GOVERNMENT NOTICES

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

No. 1399 **29 December 2008**

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

Mining and Minerals

registered by Organising Field 06 – Manufacturing, Engineering and Technology, publishes the following Qualification and Unit Standards for public comment.

This notice contains the titles, fields, sub-fields, NQF levels, credits, and purpose of the Qualification and Unit Standards. The full Qualification and Unit Standards can be accessed via the SAQA web-site at **www.saqa.org.za**. Copies may also be obtained from the Directorate of Standards Setting and Development at the SAQA offices, SAQA House, 1067 Arcadia Street, Hatfield, Pretoria.

Comment on the Qualification and Unit Standards should reach SAQA at the address below and ***no later than 29 January 2009.*** All correspondence should be marked **Standards Setting – SGB for Mining and Minerals** and addressed to

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ACTING DIRECTOR: STANDARDS SETTING AND DEVELOPMENT

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
Further Education and Training Certificate: Minerals Processing

SAQA QUAL ID	*QUALIFICATION TITLE*		
64889	Further Education and Training Certificate: Minerals Processing		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
QUALIFICATION TYPE	*FIELD*	*SUBFIELD*	
Further Ed and Training Cert	6 - Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	*MINIMUM CREDITS*	*NQF LEVEL*	*QUAL CLASS*
Undefined	137	Level 4	Regular-Unit Stds Based

This qualification replaces:

Qual ID	Qualification Title	NQF Level	Min Credits	Replacement Status
49049	Further Education and Training Certificate: Lump Ore Beneficiation	Level 4	166	Will occur as soon as 64889 is registered

PURPOSE AND RATIONALE OF THE QUALIFICATION
Purpose:

This qualification is intended to address the training needs for metallurgical process controllers. This competence provides the skills needed to supervise and coordinate significant processes within metallurgical operations. It also provides the basis upon which further related learning and career development can take place.

Through the employment of competent operating personnel, employers and in turn the field and sub-field have confidence that this critical work in the industry is efficiently carried out.

Social development and economic transformation are enhanced through efficient extraction, and career development and personal job satisfaction of operating personnel are facilitated through the learning process used to achieve the competency specified.

Learners credited with this qualification will be able to:

> Communicate and solve problems in Mineral Processing.
> Maintain Occupational Health, Safety and general housekeeping.
> Lead a team to work co-operatively to achieve objectives.
> Control metallurgical operations from a control room.

Rationale:

"Minerals Processing" in this context refers to the extraction of valuable minerals contained in mined ore and the production of related products, or enriched concentrates, for further processing or sale. Processes employed in the recovery of gold, platinum, uranium, base metals, coal, iron ore, diamonds, manganese etc. are provided for in this qualification. Recovery rates and cost implications relating to minerals extraction processes must be optimised to

ensure the ongoing viability of the producer. Obtaining this qualification will equip learners to supervise and coordinate the Mineral processing operation in achieving this goal.

End products of these processes are metals or metal compounds that can be used in a wide variety of applications, for example:

> Gold used for jewellery, currency, electronic components, dentistry.
> Uranium used for nuclear power stations fuel, nuclear powered ships and submarines, and isotopes for instrumentation.
> Base metals like copper and aluminium for conductors, zinc for anti-corrosion coatings, cobalt for paint, and lead for battery poles.
> Platinum group metals for jewellery and catalysts.
> Mineral sand products (titanium etc.) for steel hardening, paint pigments and special alloys.
> Lump Ore Beneficiation done to increase grade of the ore in order to minimise the cost of subsequent transport and further processing.

Production of these commodities is of tremendous benefit to the economy, as well as society, by way of local and foreign investments and sale of products.

Typical learners are operating personnel working in a metallurgical plant. A learner achieving this qualification will be qualified to monitor and control a mineral processing plant.

This is the third qualification in the learning pathway for Mineral Processing. A learner would proceed from this qualification to a National Diploma or Degree in Extraction Metallurgy or Chemical engineering.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED IN PLACE
Communication and Mathematical Literacy at NQF Level 3.

