for P Comment
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	Draft - Prep for P Comment
Core	114470 Demonstrate knowledge and understanding of thermal efficiency in a power plant	Level 5	3	Draft - Prep for P Comment
Elective	14062 Demonstrate Knowledge of Safe Entry into Prohibited and or Restricted Areas	Level 3	2	Draft - Prep for P Comment
Elective	113957 Use data entry and retrieval skills to input and retrieve computer data	Level 3	4	Recommended
Elective	10144 Identify, suggest and implement corrective actions to improve quality	Level 4	6	Registered
Elective	12998 Produce spreadsheets using accounting related information technology	Level 5	8	Registered
Elective	15226 Implement systems to meet the flow of information in a team, department or division	Level 5	3	Registered
Elective	14504 Demonstrate knowledge and understanding of e-business as a competitive tool	Level 6	7	Registered
Fundamental	14045 Apply Transformational Leadership by Interacting with Key Stakeholders	Level 4	8	Draft - Prep for P Comment
Fundamental	14046 Lead subordinates to support the strategy of the organisation	Level 4	4	Draft - Prep for P Comment
Fundamental	14048 Apply Self Management Concepts	Level 4	3	Draft - Prep for P Comment
Fundamental	14049 Understands, Applies and Displays Constructive Thinking	Level 4	5	Draft - Prep for P Comment
Fundamental	14047 Apply Sound Management Practices in Order to Achieve Short to Mid Term Objectives	Level 5	10	Draft - Prep for P Comment

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: in Nuclear Power Plant Operation

SAQA QUAL ID	QUALIFICA	QUALIFICATION TITLE					
23733	National Ce	National Certificate: in Nuclear Power Plant Operation					
SGB NAME	SGB Power	GB Power Plant Operations					
ABET BAND PROVIDER NAME							
Undefined							
QUALIFICATION CODE		QUAL TYPE	SUBFIELD				
MET-4-National Certificate		National Certificate	Engineering and Related Design				
MINIMUM CREDITS		NQF LEVEL	QUALIFICATION CLASS				
239		Level 4 Regular-Unit Stds Based					
SAQA DECISIC	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 performing operational activities on Nuclear Steam Generator and Steam driven Turbo generator systems/processes and related equipment. This qualification will ensure professionalism, proficiency and excellence in the operating of power plants. It will also assist in changing perceptions on the status and functional levels of operators in the work place. The qualification will provide the operators with pride, self worth and enhance their morale.

Worth to the employer will be manifested in the competence of the employee in terms of safe, sound and efficient operations performed by the operator. This qualification will provide for recognition of prior learning of existing operators' competence throughout the industry and allow credits to be obtained in cross-functional learning fields.

The qualification will provide the foundational requirements for mobility and vertical progression into nuclear power plant control.

A person acquiring this qualification will have skills, knowledge and behavioural competence in the following areas on a nuclear power plant:

> Energy conversion process and the impact of specific plant on this process.

> Planning and organising of own job requirements.

> Legislation regarding safety, health and environment on the specific plant area.

> Technical understanding of mechanical, electrical and instrumentation components.

> Dangers of chemicals used in his/her direct work environment.

> Lessons learned from trends/incidents related to his/her specific plant.

> Problem solving and decision-making.

> Big Picture Thinking.

> Process plant operating philosophies and configuration.

> Communication, structures, procedures and processes.

> Duties and responsibilities of persons within the functional area.

Rationale of the qualification

This qualification is based on Nuclear industry needs in building competences in the workplace for Nuclear Power Plant Operators. The qualification therefore sets national standards for field operators on Nuclear Steam Generators and Steam driven Turbo generators on nuclear power plants.

This qualification provides the learner with accessibility primarily to be employed within the functional areas of Nuclear power plants but does not exclude horizontal movement to other power utilities.

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Other considerations in national interest addressed by this Qualification are:

- > Setting national standards of practice in this specific learning field
- > Building individual capacity in this specialised profession
- > Ensure entry, progression and mobility into Life Long Learning in this specific learning field
- > Addressing Power Plant Operations Industry specific employment requirements
- > Enhancing of professional competence on a national level
- > Providing an avenue of upliftment for the previously disadvantaged into this professional discipline
- > Providing a Qualification to be used in a learnership in this field

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

> National Certificate in Nuclear Plant Auxiliary Operation (NQF 3)

- > Learners should also be competent in:
- > Communication and language studies NQF 3
- > Mathematical literacy NQF 3

Recognition of prior learning (RPL)

This qualification will be achieved in part or in whole through recognition of prior learning for those qualifications previously issued by the ESKOM AND ALLIED INDUSTRIES TRAINING BOARD (EAITB), i.e. Power Plant Operator Certificate. (Currently being issued by the ENERGY SETA)

QUALIFICATION RULES

Level, credits and learning components assigned to the qualification in power plant auxiliary systems operation:

> This Certificate is made up of a Planned combination of learning outcomes that have a defined purpose and will provide the learner with applied competence and a strong base for further learning in Power Plant Operations.

> Minimum credits required to complete this qualification are 239 which is the sum of fundamental and core credits. Electives are not required but may be selected to meet specific industry needs.

> The credits relate directly to the purpose of the Qualification with maximum portability between power utilities.

EXIT LEVEL OUTCOMES

- 1. Solve complex problems through the application of mathematics in a variety of contexts.
- 2. Communicate effectively in first and second language in the workplace.
- 3. Demonstrate understanding of generic nuclear fundamentals.
- 4. Demonstrate knowledge of occupational regulatory requirements.
- 5. Operate Nuclear Power Plant Systems.
- 6. Display understanding of leadership concepts related to Power Plant Operations.
- 7. Perform basic functions on a stand alone computer.

Critical cross-field outcomes:

This qualification addresses the following critical cross-field outcomes, as detailed in the assessment criteria for each exit level outcome and within the unit standards associated with each exit level outcome:

a) Identifying and solving problems in which responses indicate that responsible decisions using critical and creative thinking have been made.

b) Working effectively with others as a member of a team, group, organisation or community.

c) Organising and managing oneself and one's activities responsibly and effectively.

d) Collecting, analysing, organising and critically evaluating information.

e) Communicating effectively using visual, mathematical and/or language skills in the modes of oral/written persuasion.

f) Using science and technology effectively and critically, showing responsibility towards the environment

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and health of others.

g) Demonstrating and understanding of the world as a set of related systems by recognising that problemsolving contexts do not exist in isolation.

Learning programmes directed towards this qualification will also contribute to the full personal development of each learner and the social and economic development of the society at large, by making individuals aware of the importance of:

1) Reflecting on and exploring a variety of strategies to learn more effectively.

2) Participating as responsible citizens in the life of local, national and global communities.

3) Being culturally and aesthetically sensitive across a range of social contexts.

4) Exploring education and career opportunities; and developing entrepreneurial opportunities.

Exit points for learners who do not complete the Qualifications

Learners will be credited with Unit Standards in which they have proved competence and will be able to retain these credits. However, should the substance of these standards change substantively in future the validity of the credits may be affected.

ASSOCIATED ASSESSMENT CRITERIA

1.

> Problems identified using appropriate techniques.

> Root causes identified and solving derived are appropriate to the problems.

> Solutions derived are appropriate to the problems.

> Problem solving approach is communicated in a clear and structured manner using appropriate terminology.

> Solutions are validated in terms of the problem situation.

> Technology is used effectively to assist in problems solving as required

2.

First Language:

> Language structure and features are applied effectively to accommodate workplace requirements.

> Appropriate media is used to communicate in a clear and structured manner.

> Media used for communications contributes to effective communication.

> Communication barriers are identified and addressed as appropriate to the situation

Second language:

> Text in written and oral communication interpreted against set standards

3.

> Knowledge is demonstrated of the application of power plant engineering concepts within the context of plant operations.

> Applications of knowledge are suited for problem solving on nuclear process plants.

> Equipment design and application theories understood within the context of their application.

> Explanations provided of generic nuclear fundamentals are consistent with established literature and engineering conventions.

> Applications of knowledge contribute towards the safe and effective operation of nuclear plant processes

4.

> As Low As Reasonably Achievable (ALARA) concepts are applied to minimise exposure to radiation.

> Safety principles are applied in a holistic manner that protects plant and people.

> Non-compliance to statutory requirements is described in terms of the potential impact on the micro environment.

> Interrelations between related regulatory requirements are described in terms of standard operating procedures.

5.

> Plant operations are performed safely and efficiently according to operating standards.

> As Low As Reasonably Achievable (ALARA) concepts are applied to minimise exposure to radiation.

> Out of normal emergency conditions are identified and acted upon using Nuclear Power Plant Engineering Principles.

> Interrelation of Auxiliary Systems are interpreted and contextualised within Power Generation.

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> Principles of teamwork are applied according to operational requirements.

- 6.
- > The role of self management is explained within the context of transformational leadership.
- > The role of management practices is explained within the context of transformational leadership.
- > Leadership attributes are integrated to meet the strategic intent within the organisation.

> Understanding of leadership concepts contributes to the safe, efficient and effective operation of power plants.

7.

- > Basic functions on a stand alone computer support Power Plant operational communication activities.
- > Structure and format of communications via computer meet organisational standards.
- > Basic functions are performed in line with manufacturer's guidelines.

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 as per the rules specified. Applicable critical cross field outcomes 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.

> 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 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.

Assessors and moderators

Work place assessors should develop and conduct integrated assessments by using appropriate methods

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and techniques.

Moderation to be done according to laid down requirements.

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. Thereafter Operator qualifications 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.

Koeberg Nuclear Power Station is the only nuclear generating power station in Africa. Since its inception the station has had and maintained strong international ties with various countries namely United States of America, France and China. International best practices have been incorporated into every aspect of Koeberg's business. This was achieved by joining international nuclear quality assurance organisations. Koeberg is a member of the World Association of Nuclear Operation and the International Atomic Energy Agency. These bodies assure through the process of audits, evaluations, review and ensure that Koeberg is operated to the highest international standards.

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: human resource development, process engineering, functional supervision, system specialization, quality assurance and health and safety.

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 SETA.

> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant SETA.

> Assessment and moderation of assessment will be overseen by the relevant SETA according to the SETA's policies and guidelines

> Moderation must include both internal and external moderation of assessments at exit points of the qualification. 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

Criteria for registration of assessors

The assessor must be:

> Competent on the standard at which the assessment is conducted

> At least 12 months experienced in performing the outcomes for which he/she is registered.

> Recognised as a subject matter expert by the organisation/industry.

> Registered with the relevant SETA.

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	13723 Operate turbo-generator fire extinguishing system or	a nuclear power plant	Level 3	1	Draft - Prep for P Comment
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Core	13726 Operate support plant compressed air systems	Level 3	8	Draft - Prep for P
				Comment
Core	14062 Demonstrate Knowledge of Safe Entry into Prohibited and or Restricted Areas	Level 3	2	Draft - Prep for P Comment
Core	14102 Apply Radiation Requirements for Activities in Radiologically Controlled Zones at a Nuclear Power Plant	Level 3	2	Draft - Prep for P Comment
Core	14119 Operate nuclear auxiliary cooling systems	Level 3	15	Draft - Prep for P Comment
Core	14217 Operate Bulk Lubrication Oil Systems	Level 3	5	Draft - Prep for P Comment
Core	11944 Operate Stearn Turbine Condensate System	Level 4	8	Draft - Prep for P Comment
Core	13705 Describe fundamental instrumentation and measurement equipment associated with nuclear power plant	Levei 4	3	Draft - Prep for P Comment
Соге	13706 Describe fundamental material science related to brittle fracture and vessel thermal stress in nuclear power plants	Level 4	3	Draft - Prep for P Comment
Core	13707 Describe the operation and application of electrical equipment as required for nuclear power plant	Level 4	3	Draft - Prep for P Comment
Core	13709 Apply fundamental reactor engineering principles and theories related to nuclear power generating plant	Level 4	12	Draft - Prep for P Comment
Core	13710 Explain thermodynamic principles and concepts as applied in nuclear power openerating plant	Level 4	9	Draft - Prep for P Comment
Core	13720 Operate Turbo-Generator Oil Systems	Level 4	9	Draft - Prep for P
Core	13721 Operate Turbo-Generator Cooling Systems	Level 4	12	Draft - Prep for P
Core	13724 Operate Turbo-Generator Auxiliary Systems	Level 4	3	Draft - Prep for P
Core	13725 Operate Support Plant Electrical Systems	Level 4	7	Draft - Prep for P
Core	13727 Operate radioactive liquid waste treatment and handling systems	Level 4	17	Draft - Prep for P Comment
Core	13728 Operate nuclear reactor refueling water systems	Level 4	3	Draft - Prep for P Comment
Core	13794 Operate nuclear reactor vent and drain systems	Level 4	3	Draft - Prep for P Comment
Core	13798 Operate nuclear reactor fire extinguishing systems	Level 4	1	Draft - Prep for P Comment
Core	13801 Operate radioactive gaseous waste handling systems	Level 4	3	Draft - Prep for P Comment
Core	14059 Operate Steam Turbine Condenser Air Evacuation Systems	Level 4	6	Draft - Prep for P Comment
Core	14107 Operate Support Plant Diesel Systems	Level 4	2	Draft - Prep for P Comment
Core	14113 Operate support plant fire extinguishing systems	Level 4	2	Draft - Prep for P Comment
Core	14115 Operate nuclear reactor coolant and support systems	Level 4	15	Draft - Prep for P Comment
Core	14116 Operate nuclear reactor safeguard systems	Level 4	3	Draft - Prep for P Comment
Core	14126 Demonstrate knowledge of steam turbines design and application	Level 4	6	Draft - Prep for P Comment
Core	14880 Operate Steam Turbine Feedwater Storage, Heating and Pumping Systems	Level 4	12	Draft - Prep for P Comment
Core	14881 Operate Steam Turbine Steam Systems	Level 4	10	Draft - Prep for P Comment
Elective	7547 Operate a personal computer system	Level 2	6	Reregistered
Elective	7572 Demonstrate knowledge of and produce computer spreadsheets using basic functions	Level 2	3	Registered
Elective	14061 Understand Management Practices	Level 3	7	Draft - Prep for P Comment
Elective	14064 Understands Constructive Thinking	Level 3	12	Draft - Prep for P Comment
Elective	13600 Demonstrate knowledge of regulatory requirements for permit to work systems	Level 5	10	Draft - Prep for P Comment

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Fundamental	8968 Accommodate audience and context needs in oral communication	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	14060 Understands transformational leadership	Level 3	5	Draft - Prep for P Comment
Fundamental	14063 Apply Self Management through the Concepts of Positive Self-esteem and Resiliency	Level 3	2	Draft - Prep for P Comment
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
Fundamenta)	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

QUALIFICATION:

National Diploma: Nuclear Power Plant Process Control

SAQA QUAL ID	QUALIFICAT	QUALIFICATION TITLE					
23734	National Diplo	oma: Nuclear Power Pla	ant Process Control				
SGB NAME	SGB Power F	Plant Operations					
ABET BAND PROVIDER NAME							
Undefined			-				
QUALIFICATION CODE		QUAL TYPE	SUBFIELD				
MET-5-National	Diploma	National Diploma	Manufacturing and Assembly				
MINIMUM CRED	ITS	NQF LEVEL	QUALIFICATION CLASS				
295		Level 5	Regular-Unit Stds Based				
SAQA DECISIOI	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 performing process control activities on a Nuclear power plant. This qualification will ensure professionalism, proficiency and excellence in the control of Nuclear power generation units. It will also assist in changing perceptions on the status and functional levels of process controllers in Nuclear power generation. The qualification will provide the incumbent with pride, self worth and enhance their morale.

Worth to the employer will be manifested in the competence of the employee in terms of safe, sound and efficient operations performed by the process controller. This qualification will provide standards for recognition of prior learning of existing process controller competence throughout the industry and allow credits to be obtained in cross- functional learning fields.

A person acquiring this qualification will have skills, knowledge and behavioural competence to perform the following:

> To objectively recognise what is happening in or across situations with people, plant and materials.

> To recognise the direct impact of decisions and actions and the effects on plant and people in the direct work environment.

> The most appropriate action is decided upon after problems were recognised, analysed and the options evaluated.

> The person can listen, question, observe, describe accurately and align with the senders' needs

> The person can order resources, ideas, events, people and plant to enable required events to realise at organisation and system level.

> The energy flow through the conversion process is known and the key conversion process concepts are understood.

> The theory of application of mechanical, electrical and instrumentation plant components and their interrelation to the plant are known and understood.

> Interrelated plant processes and safety equipment are operated and controlled safely and efficiently.

> Relevant documentation is completed accurately and processed correctly according to operating

procedures, service notifications and authorisation requirements.

> The trends/incidents related to the specific plant are understood.

> Concepts, terms and theory of the specified technical field as for the prescribed subjects are known.

> Operation of the plant is controlled to stay within the set limits for environmental impact.

> Process chemistry fundamentals applicable to process plant and the implications of operating outside of chemical specifications are known and understood.

> The relevant regulatory requirements are known, understood and complied with, and subordinates are trained and controlled in their adherence to the Regulations.

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> The Organisation's purpose, values it subscribes to and it's vision are known and staff are led in accordance with this.

> The computer is utilised to manage/control the plant processes and analyses plant and conditions.
> Production targets are met by planning, organising, leading and controlling of staff, and motivating and influencing their behaviour create effective working relationships.

Rationale of the qualification

This qualification is designed for learners who will be responsible for controlling integrated processes on a Power plant from remote located control centres.

This qualification is based on the power generation industry needs in building competence in the workplace for Nuclear Power Plant Process Operations. The qualification therefore sets national standards for Power Plant Controllers in Nuclear Power Plant Process Control.

This qualification provides the learner with accessibility to be employed within the process control function on Nuclear power plant units.

Other considerations in national interest addressed by this Qualification are:

> Setting national standards of practice in this specific learning field

> Building individual capacity in this specialised profession

> Ensure entry, progression and mobility into Life Long Learning in this specific learning field

> Addressing Power Plant Operations Industry specific employment requirements

> Enhancing of professional competence on a national level

> Providing an avenue of upliftment for the previously disadvantaged into this professional 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

> National Certificate in Nuclear Power Plant Operations NQF Level 4.

Learners should also be competent in

> Communication and Language studies NQF 4

> Mathematics NQF 4

Recognition of prior learning (RPL)

This qualification will be achieved in part through recognition of prior learning for those qualifications previously issued by the ESKOM AND ALLIED INDUSTRIES TRAINING BOARD (EAITB), i.e. Power Plant Controller Certificate. (Currently been issued by the ENERGY SETA)

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 for Nuclear Power Plant Process Controller

This Diploma consists of a planned combination of outcomes preparing the learner to perform outcomes directly linked to the safe and sound operation of a power generating on a Nuclear power plant and also developing leadership competence needed to lead subordinates to the strategic intent of the organization.

EXIT LEVEL OUTCOMES

1. Display understanding of leadership concepts related to Power Plant Operations.

2. Demonstrate understanding of the fundamentals of Power Plant Engineering Concepts related to nuclear power generation units.

3. Demonstrate knowledge of regulatory requirements associated with the control of nuclear power plant operations.

4. Control Nuclear steam and turbo generator within safe operating parameters.

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5. Perform basic functions on a stand-alone computer.

6. Perform continuous improvement activities on Nuclear Power Plant Processes.

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 Standards, 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(s) 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.

This qualification addresses the following critical cross-field outcomes, as detailed in the assessment criteria for each exit level outcome and within the unit standards associated with each exit level outcome:

a) Identifying and solving problems in which responses indicate that responsible decisions using critical and creative thinking have been made.

b) Working effectively with others as a member of a group, organisation or community.

c) Organising and managing oneself and one's activities responsibly and effectively.

d) Collecting, analysing, organising and critically evaluating information.

e) Communicating effectively using visual, mathematical and/or language skills in the modes of oral/written persuasion.

f) Using science and technology effectively and critically, showing responsibility towards the environment and health of others.

g) Demonstrating and understanding of the world as a set of related systems by recognising that problemsolving contexts do not exist in isolation.

Learning programmes directed towards this qualification will also contribute to the full personal development of each learner and the social and economic development of the society at large, by making individuals aware of the importance of:

1) Reflecting on and exploring a variety of strategies to learn more effectively.

2) Participating as responsible citizens in the life of local, national and global communities.

3) Being culturally and aesthetically sensitive across a range of social contexts.

4) Exploring education and career opportunities; and developing entrepreneurial opportunities.

ASSOCIATED ASSESSMENT CRITERIA

1.

> The role of self-management is described within the context of first line supervision.

> The role of management practices are described within the context of first line supervision.

> Leadership attributes are integrated to meet the strategic intent within the organisation.

> Understanding of leadership concepts contributes to the safe, efficient and effective control of power plants.

2.

> Knowledge is demonstrated on the application of nuclear power plant engineering concepts within the context of power plant process control.

> Applications of knowledge are suited for solving control problems on the nuclear process plant.

> Equipment design and application theories are described within the context of their application.

> Knowledge demonstrated of the technology associated with the control of power generating plant.

> Theories related to the generation of electricity and related apparatus are interpreted within the context of the application.

> Thermal and cycle efficiency interpreted within power generating processes.

 > Water treatment processes are described within power plant processes.
> Explanations provided of Power Plant Engineering concepts are consistent with established literature and engineering conventions.

> Applications of knowledge contribute towards the safe and effective control of nuclear plant processes

3.

> As Low As Reasonably Achievable (ALARA) concepts are applied to minimise exposure to radiation.

> Safety principles are applied in a holistic manner that protects plant and people.

> Regulatory requirements in workplace procedures are described and interpreted within the context of the

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Occupational Health and Safety Act

> Non-compliance to statutory requirements is described in terms of the potential impact on the micro environment.

> Interrelations between related regulatory requirements are described in terms of standard operating procedures

4.

> Plant operations and control activities are performed according to operating standards.

> Out of normal emergency conditions are identified and acted upon using Power Plant Engineering Principles.

> Interrelation of Nuclear generator processes are interpreted and contextualised within Power Generating unit

> Teamwork activities are facilitated to meet operational requirements

> Power generating processes are controlled to meet system demand.

> Tasks assigned to respective staff so as to meet operational requirements.

> Thermal efficiency attained meets design specifications

5.

> Basic functions on a stand-alone computer support Power Plant operational communication activities.

> Structure and format of communications via computer meet organisational standards.

> Basic functions are performed in line with manufacturer's guidelines

6.

> Corrective actions identified and suggested for improvement of activities on Nuclear Power Plant Processes.

> Corrective actions disseminated to appropriate individuals.

> Corrective actions implemented to improve quality of activities on Nuclear Power Plant Processes

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 as per the specified rules. Applicable critical cross-field outcomes 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.

