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No. 25853

PART 1 OF 2



AIDS HELPLINE: 0800-0123-22 Prevention is the cure

CONTENTS • INHOUD*No.**Page
No. Gazette
No.***GOVERNMENT NOTICES****South African Qualifications Authority***Government Notices*

1831	Standards Generating Bodies: National Standards Body 09, Health Sciences and Social Services	3	25853
1832	do.: National Standards Body 07, Human and Social Studies	8	25853
1833	Public notice by NSB 07, Human and Social Studies, of extension of the brief of the Standards Generating Body (SGB) for Society and Environment Interactions	14	25853
1834	Public notice by NSB 12, Physical Planning and Construction, of extension of the brief and membership of the SGB for Electrical Engineering and Construction	17	25853
1835	National Standards Bodies Regulations: Standards Generating Body (SGB) for Power Plant registered by NSB 06: Engineering, Manufacturing and Technology	20	26853
1836	do.: Standards Generating Body (SGB) for Electrical Engineering and Construction registered by NSB 12: Physical Planning and Construction	232	25853
1837	do.: Standards Generating Body (SGB) for Early Childhood Development registered by NSB 05: Education, Training and Development	547	25853

GOVERNMENT NOTICES

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

No. 1831

19 December 2003

*Established in terms of Act 58 of 1995*

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In order to proceed with the recognition of Standards Generating Bodies in terms of Government Regulations 19(1)(c) and 22(2) of 28 March 1998, National Standards Body 09, Health Sciences and Social Services invites public comment with respect to *the acceptability of the nominees and the representativeness of the key education and training stakeholder interest groups* listed as SGB applicants below.

In addition, the NSB invite submissions from interested parties wishing to serve on such an SGB. Interested parties should take note of the section on SGB Information below.

All nominations/ applications should be accompanied by curricula vitae.

More information regarding this application may be obtained on the SAQA website or from the SAQA offices.

Comment should reach the NSB at the address below by not later than **15 January 2004**. All correspondence should be marked **SGB for Ancillary health Care** and be 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 – 4315119
e-mail: dmphuthing@saqa.co.za

SGB INFORMATION

As a necessary step in the development and implementation of the National Qualifications Framework, The National Standards Bodies are briefed [regulation 19(1)(c) of 28 March 1998] to recognise or establish Standards Generating Bodies (SGBs).

SGBs shall:

- a. generate standards and qualifications in accordance with the Authority requirements in identified sub-fields and levels;
- b. update and review standards;
- c. recommend standards and qualifications to National Standards Bodies;
- d. recommend criteria for the registration of assessors and moderators or moderating bodies; and
- e. perform such other functions as may from time-to-time be delegated by their National Standards Body.

Any bodies wishing to nominate representatives, make application to serve on, or make any other submission with regard to the above SGB should note the following information.

SGBs should be composed of organisations, which shall be key education and training stakeholder interest groups and experts in the sub-field. The NSB, when making its final decisions will have due regard for, among other things, *'the need for representativeness and equity, redress and relevant expertise in terms of the work of the SGBs.'*

Organisations proposing to nominate persons to SGBs should be sensitive to the need for **equity** and **redress**, and shall nominate persons who-

- (a) will be able to consider issues of productivity, fairness, public interest and international comparability as related to education and training in the sub-field;
 - (b) enjoy credibility in the sub-field in question, who enjoy respect; have the necessary expertise and experience in the sub-field and have the support or backing of the nominating body;
 - (c) are able to advocate and mediate the needs and interests of all levels within the sub-field covered by the Standards Generating Body;
 - (d) are able to exercise critical judgement at a high level; and
 - (e) are committed to a communication process between the Standards Generating Body, the National Standards Body and the Constituency.
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**PUBLIC NOTICE BY NSB 09, HEALTH SCIENCES AND SOCIAL SERVICES, OF AN
EXTENDED BRIEF OF THE SGB FOR ANCILLARY HEALTH CARE**

NSB 09 hereby proposes to extend the brief of the SGB for Ancillary Health Care for NQF levels 1 – 4

BRIEF OF THE SGB

1. Develop career pathways for ancillary health workers and guidelines for the scope or range of practice of ancillary health workers from NQF level 1 through to NQF level 4 [Regulation 24 (1)(e)]
2. Generate the following unit standards-based qualifications for ancillary health workers in accordance with Authority requirements in the area of ancillary health care [Regulation 24 (1)(a)]
 - National Certificate in Ancillary Health Care (NQF level 1)
 - National Certificate in Ancillary Health Care (NQF level 2)
 - National Certificate in Ancillary Health Care (NQF level 3)
 - Further Education and Training Certificate in Ancillary Health Care (NQF level 4)
3. Recommend the qualifications and pathways in 1 and 2 above to NSB 09 [Regulation 24 (1)(c)]
4. Review and update the proposed and subsequent standards and qualifications in ancillary health care as required [Regulation 24 (1)(b)]
5. Recommend criteria for the registration of assessors and moderators or moderating bodies [Regulation 24 (1)(d)]
6. Liaise with other NSBs and SGBs – within and outside NSB 09 – which have vested interests in the subject of ancillary health care during the process of developing qualifications and standards, as and when directed by NSB 09 [Regulation 24 (1)(e)]
7. Perform such other functions as may from time to time be delegated by NSB 09: Health Sciences and Social Services [Regulation 24 (1)(e)]

COMPOSITION OF THE SGB

NOMINEE	WORKPLACE	NOMINATING BODY	QUALIFICATION / EXPERIENCE
Southgate, K (CONVENOR)	Lethukukhanya Training Institute	Lethukukhanya Training Institute	BA (Eng & Psych); Dip Nur Ed; Practitioner's Cert in ABET; 12 years' clinical; 10 years' counselling; 6 years' teaching
Bakker, JJ	South African Red Cross Society (SARCS)	SARCS	Registered Nurse (RN); Registered Midwife (RM); 22 years clinical at Red Cross
Cameron, S	Pretoria Sungardens Hospice	Hospice Association of South Africa	HED; BA Psychology; Post Grad Dip in Functional Therapy; 5 years' clinical & 5 years' teaching experience

Eccles, L	AFROX Healthcare	AFROX Healthcare	RN; BSc; 18 years' clinical experience; 14 years' administration; 2 years' training
Legasa, R	Association for the Physically Disabled	Association for the Physically Disabled	Post Grad Dip in Nursing Science: Health Care Dynamics; 13 years' clinical and teaching experience
Lepali, S	National Education, Health & Allied Workers Union (NEHAWU) Johannesburg Branch	Congress of South African Trade Unions (COSATU)	Labour Relations Management for the Public Service; 10 years' workplace experience
Levendal, E	National Progressive Primary Health Care Network	National Progressive Primary Health Care Network	Post Grad Dip in N Ed; BA (Social Sciences); 6 years' clinical; 9 years teaching & 13 years' administration experience
Machedi, S	Faculty of Health Sciences, Mangaung University	University of the Free State	Post Grad Dip in N Ed & N Admin; BA N Science; 11 years' clinical, 2 years' teaching & 4 years' admin experience
Marais, H	National Council for The Physically Disabled	National Council for The Physically Disabled	BA Social Work; 5 years' as probation officer; 10 years' clinical social work & 10 years' social welfare administration experience
Masilela, I	South African Federation for Mental Health	South African Federation for Mental Health	Dip in General Nursing & Midwifery; BA Social Work; 12 years clinical nursing, 2 years' social work & 5 years' training management experience
Mathijs, F	National Progressive Primary Health Care Network (NPPHCN)	NPPHCN	BA Cur; Dip N Ed; Dip for Educators of Adults. Experience:-11 years clinical nursing, 11 years' N Ed, 4 years' training management – St John Ambulance & 5 years' management - CANSA
Mogopodi, M	National Union of Metal Workers of South Africa (NUMSA)	NUMSA	UNISA Cert in ABET; 6 years experience as ABET trainer
Motlabani, I	Taung District Community Health Services	Taung District Community Health Services	BA Nursing; 7 years' clinical nursing & 7 years nursing administration experience
Ngidi, B E	Mangosuthu Technikon, Dept of Community Extension	Mangosuthu Technikon	B Home Ec; AdvDip Adult Education; 22 years' teaching and clinical
Ngubo, T	The Valley Trust	The Valley Trust	M Cur (Community Health); 3 years clinical nursing & 9 years teaching experience; 4 years' management experience

Nkosi, B	Cotlands Baby Sanctuary / Institute of Urban Primary Health Care	Cotlands Baby Sanctuary	BA Cur (N Ed & Community Health); 6 years' clinical community health & 4 years' community worker training
Saane, D	Planned Parenthood Association of South Africa – Gauteng	Planned Parenthood Association of South Africa	BA Cur (Community Health & N Ed); 14 years' clinical nursing & 7 years' training experience
Strydom, M	North West Province Dept of Health	North West Dept of Health	M A Nur Ed; Primary Health Nursing; Health Assessment & Treatment; 27 years' clinica; 12 years' education
Trueman, K A	Ipas-SA (NGO dealing with women's reproductive health and rights)	Ipas-SA	RN; RM; B Com; 20 years' clinical; 8 years admin; 5 years' lecturing
Ward, S	Soul City	Soul City	B Prim Ed; M Public & Development Management; 4 years' education experience; 9 years' education, training and development management in NGO sector
Zikalala, T	Transport Education and Training Authority (TETA)	TETA	Certificates in HIV/AIDS counselling; 10 years' experience in project management and counselling

No. 1832

19 December 2003

SOUTH AFRICAN QUALIFICATIONS AUTHORITY (SAQA)

In Order to proceed with the recognition of Standards Generating Bodies in terms of Government Regulations 19(1)(c) and 22(2) of 28 March 1998, National Standards Body 07, Human and Social Studies, invites public comment with respect to *the acceptability of the nominees and the representativeness of the key education and training stakeholder interest groups* listed as SGB applicants below.

In addition, the NSB invite submissions from interested parties wishing to serve on such an SGB. Interested parties should take note of the section on SGB information below.

All nominations/applications should be accompanied by curricula vitae.

More information regarding this application may be obtained on the SAQA website or from the SAQA offices.

Comment should reach the NSB at the address ***below by not later than 18 January 2004.*** All correspondence should be marked **SGB for Anthropology** 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: mmphuthing@saqa.co.za

SGB INFORMATION

As a necessary step in the development and implementation of the National Qualifications Framework, the National Standards Bodies are briefed [regulation 19(1)(c) of 28 March 1998] to recognize or establish Standards Generating Bodies (SGB).

SGBs shall:

- a. generate standards and qualifications in accordance with the Authority requirements in identified sub-fields and levels;
- b. update and review standards;
- c. recommend standards and qualifications to National Standards Bodies;
- d. recommend criteria for the registration of assessors and moderators or moderating bodies; and
- e. perform such other functions as may from time-to-time be delegated by their National Standards Body.

Any bodies wishing to nominate representatives, make application to serve on, or make any other submission with regard to the above SGB should note the following information.

SGBs should be composed of organizations, which shall be key education and training stakeholder interest groups and experts in the sub-field. The NSB, when making its final decisions will have due regard for, among other things, *"the need for representativeness and equity, redress and relevant expertise in terms of the work of the SGB's."*

Organisations proposing to nominate persons to SGBs should be sensitive to the need for equity and redress, and shall nominate persons who-

- (a) will be able to consider issues of productivity, fairness, public interest and international comparability as related to education and training in the sub-field;
- (b) enjoy credibility in the sub-field in question, who enjoy respect; have the necessary expertise and experience in the sub-field and have the support or backing of the nominating body;
- (c) are able to advocate and mediate the needs and interests of all levels within the sub-field covered by the Standards Generating Body;
- (d) are able to exercise critical judgement at a high level; and
- (e) are committed to a communication process between the Standards Generating Body, the National Standards Body and the Constituency.

**PUBLIC NOTICE BY NSB 07, HUMAN AND SOCIAL STUDIES, FOR THE
REGISTRATION OF A STANDARDS GENERATING BODY (SGB) FOR
ANTHROPOLOGY**

The National Standards Body (NSB) 07 has received an application to recognise and register an SGB for Anthropology in the sub-field of General Social Science for a period of three years until July 2006.

PROPOSED BRIEF OF THE SGB

1. Identify transformation, development, access and equity issues relevant to Anthropology and develop mechanisms to include these issues within the standards and qualifications as envisaged in (4) below [*Regulation 24 (1)(e)*].
2. Develop learning and career pathways for potential standards and qualifications in Anthropology from NQF levels 2 to 8 [*Regulation 24 (1)(e)*].
3. Review, add to and update existing qualifications and standards [*Regulation 24 (1)(b)*].
4. Generate the following qualifications and standards generated in accordance with Authority requirements at NQF levels 2 to 8 [*Regulation 24 (1)(a)*].
 - Unit Standards in Anthropology (NQF levels 2-4)
 - National Certificates and Diplomas in Anthropology (NQF levels 2-5)
 - First Degree in Anthropology (NQF level 6)
 - Honours Degree in Anthropology (NQF level 7)
 - Masters Degree in Anthropology (NQF level 8)
 - Doctoral Degree in Anthropology (NQF level 8+)
5. Recommend the qualifications and/or standards generated under 3 and 4 above to NSB 07 [*Regulation 24 (1)(c)*].
6. Liaise with other Standard Generating Bodies (SGBs) in the sub-fields whose briefs mandate them to generate anthropological qualifications [*Regulation 24 (1)(a) & (e)*].
7. Recommend criteria for the registration of assessors and moderators or moderating bodies [*Regulation 24 (1)(d)*].
8. Review these qualifications and unit standards and effect the necessary changes [*Regulation 24 (1)(b)*].
9. Accept and perform other related functions as requested by NSB 07 [*Regulation 24 (1)(e)*].

Proposed Composition of the SGB

Name of Nominee	Workplace	Nominating Body	Qualifications/Experience
Becker, Heike	Department of Anthropology, University of Western Cape	University of Western Cape	PhD (Economic and Social Sciences), MA, Postgraduate Diploma in Journalism. Experience in a range of research projects, Lecturing experience.
De Jongh, Mike	Department of Anthropology, Archaeology, Geography and Environmental Studies, University of South Africa (UNISA)	Anthropology Southern Africa (ASA)	PhD, MA, BA Hons, BA. Professor, Head of Department.
De Beer, Frik	Department of Anthropology, Archaeology, Geography and Environmental Studies, University of South Africa (UNISA)	Anthropology Southern Africa (ASA)	D.Phil. 33 years of experience at University level.
De Wet, T	Department of Development Studies, Rand Afrikaans University (RAU)	Rand Afrikaans University (RAU)	PhD (Anthropology), MA (Anthropology), BA Hons, BA. Associate Professor, Experience in a number of research projects.
Dlamini, C Makhosonke	Embhuleni Royal Residence: Tribal Authority	Embhuleni Tribal Authority	Matric. Tribal Leader, Member of Mpumalanga House of Traditional leaders,
Gibson, Diana	Department of Anthropology and Sociology, University of Western Cape	Anthropology Southern Africa (ASA)	D.Phil (Anthropology), MA, BA Hons, BA. Senior Lecturer, experience in curriculum development.
Hirst, MM	Ethnological Section, Amathole Museum	Amathole Museum	D.Phil (Anthropology), Hons (Psychology), BA. Lecturer, Anthropologist.