Recognition of Prior Learning:

This qualification can be achieved wholly or in part through recognition of prior learning.

Evidence can be presented in a variety of forms, including international or previous local qualifications, reports, testimonials mentioning functions performed, work records, portfolios, videos of practice and performance records.

Access to the Qualification:

Access is open, however it is preferable that learners have completed the National Certificate in Minerals Processing, NQF Level 3.

QUALIFICATION RULES
Fundamental Component:

> All unit standards totalling 56 credits are compulsory.

Core Component:

> All 37 credits are compulsory.

Elective Component:

> A minimum of 44 credits must be obtained from the rest of the electives to make up a minimum of 137 credits for the qualification.

EXIT LEVEL OUTCOMES
Range:

> Workplace refers to the Minerals Processing environment.
> Minerals processing refers to the processing of Gold, Uranium, Base metals, Platinum, Minerals Sands and Lump Ore.
> Metallurgical Operations include Milling- and Classifications, Leaching, Elution, Carbon adsorption, Froth flotation, Thickening, dense medium separation, de-watering, resin adsorption, Uranium recovery, Crushing etc.

1. Communicate and solve problems in the workplace.

2. Maintain Occupational Health, Safety and general housekeeping.

3. Lead a team to work co-operatively to achieve objectives.

4. Control metallurgical operations from a control room.

Critical Cross field Outcomes:

The Critical Cross-Field Outcomes are addressed in the qualification as follows:

While overseeing mineral process operations, qualifying learners are able to:

Identify and solve problems in which responses display that responsible decisions using critical thinking have been made:
> Monitor and control plant, equipment and processes in a minerals processing environment in terms of physical condition and operation.
> Monitor plant and control equipment and processes in a minerals processing environment in terms of compliance with operational procedures and quality assurance requirements.
> Respond to non-conformances in a minerals processing environment.
> Respond to emergencies in a minerals processing environment (plant, buildings, process).
> Apply preventative or remedial action in accordance with operating procedures.

Work effectively with others as a member of a team, group, organisation or community by:
> Contribute to team goals and achievements by adhering to agreed working methods and processes.
> Contribute to team efficiency by supporting other team members in the minerals processing environment.
> Adhere to team protocols, codes of conduct and generally promoting a positive team spirit.
> Coordinate one's work with that of others in the direct surrounding area, internal and external operations.

Organise and manage oneself and one's activities responsibly and effectively by:
> Conduct shift take-over and hand-over activities effectively in order to ensure typical continuous operations in a minerals processing plant.
> Apply operating instructions to control and respond to process plant conditions.
> Take preventive and remedial action to solve operating problems in a process plant.
> Maintain product quality by adhering to quality assurance requirement in a minerals processing environment.

Collect, analyse, organise and critically evaluate information by:
> Monitor operational parameters in a minerals processing environment.
> Collate and sort quality assurance data.
> Monitor and interpret quality assurance data against the requirements.
> Manage records, reports and stock.

Communicate effectively by using mathematical and/or language skills in the modes of oral and/or written presentations by:
> Interpret, record and report minerals processing plant data obtained from visual inspections, instrument readings and process control feedback.
> Complete reports, log sheets, shift handover activities and other process control activities effectively, ensuring that all other team members are aware of critical information.
> Prepare and submit reports, non-conformance reports and other required documentation.
> Work with modern communications technology such as computer messaging, cellular phones and radio systems in a process control environment.

Use science and technology effectively and critically, showing responsibility towards the environment and health of others by:
> Work according to health and safety regulations.
> Use relevant terminology and adhere to standard protocols such as SI, ISO and other standards applicable in the minerals processing environment.
> Control technologically advanced production equipment according to operating procedures.
> Work and interpret technologically advanced instrumentation and computer systems.