> 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 control 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 the range of formative and summative methods. Assessors should assess and give credit for the evidence of learning that has already been acquired 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 simulations

> Knowledge tests, exams, case studies, projects, logbooks, workbooks

> Verbal report backs (presentations)

> Portfolios of evidence (RPL)

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- > 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 competence level to assess the achievement of the learner. A detailed portfolio of evidence is required to prove the practical, foundational and reflective competencies of the learner.

Assessors and moderators

Work place assessors should develop and conduct integrated assessments by using appropriate methods and techniques.

Moderation to be done according to laid down requirements.

INTERNATIONAL COMPARABILITY

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.

ARTICULATION OPTIONS

This qualification provides the learner with the flexibility to pursue different careers in power generation related industries. Possible articulation fields could be the following: human resource development, process engineering, functional supervision, system specialization, quality assurance and health and safety.

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 SETA.

> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant SETA.

> Assessment and moderation of assessment will be overseen by the relevant SETA according to the SETAs policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between SETAs (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 qualification. 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 be assessed through an accredited assessment provider/centre.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors need to be competent in the planning and conducting of assessment of learning outcomes and in the design and development of assessments as described in the unit standard: Plan and conduct assessment of learning outcomes (ID: 7978).

The assessor must be:

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> Competent on the standard at which the assessment is conducted

> At least 1 year experience in performing the outcomes for which he/she is registered for
> Recognised as a subject matter expert in the specific organisation/industry
> Registered with the relevant SETA

NOTES

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	10677 Interpret electrical theories	Level 3	3	Draft - Prep for P Comment
Core	10707 Understanding the principles of magnetism	Level 3	2.	Draft - Prep for P Comment
Core	10719 Understand the operating principles of transformers	Level 3	3	Draft - Prep for P Comment
Core	10893 Demonstrate knowledge and understanding of electrical power generation	Level 3	5	Draft - Prep for P Comment
Core	10894 Interpret electrical circuits	Level 3	2	Draft - Prep for P Comment
Core	14204 Interpret basic electronic theories in power plant process control	Level 3	2	Draft - Prep for P Comment
Core	10689 Understand electrical protection systems associated with power generating processes	Level 4	6	Draft - Prep for P Comment
Core	10897 Explain transformer characteristics applied on power systems	Level 4	2	Draft - Prep for P Comment
Core	10933 Understand the principles of alternating current (AC) motor operation and application in a process plant	Level 4	5	Draft - Prep for P Comment
Core	13803 Phasing and or synchronising on high voltage intergrated systems	Level 4	3	Draft - Prep for P Comment
Core	14056 Demonstrate knowledge and understanding of earthing practices on alternating current power systems	Level 4	2	Draft - Prep for P Comment
Core	14058 Describe instrumentation control within a process control system	Level 4	9	Draft - Prep for P Comment
Core	12998 Produce spreadsheets using accounting related information technology	Level 5	8	Registered
Core	13568 Shutdown a steam driven turbo-generator system from a control room	Level 5	11	Draft - Prep for P Comment
Core	13572 Monitor and Sustain Plant Operability of a Stearn Driven Turbo-Generator System from a Control Room	Level 5	7	Draft - Prep for P Comment
Core	13600 Demonstrate knowledge of regulatory requirements for permit to work systems	Level 5	10	Draft - Prep for P Comment
Core	13804 Start up Nuclear Steam Supply Plant from a Control Room	Level 5	32	Draft - Prep for P Comment
Core	13811 Start up Turbo-Generator Plant from a Control Room	Level 5	14	Draft - Prep for P Comment
Core	13816 Control Load Variations on a Nuclear Steam Supply Plant from a Control Room.	Level 5	11	Draft - Prep for P Comment
Core	13817 Control Load Variations on a Turbo-Generator Plant from a Control Room.	Level 5	7	Draft - Prep for P Comment
Core	13817 Control Load Variations on a Turbo-Generator Plant from a Control Room.	Level 5	7	Draft - Prep for P Comment
Core	13817 Control Load Variations on a Turbo-Generator Plant from a Control Room.	Level 5	7	Draft - Prep for P Comment
Core	13819 Shutdown a Nuclear Steam Supply Plant from a Control Room	Level 5	26	Draft - Prep for P Comment
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	Draft - Prep for P Comment
Core	14227 Monitor and Sustain Nuclear Steam Supply Plant from a Control Room	Level 5	5	Draft - Prep for P Comment

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Core	14230 Stabilise Out of Normal and or Emergency Condition on a Nuclear Sleam Supply Plant from a Control Room	Level 5	57	Draft - Prep for P Comment
Core	14231 Stabilise Out of Normal and or Emergency Conditions on Nuclear Power Plant Turbo Generating Unit	Level 5	6	Draft - Prep for P Comment
Core	14232 Preserve Nuclear Stearn Supply Plant	Level 5	4	Draft - Prep for P Comment
Core	14233 Preserve Steam Driven Turbo-Generator Plant	Level 5	4	Draft ~ Prep for P Comment
Core	14907 Describe the Regulatory Nuclear Safety requirements as applied in nuclear power generating plant	Level 5	1	Draft - Prep for P Comment
Core	114470 Demonstrate knowledge and understanding of thermal efficiency in a power plant	Level 5	3	Draft - Prep for P Comment
Elective	7547 Operate a personal computer system	Level 2	6	Reregistered
Elective	7568 Demonstrate knowledge of and produce word processing documents using basic functions	Level 2	3	Registered
Elective	7571 Demonstrate the ability to use electronic mail software to send and receive messages	Level 2	3	Registered
Elective	7567 Produce and use spreadsheets for business	Level 3	5	Registered
Elective	7570 Produce word processing documents for business	Level 3	5	Registered
Elective	10144 Identify, suggest and implement corrective actions to improve quality	Level 4	6	Registered
Fundamental	14045 Apply Transformational Leadership by Interacting with Key Stakeholders	Level 4	8	Draft - Prep for P Comment
Fundamental	14046 Lead subordinates to support the strategy of the organisation	Level 4	4	Draft - Prep for P Comment
Fundamental	14048 Apply Self Management Concepts	Level 4	3	Draft - Prep for P Comment
Fundamental	14049 Understands, Applies and Displays Constructive Thinking	Level 4	5	Draft - Prep for P Comment
Fundamental	14047 Apply Sound Management Practices in Order to Achieve Short to Mid Term Objectives	Level 5	10	Draft - Prep for P Comment



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Hydro Power Plant Operation

SAQA QUAL ID	QUALIFICATION TITLE					
23735	National Cert	ificate: Hydro Power Plan	nt Opera	tion		
SGB NAME	SGB Power F	Plant Operations		· · · · · · · · · · · · · · · · · · ·		
ABET BAND		PROVIDER NAME				
Undefined						
QUALIFICATION	I CODE	QUAL TYPE	SU	BFIELD		
MET-4-National (Certificate	National Certificate	En	gineering and Related Design		
MINIMUM CRED	ITS	NQF LEVEL	QU	ALIFICATION CLASS		
150		Level 4	Re	Regular-Unit Stds Based		
SAQA DECISION	SAQA DECISION NUMBER REGISTRATION START DATE REGISTRATION END DATE					

PURPOSE OF THE QUALIFICATION

Learners obtaining this qualification will be recognized on a national level for performing operational activities on Hydro driven Power Plant auxiliary systems/processes and related equipment. The qualification will ensure professionalism, proficiency and excellence in the operating of Hydro power plants. It will also assist in changing perceptions on the status and functional levels of operators in the work place. The qualification will provide the operators with pride, self worth and enhance their morale.

Worth to the employer will be manifested in the competence of the employee in terms of safe, sound and efficient operations performed by the operator. This qualification will provide for recognition of prior learning of existing operators' competence throughout the industry and allowed credits to be obtained in cross-functional learning fields.

The qualification will provide the foundational requirements for mobility and vertical progression into Hydro power plant control.

A person acquiring this qualification will have skills, knowledge and behavioural competence in the following areas:

- > Energy conversion process and the impact of specific plant on this process.
- > Planning and organising of own job requirements
- > Legislation regarding safety, health and environment on the specific plant area.
- > Technical understanding of mechanical, electrical and instrumentation components.
- > Dangers of chemicals used in his/her direct work environment.
- > Lessons learned from trends/incidents related to his/her specific plant.
- > Problem solving and decision making.
- > Big Picture Thinking.
- > Process plant operating philosophies and configuration.
- > Communication, structures, procedures and processes.
- > Duties and responsibilities of persons within the functional area.

Rationale of the qualification

This qualification is based on the industry needs in building competencies in the workplace for Hydro Power Plant Operator. The qualification therefore sets national standards for field operators on Hydro driven Power Plants.
This qualification provides the learner with accessibility primarily to be employed within the functional areas of Hydro driven power plants but does not exclude horizontal movement to other power utilities.

Other considerations in national interest addressed by this Qualification are:

- > Setting national standards of practice in this specific learning field
- > Building individual capacity in this specialised profession
- > Ensure entry, progression and mobility into Life Long Learning in this specific learning field
- > Addressing Power Plant Operations Industry specific employment requirements
- > Enhancing of professional competence on a national level
- > Providing an avenue of upliftment for the previously disadvantaged into this professional 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

> National Certificate in Power Plant Auxiliary System Operation NQF 3.

Learners should also be competent in:

> Communication and language studies NQF 3

> Mathematical literacy NQF 3

Recognition of prior learning (RPL)

This qualification will be achieved in part or in whole through recognition of prior learning for those qualifications previously issued by the ESKOM AND ALLIED INDUSTRIES TRAINING BOARD (EAITB), i.e. Power Plant Operator Certificate. (Currently being issued by the ENERGY SETA)

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 hydro power plant operations

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 continuous process plant operations.

Minimum credits required to complete this qualification are 150, which is the sum of fundamental and core credits and 22 electives to be selected to meet specific industry needs.

The majority of credits relates directly to the purpose of the Qualification with maximum portability between power utilities.

EXIT LEVEL OUTCOMES

- 1. Solve complex problems through the application of mathematics in a variety of contexts.
- 2. Communicate effectively in the workplace.
- 3. Display understanding of leadership concepts related to power plant operations.
- 4. Demonstrate knowledge of regulatory requirements associated with power plant operation.

5. Operate Hydro Turbine Generator processes and associated equipment within safe operating parameters.

6. Perform basic functions on a stand alone computer.

Exit points for learners who do not complete the Qualifications

Learners will be credited with Unit Standards in which they have proved competence and retain these credits, however, should the contents of these standards change significantly in future the validity of the credits may be affected.

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Critical cross-field outcomes:

This qualification addresses the following critical cross-field outcomes, as detailed in the assessment criteria for each exit level outcome and within the unit standards associated with each exit level outcome:

> Identifying and solving problems in which responses indicate that responsible decisions using critical and creative thinking have been made.

> Working effectively with others as a member of a team, group, organisation or community.

> Organising and managing oneself and one's activities responsibly and effectively.

> Collecting, analysing, organising and critically evaluating information.

> Communicating effectively using visual, mathematical and/or language skills in the modes of oral/written persuasion.

> Using science and technology effectively and critically, showing responsibility towards the environment and health of others.

> Demonstrating and understanding of the world as a set of related systems by recognising that problemsolving contexts do not exist in isolation.

Learning programmes directed towards this qualification will also contribute to the full personal development of each learner and the social and economic development of the society at large, by making individuals aware of the importance of:

1. Reflecting on and exploring a variety of strategies to learn more effectively.

2. Participating as responsible citizens in the life of local, national and global communities.

3. Being culturally and aesthetically sensitive across a range of social contexts.

4. Exploring education and career opportunities; and developing entrepreneurial opportunities.

ASSOCIATED ASSESSMENT CRITERIA

1.

> Problems identified using appropriate techniques.

> Problem solving strategies are appropriate to the problems at hand in real work situations.

> Root causes identified and solutions derived are appropriate to the problems.

> Problem solving approach is communicated in a clear and structured manner using appropriate

terminology.

> Solutions are validated in terms of the problem situation.

> Technology is used effectively to assist in problems solving as required.

2.

First Language:

> Language structure and features are applied effectively to accommodate workplace requirements.

> Appropriate media is used to communicate in a clear and structured manner.

> Media used for communications contributes to effective communication.

> Communication barriers are identified and addressed as appropriate to the situationSecond Language:

> Text in written and oral communication interpreted against set standards.

3.

> The role of self management is explained within the context of transformational leadership.

> The role of management practices is explained within the context of transformational leadership.

> Leadership attributes are integrated to meet the strategic intent within the organisation.

> Understanding of leadership concepts contributes to the safe, efficient and effective operation of power plants.

4.

> Regulatory requirements in workplace procedures are described and interpreted within the context of the Occupational Health and Safety Act

> Non-compliance to statutory requirements is described in terms of the potential impact on the micro environment.

> Interrelations between related regulatory requirements are described in terms of standard operating procedures.

5.

> Plant operations are performed according to operating standards.

> Out of normal emergency conditions are identified and acted upon using Power Plant Engineering

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Principles.

- > Interrelation of Hydro Systems are interpreted and contextualised within Power Generation.
- > Principles of teamwork are applied according to operational requirements.

6.

- > Basic functions on a stand alone computer support Power Plant operational communication activities.
- > Structure and format of communications via computer meet organisational standards.
- > Basic functions are performed in line with manufacturer's guidelines.

Integrated Assessment

The applied competence (practical, foundational and reflective competencies) of this qualification will be achieved if a learner is able to achieve the exit level outcomes of the qualification as per the rules specified. Applicable critical cross field outcomes 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.

> 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 (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 assesses competence holistically. These methods include but 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.

Assessors and moderators

Work place assessors should develop and conduct integrated assessments by using appropriate methods and techniques. Moderation to be done according to laid down requirements.

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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 gualification was further developed to meet the SAQA requirements for registration.

In South Africa there are a number of Hydro Power stations as well as two Pump Storage schemes. The training and development of Hydro operators and controllers take place in South Africa where a number of these utilities have been benchmarked against EPRI standards.

Hydro Operator Training in Sub-Saharan Africa is provided at Kafue Gorge Regional Training Centre which was funded by the Norwegian government. A number of short courses are offered where candidates from the following countries are trained: Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia, Zimbabwe, Namibia, Mauritius, Uganda and Kenya.

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: human resource development, process engineering, functional supervision, system specialization, guality assurance and health and safety.

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 SETA.

> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant SETA.

> Assessment and moderation of assessment will be overseen by the relevant SETA according to the SETA's policies and guidelines

> Moderation must include both internal and external moderation of assessments at exit points of the qualification. 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 on the standard at which the assessment is conducted

> At least 12 months experienced in performing the outcomes for which she/he is registered for

> Recognised as a subject matter expert in the specific industry

> Registered with the relevant SETA.

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	14062 Demonstrate Knowledge of Safe Entry into Prohibited and or Restricted Areas			2	Draft - Prep for P Comment
Core	14217 Operate Bulk Lubrication Oil Systems		Level 3	5	Draft - Prep for P Comment
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Core	10900 Operate hydro power generation common cooling water	Level 4	4	Draft - Prep for P Comment
Core	13633 Operate hydro power generation drainage and dewatering systems	Level 4	4	Draft - Prep for P Comment
Core	13638 Operate hydro power generation station plants - Emergency standby electrical systems	Level 4	2	Draft - Prep for P Comment
Core	13645 Operate hydro turbine plant cooling water system	Level 4	4	Draft - Prep for P Comment
Core	13652 Operate hydro turbine plant bearing systems	Level 4	7	Draft - Prep for P Comment
Core	13658 Operate hydro turbine plant main inlet valve system	Level 4	4	Draft - Prep for P Comment
Core	13664 Operate hydro turbine plant governing systems	Level 4	4	Draft - Prep for P Comment
Core	13665 Operate hydro turbine plant shaft sealing system	Level 4	2	Draft - Prep for P Comment
Core	13666 Operate hydro turbine plant blow down air system	Level 4	. 4	Draft - Prep for P Comment
Core	13673 Operate hydro power generation turbine plant main pump and/or turbine system	Level 4	5	Draft - Prep for P Comment
Core	14211 Operate hydro power generation transformer auxiliary systems	Level 4	4	Draft - Prep for P Comment
Core	14212 Operate hydro generator cooling system	Level 4	4	Draft - Prep for P Comment
Core	14213 Operate hydro power generator mechanical brake and jacking system	Level 4	3	Draft - Prep for P Comment
Core	14215 Operate Hydro Power Generator Starting and Braking Devices	Level 4	4	Draft - Prep for P Comment
Core	14216 Operate Hydro Generator Plant Bearing Systems	Level 4	2	Draft - Prep for P Comment
Elective	7547 Operate a personal computer system	Level 2	6	Reregistered
Elective	7572 Demonstrate knowledge of and produce computer spreadsheets using basic functions	Levei 2	3	Registered
Elective	14060 Understands transformational leadership	Level 3	5	Draft - Prep for P Comment
Elective	14061 Understand Management Practices	Level 3	7	Draft - Prep for P Comment
Elective	14063 Apply Self Management through the Concepts of Positive Self-esteem and Resiliency	Level 3	2	Draft - Prep for P Comment
Elective	14064 Understands Constructive Thinking	Level 3	12	Draft - Prep for P Comment
Elective	13600 Demonstrate knowledge of regulatory requirements for permit to work systems	Level 5	10	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	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



QUALIFICATION:

National Diploma: Hydro Power Plant Process Control

SAQA QUAL ID	QUALIFICATION TITLE					
23736	National Diplo	oma: Hydro Power Plant Pro	cess Control			
SGB NAME	SGB Power F	Plant Operations				
ABET BAND		PROVIDER NAME				
Undefined						
QUALIFICATION	I CODE	QUAL TYPE	SUBFIELD			
MET-5-National	Diploma	National Diploma	Manufacturing and Assembly			
MINIMUM CRED	ITS	NQF LEVEL	QUALIFICATION CLASS			
241		Level 5 Regular-Unit Stds Based				
SAQA DEÇÍSION	SAQA DECISION NUMBER REGISTRATION START DATE REGISTRATION END DATE					

PURPÓSE OF THE QUALIFICATION

Learners obtaining this qualification will be recognised on a national level for performing process control activities on a Hydro fired power plant. This qualification will ensure professionalism, proficiency and excellence in the control of Hydro power generation units. It will also assist in changing perceptions on the status and functional levels of process controllers in Hydro power generation. The qualification will provide the incumbent with pride, self worth and enhance their morale.

Worth to the employer will be manifested in the competence of the employee in terms of safe, sound and efficient operations performed by the process controller. This qualification will provide standards for recognition of prior learning of existing process controller competence throughout the industry and allow credits to be obtained in cross-functional learning fields.

A person acquiring this qualification will have skills, knowledge and behavioural competence to perform the following:

> To objectively recognise what is happening in or across situations with people, plant and materials.

> To recognise the direct impact of decisions and actions and the effects on plant and people in the direct work environment.

> The most appropriate action is decided upon after problems were recognised, analysed and the options evaluated.

> The person can listen, question, observe, describe accurately and align with the senders' needs.

> The person can order resources, ideas, events, people and plant to enable required events to realise at organisation and system level.

> The energy flow through the conversion process is known and the key conversion process concepts are understood.

> The theory of application of mechanical, electrical and instrumentation plant components and their interrelation to the plant are known and understood.

> Interrelated plant processes and safety equipment are operated and controlled safely and efficiently.

> Relevant documentation is completed accurately and processed correctly according to operating

procedures, service notifications and authorisation requirements.

> The trends/incidents related to the specific plant are understood.

> Concepts, terms and theory of the specified technical field as for the prescribed subjects are known.

> Operation of the plant is controlled to stay within the set limits for environmental impact.

> Process chemistry fundamentals applicable to process plant and the implications of operating outside of chemical specifications are known and understood.

> The relevant regulatory requirements are known, understood and complied with, and subordinates are trained and controlled in their adherence to the Regulations.

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> The Organisation's purpose, values it subscribes to and its vision are known and staff is led in accordance with this.

The computer is utilised to manage/control the plant processes and analyses plant and conditions.
Production targets are met by planning, organising, leading and controlling of staff, and motivating and influencing their behaviour create effective working relationships.

Rationale of the qualification:

This qualification is designed for learners who will be responsible for controlling integrated processes on a Power plant from remote located control centres.

This qualification is based on the power generation industry needs in building competence in the workplace for Hydro Power Plant Process Operations. The qualification therefore sets national standards for Power Plant Controllers in Hydro Fired Power Plant Process Control.

This qualification provides the learner with accessibility to be employed within the process control function on Hydro fired power plant units.

Other considerations in national interest addressed by this Qualification are:

- > Setting national standards of practice in this specific learning field
- > Building individual capacity in this specialised profession
- > Ensure entry, progression and mobility into Life Long Learning in this specific learning field
- > Addressing Power Plant Operations Industry specific employment requirements
- > Enhancing of professional competence on a national level
- > Providing an avenue of upliftment for the previously disadvantaged into this professional 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

> National Certificate in Hydro Power Plant Operations NQF Level 4.

Learners should also be competent in:

- > Communication and Language studies NQF 4
- > Mathematics NQF 4

Recognition of Prior Learning (RPL):

This qualification will be achieved in part through recognition of prior learning for those qualifications previously issued by the Eskom and Allied Industries Training Board (EAITB), i.e. Power Plant Controller Certificate (currently been issued by the Energy SETA).

Any other evidence of prior learning should be assessed through formal RPL processes to recognise achievement thereof.

QUALIFICATION RULES

This Diploma consists of a planned combination of outcomes preparing the learner to perform outcomes directly linked to the safe and sound operation of a power generating on a Hydro power plant and also developing leadership competence needed to lead subordinates to the strategic intent of the organization.

This qualification consists of unit standards that are classified as fundamental, core and elective.

EXIT LEVEL OUTCOMES

1. Demonstrate understanding of leadership concepts related to the function of first line supervision.

2. Demonstrate understanding of the fundamentals of Power Plant Engineering Concepts related to the control of hydro power generating units.

Demonstrate knowledge of regulatory requirements associated with the control of hydro power generating units.

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- 4. Control Hydro power generating processes within safe operating parameters.
- 5. Demonstrate ability to perform basic functions on a stand-alone computer.
- 6. Perform continuous improvement activities on Hydro Power Plant Processes.

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 Standards, 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(s) 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.