Kekana, LJ		Department of Local Government and Housing	BA, Diploma of Theology. Director of Traditional Affairs – Limpopo province, worked as a Minister.
Kriel, Inge	Department of Anthropology and Archaeology, University of Pretoria	University of Pretoria	PhD (application in progress), MA (Anthropology), BA Hons, BA. Lecturing experience, experience as a social/development consultant and community developer.
Maree, Gert	Department of Anthropology, Archaeology, Geography and Environmental Studies, University of South Africa (UNISA)	Anthropology Southern Africa (ASA)	BA Hons (Anthropology), Post Graduate Diploma in Museum Science. Lecturing experience, Secretary of ASA.
Palmer, Robin	Rhodes University	Anthropology Southern Africa (ASA)	Dphil (Social Anthropology), MA, BA (Hons). Lecturing experience, experience in various research projects.
Pauw, Henk	University of Port Elizabeth	Anthropology Southern Africa (ASA)	BA (Hons), BA. Director of the School of Social Sciences and Humanities, 30 years teaching and research experience in Anthropology.
Sithole, Pearl	Department of Anthropology, University of Durban Westville	Anthropology Southern Africa (ASA)	Ph.D, M.Phil (Social Anthropology), BA Hons (Social Anthropology), BA. Lecturing experience, Areas of research and interest: gender, development and social change.
Van Heerden, Eulalie	Department of Anthropology, Archaeology, Geography and Environmental Studies, University of South Africa (UNISA)	Anthropology Southern Africa (ASA)	PhD (Anthropology). Senior lecturer, member of Council of Anthropology Southern Africa.

Vena, Z	Cory Library, Rhodes University	Rhodes University	B.Soc.Sc (currently completing), B.BI (unfinished degree). Librarian (historical research), consultancy, interest with traditional knowledge (religion, rituals and belief systems).
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No. 1833

19 December 2003

**PUBLIC NOTICE BY NSB 07, HUMAN AND SOCIAL STUDIES, OF EXTENSION OF THE BRIEF
OF THE STANDARDS GENERATING BODY (SGB) FOR SOCIETY AND ENVIRONMENT
INTERACTIONS**

The National Standards Body (NSB) 07 hereby extends the brief of the SGB for Society and Environment Interactions in the sub-field of Environmental Relations from November 2003 until 31 March 2004.

PROPOSED BRIEF OF THE SGB

1. Develop learning pathways for potential qualifications and unit standards in the area of Society and Environment Interactions from level 1 through to level 8 [*Regulation 24 (1)(e)*].
2. Generate the following standards and qualifications in the sub-field of Environmental Relations in accordance with Authority requirements, for NQF levels 1 – 8, for competencies in the practice of, amongst other related fields, educators; environmental consultants, journalists and planners; professional researchers; tourism managers; environmental scientists and decision makers in all sectors; social ecologists; environmental auditors, safety, health and environmental managers developers (urban, rural land and property developers); agriculturists; community based organisation sectors; environmental economists, nature conservators [*Regulation 24 (1)(a)*].
3. The following qualifications shall be generated:
 - Certificate in Society and Environment Interactions (Level 1)
 - National Certificate in Society and Environment Interactions (Level 4)
 - National Diploma in Society and Environment Interactions (Level 5)
 - First Degree in Society and Environment Interactions (Level 6)
 - Honours Degree in Society and Environment Interactions (Level 7)
 - Masters Degree in Society and Environment Interactions (Level 8)
 - Doctorate in Society and Environment Interactions (Level 8)
4. Recommend the qualifications and standards generated under 1 and 2 above, to the NSB [*Regulation 24 (1)(c)*].
5. Recommend criteria for the registration of assessors and moderators or moderating bodies [*Regulation 24 (1)(d)*].
6. Liaise with any other SGBs, as required, where environment and society interactions are involved/are being considered [*Regulation 24 (1)(e)*].
7. Perform such other related functions as may from time to time be delegated by the NSB [*Regulation 24 (1)(e)*].

PROPOSED COMPOSITION OF THE SGB

NOMINEE	WORKPLACE	NOMINATING BODY	QUALIFICATIONS/ EXPERIENCE
Clacherty, Alistair	Clacherty & Associates Education Consultants	Clacherty & Associates Education Consultants	Long teaching experience in Geography at primary and high schools and College of Education
Fig, David	University of Witwatersrand	University of Witwatersrand	Long teaching experience in Environmental Sociology
Fox, Roddy	Rhodes University	Rhodes University	Head of Department and long teaching experience in Geography
Haffer, Catherine	Technikon Pretoria	Committee of Technikon Principals	Lecturer in Environmental Law, Management, Resources
Daniel K Irurah	University of Witwatersrand (Wits)	University of Witwatersrand (Wits)	Ph.D (Architecture) (University of Pretoria), M. Arch (Master of Architecture) (University of Oregon). Consultancy, Project Manager - Housing policy, training and lecturing, researcher.
Mahlobogoane, Master	S Musi P School	South African Democratic Teachers' Union	Long teaching experience in Natural Sciences
Gezani Lamson Maluleke	African Wildlife Foundation (AWF)	African Wildlife Foundation (AWF)	Certificate in Project Management (School of Public Management Development – Wits), Certificate in Leadership Training and Management (University of the North). Coordinating eco-tourism development programmes, cultural tourism projects, water projects, and policy.
Mathews, John	Eduviro Consulting	Eduviro Consulting	Long experience as a consultant in the field of Environmental Education and Management
Mzazi, Phumla	Department of Environmental Affairs and Tourism, Eastern Cape	Department of Environmental Affairs and Tourism	Long experience as an Environmental Officer

Nbaben, Lindile	University of Witwatersrand	University of Witwatersrand	Lecturer in Geography and Environmental Studies
Bangani Eric Ngeleza	KNC & Associates	KNC & Associates	M.Sc (UCT), B.A. Hons (UCT). Researcher, analyst, consultant and management facilitator and trainer in policy and environmental issues.
Radebe, S C L	Sukuma Comprehensive School	Sukuma Comprehensive School	Long teaching experience in Geography
Novuselelo Songelwa	Transvaal Rural Action Committee (TRAC) - Mpumalanga	Transvaal Rural Action Committee (TRAC) - Mpumalanga	M.Ed (UWC), B.Ed (University of Transkei), Gender and Environmental Co-ordinator, Environmental Education Officer, experience in monitoring and evaluation of projects and programmes, adult education and training.
Tafa, Kutala	Nozuko S S School	South African Democratic Teachers' Union	Long teaching experience in Geography
David Johannes Philippus De Waal	Afrosearch (Pty) Ltd	Afrosearch (Pty) Ltd	DLitt et Phill. (UNISA), M.A. (Stellenbosch). Senior consultant, specialist community based management, training and facilitation, community mobilization.

Resignations:

MJ Custers
 M Nicolau
 R Pretorius
 MS Ramathunya
 C Senatle
 BN Tyku
 PD Wilmot
 S Zietsman

No. 1834

19 December 2003

**PUBLIC NOTICE BY NSB 12, PHYSICAL PLANNING AND CONSTRUCTION, OF
EXTENSION OF THE BRIEF AND MEMBERSHIP OF THE SGB FOR ELECTRICAL
ENGINEERING AND CONSTRUCTION**

NSB 12 hereby, in terms of *NSB Regulation 24 (1) (e)*, notifies you of its intentions to extend the brief and membership of an SGB for Electrical Engineering and Construction which is registered under the sub-field of Electrical Infrastructure Construction from levels 1-8 until 07 July 2004.

1. Develop learning pathways for potential Qualifications and Unit Standards in the sub-field Electrical Infrastructure Construction from level 1 through to Level 8 [*Regulation 24(1)(e)*].
2. Generate Electrical Engineering and Construction Unit Standard-based Certificates in the sub-field, in accordance with Authority requirements, at NQF levels 1 to 8 in the areas of: Generation; Distribution; Transmission, Electrical Engineering; and Electrical Construction [*Regulation 24 (1)(a)*].
3. The following Qualifications shall be generated:
 - o National Certificate in Electrical Energy – NQF 02
 - o National Certificate in Electrical Energy – NQF 03
 - o National Certificate in Electrical Energy – NQF 04
 - o National Diploma in Electrical Energy – NQF 05
 - o National Certificate in Railway Signalling Technology – NQF 4
 - o National Certificate in Railway Signalling Technology – NQF 5
4. The following Qualifications shall be reviewed:
General Education and Training Certificate in Basic Technical Practice (Energy)–NQF1
5. Recommend the Qualifications and Unit Standards generated under 2, above, to the NSB [*Regulation 24(1)(c)*].
6. Recommend criteria for the registration of assessors and moderators or moderating bodies [*Regulation 24 (1)(d)*].
7. Liase with any other SGB, as required, where Energy is involved or being considered [*Regulation 24 (1) (e)*].
8. Accept and perform other related functions as requested by NSB 12, Physical Planning and Construction [*Regulation 24 (1) (e)*].

COMPOSITION OF THE SGB

NOMINEE	WORKPLACE	NOMINATING BODY	EXPERIENCE / QUALIFICATIONS
Buck, W	Eskom	Eskom Generation	National Diploma in Electrical Engineering 9 years experience in practical field, and 3 years as Inspector and Mentor for the Electrical Field
Dempsey, P	Germiston College	Committee of Technical Principals	Matric N6
Dutschke, M	Bavaria Government (Germiston College)	Germiston College	BA Honours Language / Education Teachers Diploma Phd. Language
Ferreira, HP	ISCOR Flat Steel Projects	Ion and Steel Corporation	National N Diploma in the Electrical Field ETDP Diploma 14 Years as Training Officer
Jacobs, PJ	Ekurhuleni Metropolitan Council	Ekurhuleni Metropolitan Council	Matric National Technical Diploma 11 years experience as a Technical Officer
Heame, IE	Western Cape Education Department	Western Cape Education Department	BA, Teachers Higher Bilingual Certificate National Technical Diploma (N6)
Hoffman, G	Denel Training Academy	Denel Training Academy	CBMT Test Official Assessor / Moderator Trainer RPL advisement/assessment/verification
Hogan, W	De Beers Consolidated mines	Mining Industry and Engineering Training Board	Training Development Diploma NTS 5 Chamber of Mines Certificate Assessor (Learning Network)
Kleinhans, W	Volkswagen SA	Volkswagen SA	N3, Training Officer
Mallick, O	Nelson Mandela Metropolitan	National Association of Congress Trade Unions	N3 Senior Training Officer Electrical
Pepler, TA	Centurion College	Centurion College	Lecturer
Pretorius, LA	Electrical Contractor	Electrical	Matric

	of South Africa	Contractor of South Africa	N6 Certificate
Rossouw, A	Eskom	Eskom Distribution	N3 (Electrical Engineering) Qualified Electrician Management Development Program Group Facilitator Instructional Writer Process Coordinator for Distribution Technology – Group Technical Training
Sampson, R	Steve Hurter	Steve Hurter	Matric N3 (Electrical Engineering) Qualified Electrician Trade Test Officer Part time Lecturer(N1-N3) BA - FSN AST NWFE
Seya, S	Eskom	Eskom Distribution	N5 Certificate Diploma Energy Technology Technical Skills Training Manager -
Van der Linde, A	Van Linde Energy Consultant	Energy Sector Education and Training Authority	Higher Education Diploma (Technical) – UNISA M Dip Tech Electrical Engineering (Cum Laude) - PE Technikon PhD Electrical Engineering - University of Hertfordshire, UK
Vermeulen, A	Spoornet	Spoornet	Chief Training Officer: Managing Training - Spoornet

NEW MEMBERS

NOMINEE	WORKPLACE	NOMINATING BODY	EXPERIENCE / QUALIFICATIONS
Breedt, D. C.	TAGTEC	TAGTEC	Military Service Apprenticeship; Skills Development Facilitator; Power Electronics; Specialised Class 8E Electric Loco Motive Power; and Skills Development Programme Manager
Van Dyk, D	Pietermaritzburg Technical College	TAGTEC	BSc; Higher Diploma in Education; MSc. Zoology; Laboratory Technician, Scientific Assistant for three years; Lecturer; and ABET Director/Co-ordinator

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 qualifications 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 www.saqg.org.za. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, Hatfield Forum West, 1067 Arcadia Street, Hatfield.

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

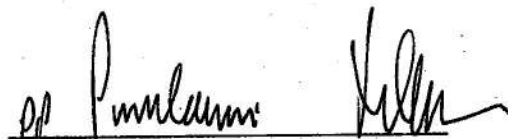
Private Bag X06

Waterkloof

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or faxed to 012 – 431 5144

e-mail: mmphuthing@saqa.co.za



JOE SAMUELS

DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Power Plant Auxiliary Systems Operation

SAQA QUAL ID	QUALIFICATION TITLE	
23677	National Certificate: Power Plant Auxiliary Systems Operation	
SGB NAME	SGB Power Plant Operations	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
MET-3-National Certificate	National Certificate	Engineering and Related Design
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
122	Level 3	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

Learners obtaining this qualification will be recognised on a national level 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

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.

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 problem-solving 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.
- 3.3 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.

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

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.)**

	UNIT STANDARD ID AND TITLE	LEVEL	CREDITS	STATUS
Core	13961 Demonstrate Knowledge and Use of Hand Operated Fire Fighting Equipment	Level 2	4	Draft - Prep for P Comment
Core	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

Elective	114456 Operate coal handling systems	Level 3	11	Draft - Prep for P Comment
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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Fossil Power Plant Operation

SAQA QUAL ID	QUALIFICATION TITLE	
23678	National Certificate: Fossil Power Plant Operation	
SGB NAME	SGB 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
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

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?

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 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

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:

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 problem-solving 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.

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:

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

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
Core	14905 Operate Fossil Fired Steam Generator Auxiliary Systems	Level 4	9	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
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	Level 4	6	Registered
Fundamental	7484 Describe, represent, analyse and explain changes in shape and motion in 2- and 3-dimensional space with justification	Level 4	4	Registered
Fundamental	8974 Engage in sustained oral communication and evaluate spoken texts	Level 4	5	Registered
Fundamental	8975 Read, analyse and respond to a variety of texts	Level 4	5	Registered
Fundamental	8976 Write for a wide range of contexts	Level 4	5	Registered
Fundamental	8979 Use language and communication in occupational learning programmes	Level 4	5	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Diploma: Fossil Power Plant Process Control

SAQA QUAL ID	QUALIFICATION TITLE	
23679	National Diploma: Fossil Power Plant Process Control	
SGB NAME	SGB Power Plant Operations	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION 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 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 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 its 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

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 problem-solving 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

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:

- > 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

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 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 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

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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: in Nuclear Power Plant Operation

SAQA QUAL ID	QUALIFICATION TITLE	
23733	National Certificate: in Nuclear Power Plant Operation	
SGB NAME	SGB 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 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.

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

and health of others.

g) Demonstrating and understanding of the world as a set of related systems by recognising that problem-solving 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.