Demonstrate an understanding of the world as a set of related systems by recognising that problem solving contexts do not exist in isolation by:
> Understand the impact of upstream, downstream and parallel minerals processing systems upon each other and his own role in each context.
> Request assistance from other team members and support personnel.
> Assist other team members and work together with support personnel to investigate and resolve problem areas.
> Adjust equipment and machinery while taking cognizance of the impact on other processes.

ASSOCIATED ASSESSMENT CRITERIA
Range:

> Workplace refers to the Minerals Processing environment.
> Minerals processing refers to the processing of Gold, Uranium, Base metals, Platinum, Minerals Sands and Lump Ore.
> Metallurgical Operations include Milling- and Classifications, Leaching, Elution, Carbon adsorption, Froth flotation, Thickening, dense medium separation, de-watering, resin adsorption, Uranium recovery, Crushing etc.

Associated Assessment Criteria for Exit Level Outcome 1:

1.1 Oral and written communication is maintained and adapted as required to promote effective interaction in a metallurgical plant.
1.2. Mathematical principles are applied while performing the tasks related to mineral processing.
1.3. Process problems are resolved and recorded in accordance with set standards.
1.4. Time and the work processes are managed to achieve effective control of the different operations within a metallurgical plant.

Associated Assessment Criteria for Exit Level Outcome 2:

2.1. Procedures, material requirements and methodologies are employed in compliance with the prescribed Occupational Safety, Health and Environmental standards.
2.2. Plant safety, quality and efficiency maintained at optimal levels in accordance with organisational standards.
2.3. Mechanisms for minimising of Occupational Health, Safety and Environmental impacts and risks, as specified in current legislation, are ensured to be in place in place.

Associated Assessment Criteria for Exit Level Outcome 3:

3.1. The principles of leadership are explained and applied within a work unit.
3.2. The budgeting function within a business unit is explained, planned and applied in accordance with set parameters.
3.3. The organisation's objectives and Standard Operating Procedures (SOPs) are analysed in order to determine the direction of work units.
3.4. Knowledge of group dynamics is applied to build a team.

Associated Assessment Criteria for Exit Level Outcome 4:

4.1. Knowledge of controlling and operating a metallurgical plant from a control room is demonstrated in accordance with standard operating practices.
4.2. Metallurgical processes are monitored and controlled using various automated methods.
4.3. The impact of all processes and material variables on the specific metallurgical operation is integrated as required.
4.4. Corrective action is taken to maintain product quality and process integrity.
4.5. Production results and deviations are reported and logged on a continual basis according to data logging requirements.

Integrated Assessment:

Integrated assessment at the level of the qualification provides an opportunity for learners to show they are able to integrate concepts, actions and ideas achieved across a range of unit standards and contexts.

Integrated assessment must evaluate the quality of observable performance as well as the thinking behind the performance, and must be based on a summative assessment guide. The guide will spell out how the assessor will assess different aspects of the performance and will include:

> Observing the learner at work (both in the primary activity as well as other interactions).
> Asking questions and initiating short discussions to test understanding.
> Looking at records and reports in the portfolio and reviewing previous assessments.

In some cases inference will be necessary to determine competence depending on the nature and context within which performance takes place.

It is necessary to ensure that the fundamental part of the qualification is also targeted to ensure that while the competence may have been achieved in a particular context, learners are able to apply it in a range of other contexts and for future learning. The assessment should also ensure that all the critical cross-field outcomes have been achieved.

The learner may choose in which language he/she wants to be assessed. This should be established as part of a process of preparing the learner for assessment and familiarising the learner with the approach being taken.

While this is primarily a workplace-based qualification, evidence from other areas of endeavour may be introduced if pertinent to any of the exit-level outcomes. The assessment process

should cover both the explicit tasks required for the qualification as well as the understanding of the concepts and principles that underpin the activities associated with minerals processing.

