No. 224 **16 March *2007***

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 13 April 2007.*** All correspondence should be marked Standards Setting – Mining and Minerals and addressed to

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SOUTH AFRICAN QUALIFICATIONS AUTHORITY

QUALIFICATION:
National Certificate: Sulphuric Acid Production

SAQA QUAL ID	***QUALIFICATION TITLE***		
58186	National Certificate: Sulphuric Acid Production		
SGB		***PROVIDER***	
SGB Mining and Minerals			
ETQA			
QUALIFICATION TYPE	***FIELD***	***SUBFIELD***	
National Certificate	6 - Manufacturing, Engineering and Technology	Fabrication and Extraction	
ABET BAND	***MINIMUM CREDITS***	***NQF LEVEL***	***QUAL CLASS***
Undefined	134	Level 3	Regular-Unit Stds Based
REGISTRATION STATUS	***SAQA DECISION NUMBER***	***REGISTRATION START DATE***	***REGISTRATION END DATE***
Draft - Prep for P			

The purpose of this qualification is to build competence required by employees within the Sulphuric Acid Production field, and add value to the qualifying learner in terms of enrichment, learning and application of this competence within the workplace.

The key skills, knowledge and understanding reflected in this qualification are those of conducting the essential operations associated with efficient and safe operation of the Sulphuric Acid Production plant. This qualification is designed to be flexible and accessible and empowers the learner to acquire and demonstrate knowledge, skills, attitudes and values required to work safely and effectively in a Sulphuric Acid Production plant.

This qualification is aimed at persons who work or intend to work within a Sulphuric Acid Production plant and who seek recognition for essential skills in this area.

It is intended that qualifying learners are able to:

- Communicate and solve problems within sulphuric acid production processes and operate within clearly defined contexts with some scope for personal decision-making and responsibility.
- Apply mathematical principles in practical applications also aiding in understanding of and solving of problems as well as understanding business principles and their application.
- Sustain Occupational Health and Safety in the workplace through the understanding of how to control a Sulphuric Acid production process and meet the associated environmental specifications.
- Conduct materials handling and transport hazardous materials safely.
- Conduct process control operations within Sulphuric Acid production.
- Maintain equipment i.e. by conducting maintenance of machinery within a Sulphuric Acid production process.

The unit standards are intended as building blocks for the further development of skills that will make the learner a more fulfilled, informed, efficient and cost effective worker within the

industries identified. This will result in a more efficient service to customers and more competitive industry within the global market.

Rationale:

Sulphuric Acid Production focuses on oxidation of sulphides and catalytic conversion of the sulphur dioxide gas to sulphur trioxide gas, which is absorbed in water to form sulphuric acid.

This is the second qualification in a learning pathway designed for learners in the mining and minerals sector who want to follow a career in Sulphuric Acid Production. The learning pathway commences with the National Certificate in Sulphuric Acid Production: NQF level 2 and progresses to NQF level 4 for candidates learning and working in a Sulphuric Acid Production plant. The qualification reflects the skills, knowledge and understanding required to function effectively within Sulphuric Acid Production.

This qualification will enhance the status, productivity and employability of the learner within the Mining and Minerals and related chemical manufacturing industries, as well as contribute to the quality, production rate and growth of these industries. Knowledge acquired will be of benefit by allowing learners to identify operational errors sooner and by reducing the number of incidents and accidents should enhance the overall contribution of the learner to the productivity of the industries. It will also add to the learners' status, recognition, licensing and improve their marketability and employability. The qualification opens access to additional learning at NQF level 4 in Sulphuric Acid Production.

Sulphuric Acid Production operations require a sound knowledge of materials transporting, handling and process control of gas generation, cleaning, drying, conversion and absorption associated with Sulphuric Acid Production. The mining sector puts emphasis on safety and a healthy working environment within Sulphuric Acid Production plant. Workers are appointed based on their technical knowledge, experience and potential supervisory ability.

The National Certificate in Sulphuric Acid Production NQF Level 3 is designed to meet the needs of learners in the Mining and Minerals sector (or those who wishing to enter the Mining and Minerals sector) who require the technical expertise and the essential knowledge needed to earn a formal qualification and thus satisfy the Mining and Minerals industry requirements. The qualification facilitates access from previously disadvantaged groups.