Critical Cross-Field Outcomes:

This qualification addresses the following critical cross-field outcomes, as detailed in the assessment criteria for each exit level outcome and within the unit standards associated with each exit level outcome:

a) Identifying and solving problems in which responses indicate that responsible decisions using critical and creative thinking have been made.

b) Working effectively with others as a member of a group, organisation or community.

c) Organising and managing oneself and one's activities responsibly and effectively.

d) Collecting, analysing, organising and critically evaluating information.

e) Communicating effectively using visual, mathematical and/or language skills in the modes of oral/written persuasion.

f) Using science and technology effectively and critically, showing responsibility towards the environment and health of others.

g) Demonstrating and understanding of the world as a set of related systems by recognising that problemsolving contexts do not exist in isolation.

Learning programmes directed towards this qualification will also contribute to the full personal development of each learner and the social and economic development of the society at large, by making individuals aware of the importance of:

1. Reflecting on and exploring a variety of strategies to learn more effectively.

2. Participating as responsible citizens in the life of local, national and global communities.

3. Being culturally and aesthetically sensitive across a range of social contexts.

4. Exploring education and career opportunities; and developing entrepreneurial opportunities.

ASSOCIATED ASSESSMENT CRITERIA

1.1 The role of self-management is described within the context of first line supervision.

1.2 The role of management practices is explained within the context of first line supervision.

1.3 Leadership attributes are integrated to meet the strategic intent within the organisation.

1.4 Understanding of leadership concepts contributes to the safe, efficient and effective control of power plants.

2.1 Knowledge is demonstrated on the application of hydro power plant engineering concepts within the context of power plant process control.

2.2 Applications of knowledge are suited for solving control problems on the hydro process plant.

2.3 Equipment design and application theories are described within the context of their application.

2.4 Knowledge is demonstrated of the technology associated with the control of power generating plants. 2.5 Theories related to the generation of electricity and related apparatus are interpreted within the context of their application.

2.6 Water treatment principles are described within power plant thermal processes.

2.7 Explanations provided of Power Plant Engineering concepts are consistent with established literature and engineering conventions.

2.8 Applications of knowledge contribute towards the safe and effective control of hydro plant processes.

3.1 Regulatory requirements in workplace procedures are described and interpreted within the context of the Occupational Health and Safety Act.

3.2 Non-compliance to statutory requirements is described in terms of the potential impact on the micro -

12/11	Qual ID:	23736	SAQA: NLRD Report "Qualification Detail"	Page 3
				-

environment.

3.3 Interrelations between related regulatory requirements are described in terms of standard operating procedures.

4.1 Plant operations and control activities are performed according to operating standards.

4.2 Out of normal emergency conditions are identified and acted upon using Power Plant Engineering Principles.

4.3 Interrelation of Hydro generator processes are interpreted and contextualised within Power Generating unit

4.4 Teamwork activities are facilitated to meet operational requirements

4.5 Power generating processes are controlled to meet system demand.

4.6 Thermal efficiency attained meets design specifications.

4.7 Tasks assigned to respective staff meet operational requirements.

5.1 Basic functions on a stand-alone computer support Power Plant operational communication activities.

5.2 Structure and format of communications via computer meet organisational standards.

5.3 Basic functions are performed in line with manufacturer's guidelines.

6.1 Corrective actions identified and suggested for improvement of activities on Hydro Power Plant Processes.

6.2 Corrective actions disseminated to appropriate individuals.

6.3 Corrective actions implemented to improve quality of activities on Hydro Power Plant Processes.

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 as per the rules specified. Applicable critical cross-field outcomes 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.

> 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 control 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 the range of formative and summative methods. Assessors should assess and give credit for the evidence of learning that has already been acquired 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 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.

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> 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 competence level to assess the achievement of the learner. A detailed portfolio of evidence is required to prove the practical, foundational and reflective competencies of the learner.

Assessors and moderators:

Work place assessors should develop and conduct integrated assessments by using appropriate methods and techniques.

Moderation to be done according to laid down requirements.

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.

ARTICULATION OPTIONS

This qualification provides the learner with the flexibility to pursue different careers in power generation related industries. Possible articulation fields could be the following: human resource development, process engineering, functional supervision, system specialization, quality assurance and health and safety.

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 SETA.

> Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant SETA.

> Assessment and moderation of assessment will be overseen by the relevant SETA according to the SETAs policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between SETAs (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 qualification. 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 be assessed through an accredited assessment provider/centre.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors need to be competent in the planning and conducting of assessment of learning outcomes and in the design and development of assessments as described in the unit standard: Plan and conduct assessment of learning outcomes (ID: 7978).

The assessor must be:

> Competent on the standard at which the assessment is conducted

> At least 1 year experience in performing the outcomes for which he/she is registered for

> Recognised as a subject matter expert in the specific organisation/industry

> Registered with the relevant SETA.

NOTES

N/A

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UNIT STANDARDS

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

Dore 10677 Interpret electrical theories Level 3 3 Dereft Core 10707 Undestanding the principles of transformers Level 3 2 Diraft - Prop for P Comment Core 10719 Undestand the openting principles of transformers Level 3 3 Diraft - Prop for P Comment Core 10993 Demonstrate knowledge and understanding of electrical power generation Level 3 2 Diraft - Prop for P Comment Core 10994 Interpret electrical dirculits Level 3 2 Diraft - Prop for P Comment Core 10994 Interpret electrical dirculits Level 3 2 Diraft - Prop for P Comment Core 13704 Demonstrate knowledge and understanding of Hydro power generation Level 3 2 Diraft - Prop for P Comment Core 10897 Explain transformer characteristics appled on power systems Level 4 5 Diraft - Prop for P Comment Core 10997 Explain transformer of alternoting ourment (AC) motor opention and current toware splatation processes Level 4 5 Diraft - Prop for P Comment Core 10303 Phasing and or synchronisking on high voltage integrated systems Level 4 5 Diraft - Prop for P Comment		UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core 10707 Understand the principles of transformers Level 3 2 Dirth Prep for P Comment Core 10993 Demonstrate knowledge and understanding of electrical power generation Level 3 5 Draft - Prep for P Comment Core 10994 Integrate electrical circults Level 3 2 Draft - Prep for P Comment Core 13974 Demonstrate knowledge and understanding of Hydro power generation Level 3 2 Draft - Prep for P Comment Core 13740 Demonstrate knowledge and understanding of Hydro power generation Level 3 15 Draft - Prep for P Comment Core 10689 Understand electrical protection systems associated with power generating Level 4 6 Draft - Prep for P Comment Core 10689 Understand fire principles of alternating current (AC) motor operation and exploit Demonstrate knowledge and understanding of earthing practices on alternating current power systems Level 4 3 Draft - Prep for P Comment Core 140950 Demonstrate knowledge and understanding of earthing practices on alternating current power systems Level 4 3 Draft - Prep for P Comment Core 140950 Demonstrate knowledge and understanding of earthing practices on alternating current power systems Level 4 5	Core	10677 Interpret electrical theories	Level 3	3	Draft - Prep for P Comment
Core 10719 Understand the operating principles of transformers Level 3 3 Draft. Prep for P Comment Core 10893 Demonstrate knowledge and understanding of electrical power generation Level 3 2 Draft. Prep for P Comment Core 10894 Interpret electrical circuits Level 3 2 Draft. Prep for P Comment Core 14204 Interpret electrical protocition systems associated with power generating concepts and theories Level 3 2 Draft. Prep for P Comment Core 10689 Understand the principles of atternating current (AC) motor operation and approxement Level 4 5 Draft. Prep for P Comment Core 10933 Understand the principles of atternating current (AC) motor operation and approxement Level 4 5 Draft. Prep for P Comment Core Core 10933 Understand the principles of atternating current (AC) motor operation and approxement Level 4 5 Draft. Prep for P Comment Core Core 14055 Deprincestrate knowledge and understanding of electrical systems Level 4 2 Draft. Prep for P Comment Core Core 14055 Deprincestrate knowledge and understanding of electrical systems Level 4 2 Draft. Prep for P Comme	Core	10707 Understanding the principles of magnetism	Level 3	2	Draft - Prep for P Comment
Core 10893 Demonstrate knowledge and understanding of electrical power generation Level 3 5 Draft - Prop for D Comment Core 10894 Interpret electrical circuits Level 3 2 Draft - Prop for D Comment Core 13704 Demonstrate knowledge and understanding of Hydro power generation Level 3 2 Draft - Prop for D Comment Core 14204 Interpret Leads electronic throokers associated with power generating processes Level 3 2 Draft - Prop for D Comment Core 10897 Explain transformer characteristics applied on power systems Level 4 6 Draft - Prop for D Comment Core 10893 Tables and the principles of atternating current (AC) motor operation and application in a process plant Level 4 5 Draft - Prop for D Comment Core 13803 Phasing and or synchronising on high valage intergrated systems Level 4 5 Draft - Prop for D Comment Core 14055 Demonstrate knowledge and understanding of electrical systems and related Level 4 6 Draft - Prop for D Comment Core 14055 Demonstrate knowledge and understanding of electrical systems and related Level 4 9 Draft - Prop for D Comment Core 14055 De	Core	10719 Understand the operating principles of transformers	Level 3	3	Draft - Prep for P Comment
Core 10894 Interpret electrical circuits Level 3 2 Draft - Prep for P Comment Core 13704 Demonstrate knowledge and understanding of Hydro power generation concepts and theories Level 3 15 Draft - Prep for P Comment Care 14204 Interpret basic electronic theories in power plant process control Level 3 2 Draft - Prep for P Comment Care 10689 Undenstand electrical protection systems associated with power generating Level 4 6 D raft - Prep for P Comment Core 10697 Explain transformer characteristics appled on power systems Level 4 2 D raft - Prep for P Comment Core 10933 Undenstand the principles of alternating current (AC) motor operation and application in a process plant Level 4 5 D raft - Prep for P Comment Core 14056 Demonstrate knowledge and undenstanding of earthing practices on alternating concepts Level 4 5 D raft - Prep for P Comment Core 14056 Demonstrate knowledge and undenstanding of earthing practices on alternating Level 4 5 D raft - Prep for P Comment Core 14056 Demonstrate knowledge and undenstanding of earthing systems and neitate Level 4 5 D raft - Prep for P Comment	Core	10893 Demonstrate knowledge and understanding of electrical power generation	Level 3	5	Draft - Prep for P Comment
Core 13704 Demonstrate knowledge and understanding of Hydro power generation concepts and theories Level 3 Comment Care 14204 Interpret basic electronic theories in power plant process control Level 4 2 Draft - Prep for P Comment Care 10668 Understand electrical protection systems associated with power generating Level 4 6 D raft - Prep for P Comment Core 10833 Understand the principles of alternating current (AC) motor operation and application in a process plant Level 4 5 D raft - Prep for P Comment Core 13803 Phesing and or synchronising on high voltage integrated systems Level 4 3 D raft - Prep for P Comment Core 14056 Demonstrate knowledge and understanding of electrical systems Level 4 5 D raft - Prep for P Comment Core 14056 Demonstrate knowledge and understanding of electrical systems and related concepts Comment Comment Core 14057 Demonstrate knowledge and understanding of electrical systems Level 4 5 D raft - Prep for P Comment Core 14057 Demonstrate knowledge and understanding of electrical systems Level 4 5 D raft - Prep for P Comment Core 14057 Demonstrate knowledge and unde	Core	10894 Interpret electrical circuits	Level 3	2	Draft - Prep for P Comment
Core 14204 Interpret basic electronic theories in power plant processes control Level 3 2 Draft - Prep for P Comment Care 10669 Understand electrical protection systems associated with power generaling Level 4 6 Draft - Prep for P Comment Core 10897 Explain transformer characteristics applied on power systems Level 4 5 Draft - Prep for P Comment Core 10933 Understand the principles of alternating current (AC) motor operation and application in a process plant Level 4 5 Draft - Prep for P Comment Core 14056 Demonstrate knowledge and understanding of earthing practices on alternating current power systems Level 4 6 Draft - Prep for P Comment Core 14056 Demonstrate knowledge and understanding of electrical systems and related concepts Core Comment Comment Core 14058 Describe instrumentation control within a process control system Level 4 6 Draft - Prep for P Comment Core 10898 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 32 Draft - Prep for P Comment Core 13519 Control Load Variations on a Hydro Power Generating Unit in Pumping Mode the form a Control Room Level 5 10 Draft - P	Core	13704 Demonstrate knowledge and understanding of Hydro power generation concepts and theories	Level 3	15	Draft - Prep for P Comment
Core 10669 Understand electrical protection systems associated with power generating Level 4 6 Draft - Prep for P Comment Core 10897 Explain transformer characteristics applied on power systems Level 4 5 Draft - Prep for P Comment Core 13803 Understand the principles of alternating current (AC) motor operation and Level 4 5 Draft - Prep for P Comment Core 13803 Phasing and or synchronishing on high voltage integrated systems Level 4 2 Draft - Prep for P Comment Core 14056 Demonstrate knowledge and understanding of eaching practices on alternating Level 4 2 Draft - Prep for P Comment Core 14055 Demonstrate knowledge and understanding of electrical systems and related comment Core moment 2 Draft - Prep for P Comment Core 14058 Describe instrumentation control within a process control system Level 4 5 Draft - Prep for P Comment Core 10898 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13517 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13519 Control Load Varia	Core	14204 Interpret basic electronic theories in power plant process control	Level 3	2	Draft - Prep for P Comment
Core 10897 Explain transformer characteristics applied on power systems Level 4 2 Draft - Prep for P Comment Core 13803 Understand the principles of alternating current (AC) motor operation and application in a process plant Level 4 5 Draft - Prep for P Comment Core 13803 Phasing and or synchronising on high voltage intergrated systems Level 4 3 Draft - Prep for P Comment Core 14055 Demonstrate knowledge and understanding of earthing practices on alternating current power systems Level 4 6 Draft - Prep for P Comment Core 14055 Demonstrate knowledge and understanding of electrical systems and related concepts Level 4 6 Draft - Prep for P Comment Core 14058 Describe instrumentation control within a process control system Level 4 9 Draft - Prep for P Comment Core 10839 Sturtup Hydro Power Generating Unit from a Control Centres Level 5 32 Draft - Prep for P Comment Core 13517 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13519 Control Load Variations on a Hydro Power Generating Unit in Pumping Mode Level 5 10 Draft - Prep for P Comment	Core	10689 Understand electrical protection systems associated with power generating processes	Level 4	6	Draft - Prep for P Comment
Core 10933 Understand the principles of alternating current (AC) motor operation and application in a process plant Level 4 5 Draft - Prep for P Comment Core 13803 Phesing and or synchronishig on high voltage intergrated systems Level 4 3 Draft - Prep for P Comment Core 14055 Demonstrate knowledge and understanding of electrical systems and related concepts Level 4 6 Draft - Prep for P Comment Core 14055 Demonstrate knowledge and understanding of electrical systems and related concepts Level 4 6 Draft - Prep for P Comment Core 14058 Describe instrumentation control within a process control system Level 4 9 Draft - Prep for P Comment Core 10898 Startup Hydro Power Generating Unit from a Control Within a process control system Level 5 32 Draft - Prep for P Comment Core 10899 Shutdown Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13517 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 4 Draft - Prep for P Comment Core 13520 Control Load Variations on a Hydro Power Generating Unit in Generating and the Control Room Level 5 7 <td< td=""><td>Core</td><td>10897 Explain transformer characteristics applied on power systems</td><td>Level 4</td><td>2</td><td>Draft - Prep for P Comment</td></td<>	Core	10897 Explain transformer characteristics applied on power systems	Level 4	2	Draft - Prep for P Comment
Core 13803 Phasing and or synchronising on high voltage intergrated systems Level 4 3 Draft - Prep for P Comment Core 14056 Demonstrate knowledge and understanding of earthing practices on alternating corrent power systems Level 4 2 Draft - Prep for P Comment Core 14057 Demonstrate knowledge and understanding of electrical systems and related Level 4 6 Draft - Prep for P Comment Core 14058 Describe instrumentation control within a process control system Level 4 9 Draft - Prep for P Comment Core 10898 Starup Hydro Power Generating Unit from a Control Room Level 5 32 Draft - Prep for P Comment Core 10899 Shutdown Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13517 Starup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 4 Draft - Prep for P Comment Core 13519 Control Load Variation on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room Level 5 4 Draft - Prep for P Comment Core 13520 Stalup Mark Over Generating Unit from a Control Room Level 5 7 Draft - Prep for P Comment	Core	10933 Understand the principles of alternating current (AC) motor operation and application in a process plant	Level 4	5	Draft - Prep for P Comment
Core 14056 Demonstrate knowledge and understanding of earthing practices on alternating current power systems 2 Draft - Prep for P Comment Core 14057 Demonstrate knowledge and understanding of electrical systems and related concepts Level 4 6 Draft - Prep for P Comment Core 14058 Describe instrumentation control within a process control system Level 4 9 Draft - Prep for P Comment Core 10898 Startup Hydro Power Generating Unit from a Control Room Level 5 32 Draft - Prep for P Comment Core 10899 Shutdown Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13517 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13519 Control Load Variations on a Hydro Power Generating Unit in Pumping Mode Level 5 4 Draft - Prep for P Comment Core 13520 Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compansition Mode from a Control Room Level 5 1 Draft - Prep for P Comment Core 13523 Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from the Control Room Level 5 10 Draf	Core	13803 Phasing and or synchronising on high voltage intergrated systems	Level 4	3	Draft - Prep for P Comment
Core 14057 Demonstrate knowledge and understanding of electrical systems and related Level 4 6 Draft - Prep for P Comment Core 14058 Describe instrumentation control within a process control system Level 4 9 Draft - Prep for P Comment Core 10898 Startup Hydro Power Generating Unit from a Control Room Level 5 32 Draft - Prep for P Comment Core 10899 Shutdown Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13517 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13517 Startup Hydro Power Generating Unit in Pumping Mode Level 5 4 Draft - Prep for P Comment Core 13519 Control Load Variation on a Hydro Power Generating Unit in Pumping Mode Level 5 4 Draft - Prep for P Comment Core 13520 Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room Level 5 7 Draft - Prep for P Comment Core 13523 Monitor and Sustain Plant Operability of a Hydro Power Generation Auxiliary Level 5 7 Draft - Prep for P Comment Core 13525 Monitor and Sustain Plant Operability of a Hydr	Core	14056 Demonstrate knowledge and understanding of earthing practices on alternating current power systems	Level 4	2	Draft - Prep for P Comment
Core 14058 Describe instrumentation control within a process control system Level 4 9 Draft - Prep for P Comment Core 10898 Startup Hydro Power Generating Unit from a Control Room Level 5 32 Draft - Prep for P Comment Core 10899 Shutdown Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13517 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 13 Draft - Prep for P Comment Core 13519 Control Load Variation on a Hydro Power Generating Unit in Pumping Mode Level 5 4 Draft - Prep for P Comment Core 13520 Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room Level 5 12 Draft - Prep for P Comment Core 13523 Shutlown Hydro Power Generating Unit from a Control Room Level 5 7 Draft - Prep for P Comment Core 13523 Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from Systems from Control Centres 10 Draft - Prep for P Comment Core 13526 Stabilise Out of Normal and or Emergency Condition on Hydro Power Level 5 10 Draft - Prep for P Comment Core 13525 Stabilise Out of Normal and or Emergency Condition on Hydro Power Level 5 10 Draft - Prep for P Comment Core	Core	14057 Demonstrate knowledge and understanding of electrical systems and related concepts	Level 4	6	Draft - Prep for P Comment
Core 10898 Startup Hydro Power Generating Unit from a Control Room Level 5 32 Draft - Prep for P Comment Core 10899 Shutdown Hydro Power Generating Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13517 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 13 Draft - Prep for P Comment Core 13519 Control Load Variation on a Hydro Power Generating Unit in Pumping Mode from a Control Load Variations on a Hydro Power Generating Unit in Generating and Level 5 Level 5 4 Draft - Prep for P Comment Core 13520 Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room Level 5 12 Draft - Prep for P Comment Core 13523 Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from the Control Room Level 5 10 Draft - Prep for P Comment Core 13525 Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13526 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Level 5 15 Draft - Prep for P Comment Core 13526 Stabilise Out of Normal a	Core	14058 Describe instrumentation control within a process control system	Level 4	9	Draft - Prep for P Comment
Core 10899 Shutdown Hydro Power Generation Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13517 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 13 Draft - Prep for P Comment Core 13519 Control Load Variation on a Hydro Power Generating Unit in Pumping Mode from a Control Load Variations on a Hydro Power Generating Unit in Generating and Systems from Control Load Variations on a Hydro Power Generating Unit in Generating and Systems from Control Load Variations on a Hydro Power Generating Unit in Generating and Systems from Control Load Variations on a Hydro Power Generating Unit in Generating and Systems from Control Load Variations on a Hydro Power Generating Unit from Level 5 Level 5 4 Draft - Prep for P Comment Core 13520 Control Load Variation Plant Operability of a Hydro Power Generating Unit from the Control Room Level 5 7 Draft - Prep for P Comment Core 13528 Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13525 Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Unit from a Control Room Level 5 10 Draft - Prep for P Comment Core 13525 Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Auxiliary Systems Level 5	Core	10898 Startup Hydro Power Generating Unit from a Control Room	Level 5	32	Draft - Prep for P Comment
Core 13517 Startup Hydro Power Generating Auxiliary Systems from Control Centres Level 5 13 Draft - Prep for P Comment Core 13519 Control Load Variation on a Hydro Power Generating Unit in Pumping Mode Level 5 4 Draft - Prep for P Comment Core 13520 Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room Level 5 4 Draft - Prep for P Comment Core 13520 Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room Level 5 4 Draft - Prep for P Comment Core 13523 Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from the Control Room Level 5 7 Draft - Prep for P Comment Core 13525 Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13526 Stabilise Out of Normal and or Emergency Condition on Hydro Power Level 5 15 Draft - Prep for P Comment Core 13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Level 5 10 Draft - Prep for P Comment Core 13600 Demonstrate knowledge of regulatory requirements for p	Core	10899 Shutdown Hydro Power Generation Auxiliary Systems from Control Centres	Level 5	10	Draft - Prep for P Comment
Core 13519 Control Load Variation on a Hydro Power Generating Unit in Pumping Mode from a Control Room Level 5 4 Draft - Prep for P Comment Core 13520 Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room Level 5 4 Draft - Prep for P Comment Core 13521 Shutdown Hydro Power Generation Unit from a Control Room Level 5 12 Draft - Prep for P Comment Core 13523 Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from the Control Room Level 5 7 Draft - Prep for P Comment Core 13525 Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13526 Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Unit from a Control Room Level 5 15 Draft - Prep for P Comment Core 13526 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary Systems Level 5 11 Draft - Prep for P Comment Core 13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary Systems Level 5 10 Draft - Prep for P Comment Core 13600 Demonstrate Knowledge and Understanding of the Electrical Technology Associated with	Core	13517 Startup Hydro Power Generating Auxiliary Systems from Control Centres	Level 5	13	Draft - Prep for P Comment
Core 13520 Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room Level 5 4 Draft - Prep for P Comment Core 13521 Shutdown Hydro Power Generation Unit from a Control Room Level 5 12 Draft - Prep for P Comment Core 13523 Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from the Control Room Level 5 7 Draft - Prep for P Comment Core 13525 Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13526 Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Auxiliary Systems Level 5 11 Draft - Prep for P Comment Core 13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary Systems Level 5 11 Draft - Prep for P Comment Core 13600 Demonstrate Knowledge of regulatory requirements for permit to work systems Level 5 10 Draft - Prep for P Comment 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 3 4 Recommended Elective 113957 Use data entry and retrieval skills to input and	Core	13519 Control Load Variation on a Hydro Power Generating Unit in Pumping Mode from a Control Room	Level 5	4	Draft - Prep for P Comment
Core 13521 Shutdown Hydro Power Generation Unit from a Control Room Level 5 12 Draft - Prep for P Comment Core 13523 Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from the Control Room Level 5 7 Draft - Prep for P Comment Core 13525 Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13526 Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Unit from a Control Room Level 5 15 Draft - Prep for P Comment Core 13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary Systems Level 5 11 Draft - Prep for P Comment Core 13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary Systems Level 5 11 Draft - Prep for P Comment Core 13600 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 Draft - Prep for P Comment 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 3 4	Core	13520 Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room	Level 5	4	Draft - Prep for P Comment
Core 13523 Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from the Control Room Level 5 7 Draft - Prep for P Comment Core 13525 Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control Centres Level 5 10 Draft - Prep for P Comment Core 13526 Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Unit from a Control Room Level 5 15 Draft - Prep for P Comment Core 13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary Systems Level 5 11 Draft - Prep for P Comment Core 13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary Systems Level 5 10 Draft - Prep for P Comment Core 13600 Demonstrate knowledge of regulatory requirements for permit to work systems Level 5 10 Draft - Prep for P Comment 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 3 4 Recommended Elective 113957 Use data entry and retrieval skills to input and retrieve computer data Level 4 6 Registered Elective 8367 Understand and develop conservation ethics Level 5 <td>Core</td> <td>13521 Shutdown Hydro Power Generation Unit from a Control Room</td> <td>Level 5</td> <td>12</td> <td>Draft - Prep for P Comment</td>	Core	13521 Shutdown Hydro Power Generation Unit from a Control Room	Level 5	12	Draft - Prep for P Comment
Core13525 Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control CentresLevel 510Draft - Prep for P CommentCore13526 Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Unit from a Control RoomLevel 515Draft - Prep for P CommentCore13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary SystemsLevel 511Draft - Prep for P CommentCore13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary SystemsLevel 511Draft - Prep for P CommentCore13600 Demonstrate knowledge of regulatory requirements for permit to work systemsLevel 510Draft - Prep for P CommentCore14041 Demonstrate Knowledge and Understanding of the Electrical Technology Associated with the Control of Electrical Energy on a Power Generating Unit in the Power PlantLevel 34RecommendedElective113957 Use data entry and retrieval skills to input and retrieve computer data ElectiveLevel 34RecommendedElective10144 Identify, suggest and implement corrective actions to improve quality ElectiveLevel 54RegisteredElective12376 Assess and control pollutionLevel 52RegisteredElective1298 Produce spreadsheets using accounting related information technology Level 5Level 58Registered	Core	13523 Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from the Control Room	Level 5	7	Draft - Prep for P Comment
Core13526 Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Unit from a Control RoomLevel 515Draft - Prep for P CommentCore13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary SystemsLevel 511Draft - Prep for P CommentCore13600 Demonstrate knowledge of regulatory requirements for permit to work systemsLevel 510Draft - Prep for P CommentCore14041 Demonstrate knowledge and Understanding of the Electrical Technology Associated with the Control of Electrical Energy on a Power Generating Unit in the Power PlantLevel 56Draft - Prep for P CommentElective113957 Use data entry and retrieval skills to input and retrieve computer data ElectiveLevel 34RecommendedElective10144 Identify, suggest and implement corrective actions to improve quality ElectiveLevel 54RegisteredElective12376 Assess and control pollutionLevel 52RegisteredElective12998 Produce spreadsheets using accounting related information technology Level 5Level 58Registered	Core	13525 Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control Centres	Level 5	10	Draft - Prep for P Comment
Core13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary SystemsLevel 511Draft - Prep for P CommentCore13600 Demonstrate knowledge of regulatory requirements for permit to work systemsLevel 510Draft - Prep for P CommentCore14041 Demonstrate Knowledge and Understanding of the Electrical Technology Associated with the Control of Electrical Energy on a Power Generating Unit in the Power PlantLevel 56Draft - Prep for P CommentElective113957 Use data entry and retrieval skills to input and retrieve computer data ElectiveLevel 34RecommendedElective10144 Identify, suggest and implement corrective actions to improve quality ElectiveLevel 54RegisteredElective12376 Assess and control pollutionLevel 52RegisteredElective12998 Produce spreadsheets using accounting related information technology Level 5Level 58Registered	Core	13526 Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Unit from a Control Room	Level 5	15	Draft - Prep for P Comment
Core 13600 Demonstrate knowledge of regulatory requirements for permit to work systems Level 5 10 Draft - Prep for P Comment 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 Draft - Prep for P Comment Elective 113957 Use data entry and retrieval skills to input and retrieve computer data Level 3 4 Recommended Elective 10144 Identify, suggest and implement corrective actions to improve quality Level 5 4 Registered Elective 12376 Assess and control pollution Level 5 2 Registered Elective 12998 Produce spreadsheets using accounting related information technology Level 5 8 Registered	Core	13527 Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary Systems	Level 5	11	Draft - Prep for P Comment
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 Draft - Prep for P Comment Elective 113957 Use data entry and retrieval skills to input and retrieve computer data Level 3 4 Recommended Elective 10144 Identify, suggest and implement corrective actions to improve quality Level 4 6 Registered Elective 8367 Understand and develop conservation ethics Level 5 4 Registered Elective 12376 Assess and control pollution Level 5 2 Registered Elective 12998 Produce spreadsheets using accounting related information technology Level 5 8 Registered	Core	13600 Demonstrate knowledge of regulatory requirements for permit to work systems	Level 5	10	Draft - Prep for P
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Elective 10144 Identify, suggest and implement corrective actions to improve quality Level 4 6 Registered Elective 8367 Understand and develop conservation ethics Level 5 4 Registered Elective 12376 Assess and control pollution Level 5 2 Registered Elective 12998 Produce spreadsheets using accounting related information technology Level 5 8 Registered	Elective	113957 Use data entry and retrieval skills to input and retrieve computer data	Level 3	4	Recommended
Elective 8367 Understand and develop conservation ethics Level 5 4 Registered Elective 12376 Assess and control pollution Level 5 2 Registered Elective 12998 Produce spreadsheets using accounting related information technology Level 5 8 Registered	Elective	10144 Identify, suggest and implement corrective actions to improve quality	Level 4	6	Registered
Elective 12376 Assess and control pollution Level 5 2 Registered Elective 12998 Produce spreadsheets using accounting related information technology Level 5 8 Registered	Elective	8367 Understand and develop conservation ethics	Level 5	4	Registered
Elective 12998 Produce spreadsheets using accounting related information technology Level 5 8 Registered	Elective	12376 Assess and control pollution	Level 5	2	Registered
	Elective	12998 Produce spreadsheets using accounting related information technology	Level 5	8	Registered