INTERNATIONAL COMPARABILITY

The proposed qualification was compared with qualifications, courses and other learning interventions available elsewhere in the world in order to ensure that the qualification structure and unit standards proposed are comparable in terms of level, scope of qualifications and competencies covered.

In many countries related training is offered at tertiary education level (typically for higher "NQF" levels than the Level 4 of this proposed qualification), or on-the-job training, which is often very site-specific and not formally recognised.

It was interesting to note that as the levels of qualifications increase, the competencies required become broader or more generic. Specific competencies become more specialised, but aspects such as Safety, Environment, and Quality etc. appear in the majority of courses and qualifications.

Formal Qualifications:

Relevant formal qualifications were found on the Australian and New Zealand frameworks. The proposed FETC: Minerals Processing compared well with both these qualifications.

Australia: National Training Information Services:

The following programme is offered:

Certificate IV in Metalliferous Mining Operations (Processing):

Numerous competencies from this qualification/programme are within the proposed South African Mining and Minerals SGB qualification or in the learning pathway leading to the qualification.

Some of the competencies in the Australian qualification are:

Core:
> Work safely.
> Communicate in the workplace.
> Contribute to quality work outcomes.
> Participate in environmental work practices.
> Mine supervision:
> Apply, monitor, rectify and report statutory/legal compliance systems.
> Apply and monitor mine emergency preparedness and response systems.
> General:
> Apply risk management processes.
> Conduct safety and health investigations.
> Communicate information.

Elective units:
> General:
> Apply basic First Aid.
> Apply advanced First Aid.

> Mine supervision:
> Apply and monitor mine services and infrastructure systems.

> Commission/recommission plant.
> Supervise work in confined spaces.

> General processing:
> Manage plant shutdown and restart.
> Decommission plant.
> Analyse data and report results.

> By-product management:
> Monitor and coordinate waste and process water treatment.

> Supervision:
> Develop work priorities.
> Develop teams and individuals.
> Coordinate implementation of customer service strategies.
> Monitor a safe workplace.
> Promote innovation and change.
> Implement effective workplace relationships.
> Implement operational plan.
> Implement workplace information system.
> Implement continuous improvement.
> Promote team effectiveness.
> Contribute to assessment.
> Plan and organise assessment.
> Assess competence.
> Participate in assessment validation.
> Provide training through instruction and demonstration of work skills.

New Zealand: The New Zealand Qualification Authority:

The following programme is offered:

National Certificate in Extractive Industries (Mineral Processing - Alluvial Gold), Level 4, Credits 216.

The structure, outcomes and purpose of this qualification compare well with the proposed South African Mining and Minerals SGB qualification.
Some of the competencies in the New Zealand qualification are:

Compulsory:
> Suppress fire with hand extinguishers and fixed hose reels.
> Demonstrate knowledge of electrical safe working practices.
> Demonstrate knowledge of electrical testing to ensure safety.
> Operate alluvial gold plant.
> Maintain an alluvial gold plant.
> Manage first aid in emergency situations.
> Provide first aid.
> Provide resuscitation.
> Protect health and safety in the workplace.
> Communicate information in a specified workplace.
> Sling and communicate during crane operations.

Elective:
> Select, use, and care for engineering hand tools.
> Select, use, and maintain portable hand held engineering power tools.

> Follow safe working practices on an engineering work site.
> Lubricate machines in industry.

Other courses and programmes:

ASM International runs courses in the USA, Canada as well as the UK.

Elements of Metallurgy:
> Steps in processing common ores to metals.
> Beneficiating and reducing methods.
> Types of furnaces.
> Refractories.

These items could very well form part of the training for the achievement of the proposed Minerals Processing qualification. However, they are not organised in the same manner as the proposed qualification.

India:

In India the courses offered are pitched well above the level of this proposed certificate. There are also degree courses and hence a comparative analysis was not practical.

Practical Metallurgical Solutions offers courses in various countries all over the world including:
> North & South America.
> India.
> China.
> Europe.
> Japan.
> South Korea.