The National Certificate in Sulphuric Acid Production: NQF Level 3 will produce knowledgeable, skilled learners able to contribute to improved productivity and efficiency within the industries discussed above, It will also provide the means for current workers to receive recognition of prior learning, to upgrade their skills and receive a nationally recognised qualification. The qualification provides a benefit to society and economy through enhanced citizenship, increasing social and economic productivity, providing specifically skilled people and transforming and redressing the legacies of inequity.

This qualification allows for access, progression, portability and mobility within and between the different Sulphuric Acid Production areas in the Mining and Minerals industry, or the Chemical Manufacturing industry.

RECOGNIZE PREVIOUS LEARNING?
Y

LEARNING ASSUMED TO BE IN PLACE
It is assumed that candidates embarking on learning programs towards this qualification are already competent in the following area:

- Communication and Mathematical literacy at NQF Level 2.

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.

All such evidence should be judged according to the general principles of assessment described in the note to assessors.

Access to the qualification:

Access to this qualification is open bearing in mind learning assumed to be in place.

QUALIFICATION RULES
All the Fundamental unit standards are compulsory:

- **20** credits for Communication.
- **16** credits for Mathematical Literacy.
- Total: 36 credits.

All the Core unit standards are compulsory:

- All 52 credits from the core component of the qualification.

Elective:

- **A** total of **46** credits (minimum) to select from the elective component.

EXIT LEVEL OUTCOMES
1. Communicate and solve problems within sulphuric acid production processes and operate within clearly defined contexts with some scope for personal decision-making and responsibility.

2. Understand how to control a Sulphuric Acid Production process and the ability to meet occupational safety, health and environmental specifications.

3. Handle and transport material in a Sulphuric Acid Production plant.

4. Maintain systems in the Suphuric Acid Production process.

Critical Cross-Field Outcomes:

- Identifying and solving problems in which responses display that responsible decisions using critical thinking have been made.
  - Exit Level Outcomes **1,2,3** and **4.**

- Working effectively with others as a member of a team, group, organization and community.
  - Exit Level Outcomes **1** and **4.**

- Organising and managing oneself and one's activities responsibly and effectively.
  - Exit Level Outcomes **1,2** and **4.**

- Collecting, analyzing, organizing and critically evaluating information.
  - Exit Level Outcomes 1,2 and 3.

- Communicating effectively using visual, mathematical and/or language skills.
  - Exit Level Outcomes 1 and 4.

- Using science and technology effectively and critically, showing responsibility toward the environment and health of others.
  - Exit Level Outcomes 1,2 and 3.

- Demonstrating an understanding of the world as a set of related systems by recognizing that problem contexts do not exist in isolation.
  - Exit Level Outcome 1.

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.
- Appropriate procedures are selected to solve problems in an efficient and effective manner
- Unfamiliar problems are accurately reported to appropriate personnel.
- Can respond to questions and discuss issues related to familiar problems in the setting up, operating and monitoring of process equipment for sulphuric acid production.

2.
- The process is monitored and controlled according to Sulphuric Acid Production specifications.
- A clean, safe and healthy work environment is maintained.
- Problems relating to the Sulphuric Acid Production process are solved using sector acceptable processes and procedures.

3.
- Materials are transported and handled according to Sulphuric Acid Production specifications.
- Problems relating to the Sulphuric Acid Production process are solved using sector acceptable processes and procedures.

4.
- Systems are maintained according *to* Sulphuric Acid Production specifications.
- Problems relating to maintenance of systems in the Sulphuric Acid Production plant are solved using sector acceptable processes and procedures.

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 further learning. The assessment should also ensure that all the critical cross-field outcomes have been achieved.

The learner may choose in which language s/he 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.

Assessors should keep the following general principles in mind when designing and conducting assessments:

- Focus the initial assessment activities on gathering evidence in terms of the main outcomes expressed in the titles of the unit standards to ensure assessment is integrated rather than fragmented. The aim is to declare the person competent in terms of the qualification purpose. Where assessment at across titles or at title level is unmanageable, then focus assessment around each specific outcome, or groups of specific outcomes. Take special note of the need for integrated assessment.