> 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

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 on a nuclear power plant	Level 3	1	Draft - Prep for P. Comment

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 Steam Turbine Condensate System	Level 4	8	Draft - Prep for P Comment
Core	13705 Describe fundamental instrumentation and measurement equipment associated with nuclear power plant	Level 4	3	Draft - Prep for P Comment
Core	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 generating plant	Level 4	9	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	13725 Operate Support Plant Electrical Systems	Level 4	7	Draft - Prep for P Comment
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

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
Fundamental	8976 Write for a wide range of contexts	Level 4	5	Registered
Fundamental	8979 Use language and communication in occupational learning programmes	Level 4	5	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Diploma: Nuclear Power Plant Process Control

SAQA QUAL ID	QUALIFICATION TITLE	
23734	National Diploma: Nuclear Power Plant Process Control	
SGB NAME	SGB Power Plant Operations	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
MET-5-National Diploma	National Diploma	Manufacturing and Assembly
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
295	Level 5	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

Learners obtaining this qualification will be recognised on a national level for 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.

- > The Organisation's purpose, values it subscribes to and its 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.

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 problem-solving 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

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)

- > 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:

- > 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 integrated 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 Steam 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

Core	14230 Stabilise Out of Normal and or Emergency Condition on a Nuclear Steam 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 Steam 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 Certificate: Hydro Power Plant Operation	
SGB NAME	SGB 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
150	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 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.

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 problem-solving 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 situation

Second 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

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.

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.

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, 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 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	Level 3	2	Draft - Prep for P Comment
Core	14217 Operate Bulk Lubrication Oil Systems	Level 3	5	Draft - Prep for P Comment

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	Level 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Diploma: Hydro Power Plant Process Control

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

PURPOSE OF THE QUALIFICATION

Learners obtaining this qualification will be recognised on a national level for 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.

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

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 problem-solving 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 -

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,

- > 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

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	13704 Demonstrate knowledge and understanding of Hydro power generation concepts and theories	Level 3	15	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	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 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 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	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 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

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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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		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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

2

Demonstrate Knowledge and Understanding Towards Occupational health and safety Regulatory Requirements

SAQA US ID	UNIT STANDARD TITLE		
13963	Demonstrate Knowledge and Understanding Towards Occupational health and safety Regulatory Requirements		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

3

Operate nuclear reactor building air lock system

SAQA US ID	UNIT STANDARD TITLE		
114464	Operate nuclear reactor building air lock system		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

4

Apply Engineering Principles and concepts in a Power Generation Process Plant

SAQA US ID	UNIT STANDARD TITLE		
10195	Apply Engineering Principles and concepts in a Power Generation Process Plant		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

5

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

SAQA US ID	UNIT STANDARD TITLE		
14102	Apply Radiation Requirements for Activities in Radiologically Controlled Zones at a Nuclear Power Plant		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 3	2

Specific Outcomes:

SPECIFIC OUTCOME 1

Enter radiologically controlled zone.

SPECIFIC OUTCOME 2

Perform activities in a radiologically controlled zone.

SPECIFIC OUTCOME 3

Exit of radiologically controlled zones.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

6

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

SAQA US ID	UNIT STANDARD TITLE		
14063	Apply Self Management through the Concepts of Positive Self-esteem and Resiliency		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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		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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 3	5

Specific Outcomes:

SPECIFIC OUTCOME 1

Understand principles of power generation.

SPECIFIC OUTCOME 2

Understand principles of electrical load control.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

8

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

SAQA US ID	UNIT STANDARD TITLE		
14037	Demonstrate knowledge and understanding of heat exchange equipment used in a process plant		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

9

Demonstrate knowledge and understanding of Hydro power generation concepts and theories

SAQA US ID	UNIT STANDARD TITLE		
13704	Demonstrate knowledge and understanding of Hydro power generation concepts and theories		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

11

Demonstrate knowledge of Steam Generator design and application

SAQA US ID	UNIT STANDARD TITLE		
10574	Demonstrate knowledge of Steam Generator design and application		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

12

Demonstrate knowledge of steam turbines design and application

SAQA US ID	UNIT STANDARD TITLE		
14065	Demonstrate knowledge of steam turbines design and application		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

13

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

15

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	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 3	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Interpret process measurement.

SPECIFIC OUTCOME 2

Describe measurement instrumentation.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

18

Differentiate between valve designs and application theories associated with process plants

SAQA US ID	UNIT STANDARD TITLE		
10598	Differentiate between valve designs and application theories associated with process plants		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 3	1

Specific Outcomes:

SPECIFIC OUTCOME 1

Define valve classifications and types according to application.

SPECIFIC OUTCOME 2

Maintain valve operability.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

20

Interpret electrical circuits

SAQA US ID	UNIT STANDARD TITLE		
10894	Interpret electrical circuits		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 3	2

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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

21

Interpret electrical theories

SAQA US ID		UNIT STANDARD TITLE	
10677		Interpret electrical theories	
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 3	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Explain atom theory.

SPECIFIC OUTCOME 2

Demonstrate knowledge of theories of electricity.



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	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB PPO	Regular	Level 3	2

Specific Outcomes:**SPECIFIC OUTCOME 1**

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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB PPO	Regular	Level 3	5

Specific Outcomes:

SPECIFIC OUTCOME 1

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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB PPO	Regular	Level 3	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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

27

Operate coal handling systems

SAQA US ID	UNIT STANDARD TITLE		
114456	Operate coal handling systems		
SGB NAME	ABET BAND	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB PPO	Regular	Level 3	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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

28

Operate Compressed Air Systems

SAQA US ID	UNIT STANDARD TITLE		
114465	Operate Compressed Air 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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

Shutdown plant.

SPECIFIC OUTCOME 6

Isolate shutdown plant.

SPECIFIC OUTCOME 7

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

33

Operate hydrogen production plants

SAQA US ID		UNIT STANDARD TITLE	
12023		Operate hydrogen production plants	
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 STANDARD 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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB PPO	Regular	Level 3	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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

37

Operate nuclear reactor fire extinguishing systems

SAQA US ID	UNIT STANDARD TITLE		
114461	Operate nuclear reactor fire extinguishing 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

40

Operate Nuclear Support Plant Water Supply Systems

SAQA US ID	UNIT STANDARD TITLE		
114469	Operate Nuclear 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 and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

41

Operate potable water systems on power plants

SAQA US ID	UNIT STANDARD TITLE		
114466	Operate potable water systems on power plants		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

42

Operate support plant compressed air systems

SAQA US ID	UNIT STANDARD TITLE		
13726	Operate support plant compressed air systems		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

43

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

SAQA US ID	UNIT STANDARD TITLE		
13723	Operate turbo-generator fire extinguishing system on a nuclear power plant		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

44

Operate Waste Handling Systems Associated with Power Plant Processes

SAQA US ID	UNIT STANDARD TITLE		
11957	Operate Waste Handling Systems Associated with Power Plant Processes		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

46

Understand the operating principles of transformers

SAQA US ID	UNIT STANDARD TITLE		
10719	Understand the operating principles of transformers		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

47

Understanding the principles of magnetism

SAQA US ID	UNIT STANDARD TITLE		
10707	Understanding the principles of magnetism		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

48

Understand Constructive Thinking

SAQA US ID	UNIT STANDARD TITLE		
14064	Understand Constructive Thinking		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

49

Understand transformational leadership

SAQA US ID	UNIT STANDARD TITLE		
14060	Understand transformational leadership		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

51

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

SAQA US ID	UNIT STANDARD TITLE		
13709	Apply fundamental reactor engineering principles and theories related to nuclear power generating plant		
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 STANDARD 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

52

Apply Self Management Concepts

SAQA US ID	UNIT STANDARD TITLE		
14048	Apply Self Management Concepts		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 4	3

Specific Outcomes:

SPECIFIC OUTCOME 1

Take conscious 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 conscious decision to succeed through resiliency.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION	SUBFIELD DESCRIPTION		
Manufacturing, Engineering and Technology	Engineering and Related Design		
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

54

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

SAQA US ID	UNIT STANDARD TITLE		
14056	Demonstrate knowledge and understanding of earthing practices on alternating current power 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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)



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

56

Demonstrate knowledge of steam turbines design and application

SAQA US ID	UNIT STANDARD TITLE		
14126	Demonstrate knowledge of steam turbines design and application		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

57

Describe fundamental instrumentation and measurement equipment associated with nuclear power plant

SAQA US ID	UNIT STANDARD TITLE		
13705	Describe fundamental instrumentation and measurement equipment associated with nuclear power plant		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 4	3

Specific Outcomes:**SPECIFIC OUTCOME 1**

Define brittle fracture.

SPECIFIC OUTCOME 2

Explain the effects of radiation on materials.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

59

Describe instrumentation control within a process control system

SAQA US ID		UNIT STANDARD TITLE	
14058		Describe instrumentation control within a process control system	
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

60

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

SAQA US ID	UNIT STANDARD TITLE		
13707	Describe the operation and application of electrical equipment as required for nuclear power plant		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

62

Explain transformer characteristics applied on power systems

SAQA US ID	UNIT STANDARD TITLE		
10897	Explain transformer characteristics applied on power 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 4	2

Specific Outcomes:

SPECIFIC OUTCOME 1

Analyse transformer performance variables.

SPECIFIC OUTCOME 2

Differentiate between transformer configurations.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

63

Lead subordinates to support the strategy of the organisation

SAQA US ID	UNIT STANDARD TITLE		
14046	Lead subordinates to support the strategy of the organisation		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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 challenging objectives.

SPECIFIC OUTCOME 4

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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

66

Operate Fossil Fired Steam Generator for Fuel Firing System

SAQA US ID	UNIT STANDARD TITLE		
14901	Operate Fossil Fired Steam Generator for Fuel Firing System		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

69

Operate hydro generator cooling system

SAQA US ID	UNIT STANDARD TITLE		
14212	Operate hydro generator cooling system		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

70

Operate Hydro Generator Plant Bearing Systems

SAQA US ID	UNIT STANDARD TITLE		
14216	Operate Hydro Generator Plant Bearing 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

71

Operate hydro power generation common cooling water

SAQA US ID	UNIT STANDARD TITLE		
10900	Operate hydro power generation common cooling water		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-4-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

74

Operate hydro power generation transformer auxiliary systems

SAQA US ID	UNIT STANDARD TITLE		
14211	Operate hydro power generation transformer auxiliary 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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).



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

85

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	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

86

Operate nuclear reactor fire extinguishing systems

SAQA US ID		UNIT STANDARD TITLE	
13798		Operate nuclear reactor fire extinguishing 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

87

Operate radioactive gaseous waste handling systems

SAQA US ID	UNIT STANDARD TITLE		
13801	Operate radioactive gaseous waste handling 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 STANDARD 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

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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

90

Operate Steam Turbine Condenser Air Evacuation Systems

SAQA US ID	UNIT STANDARD TITLE		
14059	Operate Steam Turbine Condenser Air Evacuation 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

91

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 Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

92

Operate Steam Turbine Steam Systems

SAQA US ID	UNIT STANDARD TITLE		
14881	Operate Steam Turbine Steam 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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

Demonstrate knowledge and understanding.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

93

Operate Support Plant Diesel Systems

SAQA US ID	UNIT STANDARD TITLE		
14107	Operate Support Plant Diesel 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-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

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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

94

Operate Support Plant Electrical Systems

SAQA US ID	UNIT STANDARD TITLE		
13725	Operate Support Plant Electrical 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-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

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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

96

Operate Support Plant Ventilation Systems

SAQA US ID	UNIT STANDARD TITLE		
14101	Operate Support Plant Ventilation 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

98

Operate Turbo-Generator Auxiliary Systems

SAQA US ID	UNIT STANDARD TITLE		
13724	Operate Turbo-Generator Auxiliary 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 STANDARD 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

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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD: 14055

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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		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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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		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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 Knowledge and Understanding of Pulverised Fuel Firing Regulations (PFFR) as applied on fossil fired power generating plants.		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB PPO	Regular	Level 5	10

Specific Outcomes:

SPECIFIC OUTCOME 1

Describe the requirements to apply a permit.

SPECIFIC OUTCOME 2

Describe the requirements for a lock-out system.

SPECIFIC OUTCOME 3

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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-MNA-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



Established in terms of Act 58 of 1995

SOUTH AFRICAN QUALIFICATIONS AUTHORITY**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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

127

Preserve Nuclear Steam Supply Plant

SAQA US ID		UNIT STANDARD TITLE	
14232		Preserve Nuclear Steam Supply Plant	
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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		ABET BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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 centralised 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

141

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 Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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		ABET BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

146

Startup a Fossil Fired Power Generating Unit from a Control Room.

SAQA US ID	UNIT STANDARD TITLE		
13577	Startup a Fossil Fired Power Generating Unit from a Control Room.		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

147

Startup a fossil fired steam generator from a control room

SAQA US ID	UNIT STANDARD TITLE		
13558	Startup a fossil fired steam generator from a control room		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Manufacturing and Assembly	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

148

Startup a Steam Driven Turbo-Generator from a Control Room.

SAQA US ID	UNIT STANDARD TITLE		
13561	Startup a Steam Driven Turbo-Generator from a Control Room.		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

149

Startup Hydro Power Generating Auxiliary Systems from Control Centres

SAQA US ID	UNIT STANDARD TITLE		
13517	Startup Hydro Power Generating Auxiliary Systems from Control Centres		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

150

Startup Hydro Power Generating Unit from a Control Room

SAQA US ID	UNIT STANDARD TITLE		
10898	Startup Hydro Power Generating Unit from a Control Room		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

151

Demonstrate Knowledge and Use of Hand Operated Fire Fighting Equipment

SAQA US ID	UNIT STANDARD TITLE		
13961	Demonstrate Knowledge and Use of Hand Operated Fire Fighting Equipment		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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 ancillary extinguishing equipment.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

153

Operate Potable Water Systems on Fossil Power Plants.

SAQA US ID	UNIT STANDARD TITLE		
12095	Operate Potable Water Systems on Fossil Power Plants.		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

154

Interpret liquid transfer theories in a process plant

SAQA US ID	UNIT STANDARD TITLE		
10488	Interpret liquid transfer theories in a process plant		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

155

Operate Bulk Lubrication Oil Systems

SAQA US ID	UNIT STANDARD TITLE		
14217	Operate Bulk Lubrication Oil 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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

156

Operate Fire Extinguishing System

SAQA US ID	UNIT STANDARD TITLE		
13957	Operate Fire Extinguishing System		
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 STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME	
SGB Power Plant Operations	Undefined		
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 STANDARD 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 reactor refueling water systems.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD 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 reactor safeguard systems.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 BAND	PROVIDER NAME
SGB Power Plant Operations		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD 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 reactor vent and drain systems.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

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 DESCRIPTION		SUBFIELD DESCRIPTION	
Manufacturing, Engineering and Technology		Engineering and Related Design	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
MET-ENG-0-SGB 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 nuclear reactor ventilation systems.



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

164

Operate Support Plant Cooling Systems

SAQA US ID	UNIT STANDARD TITLE		
14105	Operate Support Plant Cooling 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 STANDARD 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.

No. 1836

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

Electrical Engineering and Construction

Registered by NSB 12 : Physical Planning and Construction publishes the following qualifications and unit standards for public comment.