03/12/11

23736

SAQA: NLRD Report "Qualification Detail"

Elective	15226 Implement systems to meet the flow of information in a team, department or division	Level 5	3	Registered
Elective	14504 Demonstrate knowledge and understanding of e-business as a competitive tool	Level 6	7	Registered
Fundamental	14045 Apply Transformational Leadership by Interacting with Key Stakeholders	Level 4	8	Draft - Prep for P Comment
Fundamental	14046 Lead subordinates to support the strategy of the organisation	Level 4	4	Draft - Prep for P Comment
Fundamental	14048 Apply Self Management Concepts	Level 4	3	Draft - Prep for P Comment
Fundamental	14049 Understands, Applies and Displays Constructive Thinking	Level 4	5	Draft - Prep for P Comment
Fundamental	14047 Apply Sound Management Practices in Order to Achieve Short to Mid Term Objectives	Level 5	10	Draft - Prep for P Comment

03/12/11

Qual ID: 2

23736

SAQA: NLRD Report "Qualification Detail"



UNIT STANDARD:

1

Demonstrate Knowledge and Understanding of The Organisation

SAQA US ID	UNIT STANDARD TITLE						
13962	Demonstrate Knowledge and Understanding of The Organisation						
SGB NAME	SGB NAME ABET BAND PROVIDER NAME						
SGB Power Plant Operations			Undefined				
FIELD DESCR	IPTION		SUBFIELD	DESCRIPTION			
Manufacturing,	Engineering and T	rechnology	Engineering	and Related Desig	n		
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 2	2		

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain basic condition of employment within specific discipline.

SPECIFIC OUTCOME 2

Demonstrate knowledge of workplace environment.

SPECIFIC OUTCOME 3

Demonstrate knowledge of personal hygiene and health.

SPECIFIC OUTCOME 4

Explain organisation business principles.



UNIT STANDARD:

2

Demonstrate Knowledge and Understanding Towards Occupational health and safety Regulatory Requirements

SAQA US ID	UNIT STANDARD TITLE							
13963	Demonstrate Kno Regulatory Requ	owledge and Un irements	derstanding T	owards Occupational heal	th and safety			
SGB NAME		······································	ABET BAND	PROVIDER NAME				
SGB Power PI	ant Operations		Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	Technology	Engineering	g and Related Design				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 2	2			

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain the scope of regulations in the work place.

SPECIFIC OUTCOME 2

Description given on the purpose & compliance of relevant regulatory requirements in the workplace.



UNIT STANDARD:

Operate nuclear reactor building air lock system

SAQA US ID	UNIT STANDA	UNIT STANDARD TITLE							
114464	Operate nuclea	Operate nuclear reactor building air lock system							
SGB NAME			ABET BANL	PROVIDER NAME					
SGB Power Pl	ant Operations	· ·	Undefined						
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION					
Manufacturing	, Engineering an	d Technology	Engineerin	g and Related Design					
UNIT STAND	ARD CODE	UNIT STAN	DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 2	2				

Specific Outcomes:

SPECIFIC OUTCOME 1

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 2

Stabilise transient conditions.

SPECIFIC OUTCOME 3

Isolate shutdown plant.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of nuclear building air lock system.

3



UNIT STANDARD:

4

Apply Engineering Principles and concepts in a Power Generation Process Plant

SAQA US ID	UNIT STANDARD TITLE							
10195	Apply Engineering	Apply Engineering Principles and concepts in a Power Generation Process Plant						
SGB NAME	GB NAME ABET BAND PROVIDER NAME							
SGB Power Pla	SGB Power Plant Operations							
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and T	echnology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	5			

Specific Outcomes:

SPECIFIC OUTCOME 1

Preserve energy in a process plant.

SPECIFIC OUTCOME 2

Interpret Process Plant Efficiency.

SPECIFIC OUTCOME 3

Diagram interpretation.

SPECIFIC OUTCOME 4

Understand Power Generation Methods.



UNIT STANDARD:

5

Apply Radiation Requirements for Activities in Radiologically Controlled Zones at a Nuclear Power Plant

SAQA US ID UNIT STANDARD TITLE

Apply Radiation Requirements for Activities in Radiologically Controlled Zones at a Nuclear 14102 Power Plant ABET BAND PROVIDER NAME SGB NAME SGB Power Plant Operations Undefined FIELD DESCRIPTION SUBFIELD DESCRIPTION Engineering and Related Design Manufacturing, Engineering and Technology UNIT STANDARD CODE UNIT STANDARD TYPE NQF LEVEL CREDITS MET-ENG-0-SGB PPO Regular Level 3 2

Specific Outcomes:

SPECIFIC OUTCOME 1

Enter radiologically contolled zone.

SPECIFIC OUTCOME 2

Perform activities in a radiologically controlled zone.

SPECIFIC OUTCOME 3

Exit of radiologically controlled zones.



UNIT STANDARD:

6

Apply Self Management through the Concepts of Positive Self-esteem and Resiliency

SAQA US ID	UNIT STANDARD TITLE							
14063	Apply Self Manag	Apply Self Management through the Concepts of Positive Self-esteem and Resiliency						
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined	Jndefined				
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	Technology	Engineering	g and Related Design				
UNIT STANDARD CODE UNIT STAND		UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	2			

Specific Outcomes:

SPECIFIC OUTCOME 1

Believe in one's personal capabilities through positive self-esteem.

SPECIFIC OUTCOME 2

Maintain effort to succeed through resiliency.



UNIT STANDARD:

7

Demonstrate knowledge and understanding of electrical power generation

SAQA US ID	UNIT STANDARD TITLE							
10893	Demonstrate knowledge and understanding of electrical power generation							
SGB NAME	SGB NAME ABET BAND PROVIDER NAME							
SGB Power Plant Operations Undefined								
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	Technology	Engineering	g and Related Design				
UNIT STANDARD CODE UNIT STANDA			ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	5			

Specific Outcomes:

SPECIFIC OUTCOME 1

Understand principles of power generation.

SPECIFIC OUTCOME 2

Understand principles of electrical load control.



UNIT STANDARD:

8

Demonstrate knowledge and understanding of heat exchange equipment used in a process plant

SAQA US ID	UNIT STANDARD TITLE						
14037	Demonstrate know plant	wledge and und	derstanding of	heat exchange equipment	used in a process		
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power PI	ant Operations	· · · ·	Undefined		· · · · · · · · · · · · · · · · · · ·		
FIELD DESCR	RIPTION	· .	SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	Technology	Engineering	and Related Design			
UNIT STANDA	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 3	2		

Specific Outcomes:

SPECIFIC OUTCOME 1

Define cooling principles and equipment used in a process plant.

SPECIFIC OUTCOME 2

Define heat transfer principles and equipment in heat exchange processes.



UNIT STANDARD:

9

Demonstrate knowledge and understanding of Hydro power generation concepts and theories

SAQA US ID	UNIT STANDARD TITLE							
13704	Demonstrate k	Demonstrate knowledge and understanding of Hydro power generation concepts and theories						
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design				
UNIT STAND	ARD CODE	UNIT STANL	DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	15			

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain the role of hydroelectric power generation in the power system.

SPECIFIC OUTCOME 2

Explain Hydro power station operating principles.

SPECIFIC OUTCOME 3

Explain Hydro Turbine concepts and theories.

SPECIFIC OUTCOME 4

Explain Hydro Generator concepts and theories.

SPECIFIC OUTCOME 5

Explain functions of Hydro Plant Auxiliary Equipment.

SPECIFIC OUTCOME _6

Define Hydro Plant Operational And Maintenance principles.



UNIT STANDARD:

10

Demonstrate Knowledge of Safe Entry into Prohibited and/ or Restricted Areas

SAQA US ID	UNIT STANDARD TITLE							
14062	Demonstrate Knowledge of Safe Entry into Prohibited and/ or Restricted Areas							
SGB NAME			ABET BANK	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCA	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAN		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	2			

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe the requirements to enter a prohibited and/ or restricted area.

SPECIFIC OUTCOME 2

Demonstrate knowledge of health and safety requirements and procedures under entry approval.

SPECIFIC OUTCOME 3

Demonstrate knowledge of on site work practices within prohibited and or restricted areas.

SPECIFIC OUTCOME 4

Demonstrate knowledge of emergency procedures.



UNIT STANDARD:

11

Demonstrate knowledge of Steam Generator design and application

SAQA US ID	UNIT STANDARD TITLE								
10574	Demonstrate k	Demonstrate knowledge of Steam Generator design and application							
SGB NAME			ABET BAN	ס	PROVIDER NAME				
SGB Power Pl	ant Operations	· · · · · · · · · · · · · · · · · · ·	Undefined			۰.			
FIELD DESCR	RIPTION	· · · · · · · · · · · · · · · · · · ·	SUBFIELI	D DE	SCRIPTION				
Manufacturing	, Engineering a	nd Technology	Manufactu	ring a	and Assembly				
UNIT STANDA	ARD CODE	UNIT STAND	OARD TYPE	NQ	F LEVEL		CREDITS		
MET-ENG-0-S	GB PPO	Regular		Lev	vel 3		6		

Specific Outcomes:

SPECIFIC OUTCOME 1

Distinguish between different steam generator types and application theories.

SPECIFIC OUTCOME 2

Describe steam generation concepts and theories.

SPECIFIC OUTCOME 3

Describe the operating philosophy of a steam generator.

SPECIFIC OUTCOME 4

Demonstrate knowledge of combustion processes on a steam generator.

SPECIFIC OUTCOME 5

Explain protections required on a steam generator.

SPECIFIC OUTCOME 6

Demonstrate understanding of steam generator efficiency.

SPECIFIC OUTCOME 7

Identify potential safety hazards on a steam generator.



UNIT STANDARD:

12

Demonstrate knowledge of steam turbines design and application

SAQA US ID	UNIT STANDARD TITLE						
14065	Demonstrate know	Demonstrate knowledge of steam turbines design and application					
SGB NAME ABET BAND				PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing,	Engineering and T	echnology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STAND		UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 3	6		

Specific Outcomes:

SPECIFIC OUTCOME 1

Distinguish between different steam turbines types and application theories

SPECIFIC OUTCOME 2

Describe steam turbines concepts and theories.

SPECIFIC OUTCOME 3

Describe the operating philosophy of steam turbine systems



UNIT STANDARD:

13

Established in terms of Act 58 of 1995

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Describe bearing types, designs and application theories associated with process plants

SAQA US ID	UNIT STANDARD TITLE							
10585	Describe bearing types, designs and application theories associated with process plants							
SGB NAME			ABET BAN	PROVIDER N	IAME			
SGB Power Pl	ant Operations		Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	Engineering a	nd Technology	Manufactu	ring and Assembly				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	2			

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe bearing theories.

SPECIFIC OUTCOME 2

Identify bearing types and application.

SPECIFIC OUTCOME 3

Maintain bearing operability.



UNIT STANDARD:

14

Describe lubrication methods and applications associated with process plants

SAQA US ID	UNIT STANDARD TITLE					
10582	Describe lubrication methods and applications associated with process plants					
SGB NAME			ABET BAND	PROVIDER NAME		
SGB Power Plant Operations			Undefined			
FIELD DESCR	IPTION		SUBFIELD	DESCRIPTION		
Manufacturing,	Engineering and T	Fechnology	Manufacturing and Assembly			
UNIT STANDARD CODE UNIT STANL		UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS	
MET-ENG-0-SGB PPO Regular		Regular		Level 3	2	

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of lubrication theories and applications.

SPECIFIC OUTCOME 2

Explain lubricant conditioning methods.

SPECIFIC OUTCOME 3

Explain typical lubrication system configurations.

SPECIFIC OUTCOME 4

Describe safety precautions associated with lubrication.



UNIT STANDARD:

Describe plant instrumentation and process measurement used on Power Generation plant

SAQA US ID	UNIT STANDARD TITLE						
14036	Describe plant instrumentation and process measurement used on Power Generation plant						
SGB NAME			ABET BAND	P	PROVIDER NAME		
SGB Power Plant Operations			Undefined	Indefined			
FIELD DESCR	IPTION		SUBFIELD DESCRIPTION				
Manufacturing,	Engineering and 1	echnology	Engineering	Engineering and Related Design			
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF	F LEVEL	CREDITS		
MET-ENG-0-SGB PPO Regular			Leve	əl 3	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Interpret process measurement.

SPECIFIC OUTCOME 2

Describe measurement instrumentation.



UNIT STANDARD:

16

Describe power transmission designs and application theories associated with process plants

SAQA US ID	UNIT STANDARD TITLE						
10613	Describe power transmission designs and application theories associated with process plants						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering ar	nd Technology	Engineerin	Engineering and Related Design			
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Distinguish between different types of power machines.

SPECIFIC OUTCOME 2

Explain the types and application of power transmission methods.

SPECIFIC OUTCOME 3

Maintain operability of power machines and transmission equipment.



UNIT STANDARD:

17

Describe the working principle of compressed air systems associated with process plant

SAQA US ID	UNIT STANDARD TITLE						
10587	Describe the working principle of compressed air systems associated with process plant						
SGB NAME			ABET BANL	PROVIDER NAME			
SGB Power Plant Operations			Undefined	Undefined			
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	Engineering and Related Design			
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	2		

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe compressor theories.

SPECIFIC OUTCOME 2

Identify compressor types and applications.

SPECIFIC OUTCOME 3

Maintain compressor operability.



UNIT STANDARD:

18

Differentiate between valve designs and application theories associated with process plants

SAQA US ID	UNIT STANDA	RD TITLE					
10598	Differentiate bel	prentiate between valve designs and application theories associated with process plants					
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	IPTION		SUBFIELD	SUBFIELD DESCRIPTION			
Manufacturing,	Engineering and	d Technology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	1		

Specific Outcomes:

SPECIFIC OUTCOME 1

Define valve classifications and types according to application.

SPECIFIC OUTCOME 2

Maintain valve operability.



UNIT STANDARD:

19

Interpret basic electronic theories in power plant process control

SAQA US ID	UNIT STANDARD TITLE						
14204	Interpret basic electronic theories in power plant process control						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCH	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering ar	nd Technology	Engineering	Engineering and Related Design			
UNIT STANDARD CODE UNIT STANE		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	2		

Specific Outcomes:

SPECIFIC OUTCOME 1

Know and understand rectification by means of electronic circuits application.

SPECIFIC OUTCOME 2

Know and understand voltage regulation on power generators by means of electronic circuits.



UNIT STANDARD:

20

Interpret electrical circuits

MET-ENG-0-S	ET-ENG-0-SGB PPO Regular			Level 3	2		
UNIT STANDARD CODE UNIT STAND		UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS		
Manufacturing	, Engineering a	nd Technology	Engineering and Related Design				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
SGB Power Plant Operations			Undefined				
SGB NAME			ABET BAN	ABET BAND PROVIDER NAME			
10894	Interpret electrical circuits						
SAQA US ID	UNIT STANDARD TITLE						

Specific Outcomes:

SPECIFIC OUTCOME 1

Define symbols and concepts in an electrical circuit.

SPECIFIC OUTCOME 2

Identify the effects and relationships between circuit variables.

SPECIFIC OUTCOME 3

Identify sources of circuit supply.