The courses are not as broad as qualifications, but cover the learning that is part of the FETC: Minerals Processing.

Britain:

The competencies required for Minerals Processing are very similar to those required in the Chemical field. Competencies from the City & Guilds Level 3 NVQ in Chemical, Pharmaceutical and Petro-Chemical Manufacture illustrate this observation:

> Controlling Process Operations.
> Technical Support.
> Safety.
> Teamwork.
> Work handover.
> Preparing, controlling, maintaining, restoring and completing processing operations.
> Quality management.
> Cleaning and preparing equipment.
> SHEQ.
> Problem solving.
> Risk assessment.
> Quality control.

Conclusion:

It can be concluded that the competencies addressed by the FETC: Minerals Processing are in line with courses and qualifications from other parts of the world and represent best practice.

ARTICULATION OPTIONS
This qualification allows for both vertical and horizontal articulation.

Vertical articulation exists with:

> National Diploma: Extraction Metallurgy, NQF Level 5.
> National Diploma: Chemical Engineering, NQF Level 5.

Horizontal articulation exists with:

> ID 58538: Further Education Training Certificate: Chemical Operations, NQF Level 4.

MODERATION OPTIONS
> Anyone assessing a learner or moderating the assessment of a learner against the qualification must be registered as an assessor with the relevant Education, Training, Quality, Assurance (ETQA) Body.

> Any institution offering learning that will enable the achievement of this qualification must be accredited as a provider with the relevant Education, Training, Quality, Assurance (ETQA) Body, or with an ETQA that has a Memorandum of Understanding with the relevant ETQA.

> Assessment and moderation of assessment will be overseen by the relevant Education, Training, Quality, Assurance (ETQA) Body, or by an ETQA that has a Memorandum of Understanding with the relevant ETQA, according to the ETQA's policies and guidelines for assessment and moderation.

> Moderation must include both internal and external moderation of assessments, unless ETQA policies specify otherwise. Moderation should also encompass achievement of the competence described in the associated unit standards.

> 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 should be in possession of:

> An appropriate qualification above the level of the qualification and preferably relevant workplace practical experience.
> Registration as an assessor with the relevant ETQA.

NOTES
This qualification replaces qualification 49049, "Further Education and Training Certificate: Lump Ore Beneficiation", Level 4, 166 credits.

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
Fundamental	119457	Interpret and use information from texts	Level 3	5
Fundamental	119467	Use language and communication in occupational learning programmes	Level 3	5
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level 3	5

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
Fundamental	9015	Apply knowledge of statistics and probability to critically interrogate and effectively communicate findings on life related problems	Level 4	6
Fundamental	119462	Engage in sustained oral/signed communication and evaluate spoken/signed texts	Level 4	5
Fundamental	119469	Read/view, analyse and respond to a variety of texts	Level 4	5
Fundamental	9016	Represent analyse and calculate shape and motion in 2- and 3-dimensional space in different contexts	Level 4	4
Fundamental	119471	Use language and communication in occupational learning programmes	Level 4	5
Fundamental	7468	Use mathematics to investigate and monitor the financial aspects of personal, business, national and international issues	Level 4	6
Fundamental	119459	Write/present/sign for a wide range of contexts	Level 4	5
Core	8016	Maintaining occupational health, safety and general housekeeping	Level 3	8
Core	117877	Perform one-to-one training on the job	Level 3	4
Core	242810	Manage Expenditure against a budget	Level 4	6
Core	261017	Monitor and control a metallurgical plant from a control room	Level 4	15
Core	244105	Participate in a task team in a process environment	Level 4	4
Elective	260998	Administer first aid in the event of cyanide poisoning	Level 3	3
Elective	261137	Control a resin adsorption process in a metallurgical plant	Level 4	15
Elective	261003	Control the Biological Oxidation (Biox) Process	Level 4	15
Elective	260989	Control the carbon adsorption process in a metallurgical plant	Level 4	15
Elective	260980	Control the crushing and screening operation in a metallurgical plant	Level 4	15
Elective	261011	Control the de-watering process in a metallurgical plant	Level 4	15
Elective	261010	Control the dense medium separation process in a metallurgical plant.	Level 4	15
Elective	260978	Control the drying operation in a metallurgical plant	Level 4	15
Elective	261013	Control the elution process in a metallurgical plant	Level 4	15
Elective	260988	Control the froth flotation process in a metallurgical plant	Level 4	15
Elective	260983	Control the gravity concentration process in a metallurgical plant	Level 4	15
Elective	260985	Control the jig operation process in a metallurgical plant	Level 4	15
Elective	260999	Control the lump ore beneficiation process	Level 4	15
Elective	260986	Control the milling and classification operation in a metallurgical plant	Level 4	15
Elective	261002	Control the operation of an electric arc furnace	Level 4	15
Elective	261118	Control the process of uranium recovery from solution in a metallurgical plant	Level 4	15
Elective	260987	Control the thickening process in a metallurgical plant	Level 4	15
Elective	120389	Explain and apply the concept, principles and theories of motivation in a leadership context	Level 4	6
Elective	261117	Generate steam by means of a coal-burning boiler	Level 4	15
Elective	261012	Oversee the leaching operation in a metallurgical plant	Level 4	15