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

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 Electrical Engineering and Construction** and addressed to

The Director: Standards Setting and Development
SAQA

Attention: Mr. D Mphuthing

Postnet Suite 248

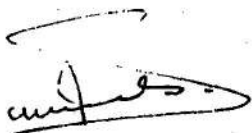
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JOE SAMUELS

DIRECTOR: STANDARDS SETTING AND DEVELOPMENT



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Electrical Engineering

SAQA QUAL ID	QUALIFICATION TITLE	
48473	National Certificate: Electrical Engineering	
SGB NAME	SGB Electrical Engineering & Construction	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
PPC-2-National Certificate	National Certificate	Electrical Infrastructure Construction
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
150	Level 2	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

This qualification will allow a person to advance through learning to an electrical qualification at NQF level 3. The core- and required elective Unit Standards provide credits that allow access to both vertically and horizontally articulated qualifications. This qualification will enhance the social status, productivity and employability of the learner within the electrical engineering and energy sector and contributes to the quality, production rate and growth of the electrical engineering and energy sector.

Through the critical cross-field component of the qualification, learners are able to demonstrate vocational skills through which they are able to engage in life skills activities, small business development, health and environmental issues. Through recognition of prior learning adult learners are encouraged to access basic education with an understanding that they already have knowledge and experience.

Hand skills play a vital role in this qualification.

Qualified learners will also understand:

- > The basics of how the business unit functions
- > Their role in the business, i.e. in construction, maintenance and related activities
- > How they are affected by legislation, regulations, agreements and policies related to their particular work environment.

With this understanding, learners will be able to participate in workplace activities.

Rationale of the qualification:

This is the first occupation based qualification in a series for learners that reflect the workplace-based needs of the electrical field that is expressed by employers and employees, both now and for the future. This qualification provides the learner with accessibility to be employed within the electrical field and provides the flexibility to pursue different careers in the broader electrical engineering energy sector and articulate within the Engineering, Electrical Construction, Generation, Transmission and Distribution specialization contexts. It also provides the Learner with enough knowledge and skills to pursue small business opportunities within the private sector through which the private sector and the economy can benefit.

For those who have acquired experience in the workplace, this qualification represents part of the RPL process to acknowledge workplace skills acquired without the benefit of former education or training.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

This qualification assumes learners have a General Education and Training Certificate at NQF level 1.

Recognition of Prior Learning:

This qualification may be obtained in whole or in part through RPL. The learner should be thoroughly briefed on the mechanism to be used and support and guidance should be provided. Care should be taken that the mechanism used provides the learner with an opportunity to demonstrate competence and is not so onerous as to prevent learners from taking up the RPL option towards gaining a qualification.

QUALIFICATION RULES

The rules of combination for this Qualification:

The Fundamental component of NQF Level 2-4 Qualifications for achieving a National Certificate requires a minimum of twenty credits for the "Communication and Language Studies" category and sixteen credits for the "Mathematics and Science" category. These qualifications also require a minimum of 120 credits in total in order to obtain a Certificate.

This Qualification's Fundamental, Core and Elective components are made up as follows:

Fundamental Unit Standards:

The "Communication and Language Studies" category contains 25 Credits and the "Mathematics and Science" category 32 Credits. This amounts to 57 Credits for the Fundamental component of the Qualification.

Core Unit Standards:

This amounts to 83 credits.

Elective Unit Standards:

This amounts to 53 Credits of which a minimum of ten Credits must be done.

The total Credits for this Qualification are 193 Credits of which a minimum 150 Credits must be done to achieve a Certificate.

EXIT LEVEL OUTCOMES

1. Demonstrate an understanding of procedures for electrical installations and an ability to use and maintain electrical equipment to meet quality and output requirements, working safely and in an environmentally aware manner.
2. Demonstrate a basic operational knowledge of mathematical, technological and theoretical concepts during the execution of tasks with an ability to read, interpret technical drawings and sketch basic electrical wiring diagrams.
3. Apply known solutions to familiar and well-defined problems related to working in the electrical engineering and energy environment with a basic understanding of forms of energy, energy efficiency and environmental awareness.

ASSOCIATED ASSESSMENT CRITERIA

- 1.1 The procedures for basic technical practices regarding electrical installations is described, explained and conducted in accordance with drawings, plans and specified requirements.
- 1.2 The use of hand tools, power tools (fixed and portable) and measuring instruments are explained and maintained in accordance with standard operating procedures.
- 1.3 Electrical installations- and equipment are identified and related to in accordance with output requirements.
- 1.4 Electrical equipments are inspected, cleaned, maintained and data recorded is clearly communicated to meet quality and output requirements.
- 1.5 Knowledge and understanding regarding personal and occupational safety practices in a commercial, industrial or domestic electrical engineering and energy environment is applied according to standard operating procedures and safety requirements.

2.1 Knowledge and understanding of technologies applied in the electrical engineering and energy environment, alternative forms of energy, energy efficiency and terminology, are demonstrated according to standard industry principles.

2.2 Knowledge and understanding of mathematical and theoretical concepts, materials and work contexts are identified, explained and demonstrated according to standard electrical engineering and energy industry principles.

2.3 The execution of tasks and technical practices are executed in a manner which comply with specified requirements to eliminate, minimise or control the risk of injuries.

2.4 Technical drawings are interpreted according to industry requirements.

2.5 Basic electrical wiring diagrams are sketched and interpreted according to symbols and components as prescribed by ISO standards.

2.6 Specified reporting and recording requirements are complied with.

Range: Specified reporting and recording must include:

- > Reporting to supervisor
- > Submitting reports
- > Logbook entries
- > Permit documentation

3.1 Known solutions to familiar and well-defined problems within the electrical construction and maintenance environment are identified, explained and applied according to standard practices.

3.2 Energy efficiency and related environmental issues are identified, described and discussed that enables a learner to resolve problems in the work environment.

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.

The identification and solving of problems, team work, organising self, using of technical diagrams, implication of actions and reactions in the world as a set of related systems must be assessed during any combination of practical, foundational and reflective 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 tool(s) to establish the foundational, reflective and embedded knowledge to problem solving and application of the world as a set of related systems within the electrical installation and maintenance environment.
- > A detailed portfolio of evidence is required to prove the practical, applied and foundational competencies of the learner.
- > Assessors and moderators should develop and conduct their own integrated assessment by making use of a range of formative and summative assessment methods. Assessors should assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.
- > Summative assessment 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.

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

INTERNATIONAL COMPARABILITY

This Qualification is benchmarked against international standards and Qualifications. The Unit Standards of which this Qualification is based were compared with Unit Standards from New Zealand, Australia and Scotland in terms of their range of electrical Qualifications, Unit Standard titles, specific outcomes, assessment criteria and degree of difficulty.

This Qualification has been compiled to be more generic to the entire low-and high voltage electrical

engineering, construction and renewable energy industries, whereas the Qualifications for the above mentioned countries are subdivided into different domains of the low voltage electrical engineering field. However, the overall scope of the other countries' Unit Standards for the electrical field has been adequately covered in this Qualification. The focus and complexity level of the core Units Standards compares very well, but the upliftment of literacy, numeracy and social skills have been emphasized more in the fundamental requirement of this Qualification to redress the inequalities of the past. More credits are therefore needed for this level than what is required for similar international levels.

The core and elective Unit Standards of this Qualification are more focused on the practical application, with the theoretical requirements built into the embedded knowledge. Only a few standards focus on theory, but is written more generically than those of the other countries. The international Qualifications on the other hand, included more knowledge-based Unit Standards with less credits linked to it.

ARTICULATION OPTIONS

This qualification will allow a person to advance to learning for an electrical engineering qualification at NQF level 3. This qualification provides the learner with the flexibility to pursue different careers in the electrical engineering and energy sector and articulation within the engineering industries. The level of flexibility within the range of electives will allow the individual to pursue further learning within life skills for the world of work, quality assurance, health and safety and engineering contexts.

MODERATION OPTIONS

- > Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant ETQA.
- > Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA.
- > Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQA's policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQA's (including professional bodies); and in terms of the moderation guideline detailed immediately below.
- > Moderation must include both internal and external moderation of assessments at exit points of the qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual Unit Standards, exit level outcomes as well as the integrated competence described in the qualification.

Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors need experience in the following areas:

Interpersonal skills, subject matter and assessment.

The assessor needs to be competent in planning, conducting and providing feedback on assessment of learning outcomes and in the design and development of assessments as described in the Unit Standards. The assessor should at least be competent at the same level or be at a level above this level 2 Qualification with at least two years of practical experience in the electrical engineering or related environment. The assessor must comply with the criteria set by the relevant ETQA.

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

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

NOTES

Qualification review and linkages:

This Qualification is part of a review of four registered ones called "General Education and Training

Certificate in Basic Technical Practice (Energy) - NQF Level 1" and "National Certificates in Electrical Engineering - NQF Level 2-4".

During the review it was found that the registered "General Education and Training Certificate in Basic Technical Practice (Energy) - NQF Level 1" is too specific to the electrical engineering and construction environment, instead of being more generic to the entire electrical engineering and energy industry. Its Elective component mainly contains Unit Standards that should be part of the NQF Level 2 Qualification. The registered Qualifications for NQF Levels 1-4 also contain a lot of Unit Standards that were designed specifically for multi-skilling persons within the mechanical trade, of which some are too activity based.

There shall be a clear link between the currently registered-and the new proposed Qualifications in the sense that many of the Unit Standards shall be the same, but shall be placed differently in mainly the Core component of the Qualifications. This is done to achieve a more progressive build-up from an entry level for the electrical industry at NQF 2, single phase installations at NQF 3, through to more complex Unit Standards such as those for three phase installations at NQF 4. Renewable energy shall also be part of the Elective component of these Qualifications.

The future GETC Qualification for Basic Technical Practice (Energy) at NQF Level 1 shall be mainly knowledge-based and shall be a generic entry level for the entire electrical engineering and energy industry.

All the activity-based Unit Standards shall not be part of the new Qualifications, but shall be replaced with new Elective Unit Standards that are required by the different electrical industries.

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	9839 Apply and maintain safety in an electrical environment	Level 1	5	Registered
Core	9964 Apply health and safety to a work area	Level 2	8	Registered
Core	10233 Install and/or replace an electrical metering units or measuring instruments	Level 2	4	Registered
Core	10237 Select, use and care for electrical measuring instruments	Level 2	4	Registered
Core	10252 Identify, inspect, use, maintain and care for engineering hand tools	Level 2	6	Registered
Core	10253 Install electric wire ways	Level 2	6	Registered
Core	10254 Maintain electrical distribution boards, panels and enclosures	Level 2	6	Registered
Core	10255 Select, use and care for power tools	Level 2	5	Registered
Core	11954 Design and construct a single phase circuit	Level 2	5	Registered
Core	113858 Maintain transformers	Level 2	5	Draft - Prep for P Comment
Core	113863 Apply soldering techniques	Level 2	2	Draft - Prep for P Comment
Core	113870 Identify, handle and assemble Low Voltage hardware and related materials	Level 2	4	Draft - Prep for P Comment
Core	113876 Inspect and clean electrical machines	Level 2	4	Draft - Prep for P Comment
Core	113877 Understand fundamentals of electricity	Level 2	8	Draft - Prep for P Comment
Core	113879 Install luminaires	Level 2	4	Draft - Prep for P Comment
Core	9888 Select, use and care for marking off/out equipment: routine shapes	Level 3	8	Registered
Elective	8200 Service and test battery	Level 2	5	Registered
Elective	9880 Perform basic welding/joining of metals	Level 2	8	Registered
Elective	12483 Perform basic first aid	Level 2	4	Registered
Elective	12484 Perform basic fire fighting	Level 2	4	Recommended
Elective	13622 Ensure safety at road works in urban areas	Level 2	2	Registered
Elective	14701 Join sheetmetal with resistance arc welding process	Level 2	4	Recommended
Elective	113859 Repair and service small gas appliances	Level 2	4	Draft - Prep for P Comment

Elective	113860	Demonstrate an understanding of the uses and safety aspect associated with flammable energy sources	Level 2	3	Draft - Prep for P Comment
Elective	113861	Maintain servitudes, wayleaves and clearances	Level 2	5	Draft - Prep for P Comment
Elective	113868	Handle and care of electrical earthing gear and related equipment	Level 2	2	Draft - Prep for P Comment
Elective	113872	Identify, handle and assemble medium / high voltage line hardware and related materials	Level 2	4	Draft - Prep for P Comment
Elective	113887	Inspect and clean medium / high voltage yards and enclosures	Level 2	2	Draft - Prep for P Comment
Fundamental	7469	Use mathematics to investigate and monitor the financial aspects of personal and community life	Level 2	2	Registered
Fundamental	7479	Describe, represent and informally analyse shape and motion in 2- and 3-dimensional space	Level 2	4	Registered
Fundamental	7547	Operate a personal computer system	Level 2	6	Reregistered
Fundamental	8962	Maintain and adapt oral communication	Level 2	5	Registered
Fundamental	8963	Access and use information from texts	Level 2	5	Registered
Fundamental	8964	Write for a defined context	Level 2	5	Registered
Fundamental	8982	Demonstrate understanding of rational and irrational numbers and number systems within the context of relevant calculations	Level 2	3	Registered
Fundamental	9007	Work with a range of patterns and functions and solve problems	Level 2	5	Registered
Fundamental	12444	Measure, estimate and calculate physical quantities and explore, describe and represent geometrical relationships in 2-dimensions in different life or workplace contexts	Level 2	3	Registered
Fundamental	12461	Communicate at work	Level 2	5	Registered
Fundamental	12465	Develop a learning plan and a portfolio for assessment	Level 2	6	Registered
Fundamental	13217	Collect and use information	Level 2	5	Registered
Fundamental	14085	Apply basic knowledge of statistics in order to investigate life and work related problems	Level 2	3	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Electrical Engineering

SAQA QUAL ID	QUALIFICATION TITLE	
48474	National Certificate: Electrical Engineering	
SGB NAME	SGB Electrical Engineering & Construction	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
PPC-4-National Certificate	National Certificate	Electrical Infrastructure Construction
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
130	Level 4	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

This qualification will allow a person to advance through learning to an electrical engineering and energy related qualification at NQF level 5. The core and required elective unit standards provide credits that allow access to both vertically and horizontally articulated qualifications. This qualification will enhance the social status, productivity and employability of the learner within the electrical engineering and energy sector and contribute to the quality, production rate and growth of the electrical engineering and energy sector. Through the critical crossfield component of the qualification, learners are able to demonstrate vocational skills through which they are able to engage in life skills activities, small business development, health and environmental issues.

A person acquiring this qualification will have skills, knowledge and experience to:

- > Evaluate and apply essential methods to technical operational systems.
- > Analyse and apply acquired knowledge in performing the tasks and solve common problems.
- > Gather and analyse relevant information, use data to apply theories and principles within electrical engineering related situations.
- > Execute role and responsibilities by being able to summarise, classify, discuss and estimate application processes required through mathematical concepts, technical and schematic diagrams, computer and technology usage in a range of different contexts.
- > Communicate with peers, customers and members of supervisory/management levels by presenting information reliably and accurately in spoken and written form.

Rationale of the qualification

This is the third occupational based qualification in a series for learners that reflect the workplace-based needs of the electrical engineering and energy field that is expressed by employers and employees, both now and for the future. This qualification provides the learner with accessibility to be employed within the electrical engineering and energy field and provides the flexibility to pursue different careers in the broader electrical engineering and energy sector.