UNIT STANDARD:

21

Interpret electrical theories

SAQA US ID	UNIT STANDARD TITLE						
10677	Interpret electrical theories						
SGB NAME			ABET BAN	ABET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined	Undefined			
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineerin	Engineering and Related Design			
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain atom theory.

SPECIFIC OUTCOME 2

Demonstrate knowledge of theories of electricity.

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

22

Interpret solid transfer system theories in a process plant

SAQA US ID	UNIT STANDARD TITLE					
10522	Interpret solid transfer system theories in a process plant					
SGB NAME		· · · ·	ABET BAND	PROVIDER NAME		
SGB Power Plant Operations			Undefined		144	
FIELD DESCR	RIPTION		SUBFIELD (DESCRIPTION		
Manufacturing,	Engineering a	nd Technology	Manufacturing and Assembly			
UNIT STANDA	ARD CODE	UNIT STAND	DARD TYPE	VQF LEVEL	CREDITS	
MET-ENG-0-S	GB PPO	Regular		_evel 3	2	

Specific Outcomes:

SPECIFIC OUTCOME 1

Classify solid transfer methods.

SPECIFIC OUTCOME 2

Identify solid transfer system transfer deficiencies.

SPECIFIC OUTCOME 3

Interpret solid transfer system operating philosophies.



UNIT STANDARD:

23

Interpret the operation of internal combustion engines used in power plants

SAQA US ID	UNIT STANDARD TITLE						
14038	Interpret the operation of internal combustion engines used in power plants						
SGB NAME		······································	ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCF	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineering	Engineering and Related Design			
UNIT STANDA	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 3	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Understand the working principles of internal combustion engines.

SPECIFIC OUTCOME 2

Understand the system and components associated with internal combustion engines.

SPECIFIC OUTCOME 3

Understand the operating and application principles associated with internal combustion engines.



UNIT STANDARD:

24

Operate nuclear support plant steam production system

SAQA US ID	UNIT STANDARD TITLE					
114455	Operate nuclear support plant steam production system					
SGB NAME			ABET BAND	PROVIDER NAME		
SGB Power Plant Operations			Undefined			
FIELD DESCR	IPTION		SUBFIELD DESCRIPTION			
Manufacturing,	Engineering and T	Technology	Manufacturing and Assembly			
UNIT STANDARD CODE UNIT STANDA			ARD TYPE	NQF LEVEL	CREDITS	
MET-MNA-0-S	GB PPO	Regular		Level 3	2	

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

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SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of support plant steam production systems.


UNIT STANDARD:

25

Operate bulk flue gas conditioning systems on fossil fired steam generators

SAQA US ID	UNIT STANDARD TITLE							
114462	Operate bulk flue gas conditioning systems on fossil fired steam generators							
SGB NAME ABET BAND PROVIDER NAME								
SGB Power Pl	ant Operations		Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and 1	Technology	Manufacturi	ng and Assembly				
UNIT STANDARD CODE UNIT STAND			ARD TYPE	NQF LEVEL	CREDITS			
MET-MNA-0-S	GB PPO	Regular		Level 3	5			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup of plant.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME .5

Shutdown plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7



UNIT STANDARD:

26

Operate bulk fuel oil systems

SAQA US ID	UNIT STANDARD TITLE							
114458	Operate bulk fuel oil systems							
SGB NAME			ABET BAND PROVIDER NAME		E			
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIEL	D DESCRIPTION	·			
Manufacturing,	Engineering and	Technology	Manufact	uring and Assembly				
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS				
MET-MNA-0-S	GB PPO	Regular		Level 3	8			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup and monitor start up conditions.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shut down plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7



UNIT STANDARD:

27

Established in terms of Act 58 of 1995

Operate coal handling systems

MET-MNA-0-S	GB PPO	Regular		Level 3	11			
UNIT STANDARD CODE UNIT STANL		DARD TYPE	NQF LEVEL	CREDITS				
Manufacturing	, Engineering a	nd Technology	Manufactu	ring and Assembly				
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION	·····			
SGB Power Plant Operations			Undefined					
SGB NAME			ABET BANL	PROVIDER NAME				
114456	Operate coal handling systems							
SAQA US ID	UNIT STAND	ARD TITLE						

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup and loading of plant.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shutdown plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7



UNIT STANDARD:

28

Operate Compressed Air Systems

SAQA US ID	UNIT STANDARD TITLE							
114465	Operate Comp	Operate Compressed Air Systems						
SGB NAME			ABET BAND	PROVIDER NAME	<u></u>			
SGB Power Plant Operations			Undefined					
FIELD DESCI	RIPTION		SUBFIELD L	DESCRIPTION				
Manufacturing	, Engineering an	d Technology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular	1	_evel 3	8			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup and monitor start up conditions.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shutdown plant.

SPECIFIC OUTCOME 6

solate shutdown plant.

SPECIFIC OUTCOME 7



UNIT STANDARD:

29

Operate Cooling Water Systems

SAQA US ID	UNIT STANDARD TITLE							
114463	Operate Cooling Water Systems							
SGB NAME			ABET BAND PROVIDER NAME					
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering an	d Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-SGB PPO Regular		Regular		Level 3	11			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup and monitor startup conditions.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shutdown plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7



UNIT STANDARD:

30

Operate Demineralised Water Systems on Fossil Power Plants.

SAQA US ID	UNIT STANDARD TITLE							
12096	Operate Demineralised Water Systems on Fossil Power Plants.							
SGB NAME			ABET BANL	PROVIDER NAME				
SGB Power Plant Operations			Undefined		·			
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAND			ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	3 PPO Regular		Level 3	4			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup and monitor startup conditions.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shutdown plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7



UNIT STANDARD:

31

Operate Fire Water Systems on Fossil Power Plants

SAQA US ID	UNIT STANDARD TITLE							
11959	Operate Fire Water Systems on Fossil Power Plants							
SGB NAME			ABET BANL	PROVIDER NAME				
SGB Power Plant Operations			Undefined	·				
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	d Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAND		OARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	3			

Specific Outcomes:

SPECIFIC OUTCOME 1

Isolate shutdown plant.

SPECIFIC OUTCOME 2

Prepare plant for service.

SPECIFIC OUTCOME 3

Startup and monitor startup conditions.

SPECIFIC OUTCOME 4

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 5

Stabilise transient conditions.

SPECIFIC OUTCOME 6

Shut down plant.

SPECIFIC OUTCOME 7



UNIT STANDARD:

32

Operate Fossil Fired Steam Generator Water and Steam Systems

SAQA US ID	UNIT STANDARD TITLE							
11893	Operate Fossil Fired Steam Generator Water and Steam Systems							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering and	l Technology	Engineering	Engineering and Related Design				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	11			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6



UNIT STANDARD:

33

Operate hydrogen production plants

SAQA US ID	UNIT STANDARD TITLE							
12023	Operate hydrogen production plants							
SGB NAME			ABET BAN	PROVIDER NAM	E			
SGB Power Plant Operations			Undefined]				
FIELD DESCR	RIPTION		SUBFIELD	SUBFIELD DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	Engineering and Related Design				
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-SGB PPO Regular			Level 3	9				

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor startup conditions.

SPECIFIC OUTCOME 2

Startup and loading of plant.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shutdown plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7



UNIT STANDARD:

34

Operate liquid petroleum gas systems on fossil power plants

SAQA US ID	UNIT STANDARD TITLE							
114459	Operate liquid petroleum gas systems on fossil power plants							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined	Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing,	, Engineering and	Technology	Manufactur	ing and Assembly				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-MNA-0-S	MNA-0-SGB PPO Regular		Level 3		1			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5



UNIT STANDARD:

35

Operate nuclear auxiliary cooling systems

SAQA US ID	UNIT STANDARD TITLE							
14119	Operate nuclear auxiliary cooling systems							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	, Engineering and	Technology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STAND,		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	15			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of nuclear auxiliary cooling systems.



UNIT STANDARD:

36

Operate nuclear liquid waste monitoring and discharge systems

SAQA US ID	UNIT STANDARD TITLE							
13712	Operate nuclear liquid waste monitoring and discharge systems							
SGB NAME			ABET BANL		PROVIDER NAME			
SGB Power Plant Operations			Undefined	Undefined				
FIELD DESCR	RIPTION		SUBFIELD	DES	SCRIPTION			
Manufacturing	, Engineering an	d Technology	Manufactu	ring a	ind Assembly			
UNIT STANDARD CODE UNIT STAN		DARD TYPE	NQ	F LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Lev	el 3	4		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge & understanding of support plant liquid waste monitoring & discharge systems.



UNIT STANDARD:

37

Operate nuclear reactor fire extinguishing systems

SAQA US ID	UNIT STANDARD TITLE							
114461	Operate nuclear r	Operate nuclear reactor fire extinguishing systems						
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and T	rechnology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	1			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions

SPECIFIC OUTCOME 3

Stabilise transient conditions

SPECIFIC OUTCOME 4

Isolate shutdown plant

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of nuclear support plant fire extinguishing systems



UNIT STANDARD:

38

Operate nuclear support plant gas production and supply systems

SAQA US ID	UNIT STANDARD TITLE						
13711	Operate nuclear support plant gas production and supply systems						
SGB NAME			ABET BAN	D PROVIDER NAME			
SGB Power Plant Operations		Undefined					
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerir	ering and Related Design			
UNIT STANDARD CODE UNIT STANDAR		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of nuclear support plant gas production and supply systems.



UNIT STANDARD:

39

Operate nuclear support plant system chlorination system

SAQA US ID	UNIT STANDARD TITLE							
13959	Operate nuclear support plant system chlorination system							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineering	and Related Design				
UNIT STAND	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	1			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of support plant chlorination system.



UNIT STANDARD:

40

Operate Nuclear Support Plant Water Supply Systems

SAQA US ID	UNIT STANDARD TITLE							
114469	Operate Nuclear	Operate Nuclear Support Plant Water Supply Systems						
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined		•			
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	Technology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	1			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions

SPECIFIC OUTCOME 3

Stabilise transient conditions

SPECIFIC OUTCOME 4

Isolate shutdown plant

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of support water supply systems



UNIT STANDARD:

41

Operate potable water systems on power plants

SAQA US ID	UNIT STANDARD TITLE								
114466	Operate potab	Operate potable water systems on power plants							
SGB NAME			ABET BAND	PROVIDER NAME					
SGB Power Plant Operations			Undefined						
FIELD DESCF	RIPTION		SUBFIELD	DESCRIPTION					
Manufacturing	, Engineering a	nd Technology	Engineering	g and Related Design					
UNIT STANDA	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	1				

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup and monitor start up conditions.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shutdown plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7



UNIT STANDARD:

42

Operate support plant compressed air systems

SAQA US ID	UNIT STANDARL	UNIT STANDARD TITLE						
13726	Operate support p	Operate support plant compressed air systems						
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	Engineering and T	Technology	Manufactur	ing and Assembly				
UNIT STANDARD CODE UNIT STANDAR		RD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	8			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of support plant compressed air systems.



UNIT STANDARD:

Operate turbo-generator fire extinguishing system on a nuclear power plant

SAQA US ID	UNIT STAND	UNIT STANDARD TITLE						
13723	Operate turbo-	Operate turbo-generator fire extinguishing system on a nuclear power plant						
SGB NAME			ABET BAN	D PROVIDER NAME				
SGB Power Plant Operations			Undefined		· · · · · · · · · · · · · · · · · · ·			
FIELD DESCR	RIPTION		SUBFIELI	DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerir	ng and Related Design				
UNIT STANDA	ARD CODE	UNIT STAN	DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	1			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of turbo-generator fire extinguishing systems.



UNIT STANDARD:

44

Operate Waste Handling Systems Associated with Power Plant Processes

SAQA US ID	UNIT STANDA	UNIT STANDARD TITLE						
11957	Operate Waste	Operate Waste Handling Systems Associated with Power Plant Processes						
SGB NAME			ABET BAN	PROVIDER NA	ME			
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering ar	nd Technology	Engineerin	g and Related Design				
UNIT STANDA	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	16			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup and loading of plant.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shut down plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7



UNIT STANDARD:

45

Understand Management Practices

SAQA US ID	UNIT STANDARD TITLE						
14061	Understand Management Practices						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering an	d Technology	Engineering	g and Related Design	· · · · · · · · · · · · · · · · · · ·		
UNIT STAND	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 3	7		

Specific Outcomes:

SPECIFIC OUTCOME 1

Gather, analyse relevant information of events and situations.

SPECIFIC OUTCOME 2

Gathers and supplies micro related information in order to resolve work related problems.

SPECIFIC OUTCOME 3

Apply basic planning and organising principles.

SPECIFIC OUTCOME 4

Understands quality orientation.



UNIT STANDARD:

46

Understand the operating principles of transformers

SAQA US ID	UNIT STANDARD TITLE							
10719	Understand the op	Understand the operating principles of transformers						
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	IPTION		SUBFIELD	DESCRIPTION	· · · · · · · · · · · · · · · · · · ·			
Manufacturing,	Engineering and T	Technology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STANDARD		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	3			

Specific Outcomes:

SPECIFIC OUTCOME 1

Know and understand the operating principles of the transformer.

SPECIFIC OUTCOME 2

Identify and describe transformer auxiliaries.



UNIT STANDARD:

47

Established in terms of Act 58 of 1995

Understanding the principles of magnetism

SAQA US ID	UNIT STANDARD TITLE							
10707	Understanding th	Understanding the principles of magnetism						
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	Technology	Engineering	and Related Design				
UNIT STANDA	RD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	2			

Specific Outcomes:

SPECIFIC OUTCOME 1

Understand the characteristics of permanent magnets.

SPECIFIC OUTCOME 2

Understand the characteristics of electro- magnetism.



UNIT STANDARD:

48

Understand Constructive Thinking

SAQA US ID	UNIT STANDARD TITLE						
14064	Understand Cons	structive Thin	king				
SGB NAME			ABET BAN	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design			
UNIT STAND	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 3	12		

Specific Outcomes:

SPECIFIC OUTCOME 1

Conceptualize big picture by understanding and supporting different levels of thinking.

SPECIFIC OUTCOME 2

Pro-actively acts to influence/change the future/outcome towards desired objectives.

SPECIFIC OUTCOME 3

Understands new processes, information and technologies.



UNIT STANDARD:

49

Understand transformational leadership

SAQA US ID	UNIT STANDARD TITLE							
14060	Understand tra	Jnderstand transformational leadership						
SGB NAME			ABET BANL	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering ar	id Technology	Engineerin	g and Related Design				
UNIT STANDA	ARD CODE	UNIT STANE	ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	5			

Specific Outcomes:

SPECIFIC OUTCOME 1

Understands the concept of communication.

SPECIFIC OUTCOME 2

Understand the concept of empowerment.

SPECIFIC OUTCOME 3

Understand the concept of relationship building and team leadership.

SPECIFIC OUTCOME 4

Understand the concept of managing diversity.

SPECIFIC OUTCOME 5

Understand the concept of stakeholder involvement.



UNIT STANDARD:

50

Apply engineering principles related to the operation of demineralisers and ion exchangers in nuclear power generating plant

SAQA US ID	UNIT STANDARD TITLE						
13708	Apply engineering principles related to the operation of demineralisers and ion exchangers in nuclear power generating plant						
SGB NAME			ABET BAND	PROVIDER NAME	·		
SGB Power Pla	ant Operations		Undefined				
FIELD DESCR	IPTION		SUBFIELD	DESCRIPTION	an a		
Manufacturing,	Engineering and T	echnology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STANDA		RD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-SGB PPO Regular			Level 4	3			

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain engineering principles related to the operation of demineralisers and ion exchangers.



UNIT STANDARD:

51

Apply fundamental reactor engineering principles and theories related to nuclear power generating plant

SAQA US ID UNIT STANDARD TITLE

13709	Apply fundame generating pla	ental reactor engi nt	neering princip	es and theories related	to nuclear power
SGB NAME			ABET BAND	PROVIDER NAME	· · ·
SGB Power Plant Operations			Undefined		
FIELD DES	CRIPTION		SUBFIELD	DESCRIPTION	
Manufacturi	ing, Engineering ar	nd Technology	Engineerin	g and Related Design	
UNIT STAN	IDARD CODE	UNIT STAN	DARD TYPE	NQF LEVEL	CREDITS
MET-ENG-	0-SGB PPO	Regular		Level 4	12

Specific Outcomes:

SPECIFIC OUTCOME 1

Define the structure of the atom and methods of radioactive decay.

SPECIFIC OUTCOME 2

Define neutron classifications and their origins and time of appearance .

SPECIFIC OUTCOME 3

Define reactor kinetics and neutron sources.

SPECIFIC OUTCOME 4

Define reactivity coefficients and the resulting effects due to changes in fuel temperature.

SPECIFIC OUTCOME 5

Understand control rod use and the changes in rod worth due to changes in various parameters.

SPECIFIC OUTCOME 6

Define burnable poisons, how they are controlled and their positive and negative effects.

SPECIFIC OUTCOME 7

Define reactor operational physics with respect to changes in reactivity.



UNIT STANDARD:

52

Apply Self Management Concepts

SAQA US ID	UNIT STANDARD TITLE						
14048	Apply Self Management Concepts						
SGB NAME			ABET BAND	ABET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing,	Engineering and	Technology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Take concious decision to improve towards excellence through the use of self analysis.

SPECIFIC OUTCOME 2

Believe in one's personal capabilities through positive self-esteem.

SPECIFIC OUTCOME 3

Neutralize stressful influences and to maintain effectiveness through stress tolerance.

SPECIFIC OUTCOME 4

Apply concious decision to succeed through resiliency.



UNIT STANDARD:

53

Apply Transformational Leadership by Interacting with Key Stakeholders

SAQA US ID	UNIT STANDARD TITLE							
14045	Apply Transformational Leadership by Interacting with Key Stakeholders							
SGB NAME			ABET BAN	PROVIDER NAME				
SGB Power PI	ant Operations	6	Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	8			

Specific Outcomes:

SPECIFIC OUTCOME 1

Understand and Apply the Concept of Empowerment, Coaching and Facilitation.

SPECIFIC OUTCOME 2

Supports Relationships Building and Team Leadership.

SPECIFIC OUTCOME 3

Acknowledge People diversity.

SPECIFIC OUTCOME 4

Market Skills Ideas in the Work Environment.

SPECIFIC OUTCOME 5

Convey Information and Views by Utilizing Applicable Communication Media.

SPECIFIC OUTCOME 6

Involve Stakeholders to add Value to Organisation Results.



UNIT STANDARD:

54

Demonstrate knowledge and understanding of earthing practices on alternating current power systems

SAQA US ID	UNIT STANDARD TITLE							
14056	Demonstrate know systems	wledge and und	erstanding of	earthing practices on alt	ernating current power			
SGB NAME	.		ABET BAND	PROVIDER NAME				
SGB Power Pl	ant Operations		Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and 1	Technology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STANDA		RD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	2			

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe theories related to earthing of alternating current power systems.

SPECIFIC OUTCOME 2

Define earthing practices and application.



UNIT STANDARD:

55

Demonstrate knowledge and understanding of electrical systems and related concepts

SAQA US ID	UNIT STANDARD TITLE							
14057	Demonstrate knowledge and understanding of electrical systems and related concepts							
SGB NAME		· · · · · · · · · · · · · · · · · · ·	ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined		•			
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION	······································			
Manufacturing	, Engineering ar	d Technology	Engineering	and Related Design				
UNIT STANDA	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	6			

Specific Outcomes:

SPECIFIC OUTCOME 1

Know and understand electrical supply systems

SPECIFIC OUTCOME 2

Understand the types of electrical distribution systems

SPECIFIC OUTCOME 3

Explain the effects of capacitance and inductance in electrical systems

SPECIFIC OUTCOME 4

Understand the working of switchgear and associated equipment (all voltages)



UNIT STANDARD:

56

Demonstrate knowledge of steam turbines design and application

SAQA US ID	UNIT STANDARD TITLE						
14126	14126 Demonstrate knowledge of steam turbines design and application						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing,	Engineering and T	Fechnology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	6		

Specific Outcomes:

SPECIFIC OUTCOME 1

Distinguish between different steam turbines types and application theories.

SPECIFIC OUTCOME 2

Describe steam turbines concepts and theories.

SPECIFIC OUTCOME 3

Describe the operating philosophy of steam turbine systems.



UNIT STANDARD:

57

Describe fundamental instrumentation and measurement equipment associated with nuclear power plant

SAQA US ID	UNIT STANDARD TITLE								
13705	Describe fundame power plant	Describe fundamental instrumentation and measurement equipment associated with nuclear plant							
SGB NAME			ABET BAND	PROVIDER NAME					
SGB Power Plant Operations			Undefined						
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION	· · · · · · · · · · · · · · · · · · ·				
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design					
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS					
MET-ENG-0-S	GB PPO	Regular		Level 4	3				

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe the operation of sensors and detectors.

SPECIFIC OUTCOME 2

Explain the application of sensors and detectors.

SPECIFIC OUTCOME 3

Describe the use of controllers and positioners.



UNIT STANDARD:

58

Describe fundamental material science related to brittle fracture and vessel thermal stress in nuclear power plants

SAQA US ID	UNIT STANDARD TITLE						
13706	Describe fundamental material science related to brittle fracture and vessel thermal stress in nuclear power plants						
SGB NAME			ABET BAND	PRO	OVIDER NAME		
SGB Power Pla	ant Operations		Undefined	Undefined			
FIELD DESCR	IPTION	······································	SUBFIELD	DESCR	RIPTION		
Manufacturing,	Engineering and 1	Technology	Engineering	and Re	elated Design		
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF L	EVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 4		3	

Specific Outcomes:

SPECIFIC OUTCOME 1

Define brittle fracture.

SPECIFIC OUTCOME 2

Explain the effects of radiation on materials.



UNIT STANDARD:

59

Describe instrumentation control within a process control system

SAQA US ID	UNIT STANDARD TITLE								
14058	Describe instru	Describe instrumentation control within a process control system							
SGB NAME			ABET BAND	PROVIDER NAME					
SGB Power Plant Operations			Undefined		· · · · · · · · · · · · · · · · · · ·				
FIELD DESCH	RIPTION	· · · · · · · · · · · · · · · · · · ·	SUBFIELD	DESCRIPTION					
Manufacturing	, Engineering ar	nd Technology	Engineerin	g and Related Design					
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS					
MET-ENG-0-S	GB PPO	Regular		Level 4	9				

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe the transmission components within a control system

SPECIFIC OUTCOME 2

Interpret control systems within a process plant

SPECIFIC OUTCOME 3

Identify types and the application of process control systems



UNIT STANDARD:

60

Describe the operation and application of electrical equipment as required for nuclear power plant

SAQA US ID	UNIT STANDAR	D TITLE			
13707	Describe the ope plant	ration and appli	cation of elec	rical equipment as requi	red for nuclear power
SGB NAME			ABET BAND	PROVIDER NAME	<u> </u>
SGB Power Pl	ant Operations		Undefined		
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION	
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design	
UNIT STAND	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-S	GB PPO	Regular		Level 4	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain motor and generator application principles.