- Make sure evidence is gathered across the entire range, wherever it applies. Assessment activities should be as close to the real performance as possible, and where simulations or role-plays are used, there should be supporting evidence to show the candidate is able to perform in the real situation.

- All assessments should be conducted in line with the following well documented principles of assessment as defined below:
  - Principles of assessment:
    - Appropriate: The method of assessment is suited to the Performance being assessed.
    - Fair: The method of assessment does not present any barriers to achievements, which are not related to the evidence. In particular, the method of assessment is sensitive to language diversity.
    - Manageable: The methods used make for easily arranged, cost-effective assessments that do not unduly interfere with learning.
    - Integrated into work or learning: Evidence collection is integrated into the work or learning process where this is appropriate and feasible.
    - Valid: The assessment focuses on the requirements laid down in the Standard; i.e. the assessment is fit for purpose.
    - Direct: The activities in the assessment mirror the conditions of actual performance as closely as possible.
    - Authentic: The assessor is satisfied that the work being assessed is attributable to the person being assessed.
    - Sufficient: The evidence collected establishes that all criteria have been met and that performance to the required Standard can be repeated consistently.
    - Systematic: Planning and recording is sufficiently rigorous to ensure that assessment is fair.
    - Open: Learners can contribute to the planning and accumulation of evidence. Assessment candidates understand the assessment process and the criteria that apply.
    - Consistent: The same assessor would make the same judgement again in similar circumstances. The judgement made is similar to the judgement that would be made by other assessors.

INTERNATIONAL COMPARABILITY

One method of Sulphuric Acid Production is as a by-process of uranium enrichment (roasting). With an ever-increasing demand for energy being experienced all over the world, the demand

for enriched uranium is escalating and together with it the opportunity for sulphuric acid manufacturing.

An intensive search was conducted via the internet to establish whether comparable courses and qualifications related to Sulphuric Acid Production existed and, if so, whether the content is comparable in terms of level, scope and competencies covered in this National Qualification.

A number of sites were visited in order to search for information from various countries:

- Australia and New Zealand both have vocational based qualifications systems. Their systems are very similar to the South African system.
- The USA has been conducting its training based on CBMT (Competency-Based) methodology since the middle 1980's. No comparable qualification or unit standards could however be found.
- Searches in other countries (Scotland, Ireland, Germany) also have vocational education and training systems but no comparable qualifications could be found.

As industry sectors and qualifications frameworks are organised differently in the various countries consulted, an exact rendition of the NC Sulphuric Acid Production L2 could not be found. However, similar competencies (unit standards) were found in various qualifications and courses.

Requirements for the NC Sulphuric Acid Production L3 go beyond mere ability to operate equipment and process, as a high level of understanding is required of the operator in order to operate and maintain plant, equipment and processes.

Australia (www.ntis.org.au):

Like South Africa, Australia has a dual education and training system. Other conditions in the two countries are also very similar.

- Australian Certificates II and III in Metalliferous Mining Operations (Processing) have unit standards approximately at the same level as the proposed South African qualification at Level 3. It is organised into various categories or specialisation areas which correlate with some of the outcomes in the proposed NC in Sulphuric Acid Production (L3).

The specialisation areas in the Australian qualification are:

- Beneficiation.
- Refining.
- Smellting.
- By-product Management.

The qualification addresses similar outcomes to those of the NC Sulphuric Acid Production L3 listed above, albeit in a different context. These outcomes are:

- Transport (hazardous) materials.
- Conduct process control operations.
- Maintain (basic) equipment.

Some relevant units of competence in the Australian Metalliferous Mining Operations qualification are:

- Perform process control room operations.
- Calibrate testing equipment and assist with its maintenance.
- Conduct filtering process.
- Conduct flotation process.

o Certificates II and III in Process Plant skills cover a number of units of competence which compare well to the NC Sulphuric Acid Manufacturing qualifications. Level II competencies require a degree of understanding, while Level III competencies point to a high degree of operator knowledge and competence.