For those who have acquired experience in the workplace, this qualification represents part of the RPL process to acknowledge workplace skills acquired without the benefit of former education or training.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

NQF 3 or equivalent and competence in the following:

- > Occupational health, safety and environmental practices within the electrical environment.
- > Use and maintenance of hand tools, power tools and measuring instruments.
- > Communication and Language.

Recognition of prior learning

This qualification may be obtained through Recognition of Prior Learning (RPL). The learner should be thoroughly briefed on the mechanism to be used and support and guidance should be provided. Care should be taken that the mechanism used provides the learner with an opportunity to demonstrate competence and is not so onerous as to prevent learners from taking up the RPL option towards gaining a qualification.

QUALIFICATION RULES

The rules of combination for this Qualification:

The Fundamental component of NQF Level 2-4 Qualifications for achieving a National Certificate requires a minimum of twenty credits for the "Communication and Language Studies" category and sixteen credits for the "Mathematics and Science" category. These qualifications also require a minimum of 120 credits in total in order to obtain a Certificate.

A candidate will receive a FET certificate for this qualification if the Unit Standards for Communication and Language Studies are also completed in any other recognised second language.

This Qualification's Fundamental, Core and Elective components are made up as follows:

Fundamental Unit Standards:

- > The "Communication and Language Studies" category contains 23 Credits and the "Mathematics and Science" category 19 Credits. This amounts to 42 Credits for the Fundamental component of the Qualification.

Core Unit Standards:

- > This amounts to 73 credits.

Elective Unit Standards:

- > This amounts to 180 Credits of which a minimum of fifteen Credits must be done.

The total Credits for this Qualification are 295 Credits of which a minimum of 130 Credits must be done to achieve a Certificate.

EXIT LEVEL OUTCOMES

1. Evaluate and apply essential methods to technical operational systems, by using procedures and equipment required in the electrical field that meet quality and output requirements, working safely in an environmental friendly manner.
2. Analyse and apply acquired knowledge in performing the tasks and solve common problems related to the electrical field within familiar contexts.
3. Gather and analyse relevant information, use data to apply theories or principles within electrical engineering situations and work in a disciplined manner.

ASSOCIATED ASSESSMENT CRITERIA

- 1.1 Knowledge and skills regarding technical operational systems on three phase circuits are demonstrated and problems solved according to maintenance procedures.
- 1.2 Knowledge and understanding regarding personal safety practices in an industrial or domestic electrical engineering and energy environment is applied according to standard operating procedures and safety requirements.

2.1 Knowledge and skills to install, commission and maintain three phase AC- and DC systems and control gear are demonstrated according to relevant procedures.

2.2 Knowledge and skills to design three phase electrical systems are demonstrated according to specialised contexts requirements and relevant procedures.

3.1 Electrical engineering sketches and drawings are evaluated and analysed in contexts with electrical engineering situations.

3.2 Data is used, theories and principles applied to do fault finding and repairs on three phase electrical systems and control gear.

3.3 Relevant information is gathered, analysed and data used to maintain electrical equipment and three phase systems.

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.

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

- > Certain exit level outcomes are measurable and verifiable through assessment criteria assessed in one application.
- > Applicable assessment tool(s) to establish the foundational, reflective and embedded knowledge to problem solving and application of the world as a set of related systems within the electrical installation and maintenance environment.
- > A detailed portfolio of evidence is required to proof the practical, applied and foundational competencies of the learner.
- > Assessors and moderators should develop and conduct their own integrated assessment by making use of a range of formative and summative assessment methods. Assessors should assess and give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.
- > Summative assessment 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.

Unit standards associated with the qualification must be used to assess specific and critical cross-field outcomes.

During integrated assessments the assessor should make use of formative and summative assessment methods and should assess combinations of practical, applied, foundational and reflective competencies.

INTERNATIONAL COMPARABILITY

This Qualification is benchmarked against international standards and qualifications. The unit standards on which this qualification is based were compared with unit standards from New Zealand, Australia and Scotland in terms of their range of electrical qualifications, unit standard titles, specific outcomes, assessment criteria and degree of difficulty.

This Qualification has been compiled to be more generic to the entire low-and high voltage electrical engineering, construction and renewable energy industry with special emphases on three phase industrial and high voltage installations. The qualifications for the above mentioned countries are subdivided into different domains of the low voltage electrical engineering field, with very little evidence of high voltage applications.

The overall scope of the other countries' Unit Standards for the electrical field has been adequately covered in the core requirement of this qualification. The focus and complexity level of the core Units Standards compares very well, but the upliftment of literacy, numeracy and social skills have been emphasized more in the fundamental requirement of this Qualification to redress the inequalities of the past. More credits are therefore needed for this level than what is required for similar international levels.

The core-and elective unit standards of this qualification are more focused on the practical application, with the theoretical requirements built into the embedded knowledge. Only a few Unit Standards focus on theory but they are written more generically than those of the other countries. The international Qualifications on the other hand, included more knowledge-based Unit Standards with less credits linked to it.

ARTICULATION OPTIONS

This qualification will allow a person to advance to learning for an electrical engineering certificate at NQF level 5. This qualification provides the learner with the flexibility to pursue different careers in the electrical industry and articulation within the engineering industries. The level of flexibility within the range of elective will allow the individual to pursue further learning within an entrepreneurship, supervision/management, quality assurance, health and safety and engineering contexts.

MODERATION OPTIONS

- > Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant ETQA.
- > Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA.
- > Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQAs policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQAs (including professional bodies); and in terms of the moderation guideline detailed immediately below.
- > Moderation must include both internal and external moderation of assessments at exit points of the qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual unit standards, exit level outcomes as well as the integrated competence described in the qualification.

Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors need experience in the following areas:
Interpersonal skills, subject matter and assessment.

The assessor needs to be competent in planning, conducting and providing feedback on assessment of learning outcomes and in the design and development of assessments as described in the unit standards. The assessor should at least be competent at the same level or be at a level above this level 4 Qualification with at least two years of practical experience in the electrical engineering or related environment. The assessor must comply with the criteria set by the relevant ETQA.
The subject matter experience of the assessor can be established by recognition of prior learning.

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

NOTES

Qualification review and linkages:

This Qualification is part of a review of four registered ones called "General Education and Training Certificate in Basic Technical Practice (Energy) - NQF Level 1" and "National Certificates in Electrical Engineering - NQF Level 2-4".

During the review it was found that the registered "General Education and Training Certificate in Basic Technical Practice (Energy) - NQF Level 1" is too specific to the electrical engineering and construction environment, instead of being more generic to the entire electrical engineering and electrical engineering and energy industry. Its Elective component mainly contains Unit Standards that should be part of the NQF

Level 2 Qualification. The registered Qualifications for NQF Levels 1-4 also contain a lot of Unit Standards that were designed specifically for multi-skilling persons within the mechanical trade, of which some are too activity based.

There shall be a clear link between the currently registered and the new proposed Qualifications in the sense that many of the Unit Standards shall be the same, but shall be placed differently in mainly the Core component of the Qualifications. This is done to achieve a more progressive build-up from an entry level for the electrical industry at NQF 2, single-phase installations at NQF 3, through to more complex Unit Standards such as those for three phase installations at NQF 4. Renewable energy shall also be part of the Elective component of these Qualifications.

The future GETC Qualification for Basic Technical Practice (Energy) at NQF Level 1 shall be mainly knowledge-based and shall be a generic entry level for the entire electrical engineering and electrical engineering and energy industry.

All the activity-based Unit Standards shall not be part of the new Qualifications, but shall be replaced with new Elective Unit Standards that are required by the different electrical industries.

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	113899 Demonstrate an understanding of basic programmable logic controllers	Level 3	10	Draft - Prep for P Comment
Core	10257 Design and Construct a Three Phase Circuit	Level 4	5	Registered
Core	10259 Fault find, repair and maintain three phase voltage electrical circuits	Level 4	8	Registered
Core	10262 Maintain and repair three phase AC machines and control gear	Level 4	12	Registered
Core	10264 Install and commission three phase AC machines and control gear	Level 4	8	Registered
Core	10266 Wire and commission three phase electrical circuits	Level 4	8	Registered
Core	113873 Understand basic electrical and mechanical engineering principles	Level 4	8	Draft - Prep for P Comment
Core	113894 Test and inspect a three phase industrial/commercial installation	Level 4	10	Draft - Prep for P Comment
Core	113968 Apply the principles of energy efficiency	Level 4	6	Draft - Prep for P Comment
Elective	13657 Install and commission direct current (DC) machines	Level 3	8	Registered
Elective	13818 Maintain low voltage switchgear	Level 3	6	Registered
Elective	113884 Fault find and repair a stand-alone battery charging wind turbine	Level 3	5	Draft - Prep for P Comment
Elective	113885 Lower, inspect service and maintain a stand-alone battery charging wind turbine	Level 3	5	Draft - Prep for P Comment
Elective	13681 Inspect, test and maintain high voltage isolators	Level 4	12	Registered
Elective	13682 Maintain direct current (DC) machines	Level 4	5	Registered
Elective	113862 Install and terminate Medium/High Voltage cables	Level 4	6	Draft - Prep for P Comment
Elective	113874 Joint Medium / High Voltage cables	Level 4	8	Draft - Prep for P Comment
Elective	113878 Spray-wash energised medium / high voltage networks	Level 4	4	Draft - Prep for P Comment
Elective	113880 Inspect, test and maintain Medium / High Voltage transformers	Level 4	6	Draft - Prep for P Comment
Elective	113881 Inspect, maintain, repair and do faultfinding on Medium / High Voltage networks	Level 4	8	Draft - Prep for P Comment
Elective	113882 Inspect, test and maintain Medium / High Voltage earthing systems	Level 4	4	Draft - Prep for P Comment
Elective	113883 Install / replace high voltage equipment and hardware	Level 4	6	Draft - Prep for P Comment
Elective	113888 Design a stand alone renewable energy system	Level 4	10	Draft - Prep for P Comment
Elective	113890 Design a wind/solar hybrid system	Level 4	5	Draft - Prep for P Comment

Elective	113892 Design a solar pump system	Level 4	4	Draft - Prep for P Comment
Elective	113895 Maintain high voltage transformer unit protection	Level 4	6	Draft - Prep for P Comment
Elective	113896 Evaluate a distribution board	Level 4	10	Draft - Prep for P Comment
Elective	113897 Troubleshoot on programmable logic controllers	Level 4	5	Draft - Prep for P Comment
Elective	113898 Issue certificate of compliance for a single phase domestic installation	Level 4	5	Draft - Prep for P Comment
Elective	113900 Operate on Medium Voltage radial networks	Level 4	20	Draft - Prep for P Comment
Elective	113901 Demonstrate an understanding of process communication systems	Level 4	8	Draft - Prep for P Comment
Elective	113969 Inspect, record and report condition of Medium / High Voltage station apparatus and related equipment	Level 4	6	Draft - Prep for P Comment
Elective	113970 Construct and commission Medium / High Voltage networks	Level 4	6	Draft - Prep for P Comment
Fundamental	7485 Demonstrate understanding of real and complex number systems	Level 4	3	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	9014 Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 4	6	Registered
Fundamental	9015 Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	6	Registered
Fundamental	9502 Write a technical report	Level 4	4	Registered
Fundamental	9506 Communicate in an assertive manner with clients and fellow workers	Level 4	4	Registered
Fundamental	12417 Measure, estimate & calculate physical quantities & explore, critique & prove geometrical relationships in 2 and 3 dimensional space in the life and workplace of adult with increasing responsibilities	Level 4	4	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:

National Certificate: Electrical Engineering

SAQA QUAL ID	QUALIFICATION TITLE	
48475	National Certificate: Electrical Engineering	
SGB NAME	SGB Electrical Engineering & Construction	
ABET BAND	PROVIDER NAME	
Undefined		
QUALIFICATION CODE	QUAL TYPE	SUBFIELD
PPC-3-National Certificate	National Certificate	Electrical Infrastructure Construction
MINIMUM CREDITS	NQF LEVEL	QUALIFICATION CLASS
129	Level 3	Regular-Unit Stds Based
SAQA DECISION NUMBER	REGISTRATION START DATE	REGISTRATION END DATE

PURPOSE OF THE QUALIFICATION

This Qualification will allow a person to advance through learning to an electrical Qualification at NQF level 3. The core and required elective Unit Standards provide credits that allow access to both vertically and horizontally articulated Qualifications. This Qualification will enhance the social status, productivity and employability of the learner within the electrical engineering and energy sector and contribute to the quality, production rate and growth of the electrical engineering and energy sector.

Through the critical crossfield component of the Qualification, learners are able to demonstrate vocational skills through which they are able to engage in life skills activities, small business development, health and environmental issues. Through recognition of prior learning adult learners are encouraged to access basic education with an understanding that they already have knowledge and experience.

A person acquiring this Qualification will have skills, knowledge and experience to:

- > Identify and apply technical operational systems.
- > Summarise, interpret information and use knowledge in performing the tasks.
- > Organise information and use data, apply theories or principles to electrical engineering situations.
- > Execute role and responsibilities by being able to summarize, classify, discuss and estimate application processes required through mathematical and theoretical concepts, technical and schematic diagrams, computer and technology usage in a range of different contexts.
- > Communicate with peers, customers and members of supervisory / management levels by expressing opinions in spoken and written form.

Rationale of the Qualification

This is the second occupational based Qualification in a series for learners that reflect the workplace-based needs of the electrical field that is expressed by employers and employees, both now and for the future. This Qualification provides the learner with accessibility to be employed within the electrical field and provides the flexibility to pursue different careers in the broader electrical engineering and energy sector and articulate within the Engineering, Electrical Construction, Generation, Transmission and Distribution specialization contexts. It also provides the Learner with enough knowledge and skills to pursue small business opportunities within the private sector through which the private sector and the economy can benefit.

For those who have acquired experience in the workplace, this Qualification represents part of the RPL process to acknowledge workplace skills acquired without the benefit of former education or training.

RECOGNIZE PREVIOUS LEARNING?

Y

LEARNING ASSUMED TO BE IN PLACE

NQF 2 or equivalent and competence in the following:

- > Occupational health, safety and environmental practices within the electrical environment
- > Use of hand tools, power tools and measuring instruments
- > Mathematics, Communication and language

Recognition of prior learning

This Qualification may be obtained in whole or in part through RPL. The learner should be thoroughly briefed on the mechanism to be used and support and guidance should be provided. Care should be taken that the mechanism used provides the learner with an opportunity to demonstrate competence and is not so onerous as to prevent learners from taking up the RPL option towards gaining a Qualification.

QUALIFICATION RULES

The rules of combination for this Qualification:

The Fundamental component of NQF Level 2-4 Qualifications for achieving a National Certificate requires a minimum of twenty credits for the "Communication and Language Studies" category and sixteen credits for the "Mathematics and Science" category. These qualifications also require a minimum of 120 credits in total in order to obtain a Certificate.

This Qualification's Fundamental, Core and Elective components are made up as follows:

Fundamental Unit Standards:

The "Communication and Language Studies" category contains 28 Credits and the "Mathematics and Science" category 23 Credits. This amounts to 51 Credits for the Fundamental component of the Qualification.

Core Unit Standards:

This amounts to 68 credits.

Elective Unit Standards:

This amounts to 90 Credits of which a minimum of ten Credits must be done.