LEARNING PROGRAMMES RECORDED AGAINST THIS QUALIFICATION
None

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the drying operation in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
260978	Control the drying operation in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
15313	Control a drying operation in a metallurgical plant	Level 4	13	Will occur as soon as 260978 is registered

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the drying operation process.

SPECIFIC OUTCOME 2
Control the drying operation process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of the drying operation process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the crushing and screening operation in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
260980	Control the crushing and screening operation in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the crushing and screening process.

SPECIFIC OUTCOME 2
Control the crushing and screening process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of the crushing and screening process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the gravity concentration process in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
260983	Control the gravity concentration process in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
110161	Control a gravity concentration process in a metallurgical plant	Level 4	17	Will occur as soon as 260983 is registered

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the gravity concentration process.

SPECIFIC OUTCOME 2
Control the gravity concentration process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of the gravity concentration process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the jig operation process in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
260985	Control the jig operation process in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the jig operation process.

SPECIFIC OUTCOME 2
Control the jig operation process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of a jig operation process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the milling and classification operation in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
260986	Control the milling and classification operation in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
11078	Control a milling and classification operation in a metallurgical plant	Level 4	17	Will occur as soon as 260986 is registered

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the milling and classification process.

SPECIFIC OUTCOME 2
Control the milling and classification process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of a milling and classification process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the thickening process in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
260987	Control the thickening process in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the thickening process.

SPECIFIC OUTCOME 2
Control the thickening process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of a thickening process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the froth flotation process in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
260988	Control the froth flotation process in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the froth flotation process.

SPECIFIC OUTCOME 2
Control the froth flotation process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of a froth flotation process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the carbon adsorption process in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
260989	Control the carbon adsorption process in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the carbon adsorption process.

SPECIFIC OUTCOME 2
Control the carbon adsorption process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of the carbon adsorption process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Administer first aid in the event of cyanide poisoning

SAQA US ID	*UNIT STANDARD TITLE*		
260998	Administer first aid in the event of cyanide poisoning		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 3	3

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Prepare to administer first aid in the event of cyanide poisoning.

SPECIFIC OUTCOME 2
Administer first-aid.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the administering of first aid.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the lump ore beneficiation process

SAQA US ID	***UNIT STANDARD TITLE***		
260999	Control the lump ore beneficiation process		
ORIGINATOR		***PROVIDER***	
SGB Mining and Minerals			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the lump ore beneficiation process.

SPECIFIC OUTCOME 2
Control the lump ore beneficiation process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of a lump ore beneficiation process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the operation of an electric arc furnace

SAQA US ID	*UNIT STANDARD TITLE*		
261002	Control the operation of an electric arc furnace		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the electric arc furnace process.