SPECIFIC OUTCOME 2

Explain abnormal motor and generator conditions.

SPECIFIC OUTCOME 3

Explain operating principles and application of breakers, relays and links.

SPECIFIC OUTCOME 4

Explain abnormal breaker, relay and link conditions.


UNIT STANDARD:

61

Explain thermodynamic principles and concepts as applied in nuclear power generating plant

SAQA US ID	UNIT STANDARD TITLE						
13710	Explain thermodynamic principles and concepts as applied in nuclear power generating plant						
SGB NAME ABET BAN			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined	Undefined			
FIELD DESCR	RIPTION		SUBFIELD	D DESCRIPTION			
Manufacturing,	Engineering and	Technology	Engineering	g and Related Design			
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	9		

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain the properties and principles of steam.

SPECIFIC OUTCOME 2

Explain the properties and principles of sub cooled liquid.

SPECIFIC OUTCOME 3

Define the thermodynamic processes used for the transformation of energy.

SPECIFIC OUTCOME 4

Define the hydraulic characteristics of fluid behaviour.

SPECIFIC OUTCOME 5

Define the mechanisms of heat transfer.

SPECIFIC OUTCOME 6

Define the concepts related to thermal hydraulics with respect to boiling heat transfer.

SPECIFIC OUTCOME 7

Describe the core thermal limits.



UNIT STANDARD:

62

Explain transformer characteristics applied on power systems

SAQA US ID	UNIT STANDARD TITLE						
10897	Explain transforme	Explain transformer characteristics applied on power systems					
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined -				
FIELD DESCR	IPTION	•	SUBFIELD DESCRIPTION				
Manufacturing,	Engineering and T	echnology	Engineering	and Related Design			
UNIT STANDA	RD CODE	CODE UNIT STANDARD TYPE		NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 4	2		

Specific Outcomes:

SPECIFIC OUTCOME 1

Analyse transformer performance variables.

SPECIFIC OUTCOME 2

Differentiate between transformer configurations.



UNIT STANDARD:

63

Lead subordinates to support the strategy of the organisation

SAQA US ID	UNIT STANDARD TITLE								
14046	Lead subordina	Lead subordinates to support the strategy of the organisation							
SGB NAME A			ABET BAND	PROVIDER NAME					
SGB Power Plant Operations			Undefined	Undefined					
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION					
Manufacturing	, Engineering ar	nd Technology	Engineerin	g and Related Design					
UNIT STAND	ARD CODE	UNIT STANDARD TYP		NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	4				

Specific Outcomes:

SPECIFIC OUTCOME 1

Proactively leads subordinates to support the strategic vision.

SPECIFIC OUTCOME 2

Questions own and others assumptions to improve him / herself.

SPECIFIC OUTCOME 3

Actively inspires people to take ownership of challeging objectives.

SPECIFIC OUTCOME 4

Support the change strategies to ensure the organisation reach strategic objective.



UNIT STANDARD:

64

Operate Fossil Fired Steam Generator and Combustion Air and Flue Gas Systems

SAQA US ID	UNIT STANDARD TITLE						
14898	Operate Fossil Fired Steam Generator and Combustion Air and Flue Gas Systems						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	IPTION	······································	SUBFIELD	DESCRIPTION			
Manufacturing,	Engineering and T	rechnology	Engineering	and Related Design			
UNIT STANDA	RD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 4	8		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6



UNIT STANDARD:

65

Operate Fossil Fired Steam Generator Auxiliary Systems

SAQA US ID	UNIT STANDARD TITLE							
14905	Operate Fossil Fired Steam Generator Auxiliary Systems							
SGB NAME ABET			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineering	g and Related Design				
UNIT STANDARD CODE UNIT STAND		OARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	9			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6



UNIT STANDARD:

66

Operate Fossil Fired Steam Generator for Fuel Firing System

SAQA US ID	UNIT STANDARD TITLE							
14901	Operate Fossil F	Operate Fossil Fired Steam Generator for Fuel Firing System						
SGB NAME	:	. , '	ABET BAND	PROVIDER NAME				
SGB Power Pi	ant Operations 🦂		Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design	· · · · · · · · · · · · · · · · · · ·			
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	13			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6



UNIT STANDARD:

67

Operate Fossil Fired Steam Generator Spray Water System

SAQA US ID	UNIT STANDARD TITLE						
14903	Operate Fossil Fired Steam Generator Spray Water System						
SGB NAME ABET BA			ABET BANK	PROVIDER NAME	· · · · · · · · · · · · · · · · · · ·		
SGB Power Plant Operations			Undefined		· · ·		
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing,	Engineering an	d Technology	Engineerin	g and Related Design			
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	T-ENG-0-SGB PPO Regular			Level 4	2		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6



UNIT STANDARD:

68

Operate Fossil Fired Steam Generator Water and Steam System

SAQA US ID	UNIT STANDARD TITLE						
14896	Operate Fossil Fired Steam Generator Water and Steam System						
SGB NAME			ABET BAND	ABET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined		~		
FIELD DESCR	RIPTION		SUBFIELD	SUBFIELD DESCRIPTION			
Manufacturing	, Engineering and	d Technology	Engineerin	g and Related Design	· · · · · · · · · · · · · · · · · · ·		
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	11		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6



UNIT STANDARD:

69

Operate hydro generator cooling system

SAQA US ID	UNIT STANDARD TITLE							
14212	Operate hydro g	Operate hydro generator cooling system						
SGB NAME		ABET BANK	PROVIDER NAME					
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering and	d Technology	Engineerin	g and Related Design				
UNIT STAND	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	4			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare generator cooling system for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate generator cooling system.

SPECIFIC OUTCOME 3

Service generator cooling system.

SPECIFIC OUTCOME 4

Monitor generator cooling system and stabilise transient conditions.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of Hydro Generator Cooling Water system operation.



UNIT STANDARD:

70

Operate Hydro Generator Plant Bearing Systems

SAQA US ID	UNIT STANDARD TITLE						
14216	Operate Hydro Generator Plant Bearing Systems						
SGB NAME SGB Power Plant Operations			ABET BAN	PROVIDER NAME			
			Undefined	·			
FIELD DESCH	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design			
UNIT STAND	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 4	2		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare bearing system (guide) for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2 Shutdown and isolate bearing system (guide).

SPECIFIC OUTCOME 3

Service bearing system (guide).

SPECIFIC OUTCOME 4

Monitor bearing system (guide) and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Generator Bearing Systems Operation.



UNIT STANDARD:

71

Operate hydro power generation common cooling water

SAQA US ID	UNIT STANDARD TITLE							
10900	Operate hydro p	Operate hydro power generation common cooling water						
SGB NAME		· ,	ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	Engineering and	Technology	Engineering	g and Related Design	· · · · · · · · · · · · · · · · · · ·			
UNIT STANDA	INIT STANDARD CODE UNIT STANDA		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-4-S	GB PPO	Regular		Level 4	4			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare common CW system for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2 Shutdown and isolate common CW system.

SPECIFIC OUTCOME 3

Service common CW system.

SPECIFIC OUTCOME 4

Monitor common CW system and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Power Plant CW System.



UNIT STANDARD:

72

Operate hydro power generation drainage and dewatering systems

SAQA US ID	UNIT STANDARD TITLE						
13633	Operate hydro power generation drainage and dewatering systems						
SGB NAME	· · ·		ABET BAND	PROVIDER NAME			
SGB Power Plant Operations		х.,	Undefined				
FIELD DESCF	RIPTION	-	SUBFIELD	DESCRIPTION			
Manufacturing	Engineering and	Technology	Engineering	and Related Design	······		
UNIT STANDA	ARD CODE	UNIT STANDA	ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 4	4		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare drainage and de-watering system for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate drainage and de-watering system.

SPECIFIC OUTCOME 3

Service drainage and de-watering system.

SPECIFIC OUTCOME 4

Monitor drainage and de-watering system and stabilise transient conditions.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of Hydro Power Plant Daining & De-watering System Operation.



UNIT STANDARD:

73

Operate hydro power generation station plants - Emergency standby electrical systems

SAQA US ID	UNIT STANDARD TITLE							
13638	Operate hydro power generation station plants - Emergency standby electrical systems							
SGB NAME			ABET BANL	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION	a, in the second se	SUBFIELD DESCRIPTION					
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAND.			ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	2			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare emergency standby electrical system for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate emergency standby electrical systems.

SPECIFIC OUTCOME 3

Service emergency standby electrical systems.

SPECIFIC OUTCOME 4

Monitor emergency standby electrical system and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Power Plant Emergency Standby Electrical System.



UNIT STANDARD:

74

Operate hydro power generation transformer auxiliary systems

SAQA US ID	UNIT STANDARD TITLE								
14211	Operate hydro po	Operate hydro power generation transformer auxiliary systems							
SGB NAME			ABET BAND	PROVIDER NAME					
SGB Power Plant Operations			Undefined		·				
FIELD DESCR	IPTION		SUBFIELD	DESCRIPTION					
Manufacturing,	Engineering and	Fechnology	Engineering	and Related Design					
UNIT STANDARD CODE UNIT STAND		UNIT STANDA	ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	4				

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare transformer auxiliary systems for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate transformer auxiliary systems.

SPECIFIC OUTCOME 3

Service transformer auxiliary systems.

SPECIFIC OUTCOME 4

Monitor transformer auxiliary systems and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Power Plant Transformer Auxiliary System Operation.



UNIT STANDARD:

75

Operate hydro power generation turbine plant main pump and/or turbine system

SAQA US ID	UNIT STANDARD TITLE							
13673	Operate hydro power generation turbine plant main pump and/or turbine system							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined	Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	, Engineering and	Technology	Engineering	Engineering and Related Design				
UNIT STANDARD CODE UNIT STAND		OARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	5			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare pump and/or turbine system for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate pump and/or turbine system.

SPECIFIC OUTCOME 3

Service pump and/or turbine system.

SPECIFIC OUTCOME 4

Monitor pump and/or turbine system and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Turbine Plant Main Pump/Turbine systems operation.



UNIT STANDARD:

76

Operate hydro power generator mechanical brake and jacking system

SAQA US ID	UNIT STANDARD TITLE						
14213	Operate hydro power generator mechanical brake and jacking system						
SGB NAME			ABET BANK	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering ar	nd Technology	Engineerin	g and Related Design			
UNIT STANDARD CODE UNIT STAN		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare mechanical brake and jacking system for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate mechanical brake and jacking system.

SPECIFIC OUTCOME 3

Service mechanical brake and jacking system.

SPECIFIC OUTCOME 4

Monitor mechanical brake and jacking system and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonst knowledge and understanding of Hydro Gener Mechanical Brake and Jacking system operation.



UNIT STANDARD:

77

Operate Hydro Power Generator Starting and Braking Devices

SAQA US ID	UNIT STANDARD TITLE							
14215	Operate Hydro Power Generator Starting and Braking Devices							
SGB NAME			ABET BAN	D PROVIDER NAM	1E			
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION	· · · · · · · · · · · · · · · · · · ·	SUBFIEL	DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerir	Engineering and Related Design				
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	4			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare starting / brake devices for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate starting / brake devices.

SPECIFIC OUTCOME 3 Service starting / brake devices.

SPECIFIC OUTCOME 4

Monitor starting / brake devices and stabilise transient conditions,

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Generator Plant Starting.



UNIT STANDARD:

78

Operate hydro turbine plant bearing systems

SAQA US ID	UNIT STANDARD TITLE						
13652	Operate hydro turbine plant bearing systems						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCI	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	Technology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	7		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare bearing system (guide) for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate bearing system (guide).

SPECIFIC OUTCOME 3

Monitor bearing system (guide) and stabilise transient conditions.

SPECIFIC OUTCOME 4

Control raw material requirements.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of Hydro Turbine Plant Bearing Systems operation.

SPECIFIC OUTCOME 6

Service bearing system (guide).



UNIT STANDARD:

79

Operate hydro turbine plant blow down air system

SAQA US ID	UNIT STANDARD TITLE						
13666	Operate hydro turbine plant blow down air system						
SGB NAME			ABET BANL	PROVIDER NAME			
SGB Power Plant Operations			Undefined		·····		
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	Engineering and	Technology	Engineerin	g and Related Design			
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	4		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare blow down air system for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate blow down air system.

SPECIFIC OUTCOME 3

Service blow down air system.

SPECIFIC OUTCOME 4

Monitor blow down air system and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Turbine Plant Blow Down Air Systems Operation.



UNIT STANDARD:

80

Operate hydro turbine plant cooling water system

SAQA US ID	UNIT STANDARD TITLE							
13645	Operate hydro turbine plant cooling water system							
SGB NAME			ABET BAN	D PROVIDER NAME				
SGB Power Plant Operations			Undefined		• ·			
FIELD DESCH	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	4			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare CW system for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate CW system.

SPECIFIC OUTCOME 3

Service CW system.

SPECIFIC OUTCOME 4

Monitor CW system and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Turbine Plant Cooling Water Systems operation.



UNIT STANDARD:

81

Operate hydro turbine plant governing systems

SAQA US ID	UNIT STANDARD TITLE						
13664	Operate hydro turbine plant governing systems						
SGB NAME			ABET BAND	ABET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined	Undefined			
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design			
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	4		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare governing system for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate governing system.

SPECIFIC OUTCOME 3

Service governing system.

SPECIFIC OUTCOME 4

Monitor governing system and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Turbine Plant Governing systems operation.



UNIT STANDARD:

82

Operate hydro turbine plant main inlet valve system

SAQA US ID	UNIT STANDARD TITLE							
13658	Operate hydro turbine plant main inlet valve system							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined	Indefined				
FIELD DESCR	RIPTION	· · · · · · · · · · · · · · · · · · ·	SUBFIELD	DESCRIPTION	·			
Manufacturing,	Engineering and	Technology	Engineerin	g and Related Design	· · · · · · · · · · · · · · · · · · ·			
UNIT STANDARD CODE UNIT STANL		UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS			
MET-FNG-0-S	GB PPO	Regular		Level 4	4			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare main inlet valve for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate main inlet valve systems.

SPECIFIC OUTCOME 3

Service main inlet valve.

SPECIFIC OUTCOME 4

Monitor main inlet valve and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Power Turbine Main Inlet Valve systems operation.



UNIT STANDARD:

83

Operate hydro turbine plant shaft sealing system

SAQA US ID	UNIT STANDARD TITLE						
13665	Operate hydro turbine plant shaft sealing system						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCH	RIPTION		SUBFIELD	SUBFIELD DESCRIPTION			
Manufacturing	, Engineering an	d Technology	Engineerin	g and Related Design			
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	2		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare shaft-sealing system for service, startup and monitor start up conditions.

SPECIFIC OUTCOME 2

Shutdown and isolate shaft sealing system.

SPECIFIC OUTCOME 3

Service shaft sealing system.

SPECIFIC OUTCOME 4

Monitor shaft-sealing system and stabilise transient conditions.

SPECIFIC OUTCOME 5

Control raw material requirements.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Hydro Turbine Plant Shaft Sealing systems operation.



UNIT STANDARD:

84

Operate nuclear reactor auxiliary cooling systems

SAQA US ID	UNIT STANDARD TITLE						
114460	Operate nuclear reactor auxiliary cooling systems						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	IPTION		SUBFIELD	DESCRIPTION			
Manufacturing,	Engineering and 1	Technology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	5		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions

SPECIFIC OUTCOME 3

Stabilise transient conditions

SPECIFIC OUTCOME 4

Isolate shutdown plant

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of nuclear auxiliary cooling systems



UNIT STANDARD:

Operate nuclear reactor coolant and support systems

SAQA US ID	UNIT STANDARD TITLE						
14115	Operate nuclear reactor coolant and support systems						
SGB NAME			ABET BAND	BET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	rechnology	Engineering	and Related Design			
UNIT STANDA	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 4	15		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of nuclear coolant and support system.

85



UNIT STANDARD:

86

Operate nuclear reactor fire extinguishing systems

SAQA US ID	UNIT STANDARD TITLE						
13798	Operate nuclear reactor fire extinguishing systems						
SGB NAME	47		ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing	Engineering an	d Technology	Engineering	g and Related Design			
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	1		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of nuclear support plant fire extinguishing systems.



UNIT STANDARD:

87

Operate radioactive gaseous waste handling systems

SAQA US ID	UNIT STANDARD TITLE							
13801	Operate radioac	Operate radioactive gaseous waste handling systems						
SGB NAME ABE			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations Und			Undefined		•			
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineering	and Related Design				
UNIT STAND	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	3			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of radioactive gaseous waste handling systems.



UNIT STANDARD:

88

Operate radioactive liquid waste treatment and handling systems

SAQA US ID	UNIT STANDARD TITLE						
13727	Operate radioactive liquid waste treatment and handling systems						
SGB NAME ABET BAN			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCH	RIPTION	· · · · ·	SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design			
UNIT STANDA	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 4	17		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of radioactive liquid waste treatment and handling systems.



UNIT STANDARD:

89

Operate Steam Turbine Condensate System

SAQA US ID	UNIT STANDARD TITLE							
11944	Operate Steam Turbine Condensate System							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineering	g and Related Design				
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	8			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of turbine condensate systems.



UNIT STANDARD:

90

Operate Steam Turbine Condenser Air Evacuation Systems

SAQA US ID	UNIT STAND	UNIT STANDARD TITLE							
14059	Operate Steam Turbine Condenser Air Evacuation Systems								
SGB NAME SGB Power Plant Operations			ABET BANK	ABET BAND PROVIDER NAME					
			Undefined						
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION					
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design	· · · · · · · · · · · · · · · · · · ·				
UNIT STAND	ARD CODE	UNIT STAN	DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular	· · · · · · · · · · · · · · · · · · ·	Level 4	6				

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6



UNIT STANDARD:

Operate Steam Turbine Feedwater Storage, Heating and Pumping Systems

SAQA US ID	UNIT STANDARD TITLE							
14880	Operate Steam Turbine Feedwater Storage, Heating and Pumping Systems							
SGB NAME		-	ABET BAND	PROVIDER NAME				
SGB Power Pl	ant Operations	~	Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	Fechnology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	12			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of turbine feedwater, storage, heating and pumping systems.



UNIT STANDARD:

92

Operate Steam Turbine Steam Systems

SAQA US ID	UNIT STANDARD TITLE							
14881	Operate Steam Tu	Operate Steam Turbine Steam Systems						
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations		Undefined		~				
FIELD DESCR	IPTION		SUBFIELD	SUBFIELD DESCRIPTION				
Manufacturing,	Engineering and 1	Technology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STANDAR		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	10			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Isolate shutdown plant.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6



UNIT STANDARD:

93

Operate Support Plant Diesel Systems

SAQA US ID	UNIT STANDARD TITLE								
14107	Operate Support I	Operate Support Plant Diesel Systems							
SGB NAME			ABET BAND	PROVIDER NAME					
SGB Power Plant Operations			Undefined						
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION					
Manufacturing,	Engineering and T	Technology	Engineering	and Related Design					
UNIT STANDA	RD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	2				

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of support diesel system.



UNIT STANDARD:

94

Operate Support Plant Electrical Systems

SAQA US ID	UNIT STANDARD TITLE							
13725	Operate Support Plant Electrical Systems							
SGB NAME AE			ABET BANK	PROVIDER NAM	E			
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	Engineering and Related Design				
UNIT STANDA	STANDARD CODE UNIT STANDARD T		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	7			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of support plant electrical system.



UNIT STANDARD:

95

Operate support plant fire extinguishing systems

SAQA US ID	UNIT STANDARD TITLE						
14113	Operate support plant fire extinguishing systems						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	IPTION		SUBFIELD I	DESCRIPTION			
Manufacturing,	Engineering and	Technology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		_evel 4	2		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of support plant fire extinguishing system.



UNIT STANDARD:

96

Operate Support Plant Ventilation Systems

SAQA US ID	UNIT STANDARD TITLE						
14101	Operate Support Plant Ventilation Systems						
SGB NAME			ABET BAN	BET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCF	RIPTION		SUBFIELD	SUBFIELD DESCRIPTION			
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design	an a		
UNIT STANDA	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 4	4		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of support water ventilation systems


UNIT STANDARD:

97

Operate Turbine Condenser Air Evacuation Systems

SAQA US ID	UNIT STANDARD TITLE							
13722	Operate Turbine Condenser Air Evacuation Systems							
SGB NAME			ABET BAND	T BAND PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	, Engineering ar	nd Technology	Engineerin	g and Related Design				
UNIT STANDA	UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	6			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of turbine condenser air evacuation systems.



UNIT STANDARD:

98

Operate Turbo-Generator Auxiliary Systems

SAQA US ID	UNIT STANDARD TITLE						
13724	Operate Turbo-Generator Auxiliary Systems						
SGB NAME			ABET BAN	D PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering and	d Technology	Engineerin	g and Related Design			
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of turbo-generator auxiliary systems.



UNIT STANDARD:

99

Operate Turbo-Generator Cooling Systems

SAQA US ID	UNIT STANDARD TITLE							
13721	Operate Turbo-Generator Cooling Systems							
SGB NAME			ABET BAND PROVIDER NAME					
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing,	Engineering a	nd Technology	Engineerin	Engineering and Related Design				
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	12			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of turbo-generator cooling systems.



UNIT STANDARD:

100

Operate Turbo-Generator Oil Systems

SAQA US ID	UNIT STANDARD TITLE							
13720	Operate Turbo-Generator Oil Systems							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined		•			
FIELD DESCR	IPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and 1	Technology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	9			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding.



UNIT STANDARD:

101

Operate turbine steam system

SAQA US ID	UNIT STANDARD TITLE						
13719	Operate turbine steam system						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing,	Engineering and	Technology	Engineerin	g and Related Design			
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	10		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Preserve plant for storage.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of turbine steam systems.



UNIT STANDARD:

102

Phasing and or synchronising on high voltage intergrated systems

SAQA US ID	UNIT STANDARD TITLE						
13803	Phasing and or synchronising on high voltage intergrated systems						
SGB NAME			ABET BANK	ABET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCF	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing,	, Engineering an	d Technology	Engineerin	g and Related Design			
UNIT STANDA	INIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 4	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Operate electrical apparatus.

SPECIFIC OUTCOME 2

Stabilise transient conditions.