The total Credits for this Qualification is 212 Credits of which a minimum 129 Credits must be done to achieve a Certificate.

EXIT LEVEL OUTCOMES

1. Identify and apply technical operational systems, by using procedures and equipment required in the electrical field that meet quality and output requirements, working safely in an environmental friendly manner.
2. Summarise, interpret information and use knowledge in performing the tasks related to electrical field or specialised contexts.
3. Organise information and use data, to apply theories and principles to within electrical engineering situations and work in a disciplined manner under supervision when necessary.

ASSOCIATED ASSESSMENT CRITERIA

1.1 Knowledge and skills regarding technical operational systems on single phase AC- and DC in industrial and domestic circuits are demonstrated and problems solved according to maintenance procedures.

1.2 Knowledge and understanding regarding personal safety practices in an industrial or domestic electrical engineering and energy environment is applied according to standard operating procedures and safety requirements.

2.1 Knowledge and skills to install, commission and maintain single phase AC- and DC systems and control gear are demonstrated according to relevant procedures.

2.2 Knowledge and skills to clean and repair electrical equipment are demonstrated according to requirements and relevant procedures.

3.1 Electrical engineering sketches and drawings are identified and interpreted in contexts with electrical engineering situations

3.2 Data is used, theories and principles applied to do fault finding and repairs on AC- and DC systems and control gear

3.3 Information is selected, organised and data used to maintain electrical equipment and single phase systems.

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.

The identification and solving of problems, team work, organising self, using of technical diagrams, implication of actions and reactions in the world as a set of related systems must be assessed during any combination of practical, foundational and reflective 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 tool(s) to establish the foundational, reflective and embedded knowledge to problem solving and application of the world as a set of related systems within the electrical installation and maintenance environment.

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

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

> Summative assessment 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.

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

INTERNATIONAL COMPARABILITY

This Qualification Benchmarked against international standards and Qualifications.

The Unit Standards on which this Qualification is based were compared with Unit Standards from New Zealand, Australia and Scotland in terms of their range of electrical Qualifications, Unit Standard titles, specific outcomes, assessment criteria and degree of difficulty.

This Qualification has been compiled more generic to the entire low-and high voltage electrical engineering, construction and renewable energy industry with special emphases on single phase domestic installations. The Qualifications for the above mentioned countries are subdivided into different domains of the low voltage electrical engineering field. However, the overall scope of the other countries' Unit Standards for the electrical field has been adequately covered in this Qualification. The focus and complexity level of the core units standards compares very well, but the upliftment of literacy, numeracy and social skills have been emphasized more in the fundamental requirement of this Qualification to redress the inequalities of the past. More credits are therefore needed for this level than what is required for similar international levels.

The core-and elective Unit Standards of this Qualification are more focused on the practical application, with the theoretical requirements built into the embedded knowledge. Only a few standards focus on theory, but

is written more generically than those of the other countries. The international Qualifications on the other hand, included more knowledge-based Unit Standards with less credits linked to it. Unit Standard Qualification Unit Standard.

ARTICULATION OPTIONS

This Qualification will allow a person to advance to learning for an electrical engineering Qualification at NQF level 4. This Qualification provides the learner with the flexibility to pursue different careers in the electrical engineering and energy industry and articulation within the engineering industries. The level of flexibility within the range of electives will allow the individual to pursue further learning within an entrepreneurship, supervision / management, quality assurance, health and safety and engineering contexts.

MODERATION OPTIONS

- > Anyone assessing a learner or moderating the assessment of a learner against this Qualification must be registered as an assessor with the relevant ETQA.
- > Any institution offering learning that will enable the achievement of this Qualification must be accredited as a provider with the relevant ETQA.
- > Assessment and moderation of assessment will be overseen by the relevant ETQA according to the ETQAs policies and guidelines for assessment and moderation; in terms of agreements reached around assessment and moderation between ETQAs (including professional bodies); and in terms of the moderation guideline detailed immediately below.
- > Moderation must include both internal and external moderation of assessments at exit points of the Qualification, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described both in individual Unit Standards, exit level outcomes as well as the integrated competence described in the Qualification.

Anyone wishing to be assessed against this Qualification may apply to be assessed by any assessment agency, assessor or provider institution that is accredited by the relevant ETQA.

CRITERIA FOR THE REGISTRATION OF ASSESSORS

Assessors need experience in the following areas:

Interpersonal skills, subject matter and assessment.

The assessor needs to be competent in planning, conducting and providing feedback on assessment of learning outcomes and in the design and development of assessments as described in the Unit Standards. The assessor should at least be competent at the same level or be at a level above this level 3 Qualification with at least two years of practical experience in the electrical engineering or related environment. The assessor must comply with the criteria set by the relevant ETQA.

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

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

NOTES

Qualification review and linkages:

This Qualification is part of a review of four registered ones called "General Education and Training Certificate in Basic Technical Practice (Energy) - NQF Level 1" and "National Certificates in Electrical Engineering - NQF Level 2-4".

During the review it was found that the registered "General Education and Training Certificate in Basic Technical Practice (Energy) - NQF Level 1" is too specific to the electrical engineering and construction environment, instead of being more generic to the entire electrical engineering and energy industry. Its Elective component mainly contains Unit Standards that should be part of the NQF Level 2 Qualification. The registered Qualifications for NQF Levels 1-4 also contain a lot of Unit Standards that were designed specifically for multi-skilling persons within the mechanical trade, of which some are too activity based.

There shall be a clear link between the currently registered-and the new proposed Qualifications in the sense that many of the Unit Standards shall be the same, but shall be placed differently in mainly the Core component of the Qualifications. This is done to achieve a more progressive build-up from an entry level for the electrical industry at NQF 2, single phase installations at NQF 3, through to more complex Unit Standards such as those for three phase installations at NQF 4. Renewable energy shall also be part of the Elective component of these Qualifications.

The future GETC Qualification for Basic Technical Practice (Energy) at NQF Level 1 shall be mainly knowledge-based and shall be a generic entry level for the entire electrical engineering and energy industry.

All the activity-based Unit Standards shall not be part of the new Qualifications, but shall be replaced with new Elective Unit Standards that are required by the different electrical industries.

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	10260 Install and commission electrical metering units or measuring instruments and control devices	Level 3	5	Registered
Core	10261 Install and Commission Single Phase AC Machines and Control Gear	Level 3	8	Registered
Core	10265 Wire and commission domestic electrical circuits	Level 3	8	Registered
Core	10269 Maintain lighting System	Level 3	4	Registered
Core	10270 Construct Basic Electronic Circuits	Level 3	4	Registered
Core	13791 Fault find on single phase alternating current (AC) systems	Level 3	8	Registered
Core	14134 Maintain and repair single phase AC machines and control gear	Level 3	6	Registered
Core	14135 Repair and maintain electric power tools	Level 3	3	Registered
Core	113893 Test and inspect a single phase domestic installation	Level 3	10	Draft - Prep for P Comment
Core	114388 Install, joint and terminate Low Voltage cables and conductors	Level 3	8	Draft - Prep for P Comment
Core	114406 Understand basic electronic theory and components	Level 3	4	Draft - Prep for P Comment
Elective	10234 Install low voltage transformers	Level 2	6	Registered
Elective	10244 Maintain and repair a high voltage security fence system	Level 2	4	Registered
Elective	113864 Inspect service and maintain a photovoltaic supplied pump	Level 2	2	Draft - Prep for P Comment
Elective	113871 Install and commission photovoltaic supplied pump	Level 2	3	Draft - Prep for P Comment
Elective	113886 Install Medium Voltage transformers	Level 2	6	Draft - Prep for P Comment
Elective	10258 Design and Install Electrical Wire Ways	Level 3	8	Registered
Elective	10268 Fault Find, Test and Repair Domestic Appliances	Level 3	6	Registered
Elective	113865 Operate on low voltage networks	Level 3	12	Draft - Prep for P Comment
Elective	113866 Inspect, test, maintain and repair Low / Medium voltage networks	Level 3	8	Draft - Prep for P Comment
Elective	113869 Fault find a photovoltaic supplied system	Level 3	8	Draft - Prep for P Comment
Elective	113875 Inspect, operate and maintain high mast lighting structures	Level 3	7	Draft - Prep for P Comment
Elective	113889 Perform work on energised low voltage networks	Level 3	8	Draft - Prep for P Comment
Elective	113891 Install / replace mini substations and ring-main units / switches	Level 3	6	Draft - Prep for P Comment
Elective	113902 Install batteries	Level 3	4	Draft - Prep for P Comment
Fundamental	7572 Demonstrate knowledge of and produce computer spreadsheets using basic functions	Level 2	3	Registered
Fundamental	7792 Maintain data in a computer system	Level 2	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
Fundamental	9010 Demonstrate an understanding of the use of different number bases and measurement units and an awareness of error in the context of relevant calculations	Level 3	2	Registered
Fundamental	9011 Use mathematics to investigate and monitor the financial aspects of personal and business issues	Level 3	5	Registered
Fundamental	9012 Investigate life and work related problems using data and probabilities	Level 3	5	Registered
Fundamental	9013 Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4	Registered
Fundamental	9960 Communicate verbally and non-verbally in the workplace	Level 3	5	Registered



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

1

Maintain transformers

SAQA US ID	UNIT STANDARD TITLE		
113858	Maintain transformers		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Electrical Engineering & Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Electrical Infrastructure Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-EIC-0-SGB ECC	Regular	Level 2	5
REGISTRATION START DATE	REGISTRATION END DATE	REGISTRATION NUMBER	SAQA DECISION NUMBER

PURPOSE OF THE UNIT STANDARD

This unit standard is for persons in the Electrical Engineering; Generation; Distribution; Transmission, Construction and Renewable Energy Sector

A person credited with this unit standard will be capable of:

Maintaining transformers according to manufacturer specifications and to prevent breakdowns and loss of operation (service).

This unit standard will contribute to the full development of the learner within the electrical engineering and construction environment by providing recognition, further mobility and transportability within the field of Physical Planning and Construction. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and upliftment within the electrical engineering and construction environment.

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills attitude and / or equivalent:

- > Relevant sections in statutory requirements
- > Select, use and care for basic hand tools
- > Introduction to industry
- > Standard lay out drawings
- > Power tools (portable)
- > Terminology associated with transformers and components
- > Working principles associated with transformers/components
- > Basic safety procedures related to the type of work and location

UNIT STANDARD RANGE

- > Maintenance is limited to Transformer Types covered by statutory requirements
 - > Maintenance is restricted to cleaning, Inspecting and replacing consumable items
- Transformers include:
- > Oil Filled Type
 - > Dry Type

UNIT STANDARD OUTCOME HEADER

N/A

Specific Outcomes and Assessment Criteria:**SPECIFIC OUTCOME 1**

Plan the work task.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Planning is arranged according to manufacturers specifications.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Planning is integrated with other disciplines and associated equipment. Range: Protection testing and monitoring, engineering, operating and control centers.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Planning is aligned with maintenance programs and schedules.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Planning is arranged according to plant availability and customer requirements.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 2**

Prepare to maintain transformers.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA**

ASSESSMENT CRITERION 1

1. Equipment, tools and personal protective equipment needed for maintenance is selected, inspected and checked for functionality and safety prior to commencement of tasks.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

Inspection reports, checklist, tools, equipment, spares, work site and work task.

ASSESSMENT CRITERION 2

2. All components and material required for maintaining transformer is correctly identified, selected and available for use.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Task instructions, process or procedures are obtained and correctly interpreted. (Permits and work orders)

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Work site hazards are identified and the appropriate action is taken in line with work site procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 5**

5. The safety aspects pertaining to maintenance are described as per Occupational Health and Safety Act requirements.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 3**

Maintain transformers.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA**

ASSESSMENT CRITERION 1

1. Personal protective equipment is used and site specific safety procedures are adhered to throughout maintenance according to safe work procedures. Range: Isolations, lockout systems and permits.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. The correct site approved cleaning materials and solvents are utilised during maintenance.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Silica gel cartridge and oil bowl is removed and contents replaced as per manufacturers specifications and site procedures. Range: Silica gel breathers, seals and termination box covers.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Transformer is cleaned according to site-specific standards.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 5**

5. Task instructions, process or procedures are followed correctly.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 4**

Complete work task.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Work area is cleaned after completion of task in line with housekeeping standards.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

ASSESSMENT CRITERION 2

2. Waste materials are disposed of according to site specific standards and procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. The impact on the environment of hazardous substances used during transformer maintenance is explained and the disposal method is described or demonstrated.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

Human safety and environmental management.

ASSESSMENT CRITERION 4

4. Quality checks are conducted after maintenance and necessary corrective action is taken according to quality assurance procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 5**

5. Equipment and tools used for maintenance is cleaned and checked for functionality and stored on completion of task.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****UNIT STANDARD ACCREDITATION AND MODERATION OPTIONS**

1. Anyone assessing a learner against this unit standard must be registered as an assessor with the relevant ETQA.
2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.
3. Moderation of assessment will be overseen by the relevant ETQA according to the moderation guidelines in the relevant qualification and the agreed ETQA procedures.

UNIT STANDARD ESSENTIAL EMBEDDED KNOWLEDGE

Knowledge that will help me understand and that I will be able to explain:

- > Terminology associated with transformers.
- > Working principles of transformers.
- > Operating principles of transformers

UNIT STANDARD DEVELOPMENTAL OUTCOME

N/A

UNIT STANDARD LINKAGES

N/A

Critical Cross-field Outcomes (CCFO):**UNIT STANDARD CCFO IDENTIFYING**

Identify and solve problems (deviations from statutory requirements are identified, reported and rectified).

UNIT STANDARD CCFO WORKING

Work effectively with others (affected parties are liased with and informed).

UNIT STANDARD CCFO ORGANIZING

Organise and manage oneself (plan, select, organise work tasks).

UNIT STANDARD CCFO COLLECTING

Collect, organise and critically evaluate information (worksite preparation).

UNIT STANDARD CCFO COMMUNICATING

Communicate (affected parties are liased with and informed).

UNIT STANDARD CCFO SCIENCE**UNIT STANDARD CCFO DEMONSTRATING****UNIT STANDARD CCFO CONTRIBUTING****UNIT STANDARD ASSESSOR CRITERIA**

N/A

UNIT STANDARD NOTES

Supplementary information:

Specified requirrements

Specified requirements include legal and legislative specific requirements and are contained in one or more of the following documents:

- > SABS Specifications
 - > OHS Act, No 85 OF 1993
 - > Manufacturer's manuals
-



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

2

Apply soldering techniques

SAQA US ID	UNIT STANDARD TITLE		
113863	Apply soldering techniques		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Electrical Engineering & Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Electrical Infrastructure Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-EIC-0-SGB ECC	Regular	Level 2	2
REGISTRATION START DATE	REGISTRATION END DATE	REGISTRATION NUMBER	SAQA DECISION NUMBER

PURPOSE OF THE UNIT STANDARD

This unit standard is for persons in the Electrical Engineering; Generation; Distribution; Transmission, Construction and Renewable Energy Sector. A person credited with this unit standard will be capable of: Light duty lead soldering

This unit standard will contribute to the full development of the learner within the electrical engineering and Construction environment by providing recognition, further mobility and transportability within the field of Physical Planning and Construction. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and upliftment within the electrical engineering and construction environment.