SPECIFIC OUTCOME 2
Control the electric arc furnace process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of a electric arc furnace process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the Biological Oxidation (Biox) Process

SAQA US ID	*UNIT STANDARD TITLE*		
261003	Control the Biological Oxidation (Biox) Process		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the Biological Oxidation (Biox) process.

SPECIFIC OUTCOME 2
Control the Biological Oxidation (Biox) process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of a Biological Oxidation (Biox) process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the dense medium separation process in a metallurgical plant.

SAQA US ID	*UNIT STANDARD TITLE*		
261010	Control the dense medium separation process in a metallurgical plant.		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the dense medium separation process.

SPECIFIC OUTCOME 2
Control the dense medium separation process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of the dense medium separation process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the de-watering process in a metallurgical plant

SAQA US ID	***UNIT STANDARD TITLE***		
261011	Control the de-watering process in a metallurgical plant		
ORIGINATOR		***PROVIDER***	
SGB Mining and Minerals			
FIELD		***SUBFIELD***	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	***UNIT STANDARD TYPE***	***NQF LEVEL***	***CREDITS***
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the de-watering process.

SPECIFIC OUTCOME 2
Control the de-watering process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of a de-watering process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Oversee the leaching operation in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
261012	Oversee the leaching operation in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
11087	Oversee a leaching operation in a metallurgical plant	Level 4	22	Will occur as soon as 261012 is registered

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the overseeing of the leaching process.

SPECIFIC OUTCOME 2
Control the leaching process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the overseeing of the leaching process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the elution process in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
261013	Control the elution process in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard replaces:

US ID	Unit Standard Title	NQF Level	Credits	Replacement Status
15338	Control an elution process in a metallurgical plant	Level 4	22	Will occur as soon as 261013 is registered

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the elution process.

SPECIFIC OUTCOME 2
Control the elution process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of a elution process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Monitor and control a metallurgical plant from a control room

SAQA US ID	*UNIT STANDARD TITLE*		
261017	Monitor and control a metallurgical plant from a control room		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the monitoring and controlling of a metallurgical plant.

SPECIFIC OUTCOME 2
Start the metallurgical plant.

SPECIFIC OUTCOME 3
Monitor and control a metallurgical plant.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the monitoring and controlling of a metallurgical plant.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Core	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Generate steam by means of a coal-burning boiler

SAQA US ID	*UNIT STANDARD TITLE*		
261117	Generate steam by means of a coal-burning boiler		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the generation of steam by means of a coal boiler.

SPECIFIC OUTCOME 2
Prepare to and generate steam by means of a coal boiler.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the steam generation process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control the process of uranium recovery from solution in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
261118	Control the process of uranium recovery from solution in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the uranium recovery process.

SPECIFIC OUTCOME 2
Control the uranium recovery process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of the uranium recovery process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Control a resin adsorption process in a metallurgical plant

SAQA US ID	*UNIT STANDARD TITLE*		
261137	Control a resin adsorption process in a metallurgical plant		
ORIGINATOR		*PROVIDER*	
SGB Mining and Minerals			
FIELD		*SUBFIELD*	
6 - Manufacturing, Engineering and Technology		Fabrication and Extraction	
ABET BAND	*UNIT STANDARD TYPE*	*NQF LEVEL*	*CREDITS*
Undefined	Regular	Level 4	15

This unit standard does not replace any other unit standard and is not replaced by another unit standard.

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the controlling of the resin adsorption process.

SPECIFIC OUTCOME 2
Control the resin adsorption process.

SPECIFIC OUTCOME 3
Complete the duties pertaining to the controlling of the resin adsorption process.

QUALIFICATIONS UTILISING THIS UNIT STANDARD

	ID	QUALIFICATION TITLE	LEVEL
Elective	64889	Further Education and Training Certificate: Minerals Processing	Level 4