SPECIFIC OUTCOME 3

Service electrical apparatus.

SPECIFIC OUTCOME 4

Monitor electrical apparatus.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of operating electrical apparatus.



UNIT STANDARD:

103

Understand electrical protection systems associated with power generating processes

SAQA US ID	UNIT STANDARD TITLE						
10689	Understand electrical protection systems associated with power generating processes						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering and T	rechnology	Engineering and Related Design				
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	6		

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain electrical protection systems associated with rotating electrical apparatus.

SPECIFIC OUTCOME 2

Explain electrical protection systems associated with non-rotating electrical apparatus.



UNIT STANDARD:

104

Understand the principles of alternating current (AC) motor operation and application in a process plant

SAQA US ID	UNIT STANDARD TITLE							
10933	Understand the principles of alternating current (AC) motor operation and application in a process plant							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION	· · ·	SUBFIELD DESCRIPTION					
Manufacturing, Engineering and Technology		Engineering	and Related Design					
UNIT STANDA	RD CODE	UNIT STANDARD TYPE		NQFLEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 4	5			

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of AC motors construction.

SPECIFIC OUTCOME 2

Understand AC motors operation principles.

SPECIFIC OUTCOME 3

Define AC motor application.



UNIT STANDARD:

105

Understand water chemistry in a power plant environment

SAQA US ID	UNIT STANDARD TITLE						
14055	Understand water chemistry in a power plant environment						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineering	and Related Design			
UNIT STANDA	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 4	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Understand basic chemical elements and concepts within a power plant.

SPECIFIC OUTCOME 2

Describe chemical components and properties in a power plant environment.

SPECIFIC OUTCOME 3

Understand water treatment processes.

SPECIFIC OUTCOME 4

Understand the influences of impurities in water used on a power plant.



UNIT STANDARD:

106

Understands, Applies and Displays Constructive Thinking

SAQA US ID	UNIT STANDARD TITLE						
14049	Understands, Applies and Displays Constructive Thinking						
SGB NAME			ABET BAND	ABET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering an	d Technology	Engineerin	Engineering and Related Design			
UNIT STANDARD CODE UNIT STAN		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-SGB PPO Regular		· · · · · · · · · · · · · · · · · · ·	Level 4	5			

Specific Outcomes:

SPECIFIC OUTCOME 1

Conceptualize the big picture by understanding and applying different levels of thinking.

SPECIFIC OUTCOME 2

Supports and guides mid/long term thinking, towards implementation of objectives.

SPECIFIC OUTCOME 3

Applies innovation to improve the work situation.

SPECIFIC OUTCOME 4

Pro-actively acts to influence/change the future/outcome towards desired objectives.

SPECIFIC OUTCOME 5

Displays and applies mental alertness through the understanding of new processes.



UNIT STANDARD:

107

Apply Sound Management Practices in Order to Achieve Short to Mid Term Objectives

SAQA US ID	UNIT STANDARD TITLE							
14047	Apply Sound Management Practices in Order to Achieve Short to Mid Term Objectives							
SGB NAME AB			ABET BANL	PROVIDER NAM	E			
SGB Power Plant Operations			Undefined	Undefined				
FIELD DESCR	RIPTION		SUBFIELD	SUBFIELD DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	Engineering and Related Design				
UNIT STANDA	ARD CODE	D CODE UNIT STAND		NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	10			

Specific Outcomes:

SPECIFIC OUTCOME 1

Gather, Analyse and Assess Relevant Information of Events and Situation.

SPECIFIC OUTCOME 2

Identify Work-related Problems.

SPECIFIC OUTCOME 3

Plan and Organise for Everything.

SPECIFIC OUTCOME 4

Delegate and Control Clear Goals to Followers.

SPECIFIC OUTCOME 5

Maintain High Reliable, Constant High Quality Outputs.



UNIT STANDARD:

108

Control load variation on a fossil fired steam generator from a control room

SAQA US ID	UNIT STANDARD TITLE						
13562	Control load variation on a fossil fired steam generator from a control room						
SGB NAME			ABET BAND	ABET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	IPTION		SUBFIELD DESCRIPTION				
Manufacturing,	Engineering and 1	[echnology	Manufacturing and Assembly				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	7		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for load change.

SPECIFIC OUTCOME 2

Change unit load.

SPECIFIC OUTCOME 3

Monitor and manage inventory within parameters during load variations.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of fossil fired steam generator loading requirements.



UNIT STANDARD:

109

Control Load Variation on a Hydro Power Generating Unit in Pumping Mode from a Control Room

SAQA US ID	UNIT STANDARD TITLE							
13519	Control Load Variation on a Hydro Power Generating Unit in Pumping Mode from a Control Room							
SGB NAME AE			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	[echnology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 5	4			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Control load variations from a centralised control room.

SPECIFIC OUTCOME 3

Monitor load variation conditions.

SPECIFIC OUTCOME 4

Optimise load variation conditions.

SPECIFIC OUTCOME 5

Control hydraulic process.

SPECIFIC OUTCOME 6

Loading.

SPECIFIC OUTCOME 7

Inventory control.

SPECIFIC OUTCOME 8

Demonstrate knowledge and understanding of Hydro Power Plant Operation and Control.



UNIT STANDARD:

110

Control load variations on a fossil fired power generation unit from a control room.

SAQA US ID	UNIT STANDARD TITLE						
13596	Control load variations on a fossil fired power generation unit from a control room.						
SGB NAME			ABET BAND	BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined		·		
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design			
UNIT STANDARD CODE UNIT STAN		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	9		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for load change.

SPECIFIC OUTCOME 2

Change unit load.

SPECIFIC OUTCOME 3

Monitor and manage inventory within parameters during load variations.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of fossil fired power generating unit loading requirements.



UNIT STANDARD:

111

Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room

SAQA US ID	UNIT STANDARD TITLE						
13520	Control Load Variations on a Hydro Power Generating Unit in Generating and Synchronous Compensation Mode from a Control Room						
SGB NAME			ABET BANL	PROVIDER NAME			
SGB Power Plant Operations		Undefined					
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	Technology	Engineering and Related Design				
UNIT STANDARD CODE UNIT STAN		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular	<u></u>	Level 5	4		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Control load variations from a centralised control room.

SPECIFIC OUTCOME 3

Monitor load variation conditions.

SPECIFIC OUTCOME 4

Optimise load variation conditions.

SPECIFIC OUTCOME 5

Control hydraulic process.

SPECIFIC OUTCOME 6

Loading.

SPECIFIC OUTCOME 7

Inventory control.

SPECIFIC OUTCOME 8

Demonstrate knowledge and understanding of Hydro Power Plant Operation and Control.



UNIT STANDARD:

112

Control Load Variations on a Nuclear Steam Supply Plant from a Control Room.

SAQA US ID	UNIT STANDARD TITLE							
13816	Control Load Variations on a Nuclear Steam Supply Plant from a Control Room.							
SGB NAME			ABET BAND	PROVIDER NAME	· · · · · · · · · · · · · · · · · · ·			
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	SUBFIELD DESCRIPTION				
Manufacturing	Engineering and	Fechnology	Engineerin	Engineering and Related Design				
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 5	11			

Specific Outcomes:

SPECIFIC OUTCOME 1

Change unit load.

SPECIFIC OUTCOME 2

Monitor and control chemical parameters during load variation.

SPECIFIC OUTCOME 3

Monitor and control inventory parameters during load variations.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of Nuclear Plant Operation.

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

113

Control load variations on a steam driven turbo-generator from a control room

SAQA US ID	UNIT STANDARD TITLE						
13564	Control load variations on a steam driven turbo-generator from a control room						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	Technology	Manufactur	Manufacturing and Assembly			
UNIT STANDA	ARD CODE	ODE UNIT STANDAI		NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	6		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for load change.

SPECIFIC OUTCOME 2

Change unit load.

SPECIFIC OUTCOME 3

Monitor and manage inventory within parameters during load variations.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of steam driven turbo generator loading requirements.



UNIT STANDARD:

114

Control Load Variations on a Turbo-Generator Plant from a Control Room.

SAQA US ID	UNIT STANDARD TITLE							
13817	Control Load Variations on a Turbo-Generator Plant from a Control Room.							
SGB NAME			ABET BAND	BAND PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	, Engineering and	I Technology	Engineerin	Engineering and Related Design				
UNIT STANDARD CODE UNIT STAN		OARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 5	7			

Specific Outcomes:

SPECIFIC OUTCOME 1

Change turbo-generator loads.

SPECIFIC OUTCOME 2

Monitor and control chemical parameters during load variation.

SPECIFIC OUTCOME 3

Monitor and control inventory parameters during load variations.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of Nuclear Plant Operation.



UNIT STANDARD:

115

Demonstrate Knowledge and Understanding of Pulverised Fuel Firing Regulations (PFFR) as applied on fossil fired power generating plants.

SAQA US ID	UNIT STANDARD TITLE									
114472	Demonstrate happlied on fos	Demonstrate Knowledge and Understanding of Pulverised Fuel Firing Regulations (PFFR) as applied on fossil fired power generating plants.								
SGB NAME SGB Power Plant Operations			ABET BAND	PROVIDER NAME						
			Undefined							
FIELD DESCH	RIPTION		SUBFIELD	SUBFIELD DESCRIPTION						
Manufacturing	, Engineering a	nd Technology	Engineering	and Related Design	· · · · · · · · · · · · · · · · · · ·					
UNIT STAND	IT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS					
MET-ENG-0-S	GB PPO	Regular	· · · · · · · · · · · · · · · · · · ·	Level 5	3					

Specific Outcomes:

SPECIFIC OUTCOME 1

Define pulverised fuel firing regulations.

SPECIFIC OUTCOME 2

Explain requirements for start-up and firing of pulverised fuel fired boilers.

SPECIFIC OUTCOME 3

Describe regulatory requirements for normal running and shutdown of pulverised fuel fired boilers.



UNIT STANDARD:

116

Demonstrate Knowledge and Understanding of the Electrical Technology Associated with the Control of Electrical Energy on a Power Generating Unit in the Power Plant

SAQA US ID	UNIT STANDARD TITLE							
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							
SGB NAME			ABET BAND	PROVIDER NAM	E			
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	Technology	Engineering and Related Design					
UNIT STANDARD CODE UNIT STANDA			ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-SGB PPO Regular			Level 5	6				

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe the principles and theories associated with electrical technology.

SPECIFIC OUTCOME 2

Explain concepts and terms associated with electrical transformers.

SPECIFIC OUTCOME 3

Explain the construction and function of electrical generators and associated equipment.



UNIT STANDARD:

117

Demonstrate knowledge and understanding of thermal efficiency in a power plant

SAQA US ID	UNIT STANDARD TITLE							
114470	Demonstrate knowledge and understanding of thermal efficiency in a power plant							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined		· · · ·			
FIELD DESCI	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	, Engineering a	nd Technology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STANDA		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	SGB PPO	Regular		Level 5	3			

Specific Outcomes:

SPECIFIC OUTCOME 1

Define the thermodynamic terminology associated with power plant efficiency.

SPECIFIC OUTCOME 2

Investigate by means of calculations.

SPECIFIC OUTCOME 3

Interpretation of causes and rectification of under average efficiencies.



UNIT STANDARD:

118

Demonstrate knowledge of regulatory requirements for permit to work systems

SAQA US ID	UNIT STANDARD TITLE							
13600	Demonstrate knowledge of regulatory requirements for permit to work systems							
SGB NAME			ABET BANK	ABET BAND PROVIDER NAME				
SGB Power Plant Operations			Undefined		×			
FIELD DESCH	RIPTION		SUBFIELD	SUBFIELD DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular	tai,	Level 5	10			

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe the requirements to apply a permit.

SPECIFIC OUTCOME 2

Desribe the requirements for a lock-out system.

SPECIFIC OUTCOME 3

Describe the requirements of testing plant and electrical apparatus during authorised maintenance.



UNIT STANDARD:

119

Describe the Regulatory Nuclear Safety requirements as applied in nuclear power generating plant

SAQA US ID	UNIT STANDARD TITLE								
14907	Describe the Regulatory Nuclear Safety requirements as applied in nuclear power generating plant								
SGB NAME ABET BA			ABET BAND	PROVIDER NAME	PROVIDER NAME				
SGB Power Pl	ant Operations		Undefined						
FIELD DESCH	RIPTION	100,000 to	SUBFIELD	UBFIELD DESCRIPTION					
Manufacturing	, Engineering an	d Technology	Engineering	and Related Design					
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS					
MET-MNA-0-S	GB MAP	Regular		Level 5	1				

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe the role of the National Nuclear Regulator (NNR).

SPECIFIC OUTCOME 2

Describe the function of all licence documents issued by the NNR.

SPECIFIC OUTCOME 3

Describe the relationship.

SPECIFIC OUTCOME 4

Describe the process with which the Nuclear Power Station ensures compliance.



UNIT STANDARD:

120

Monitor and Sustain Nuclear Steam Supply Plant from a Control Room

SAQA US ID	UNIT STANDARD TITLE					
14227	Monitor and Sustain Nuclear Steam Supply Plant from a Control Room					
SGB NAME			ABET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined			
FIELD DESCR	IPTION		SUBFIELD DESCRIPTION			
Manufacturing,	Engineering and T	echnology	Engineering	and Related Design		
UNIT STANDARD CODE UNIT STAND			ARD TYPE	NQF LEVEL	CREDITS	
MET-ENG-0-S	GB PPO	Regular		Level 5	5	

Specific Outcomes:

SPECIFIC OUTCOME 1

Control service activities on integrated plant systems.

SPECIFIC OUTCOME 2

Monitor interrelated plant conditions from a central control room.

SPECIFIC OUTCOME 3

Record and report data.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of Nuclear Plant Operation.



UNIT STANDARD:

121

Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from the Control Room

SAQA US ID	UNIT STANDARD TITLE						
13523	Monitor and Sustain Plant Operability of a Hydro Power Generating Unit from the Control Room						
SGB NAME		·	ABET BANK	PROVIDER NAM	NE		
SGB Power Plant Operations			Undefined		· · · · · · · · · · · · · · · · · · ·		
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering and	d Technology	Engineerin	Engineering and Related Design			
UNIT STANDARD CODE UNIT STAN		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	7		

Specific Outcomes:

SPECIFIC OUTCOME 1

Control service activities on integrated plant systems.

SPECIFIC OUTCOME 2

Monitor plant conditions from a control room.

SPECIFIC OUTCOME 3

Record and report data.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of Hydro Power Plant Operation and Control.



UNIT STANDARD:

122

Monitor and Sustain Plant Operability of a Steam Driven Turbo-Generator System from a Control Room

SAQA US ID	UNIT STANDARD TITLE						
13572	Monitor and Sustain Plant Operability of a Steam Driven Turbo-Generator System from a Control Room						
SGB NAME AI			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing, Engineering and Technology		Engineerin	Engineering and Related Design				
UNIT STAND	ARD CODE	UNIT STAN	DARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	7		

Specific Outcomes:

SPECIFIC OUTCOME 1

Control service activities on integrated plant systems.

SPECIFIC OUTCOME 2

Monitor interrelated plant conditions from a central control room.

SPECIFIC OUTCOME 3

Record and report data.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of steam driven turbo generator monitoring and service.



UNIT STANDARD:

123

Monitor and Sustain Plant Operability on a Fossil Fired Power Generating Unit from a Control Room

SAQA US ID	UNIT STANDARD TITLE							
13598	Monitor and Sustain Plant Operability on a Fossil Fired Power Generating Unit from a Control Room							
SGB NAME	•		ABET BANL	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	, Engineering ar	nd Technology	Engineering and Related Design					
UNIT STANDA	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	16			

Specific Outcomes:

SPECIFIC OUTCOME 1

Control service activities on integrated plant systems.

SPECIFIC OUTCOME 2

Monitor interrelated plant conditions from a central control room.

SPECIFIC OUTCOME 3

Record and report data.

SPECIFIC OUTCOME 4

Demonstrate knowledge & understanding fossil fired power generator units monitoring service.



UNIT STANDARD:

124

Monitor and Sustain Plant Operability on a Fossil Fired Steam Generator from a Control Room

SAQA US ID	UNIT STANDARD TITLE					
13571	Monitor and Sustain Plant Operability on a Fossil Fired Steam Generator from a Control Room					
SGB NAME	······································		ABET BAND	PROVIDER NAME	· · · · · · · · · · · · · · · · · · ·	
SGB Power Plant Operations			Undefined			
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION			
Manufacturing	, Engineering and	Technology	Engineering and Related Design			
UNIT STAND	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS	
MET-ENG-0-S	GB PPO	Regular		Level 5	8	

Specific Outcomes:

SPECIFIC OUTCOME 1

Control service activities on integrated plant systems.

SPECIFIC OUTCOME 2

Monitor interrelated plant conditions from a central control room.

SPECIFIC OUTCOME 3

Record and report data.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of fossil fired steam generator monitoring and service.



Established in terms of Art 58 of 1995

UNIT STANDARD:

125

Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control Centres

SAQA US ID	UNIT STANDARD TITLE						
13525	Monitor and Sustain Plant Operability on Hydro Power Generation Auxiliary Systems from Control Centres						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCF	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing, Engineering and Technology		Technology	Engineering and Related Design				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	ET-ENG-0-SGB PPO Regular			Level 5	10		

Specific Outcomes:

SPECIFIC OUTCOME 1

Control service activities on integrated plant systems.

SPECIFIC OUTCOME 2

Monitor plant conditions from a control room.

SPECIFIC OUTCOME 3

Record and report data.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of Hydro Power Plant Operation and Control.



UNIT STANDARD:

126

Monitor and Sustain Turbo-Generator Plant Operability from a Control Room

SAQA US ID	UNIT STANDARD TITLE						
14228	Monitor and Sustain Turbo-Generator Plant Operability from a Control Room						
SGB NAME		ABET BAND	ABET BAND PROVIDER NAME				
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering ar	nd Technology	Engineerin	Engineering and Related Design			
UNIT STANDA	ARD CODE	UNIT STANE	DARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	5		

Specific Outcomes:

SPECIFIC OUTCOME 1

Control service activities on integrated plant systems.

SPECIFIC OUTCOME 2

Monitor interrelated plant conditions from a central control room.

SPECIFIC OUTCOME 3

Record and report data.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of Nuclear Plant Operation.



UNIT STANDARD:

127

Preserve Nuclear Steam Supply Plant

SAQA US ID	UNIT STANDARD TITLE						
14232	Preserve Nuclear Steam Supply Plant						
SGB NAME		······	ABET BANK	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD	ELD DESCRIPTION			
Manufacturing,	Engineering and	d Technology	Engineerin	Engineering and Related Design			
UNIT STANDARD CODE UNIT STANDA		DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	4		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant and or equipment for preservation.

SPECIFIC OUTCOME 2

Monitor and sustain plant preservation conditions.

SPECIFIC OUTCOME 3

Prepare for recommissioning.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of Nuclear Plant Operation.



UNIT STANDARD:

128

Preserve Plant and or Equipment on a Fossil Fired Steam Generator from a Control Room

SAQA US ID	UNIT STANDARD TITLE						
13601	Preserve Plant and or Equipment on a Fossil Fired Steam Generator from a Control Room						
SGB NAME			ABET BAND PROVIDER NAME				
SGB Power Plant Operations			Undefined				
FIELD DESCH	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering an	d Technology	Engineerin	Engineering and Related Design			
UNIT STANDA	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant and or equipment for preservation.

SPECIFIC OUTCOME 2

Monitor and sustain plant preservation conditions.

SPECIFIC OUTCOME 3

Prepare for recommissioning.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of fossil fire steam generation system preservation process.



UNIT STANDARD:

129

Preserve Plant and or Equipment on a Steam Driven Turbo-Generator Plant

SAQA US ID	UNIT STANDARD TITLE						
13602	Preserve Plant and or Equipment on a Steam Driven Turbo-Generator Plant						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCH	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering and	Fechnology	Engineering and Related Design				
UNIT STAND	ARD CODE	UNIT STAND	ARD TYPE	NQFLEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant and/or equipment for preservation.

SPECIFIC OUTCOME 2

Monitor and sustain plant preservation conditions.

SPECIFIC OUTCOME 3

Prepare for recommissioning.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of steam driven turbo generator system preservation process



UNIT STANDARD:

130

Preserve Steam Driven Turbo-Generator Plant

SAQA US ID	UNIT STANDARD TITLE						
14233	Preserve Steam Driven Turbo-Generator Plant						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined		· ·		
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	Engineering and	Technology	Engineerin	and Related Design	<u></u>		
UNIT STANDA	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	4		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant and or equipment for preservation.

SPECIFIC OUTCOME 2

Monitor and sustain plant preservation conditions.

SPECIFIC OUTCOME 3

Prepare for recommissioning.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of steam driven turbo generator system.



UNIT STANDARD:

. 131

Shut down a fossil fired steam generator from a control room

SAQA US ID	UNIT STANDARD TITLE						
13566	Shut down a fossil fired steam generator from a control room						
SGB NAME AE			ABET BAND	ABET BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined		· · ·		
FIELD DESCR	RIPTION		SUBFIELD	ELD DESCRIPTION			
Manufacturing,	Engineering and	Technology	Manufactur	Manufacturing and Assembly			
UNIT STANDA	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	12		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for shutdown.

SPECIFIC OUTCOME 2

De-load a production unit from a control room.

SPECIFIC OUTCOME 3

Shutdown running plant and/or processes.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of fossil fired steam generator shutdown requirements.



UNIT STANDARD:

132

Shutdown a fossil fired power generating unit from a control room.

SAQA US ID	UNIT STANDARD TITLE						
13597	Shutdown a fossil fired power generating unit from a control room.						
SGB NAME			ABET BAND	PROVIDER NAI	ME		
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION	· ·	SUBFIELD DESCRIPTION				
Manufacturing	Engineering and	Technology	Engineerin	g and Related Design	ו		
UNIT STANDA	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	22		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for shutdown.

SPECIFIC OUTCOME 2

De-load a production unit from a control room.

SPECIFIC OUTCOME 3

Shutdown running plant and/or processes.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of fossil fired power generation unit.


UNIT STANDARD:

133

Shutdown a Nuclear Steam Supply Plant from a Control Room

SAQA US ID	UNIT STANDARD TITLE							
13819	Shutdown a Nuclear Steam Supply Plant from a Control Room							
SGB NAME			ABET BANK	ABET BAND PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	, Engineering an	d Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 5	26			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for shutdown.

SPECIFIC OUTCOME 2

De-load the steam supply plant from a centralised control room.

SPECIFIC OUTCOME 3

Control thermodynamic processes.