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills attitude and / or equivalent:

- > Introduction to safety
- > Engineering hand tools.

UNIT STANDARD RANGE

UNIT STANDARD OUTCOME HEADER

N/A

Specific Outcomes and Assessment Criteria:**SPECIFIC OUTCOME 1**

Plan work task.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Appropriate hand tools are identified and selected to meet the requirements of the job Range: Side cutters, long nose pliers, set of jewellers screwdrivers, wire stripper and small files.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Appropriate hand tools are used safely to meet the requirements of the job according to worksite procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Unsafe and faulty tools are identified and marked for repair or replacement according to set procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Applicable test equipment is selected and checked for functionality.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 2**

Prepare For soldering.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA**

ASSESSMENT CRITERION 1

3. Personal protective equipment is used as per Occupational Health and Safety Act and worksite regulations.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

4. Correct lead solder selected as required by task.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

Bars, ingots, pastes and solder wire.

ASSESSMENT CRITERION 3

1. Work area is inspected for safe working conditions and corrective action is taken where required.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

2. Applicable soldering equipment selected as required by task.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

Soldering iron (gas, electrical, battery), soldering stations and Solder sucker.

SPECIFIC OUTCOME 3

Perform soldering.

OUTCOME NOTES**OUTCOME RANGE**

Straight wire to wire connection Solder connection to solder tag Screened cable to a connector (audio jack)
Multi core cable to a multi pin connector.

ASSESSMENT CRITERIA**ASSESSMENT CRITERION 1**

1. Applicable tools and equipment are selected and used safely to meet the requirements of the job.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. All connections are cleaned from any dirt or oxidation.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

ASSESSMENT CRITERION 3

3. Tinning of connections done according to manufacturers specifications.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Connections soldered according to set specifications/techniques.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 4**

Complete the work task.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Work area is cleaned after completion of task in line with housekeeping standards.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Waste materials are disposed of according to site specific standards and procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Reason for the application of the disposal method is given. Human safety and environmental management.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Hand tools are cared for, maintained and stored according to worksite procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****UNIT STANDARD ACCREDITATION AND MODERATION OPTIONS**

1. Anyone assessing a learner against this unit standard must be registered as an assessor with the relevant

ETQA.

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.

3. Moderation of assessment will be overseen by the relevant ETQA according to the moderation guidelines in the relevant qualification and the agreed ETQA procedures.

UNIT STANDARD ESSENTIAL EMBEDDED KNOWLEDGE

- > Relevant sections of statutory requirements.
- > Handling and application of jointing kits.
- > Working principles of applicable equipment and components.

UNIT STANDARD DEVELOPMENTAL OUTCOME

N/A

UNIT STANDARD LINKAGES

N/A

Critical Cross-field Outcomes (CCFO):

UNIT STANDARD CCFO IDENTIFYING

Identify and solve problems.

UNIT STANDARD CCFO WORKING

Work effectively with others as a member of a team or group.

UNIT STANDARD CCFO ORGANIZING

UNIT STANDARD CCFO COLLECTING

UNIT STANDARD CCFO COMMUNICATING

Communicate effectively by means of language skills, oral and/or written.

UNIT STANDARD CCFO SCIENCE

UNIT STANDARD CCFO DEMONSTRATING

UNIT STANDARD CCFO CONTRIBUTING

UNIT STANDARD ASSESSOR CRITERIA

N/A

UNIT STANDARD NOTES

N/A



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

3

Identify, handle and assemble Low Voltage hardware and related materials

SAQA US ID	UNIT STANDARD TITLE		
113870	Identify, handle and assemble Low Voltage hardware and related materials		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Electrical Engineering & Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Electrical Infrastructure Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-EIC-0-SGB ECC	Regular	Level 2	4
REGISTRATION START DATE	REGISTRATION END DATE	REGISTRATION NUMBER	SAQA DECISION NUMBER

PURPOSE OF THE UNIT STANDARD

This unit standard is for persons working in the Low Voltage installation environment.

A person credited with this unit standard will be able to identify, handle and assemble Low Voltage hardware, equipment and related materials.

This unit standard will contribute to the full development of the learner.

The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and upliftment within Geographical Information Sciences environment.

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills attitude and/or equivalent:

- > Basic hand tools
- > Apply safety in an electrical environment
- > Personal protective equipment
- > Housekeeping (including stacking & storing)
- > Environmental awareness

UNIT STANDARD RANGE

This unit standard applies to persons working with, handling and assembling LV hardware, equipment and related materials independently.

- > Hardware will include, but are not limited to wire ways, conductors, cables/jointing kits, distribution boards, inspection boxes, termination lugs, connectors, glands, insulators, clips, saddles, straps, adapters, light fittings, screws, bolts and washers.
- > Equipment will include, but are not limited to isolators, fuses, switches, miniature circuit breakers, earth leakage units, load controllers, relays, transformers, surge arrestors.
- > Related material will include, but are not limited to insulation tapes, glues, lubricants, thread cutting oil.
- > Assembly will include, but is not limited to assembling of wire ways, jointing kits, glands, distribution boards and light fittings.

UNIT STANDARD OUTCOME HEADER

N/A

Specific Outcomes and Assessment Criteria:**SPECIFIC OUTCOME 1**

Identify and handle the appropriate Low Voltage hardware.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Instructions are interpreted and carried out as per job requirement.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Hardware identified as per instruction.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Personal protective equipment worn when handling hardware as per safe work procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Hardware selected and handled as per work instruction / manufacturer's requirements.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 2**

Identify and handle the appropriate Low Voltage equipment.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Instructions are interpreted and carried out as per job requirement.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

ASSESSMENT CRITERION 2

2. Equipment identified as per instruction.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Personal protective equipment worn when handling hardware as per safe work procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Hardware selected and handled as per work instruction/manufacture's requirements, applying basic rigging principles if required.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 3**

Assemble Low Voltage hardware.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Work site/area prepared according to worksite procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Personal protective equipment worn when assembling hardware as per safe work procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Assemble hardware in logical sequence as per manufacturer's specifications and job requirements.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

ASSESSMENT CRITERION 4

4. Work site/area to be left in order as per environmental legislation.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 4**

Identify and handle related Low Voltage materials.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Related materials identified as per job requirements.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Environmental requirements of applicable related materials are adhered to.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Personal protective equipment worn when handling related materials as per safe work procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Related materials selected and handled as per manufacturer's specifications and job requirements.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 5**

5. Waste materials disposed of as per environmental requirements.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****UNIT STANDARD ACCREDITATION AND MODERATION OPTIONS**

Anyone assessing a learner against this unit standard must be registered as an assessor with the relevant ETQA.

UNIT STANDARD ESSENTIAL EMBEDDED KNOWLEDGE

- > A basic understanding of assembling the relevant hardware.
- > A broad understanding of the application and purpose of hardware and related materials.
- > A basic understanding of the relevant procedures and practices relating to handling and assembling.

UNIT STANDARD DEVELOPMENTAL OUTCOME

N/A

UNIT STANDARD LINKAGES

N/A

Critical Cross-field Outcomes (CCFO):**UNIT STANDARD CCFO IDENTIFYING****UNIT STANDARD CCFO WORKING****UNIT STANDARD CCFO ORGANIZING****UNIT STANDARD CCFO COLLECTING**

Collect, evaluate, organise and critically evaluate information related to LV electrical hardware and related material so that these are accurately interpreted into application performance standards.

UNIT STANDARD CCFO COMMUNICATING**UNIT STANDARD CCFO SCIENCE****UNIT STANDARD CCFO DEMONSTRATING****UNIT STANDARD CCFO CONTRIBUTING****UNIT STANDARD ASSESSOR CRITERIA**

N/A

UNIT STANDARD NOTES

Specified Requirements:

Specified requirements include legal and legislative specific requirements and are contained in one or more of the following documents:

- > OHS Act
 - > Environmental Act
 - > ISO Standards
 - > SABS 0142
-



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

4

Inspect and clean electrical machines

SAQA US ID		UNIT STANDARD TITLE	
113876		Inspect and clean electrical machines	
SGB NAME		ABET BAND	PROVIDER NAME
SGB Electrical Engineering & Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Electrical Infrastructure Construction	
UNIT STANDARD CODE		UNIT STANDARD TYPE	NQF LEVEL
PPC-EIC-0-SGB ECC		Regular	Level 2
			CREDITS
			4
REGISTRATION START DATE	REGISTRATION END DATE	REGISTRATION NUMBER	SAQA DECISION NUMBER

PURPOSE OF THE UNIT STANDARD

This unit standard is for persons in the electrical engineering and maintenance environment. A person credited with this unit standard will be able to inspect and clean electrical machines.

This unit standard will contribute to the full development of the learner within the electrical engineering and construction environment by providing recognition, further mobility and transportability within the field of Physical Planning and Construction. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and upliftment within the electrical engineering and construction environment.

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills attitude and / or equivalent:

- > Introduction to industry (work environment)
- > Statutory requirements
- > Identify, inspect and clean electrical machines
- > Basic safety within the electrical environment
- > Selection and use of applicable tools
- > Use of electrical test instruments

UNIT STANDARD RANGE

1. Electrical machines may include but not limited to:

- > AC motors and alternators
- > DC motors and generators

2. Cleaning may include but not limited to:

- > Washing of frame
- > Blowing out machines with compressed air
- > Cleaning of slip rings

3. Electrical inspection may include but not limited to inspection of:

- > Earthing according to SANS 10142 - 1
- > Terminations / hot connections
- > Brushes

- > Brush gear
- > Brush pressure
- > Commutator
- > Terminal marks

4. Mechanical inspection may include but not limited to inspection of:

- > Check frame for cracks
- > Bearings
- > Couplings
- > Base mounting / bolts
- > Cooling fan / forced cooling
- > Cowling if applicable
- > Terminal box

5. Statutory requirements are included but are not limited to SANS 10142 - 1, OSH Act

UNIT STANDARD OUTCOME HEADER

N/A

Specific Outcomes and Assessment Criteria:

SPECIFIC OUTCOME 1

Plan work and prepare work area.

OUTCOME NOTES

OUTCOME RANGE

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1

1. Job instructions are interpreted according to worksite procedures.

ASSESSMENT CRITERION NOTES

ASSESSMENT CRITERION RANGE

ASSESSMENT CRITERION 2

2. Job instructions are communicated with the team leader.

ASSESSMENT CRITERION NOTES

ASSESSMENT CRITERION RANGE

ASSESSMENT CRITERION 3

3. Personal protective equipment is selected, examined and used in a manner that protects the individual.

ASSESSMENT CRITERION NOTES

ASSESSMENT CRITERION RANGE

ASSESSMENT CRITERION 4

4. Tools, material, work platforms and equipment are selected and transported to the work site.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 5**

5. The work site is examined for hazardous and sub-standard conditions. Critical hazards and sub-standard conditions encountered in a particular context are addressed.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 6**

6. Affected parties are informed and liased with according to work site procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 2**

Clean and inspect AC machines.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. The machines to be cleaned and inspected are verified.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Personal protective equipment, tools, materials, work platforms, special work platforms (if necessary) and consumables are effectively used to carry out the job.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. AC machine(s) are cleaned and inspected according to job instructions and work site procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

ASSESSMENT CRITERION 4

4. Safety, good housekeeping and environmental practices are followed before, during and after performance.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 3**

Clean and inspect DC machines.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. The machines to be cleaned and inspected are verified.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Personal protective equipment, tools, materials, work platforms, special work platforms (if necessary) and consumables are effectively used to carry out the job.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. DC machine(s) are cleaned and inspected according to job instructions and work site procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Safety, good housekeeping and environmental practices are followed before, during and after performance.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

SPECIFIC OUTCOME 4

Complete activity.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Documentation is completed and processed according to company procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Personal protective equipment, tools, DC machine components, materials, work platforms, recyclable material and unused/half used consumables are stored according to work site procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Scrap material is disposed off according to company standards and procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Work area is restored to a clean and safe condition according to work site procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 5**

5. Completion of job is reported according to work site procedures.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****UNIT STANDARD ACCREDITATION AND MODERATION OPTIONS**

1. Anyone assessing a learner against this unit standard must be registered as an assessor with the relevant ETQA.
2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.
3. Moderation of assessment will be overseen by the relevant ETQA according to the moderation guidelines in the relevant qualification and the agreed ETQA procedures.

UNIT STANDARD ESSENTIAL EMBEDDED KNOWLEDGE

- > A broad understanding of occupational health, safety and environmental statutory requirements pertaining to

the activity

- > A comprehensive understanding of applicable worksite procedures
- > A basic understanding of applicable manufacturers' specifications

Knowledge that will help me understand and that I will be able to explain:

- > Applicable work site procedures
- > Job instructions
- > Documentation required for the activity
- > Communication and teamwork principles
- > Reporting systems
- > Ingress protection rating
- > Identification, location and function of appropriate tools, personal protective equipment and consumables
- > Effect of poisonous, toxic and dangerous materials on the human body
- > Names and functions of electrical machines
- > Construction of electrical machines
- > Working principles of electrical machines are theoretically and practically explained as well as scientifically and mathematically proven
- > Uses of electrical machines

UNIT STANDARD DEVELOPMENTAL OUTCOME

N/A

UNIT STANDARD LINKAGES

N/A

Critical Cross-field Outcomes (CCFO):

UNIT STANDARD CCFO IDENTIFYING

Identify and solve problems (Identification of defects)

UNIT STANDARD CCFO WORKING

Work effectively with others (Organise material schedules with team members)

UNIT STANDARD CCFO ORGANIZING

Organise and manage oneself (Select and organise documentation and equipment)

UNIT STANDARD CCFO COLLECTING

Collect, analyse, organise and critically evaluate information (Adhere to manufacturer specifications)

UNIT STANDARD CCFO COMMUNICATING

Communicate (Reporting of defects)

UNIT STANDARD CCFO SCIENCE

Use science and technology (Environmental and personal safety)

UNIT STANDARD CCFO DEMONSTRATING

Understand the world as a set of related systems communicate (Know the consequences of incorrect using of products)

UNIT STANDARD CCFO CONTRIBUTING

UNIT STANDARD ASSESSOR CRITERIA

N/A

UNIT STANDARD NOTES

Supplementary

Specified Requirements

Specified requirements include legal and legislative specific requirements and are contained in one or more of

the following documents:

- > NZ 2395
- > OHS Act

Glossary of Terms

- > AC machines may include but are not limited to:
 - > Three phase squirrel cage induction motor
 - > Three phase slip-ring motor
 - > Synchronous machine
 - > Single phase squirrel cage induction motor
 - > Universal motor
 - > Multi-speed motor

DC machines may include but are not limited to:

- > Series
 - > Shunt
 - > Compound - Accumulative / Differential
-



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

5

Understand fundamentals of electricity

SAQA US ID	UNIT STANDARD TITLE		
113877	Understand fundamentals of electricity		
SGB NAME		ABET BAND	PROVIDER NAME
SGB Electrical Engineering & Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Electrical Infrastructure Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-EIC-0-SGB ECC	Regular	Level 2	8
REGISTRATION START DATE	REGISTRATION END DATE	REGISTRATION NUMBER	SAQA DECISION NUMBER

PURPOSE OF THE UNIT STANDARD

This unit standard is for persons in the Electrical Engineering; Generation; Distribution; Transmission, Construction and Renewable Energy Sector

A person credited with this unit standard will be capable of:

- > Explaining the atom theory
- > Explaining the effect of magnetism on a moving conductor
- > Understanding the generation and distribution of electricity
- > Stating Ohm's law and the application of it.
- > Understanding batteries as a source of electricity
- > Understanding, building and calculating the effect of electricity in series, parallel and series parallel circuits.
- > Protecting circuits and balancing the load.

This unit standard will contribute to the full development of the learner within the electrical engineering and construction environment by providing recognition, further mobility and transportability within the field of Physical Planning and Construction. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and upliftment within the electrical engineering and construction environment. This unit standard is a pre requisite for registration as an accredited person and does not give the learner the legal right to issue a Certificate of Compliance. The registering authority will do registration as an accredited person. This unit standard may not cover the Explosion Industry.

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills attitude and / or equivalent:

- > GETC certificate NQF level 1
- > Fundamentals on a NQF 2 qualification. Numeracy and literacy.

UNIT STANDARD RANGE

The range of this theoretical unit standard will include but are not limited to:

1. Explanation of one electron revolving around a nucleus.
2. Movement of electrons in a conductor.
3. Current flow through a single load.
4. Generation of electricity by means of the three basic conditions, movement, magnetism and conduction.

5. Potential difference (V) and electromotive force (EMF).
6. Rules and characteristics of magnetic lines.
7. Conversion of fuels into electrical energy.
8. Direct current generators and alternators.
9. Copper and aluminium conductors.
10. Insulating material commonly used in the electrical field.
11. Definition and application of Ohm's law with regard to Voltage, Current, Resistance and Power.
12. Circuit protection includes fuses, circuit breakers and overload relays.
13. Relevant sections of the SABS 0142-1 code of practice.

UNIT STANDARD OUTCOME HEADER

N/A

Specific Outcomes and Assessment Criteria:**SPECIFIC OUTCOME 1**

Demonstrate an understanding of the fundamentals of electricity.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Define electricity.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Explain and demonstrate the movements of electrons.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Explain the effect of an external power source on the electrons in a conductor.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Demonstrate an understanding of the current flow in a circuit.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

SPECIFIC OUTCOME 2

Differentiate between permanent and temporary magnets.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Explain the lines of force flowing outside a permanent magnet.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Define induction by a magnetic field.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Explain the production of electricity by using a conductor that moves in a magnetic field.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 3**

Define conductors and insulators.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Types and properties of conductors.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Characteristics and uses of conductors.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

ASSESSMENT CRITERION 3

3. Types and properties of insulators.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Characteristics and uses of insulators.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 4**

Demonstrate an understanding of the generation and distribution of electricity.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Electricity by means of a chemical reaction. Primary and secondary cells.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Conversion of fuels into energy.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Single phase generators.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Single phase alternators.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

SPECIFIC OUTCOME 5

Define and apply Ohm's law.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. List the SI units for Energy, Volts, Current, Resistance and Power complete with the quantity symbol, unit and unit symbol.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Describe the base units for Kilo, Milli and Mega complete with its symbol and exponent.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. List and draw the following symbols for circuits: Lamp; fuse; galvanometer; cell; circuit breaker; conductor; coil; battery; capacitor; dc power source; voltmeter; ac power source; ammeter; switch; ohmmeter; resistance; wattmeter and kilowatt-hour meter.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Define Ohm's Law.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 5**

5. Ohm's law formula as far as volts, resistance, current and power is concerned.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

ASSESSMENT CRITERION 6

6. Calculations in the following circuits. Total resistance; Current through each resistance; voltage over each resistance and power consumed by each resistance in:

- > Series
- > Parallel
- > Series / parallel

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 7**

7. Difference between power and energy.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 8**

8. Balance circuits to avoid volt drop and overloading at certain sections.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 6**

Define and apply circuit protection.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Fuses and their characteristics and purpose.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Connection of fuses in a circuit.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Single phase circuit breakers and their characteristics.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

ASSESSMENT CRITERION 4

4. Connection of circuit breakers in a circuit.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 5**

5. Overload relays and their characteristics.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 6**

6. Connection of overload relays in a circuit.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****UNIT STANDARD ACCREDITATION AND MODERATION OPTIONS**

1. Anyone assessing a learner against this unit standard must be registered as an assessor with the relevant ETQA.

2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.

3. Moderation of assessment will be overseen by the relevant ETQA according to the moderation guidelines in the relevant qualification and the agreed ETQA procedures.

UNIT STANDARD ESSENTIAL EMBEDDED KNOWLEDGE

- > Knowledge of the SABS 0142-1 code of practice pertaining to this unit standard.
- > Manipulation of formulas.
- > Definition of Ohm's law and the application of it.
- > Use and care for conductors and insulators.
- > Safety around batteries.
- > Safety when working with electricity.
- > Dangers of short circuits and loose connections.
- > Relevant sections of the OSH-act.

UNIT STANDARD DEVELOPMENTAL OUTCOME

N/A

UNIT STANDARD LINKAGES

N/A

Critical Cross-field Outcomes (CCFO):**UNIT STANDARD CCFO IDENTIFYING**

Identify and solve problems using critical and innovative thinking to make responsible decisions.

UNIT STANDARD CCFO WORKING

Work effectively with others during experiments.

UNIT STANDARD CCFO ORGANIZING

Organise and manage oneself.

UNIT STANDARD CCFO COLLECTING

Collect, organise and critically evaluate information.

UNIT STANDARD CCFO COMMUNICATING

Communicate effectively using visual, mathematical and language skills.

UNIT STANDARD CCFO SCIENCE**UNIT STANDARD CCFO DEMONSTRATING****UNIT STANDARD CCFO CONTRIBUTING****UNIT STANDARD ASSESSOR CRITERIA**

N/A

UNIT STANDARD NOTES

Supplementary Information:

Specified Requirements

Specified requirements include legal and legislative specific requirements and are contained in one or more of the following documents:

- > SABS 0142-1
- > Occupational Health & Safety Act (Act 85 of 1993)

Applicable statutory requirements

A glossary of terms about the terminology of

Context Specific

User manuals supplied manufacturers

Specifications, agreements and policies and procedures



SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

6

Install luminaires

SAQA US ID		UNIT STANDARD TITLE	
113879		Install luminaires	
SGB NAME		ABET BAND	PROVIDER NAME
SGB Electrical Engineering & Construction		Undefined	
FIELD DESCRIPTION		SUBFIELD DESCRIPTION	
Physical Planning and Construction		Electrical Infrastructure Construction	
UNIT STANDARD CODE	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
PPC-EIC-0-SGB ECC	Regular	Level 2	4
REGISTRATION START DATE	REGISTRATION END DATE	REGISTRATION NUMBER	SAQA DECISION NUMBER

PURPOSE OF THE UNIT STANDARD

This unit standard is for persons in the Electrical Engineering; Generation; Distribution; Transmission, Construction and Renewable Energy Sector

A person credited with this unit standard will be able to:

- > Explain the requirements pertaining to the installation of luminaires
- > Prepare to install a luminaire
- > Install the luminaires
- > Prepare and test the luminaires for operation

This unit standard will contribute to the full development of the learner within the electrical engineering and construction environment by providing recognition, further mobility and transportability within the field of Physical Planning and Construction. The skills, knowledge and understanding demonstrated within this unit standard are essential for social and economic transformation and upliftment within the electrical engineering and construction environment.

LEARNING ASSUMED TO BE IN PLACE

The following knowledge, skills attitude and / or equivalent:

- > Introduction to industry and operational area
- > Apply and adhere to electrical safety
- > Identify, interpret and lay out of drawings
- > Use and care for hand tools
- > Use and care for portable power tools
- > Record instrument readings
- > Select, use and care for electrical measuring instruments
- > Install electrical cables and conductors
- > Interpret single-phase diagrams
- > Joint and fault trace cables.

UNIT STANDARD RANGE

The work done will be according to the appropriate of the following specifications, standards and/or procedures:

- > Statutory requirements
- > Work site procedures
- > Manufacturer specifications

Equipment may include but are not limited to:

- > Luminaires for use in the domestic, learning institution and office environment
- > Luminaires for use in the industrial environment
- > Luminaires for use in hazardous areas
- > Luminaires for street lighting
- > Luminaires for emergency lighting
- > Luminaires for use in the sport field environment
- > Cables
- > Glands

Lamps may include but are not limited to:

- > Incandescent lamps (GLS, Tungsten halogen, compact sources)
- > Low pressure mercury vapour lamps (Switch start, Semi-resonant, Rapid start, Slimline, Compact fluorescent)
- > High intensity discharge lamps (Metal Halide, High Pressure Mercury Vapour, High Pressure Sodium, Low pressure Sodium)

UNIT STANDARD OUTCOME HEADER

N/A

Specific Outcomes and Assessment Criteria:

SPECIFIC OUTCOME 1

Explain the requirements pertaining to the selection and methods of installation.

OUTCOME NOTES

OUTCOME RANGE

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1

1. The reason for selecting of equipment/components according to cable type, cable size, voltage-, current-, wattage-, frequency rating and insulating material are given.

ASSESSMENT CRITERION NOTES

ASSESSMENT CRITERION RANGE

ASSESSMENT CRITERION 2

2. The impact of size and type of light fittings are explained.

ASSESSMENT CRITERION NOTES

ASSESSMENT CRITERION RANGE

ASSESSMENT CRITERION 3

3. The method of cable termination is explained.

ASSESSMENT CRITERION NOTES

ASSESSMENT CRITERION RANGE

ASSESSMENT CRITERION 4

4. The applicable method of installation is explained.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 5**

5. The regulations applicable to the installation of luminaires are explained.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 2**

Prepare to install a luminaire.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Appropriate documentation is acquired.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. Job instructions are communicated with the team leader.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Personal protective equipment is selected and examined in a manner that protects the individual.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. Tools, material, work platforms and equipment are selected and transported to the work site.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

ASSESSMENT CRITERION 5

5. The work site is examined for hazardous and sub-standard conditions. Critical hazards and sub-standard conditions encountered in a particular context are addressed.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 6**

6. The installation specifications are verified.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 7**

7. The consequences of not preparing to install in line with specified requirements are explained with reference to personal and team safety, impact on the environment, production costs and lost time.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 3**

Install the luminaire.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. Hazards and risks directly related to installing a luminaire are identified and addressed.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 2**

2. The luminaire is installed.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

This includes mounting, wiring, termination, etc.

ASSESSMENT CRITERION 3

3. Safety, good housekeeping and correct environmental practices are followed before, during and after performance.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

ASSESSMENT CRITERION 4

4. The consequences of not installing a luminaire in line with specified requirements are explained with reference to personal and team safety, impact on the environment, production costs and lost time.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****SPECIFIC OUTCOME 4**

Prepare and test the luminaire for operation.

OUTCOME NOTES**OUTCOME RANGE****ASSESSMENT CRITERIA****ASSESSMENT CRITERION 1**

1. The luminaire is tested to ensure compliance.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

This includes continuity, earth continuity, insulation, etc.

ASSESSMENT CRITERION 2

2. The luminaire is connected to the power.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 3**

3. Tools, material, work platforms and equipment are cleaned, inspected and stored or disposed.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 4**

4. The feedback report complies with specified requirements for format, contents, accuracy and distribution. The report is delivered within the agreed time.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE****ASSESSMENT CRITERION 5**

5. The consequences of not reporting and performing housekeeping duties in line with specified requirements are explained with reference to personal and team safety, impact on the environment, production costs and lost time.

ASSESSMENT CRITERION NOTES**ASSESSMENT CRITERION RANGE**

UNIT STANDARD ACCREDITATION AND MODERATION OPTIONS

1. Anyone assessing a learner against this unit standard must be registered as an assessor with the relevant ETQA.
2. Any institution offering learning that will enable achievement of this unit standard must be accredited as a provider through the relevant ETQA by SAQA.
3. Moderation of assessment will be overseen by the relevant ETQA according to the moderation guidelines in the relevant qualification and the agreed ETQA procedures.

UNIT STANDARD ESSENTIAL EMBEDDED KNOWLEDGE

Knowledge that will help me understand and that I will be able to explain:

- > SHERQ statutory requirements for activity
- > Applicable work site procedures
- > Applicable manufacturers' specifications
- > Documentation required for the activity
- > Communication and teamwork principles
- > Reporting systems
- > Identification, location and function of appropriate tools, material, personal protective equipment and work platforms
- > Names and functions of components used in the installation process
- > Ingress protection ratings
- > Installation procedures
- > Fault finding principles

UNIT STANDARD DEVELOPMENTAL OUTCOME

N/A

UNIT STANDARD LINKAGES

N/A

Critical Cross-field Outcomes (CCFO):**UNIT STANDARD CCFO IDENTIFYING**

Identify and solve problems in testing, fault finding, repairing and rectifying faults

UNIT STANDARD CCFO WORKING

Work effectively with others in reporting test results to superior

UNIT STANDARD CCFO ORGANIZING

Organise and manage oneself in planning the work and determining a sequence of operation

UNIT STANDARD CCFO COLLECTING

Collect, analyse, organise and critically evaluate information obtained during testing, fault finding, repairing and rectifying faults

UNIT STANDARD CCFO COMMUNICATING

Communicate with superior readings obtained, the interpretation and reporting of test results

UNIT STANDARD CCFO SCIENCE**UNIT STANDARD CCFO DEMONSTRATING****UNIT STANDARD CCFO CONTRIBUTING****UNIT STANDARD ASSESSOR CRITERIA**

N/A

UNIT STANDARD NOTES**Supplementary Information****Specified Requirements**

Specified requirements include legal and legislative specific requirements and are contained in one or more of the following documents:

- > SABS 0142
- > OSH Act
- > Statutory requirements

Glossary of Terms

Communications and teamwork principles may include but are not limited to:

- > Questions and answers
- > Discussions
- > Depending on the help of somebody else to do a job

Documentation may include but are not limited to:

- > Checklists
- > Job cards

Environmental practices may include but are not limited to correct methods of disposing of material containing:

- > Galvanise
- > Silicon
- > Cadmium
- > Fiberglas

Fault finding principles may include but are not limited to methods of discovering:

- > Broken luminaire bowls, hinges, seals, mountings
- > Sharp edges on damaged luminaires
- > Wrong wiring and termination
- > The use of wrong equipment/components

Good housekeeping practices may include but are not limited to practices given by:

- > NOSA
- > Work site procedures

Hazardous and sub-standard conditions may include but are not limited to:

- > Luminaires above moving machinery
- > Broken components with sharp edges that is to be removed
- > Equipment blocking the work area
- > Uneven surfaces onto which luminaires to be secured

Ingress protection rating may include but are not limited to:

- > Protection of persons against access to hazardous parts
- > Protection against water
- > Mechanical protection

Installing procedure may include but are not limited to:

- > Manufacturers' maintenance manuals
- > Company maintenance manuals

Job instruction may include but are not limited to instructions from:

- > Job cards
- > Team leader (Verbal instructions)

Maintenance procedure may include but are not limited to:

- > Manufacturers' maintenance manuals
- > Company maintenance manuals

CONTINUES ON PAGE 289—PART 2