SPECIFIC OUTCOME 4

Shutdown running plant processes.

SPECIFIC OUTCOME 5

De-energise and isolate plant and or apparatus.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of Nuclear Plant Operation.



UNIT STANDARD:

134

Shutdown a steam driven turbo-generator system from a control room

SAQA US ID	UNIT STANDARD TITLE							
13568	Shutdown a steam driven turbo-generator system from a control room							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCF	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design	· · · · · · · · · · · · · · · · · · ·			
UNIT STANDARD CODE UNIT STAN		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 5	11			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for shutdown.

SPECIFIC OUTCOME 2

De-load the turbo generator plant from a centrallised control room.

SPECIFIC OUTCOME 3

Shutdown running plant processes.

SPECIFIC OUTCOME 4

Control thermodynamic processes.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of steam driven turbo generator shutdown requirements.

SPECIFIC OUTCOME 6

De-energise and isolate plant and or apparatus.



UNIT STANDARD:

135

Shutdown Hydro Power Generation Auxiliary Systems from Control Centres

SAQA US ID	UNIT STANDARD TITLE							
10899	Shutdown Hydro Power Generation Auxiliary Systems from Control Centres							
SGB NAME		· · · · · · · · · · · · · · · · · · ·	ABET BANK	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION		SUBFIELD	SUBFIELD DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	Engineering and Related Design				
UNIT STANDARD CODE UNIT STAND		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 5	10			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for shutdown.

SPECIFIC OUTCOME 2

De-load and shutdown a production unit from a control room.

SPECIFIC OUTCOME 3

De-energise and isolate plant and or apparatus.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of Hydro Power Plant Operation and Control.



UNIT STANDARD:

136

Shutdown Hydro Power Generation Unit from a Control Room

SAQA US ID	UNIT STANDARD TITLE							
13521	Shutdown Hydro Power Generation Unit from a Control Room							
SGB NAME			ABET BAN	D PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	SUBFIELD DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	Engineering and Related Design				
UNIT STANDARD CODE UNIT STAN		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 5	12			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for shutdown.

SPECIFIC OUTCOME 2

De-load and shutdown a production unit from a control room.

SPECIFIC OUTCOME 3

De-energise and isolate plant and or apparatus.

SPECIFIC OUTCOME 4

Demonstrate knowledge and understanding of Hydro Power Plant Operation and Control.



UNIT STANDARD:

137

Stabilise Out of Normal and or Emergency Condition on a Nuclear Steam Supply Plant from a Control Room

SAQA US ID	UNIT STANDARD TITLE							
14230	Stabilise Out of Normal and or Emergency Condition on a Nuclear Steam Supply Plant from a Control Room							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION	······	SUBFIELD DESCRIPTION					
Manufacturing, Engineering and Technology			Engineering	and Related Design	· · · · · · · · · · · · · · · · · · ·			
UNIT STANDARD CODE UNIT STANE		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 5	57			

Specific Outcomes:

SPECIFIC OUTCOME 1

Recognise out of normal or emergency conditions.

SPECIFIC OUTCOME 2

Plan response actions.

SPECIFIC OUTCOME 3

Implement action plan.

SPECIFIC OUTCOME 4

Communicate out of normal and or emergency conditions.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of nuclear plant operation.



istablished in serms of Act 58 of 1995

UNIT STANDARD:

138

Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Unit from a Control Room

SAQA US ID	UNIT STANDARD TITLE							
13526	Stabilise Out of Normal and or Emergency Condition on Hydro Power Generation Unit from a Control Room							
SGB NAME			ABET BAN	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing, Engineering and Technology			Engineering and Related Design					
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 5	15			

Specific Outcomes:

SPECIFIC OUTCOME 1

Recognise out of normal emergency conditions

SPECIFIC OUTCOME 2

Plan response actions

SPECIFIC OUTCOME 3

Implement action plan

SPECIFIC OUTCOME 4

Communicate out of normal and or emergency conditions

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of Hydro Power Plant Operation and Control



UNIT STANDARD:

139

Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary Systems

SAQA US ID	UNIT STANDARD TITLE							
13527	Stabilise Out of Normal and or Emergency Conditions on Hydro Power Generation Auxiliary Systems							
SGB NAME			ABET BAND	PROVIDER NAME	E			
SGB Power PI	ant Operations		Undefined	Indefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION					
Manufacturing	Engineering and	Technology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STAND			ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	11			

Specific Outcomes:

SPECIFIC OUTCOME 1

Recognise out of normal or emergency conditions.

SPECIFIC OUTCOME 2

Plan response actions.

SPECIFIC OUTCOME 3

Implement action plan.

SPECIFIC OUTCOME 4

Communicate out of normal and or emergency conditions.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of Hydro Power Plant.



UNIT STANDARD:

140

Stabilise Out of Normal and or Emergency Conditions on Nuclear Power Plant Turbo Generating Unit

SAQA US ID	UNIT STANDARD TITLE							
14231	Stabilise Out of Normal and or Emergency Conditions on Nuclear Power Plant Turbo Generating Unit							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION	· · · · · · · · · · · · · · · · · · ·			
Manufacturing,	Engineering and T	echnology	Engineering	and Related Design				
UNIT STANDARD CODE UNIT STANDA			ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	6			

Specific Outcomes:

SPECIFIC OUTCOME 1

Recognise out of normal or emergency conditions

SPECIFIC OUTCOME 2

Plan response actions

SPECIFIC OUTCOME 3

Implement action plan

SPECIFIC OUTCOME 4

Communicate out of normal and or emergency conditions.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of Nuclear Plant Operation



UNIT STANDARD:

141

Established in terms of Act 58 of 1995

Stabilise Out of Normal Emergency Conditions on a Fossil Fired Power Generating Unit from a **Control Room**

SAQA US ID	UNIT STANDARD TITLE						
13599	Stabilise Out of Normal Emergency Conditions on a Fossil Fired Power Generating Unit from a Control Room						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Pla	ant Operations		Undefined				
FIELD DESCR	IPTION		SUBFIELD DESCRIPTION				
Manufacturing,	Engineering and T	Fechnology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STANDA			RD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-SGB PPO Regular				Level 5	28		

Specific Outcomes:

SPECIFIC OUTCOME 1

Recognise out of normal and/or emergency conditions

SPECIFIC OUTCOME 2

Plan response actions

SPECIFIC OUTCOME 3

Implement action plan

SPECIFIC OUTCOME 4

Communicate out of normal and/or emergency conditions.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of a fossil fired power generation unit



UNIT STANDARD:

142

Stabilise Out of Normal Emergency Conditions on a Fossil Fired Steam Generator from a Control Room

SAQA US ID	UNIT STANDARD TITLE						
13573	Stabilise Out of Normal Emergency Conditions on a Fossil Fired Steam Generator from a Control Room						
SGB NAME A			ABET BAND	PROVIDER NAME			
SGB Power Pl	ant Operations		Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing,	Engineering and 1	echnology	Manufacturing and Assembly				
UNIT STANDARD CODE UNIT STANDA			ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-SGB PPO Regular			Level 5	15			

Specific Outcomes:

SPECIFIC OUTCOME 1

Recognise out of normal and or emergency conditions.

SPECIFIC OUTCOME 2

Plan response actions.

SPECIFIC OUTCOME 3

Implement action plan.

SPECIFIC OUTCOME 4

Communicate out of normal and/or emergency conditions.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of a fossil fired steam generation system.



UNIT STANDARD:

143

Stabilise Out of Normal Emergency Conditions on a Steam Driven Turbo-Generator System from a Control Room

SAQA US ID	UNIT STANDARD TITLE							
13575	Stabilise Out of Normal Emergency Conditions on a Steam Driven Turbo-Generator System from a Control Room							
SGB NAME			ABET BAND	PROVIDER NA	ME			
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and T	echnology	Engineering	and Related Desig	n			
UNIT STANDARD CODE UNIT STANDA			RD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	12			

Specific Outcomes:

SPECIFIC OUTCOME 1

Recognise out of normal and/or emergency conditions.

SPECIFIC OUTCOME 2

Plan response actions.

SPECIFIC OUTCOME 3

Implement action plan.

SPECIFIC OUTCOME 4

Communicate out of normal and/or emergency conditions.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of steam driven turbo generator system.



UNIT STANDARD:

144

Start up Nuclear Steam Supply Plant from a Control Room

SAQA US ID	UNIT STANDARD TITLE						
13804	Start up Nuclear Steam Supply Plant from a Control Room						
SGB NAME			ABET BAND	T BAND PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing,	Engineering and	rechnology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STANDA			ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	32		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Start up plant from a centralised control room.

SPECIFIC OUTCOME 3

Monitor start up conditions.

SPECIFIC OUTCOME 4

Optimise start up conditions.

SPECIFIC OUTCOME 5

Control thermodynamic processes.

SPECIFIC OUTCOME 6

Loading.

SPECIFIC OUTCOME 7

Inventory control.

SPECIFIC OUTCOME 8

Demonstrate knowledge and understanding of Nuclear Plant Operation.



UNIT STANDARD:

145

Start up Turbo-Generator Plant from a Control Room

SAQA US ID	UNIT STANDARD TITLE						
13811	Start up Turbo-Generator Plant from a Control Room						
SGB NAME		ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined				
FIELD DESCR	RIPTION		SUBFIELD DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineering	and Related Design			
UNIT STANDA	ARD CODE	UNIT STANDARD TYPE		NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	14		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Start up plant from a centralised control room.

SPECIFIC OUTCOME 3

Monitor start up conditions.

SPECIFIC OUTCOME 4

Optimise start up conditions.

SPECIFIC OUTCOME 5

Control thermodynamic processes.

SPECIFIC OUTCOME 6

Loading.

SPECIFIC OUTCOME 7

Inventory control.

SPECIFIC OUTCOME 8

Demonstrate knowledge and understanding of Nuclear Plant Operation.



UNIT STANDARD:

146

Startup a Fossil Fired Power Generating Unit from a Control Room.

SAQA US ID	UNIT STANDARD	INIT STANDARD TITLE						
13577	Startup a Fossil Fi	Startup a Fossil Fired Power Generating Unit from a Control Room.						
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and T	Technology	Manufacturi	ng and Assembly				
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 5	55			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for startup.

SPECIFIC OUTCOME 2 Startup plant from a control room.

SPECIFIC OUTCOME 3

Monitor startup conditions.

SPECIFIC OUTCOME 4

Loading of production unit.

SPECIFIC OUTCOME 5 Inventory Control.

SPECIFIC OUTCOME 6

Optimise startup conditions.

SPECIFIC OUTCOME 7

Demonstrate knowledge understanding of fossil fired power generating units.



UNIT STANDARD:

147

Startup a fossil fired steam generator from a control room

SAQA US ID	UNIT STANDARL	DTITLE				
13558	Startup a fossil fired steam generator from a control room					
SGB NAME			ABET BAND	PROVIDER NAME		
SGB Power Plant Operations			Undefined			
FIELD DESCR	IPTION		SUBFIELD	DESCRIPTION		
Manufacturing,	Engineering and 1	echnology	Manufacturi	ng and Assembly		
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	32	

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for startup.

SPECIFIC OUTCOME 2

Startup plant from a control room.

SPECIFIC OUTCOME 3

Monitor startup conditions.

SPECIFIC OUTCOME 4

Loading of production unit.

SPECIFIC OUTCOME 5

Inventory control.

SPECIFIC OUTCOME 6

Optimise startup conditions.

SPECIFIC OUTCOME 7

Demonstrate knowledge and understanding of fossil fired steam generator startup requirements.



UNIT STANDARD:

148

Startup a Steam Driven Turbo-Generator from a Control Room.

SAQA US ID	UNIT STANDAR	UNIT STANDARD TITLE						
13561	Startup a Steam	Startup a Steam Driven Turbo-Generator from a Control Room.						
SGB NAME		·	ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined		· - · · · · · · · · · · · · · · · · · ·			
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	Technology	Engineering	and Related Design	· · · · · · · · · · · · · · · · · · ·			
UNIT STANDA	ARD CODE	DE UNIT STANDARD 1		NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	21			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for startup (Plant processes and controlroom).

SPECIFIC OUTCOME 2 Startup plant from a control room.

SPECIFIC OUTCOME 3

Monitor startup conditions (During all specific outcomes of this unit standard.

SPECIFIC OUTCOME 4

Loading of production unit.

SPECIFIC OUTCOME 5

Inventory Control.

SPECIFIC OUTCOME 6

Optimise startup conditions.

SPECIFIC OUTCOME 7

Demonstrate knowledge and understanding of steam driven turbo generator.



UNIT STANDARD:

149

Startup Hydro Power Generating Auxiliary Systems from Control Centres

SAQA US ID	UNIT STANDAI	RD TITLE					
13517	Startup Hydro Power Generating Auxiliary Systems from Control Centres						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations		Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	Technology	Engineering	and Related Design			
UNIT STANDA	ARD CODE	UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular		Level 5	13		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup plant from a centralised control room.

SPECIFIC OUTCOME 3

Monitor startup condition.

SPECIFIC OUTCOME 4

Loading.

SPECIFIC OUTCOME 5

inventory control.

SPECIFIC OUTCOME 6

Optimise startup conditions.

SPECIFIC OUTCOME 7

Demonstrate knowledge and understanding of Hydro Power Plant Operation and Control.



UNIT STANDARD:

150

Startup Hydro Power Generating Unit from a Control Room

SAQA US ID	UNIT STANDA	UNIT STANDARD TITLE						
10898	Startup Hydro P	Startup Hydro Power Generating Unit from a Control Room						
SGB NAME		(ABET BAND	PROVIDER NAME				
SGB Power Pl	ant Operations		Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering and	d Technology	Engineerin	g and Related Design				
UNIT STANDA	ARD CODE	UNIT STAN	DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 5	32			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup plant from a centralised control room.

SPECIFIC OUTCOME 3

Monitor startup conditions

SPECIFIC OUTCOME 4

Loading

SPECIFIC OUTCOME 5

Inventory control

SPECIFIC OUTCOME 6

Optimise startup conditions

SPECIFIC OUTCOME 7

Demonstrate knowledge and understanding of Hydro Power Plant Operation and Control



UNIT STANDARD:

151

Demonstrate Knowledge and Use of Hand Operated Fire Fighting Equipment

SAQA US ID	UNIT STANDA	INIT STANDARD TITLE							
13961	Demonstrate K	Demonstrate Knowledge and Use of Hand Operated Fire Fighting Equipment							
SGB NAME			ABET BANL	ABET BAND PROVIDER NAME					
SGB Power Plant Operations			Undefined	Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION					
Manufacturing	, Engineering ar	d Technology	Engineerin	g and Related Design					
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS					
MET-ENG-0-S	GB PPO	Regular		Level 2	4				

Specific Outcomes:

SPECIFIC OUTCOME 1

Demonstrate knowledge of fire and repellents.

SPECIFIC OUTCOME 2

Demonstrate the use of the various types of fire extinguishers.

SPECIFIC OUTCOME 3

Demonstrate the use of fixed hose reels and ancilliary extinguishing equipment.



UNIT STANDARD:

152

Operate Coal Handling Systems on Fossil Power Plants.

SAQA US ID	UNIT STANDARD TITLE						
12024	Operate Coal Handling Systems on Fossil Power Plants.						
SGB NAME			ABET BANK	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design			
UNIT STANDARD CODE UNIT STAND		ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 2	11		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup and loading of plant.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shutdown plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7

Demonstrate knowledge and understanding.



UNIT STANDARD:

153

Operate Potable Water Systems on Fossil Power Plants.

SAQA US ID	UNIT STANDA	UNIT STANDARD TITLE						
12095	Operate Potable Water Systems on Fossil Power Plants.							
SGB NAME		ABET BAND PROVIDER NA						
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering ar	d Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 2	1			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup and monitor start up conditions.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shutdown plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7

Demonstrate knowledge and understanding.



UNIT STANDARD:

154

Interpret liquid transfer theories in a process plant

SAQA US ID	UNIT STANDAI	UNIT STANDARD TITLE						
10488	Interpret liquid transfer theories in a process plant							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION	· · · · · · · · · · · · · · · · · · ·	SUBFIELD	DESCRIPTION				
Manufacturing,	Engineering and	Technology	Engineering and Related Design					
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular	· · · · · · · · · · · · · · · · · · ·	Level 3	3			

Specific Outcomes:

SPECIFIC OUTCOME 1

Classify Liquid Transfer methods and applications.

SPECIFIC OUTCOME 2

Identify pump deficiencies.

SPECIFIC OUTCOME 3

Identify pump characteristics.



UNIT STANDARD:

155

Operate Bulk Lubrication Oil Systems

SAQA US ID	UNIT STANDAR	JNIT STANDARD TITLE						
14217	Operate Bulk Lubrication Oil Systems							
SGB NAME			ABET BAND PROVIDER NAME					
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STANDA		ARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 3	5			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service.

SPECIFIC OUTCOME 2

Startup and monitor start up conditions.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Shutdown plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7

Demonstrate knowledge and understanding.



UNIT STANDARD:

156

Operate Fire Extinguishing System

SAQA US ID	UNIT STANDARD TITLE							
13957	Operate Fire Extinguishing System							
SGB NAME			ABET BAN	PROVIDER NAME				
SGB Power Plant Operations		Undefined						
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design				
UNIT STANDA	ARD CODE	UNIT STAN	DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	4			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare System for Start Up.

SPECIFIC OUTCOME 2

Startup and monitor start up conditions.

SPECIFIC OUTCOME 3

Monitor system during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient/emergency conditions.

SPECIFIC OUTCOME 5

Shutdown and monitor shutdown conditions.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7

Demonstrate knowledge and understanding of the System.



UNIT STANDARD:

157

Operate Support Plant Steam Production System

SAQA US ID	UNIT STANDARD TITLE							
13960	Operate Support Plant Steam Production System							
SGB NAME			ABET BANI	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAND			OARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	2			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of support plant steam production systems.



UNIT STANDARD:

158

Operate Support Plant Water Supply Systems

SAQA US ID	UNIT STANDARD TITLE							
13713	Operate Support Plant Water Supply Systems							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCRIPTION			SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineering	g and Related Design				
UNIT STANDARD CODE UNIT STAN			ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-SGB PPO Regular		Regular		Level 3	1			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of support water supply systems.



UNIT STANDARD:

159

Perform operational communicational activities

SAQA US ID	UNIT STANDARD TITLE							
13703	Perform operational communicational activities							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION	· · · · · · · · · · · · · · · · · · ·			
Manufacturing	, Engineering and	Technology	Engineering	g and Related Design				
UNIT STANDARD CODE UNIT STAN		UNIT STAND	ARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-S	GB PPO	Regular		Level 3	2			

Specific Outcomes:

SPECIFIC OUTCOME 1

Compile an operating event log.

SPECIFIC OUTCOME 2

Hand over shift.

SPECIFIC OUTCOME 3

Take over shift.



UNIT STANDARD:

160

Operate nuclear reactor refueling water systems

SAQA US ID	UNIT STANDARD TITLE						
13728	Operate nuclear reactor refueling water systems						
SGB NAME			ABET BAND	PROVIDER NAME			
SGB Power Plant Operations			Undefined				
FIELD DESCRIPTION			SUBFIELD	DESCRIPTION			
Manufacturing	, Engineering and	Technology	Engineering	and Related Design			
UNIT STANDARD CODE UNIT STANE			ARD TYPE	NQF LEVEL	CREDITS		
MET-ENG-0-S	GB PPO	Regular	······································	Level 4	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of nuclear reactor refueling water systems.



UNIT STANDARD:

161

Operate nuclear reactor safeguard systems

SAQA US ID	UNIT STANDARD TITLE							
14116	Operate nuclear reactor safeguard systems							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined		····			
FIELD DESCI	RIPTION	· · ·	SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Related Design	· · · · · · · · · · · · · · · · · · ·			
UNIT STANDARD CODE UNIT STANL		DARD TYPE	NQF LEVEL	CREDITS				
MET-ENG-0-S	GB PPO	Regular		Level 4	3			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of nuclear reactor safeguard systems.



UNIT STANDARD:

162

Operate nuclear reactor vent and drain systems

SAQA US ID	UNIT STANDARD TITLE							
13794	Operate nuclear reactor vent and drain systems							
SGB NAME			ABET BANI	ABET BAND PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCH	RIPTION		SUBFIEL	DESCR	IPTION			
Manufacturing	, Engineering a	nd Technology	Engineerin	g and Rel	lated Design			
UNIT STANDARD CODE UNIT STAN			DARD TYPE	NQF LE	VEL	CREDITS		
MET-ENG-0-SGB PPO Regular		Regular		Level 4	·····	3		

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of nuclear reactor vent and drain systems.



UNIT STANDARD:

163

Operate nuclear reactor ventilation systems

SAQA US ID	UNIT STANDARD TITLE							
13729	Operate nuclear reactor ventilation systems							
SGB NAME			ABET BAND	PROVIDER NAME				
SGB Power Plant Operations			Undefined		·			
FIELD DESCR	RIPTION		SUBFIELD	DESCRIPTION				
Manufacturing	, Engineering and	Technology	Engineerin	g and Related Design				
UNIT STANDARD CODE UNIT STAN			DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-SGB PPO Regular		Regular		Level 4	7			

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Startup and shutdown systems.

SPECIFIC OUTCOME 3

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 4

Stabilise transient conditions.

SPECIFIC OUTCOME 5

Isolate shutdown plant.

SPECIFIC OUTCOME 6

Demonstrate knowledge and understanding of nuclear reactor ventilation systems.



UNIT STANDARD:

164

Operate Support Plant Cooling Systems

SAQA US ID	UNIT STANDARD TITLE							
14105	Operate Support Plant Cooling Systems							
SGB NAME			ABET BAN	ABET BAND PROVIDER NAME				
SGB Power Plant Operations			Undefined					
FIELD DESCR	RIPTION	· · · · · · · · · · · · · · · · · · ·	SUBFIELI	DESCRIPTION				
Manufacturing	, Engineering a	nd Technology	Engineerir	ig and Related Design				
UNIT STANDARD CODE UNIT STAND			DARD TYPE	NQF LEVEL	CREDITS			
MET-ENG-0-SGB PPO Regular		·	Level 4	3				

Specific Outcomes:

SPECIFIC OUTCOME 1

Prepare plant for service and monitor start up conditions.

SPECIFIC OUTCOME 2

Monitor and sustain plant and or equipment operability during normal running conditions.

SPECIFIC OUTCOME 3

Stabilise transient conditions.

SPECIFIC OUTCOME 4

Isolate shutdown plant.

SPECIFIC OUTCOME 5

Demonstrate knowledge and understanding of nuclear support plant cooling system.