Some relevant units of competence are:

o Operate process control systems.
o Transfer bulk fluids into/out of storage facility.
o Produce product using gas absorption.

These units of competence would compare to some of the unit standards in the NC Sulphuric Acid Production L3:

- Transfer a gas by means of a gas transfer pump.
o Control low strength sulphuric acid production by means of the tower process.

o Certificates I, II and III in Manufactured Mineral Products at first held some promise, but after closer scrutiny it was established that these were for specific domains or streams and not comparable enough. However it was seen as a confirmation that the Sulphuric Production qualifications had merit.

New Zealand (www.nzqa.govt.za):

No comparable qualification was found at this level.

o An introductory qualification for Process Operators in the Extractives Industry exists, but the competencies are at a lower level than the ones required for this qualification.
- An NC in Minerals Processing also looked promising, but it was in the context of Alluvial - Gold and there was insufficient grounds for comparison.

Entry To the NC Sulphuric Acid Production L3.

In the case of the South African qualification, there is a progression of qualifications from an introductory (NC Sulphuric Acid Production L2) to an advanced level (NC Sulphuric Acid Production L4). The entry point for this qualification (Level 3) is thus ideally the Level 2 qualification or equivalent as assessed by means of RPL.

In the case of the Australian qualifications, there is also a natural progression and similarly the entry level to a qualification would be competence (knowledge and skill) at an appropriate level, typically the learner will have the qualification at the level below that of the qualification he/she intends doing.

USA:

One of the leading international manufacturers and suppliers of chemical raw materials. It uses Sulphuric Acid in fertilizers, chemicals, dyes, petroleum refining, etching and in making iron, steel and industrial explosives.

- http://catalog.asme.org/Education/ShortCourse/Essentials–Chemical.cfm

Offer a short course in Essentials of Chemical Engineering for Non-Engineers. Some of the outcomes are included in the level 2 qualification.

- Short Course Number: CH710.
o CEU's: 2.25.
o Number of days: 3.

You should attend if:

You work in a chemical-processing facility and need an overview of the basic mechanics and chemistry behind the process equipment you work with on a daily basis. This course will help operations personnel communicate effectively with the process engineers and technical managers they collaborate with by gaining a basic understanding of the operational factors and design equations that are used by chemical engineers.

You can expect to:

- Familiarize yourself with the chemical, physical principles, and design equations that form the basis for the design of equipment at your site.
- Learn the terminology used at your facility.
- Understand the functions of key unit operations within your facility's processes.

Gain a basic understanding of key concepts such as:

- Mass and energy balances.
- Reaction kinetics.
- Variable affecting heat transfer.
- Fluid flow.
- Evaporation and c'rystallization.
- Distillation.
- Absorption and extraction.
- Humidification.
- Drying.
- Crystallization.
- Filtration and separation.
- Process control.

Note: This course is recommended for individuals with no technical background and up to 3 years' experience in a plant or working with chemical engineers.

Some of the key concepts that are covered in this course are covered in the various 12-3 Sulphuric acid qualifications as embedded knowledge. These key concepts give learners basic understanding that contributes towards effective production of Sulphuric Acid.

Outcomes from the 3 qualifications could be similarly clustered by training providers for the teaching of learners towards achievement of qualifications.

Conclusion:

It is more evident at this level that the clustering of the competencies in the NC Sulphuric Acid Manufacturing qualification (L3) is unique in terms of the countries surveyed.

Again, the explanation for this seems to be in the specific way the various Skills Development systems are structured (Manufacturing and Mining being in different sectors). Sulphuric Acid Production in this instance takes place in a mixed context, i.e. an industrial chemical being produced in a metallurgical process within the mining industry.

Another reason for the uniqueness of the qualification and the absence of qualifications elsewhere is that much of process related training in the world is given either by process consultancies or by experts working for the providers of equipment, particularly process control systems, to industry. Learning thus takes place in the workplace and such learning is often incidental to process optimisation projects. It is also largely unrecognised other than internally or by the service provider "accrediting" the operator to use their equipment or processes.

ARTICULATION OPTIONS

The qualification allows for horizontal and vertical articulation

Horizontal articulation can occur with:

- National Certificate in Production of Fertilizers: NQF Level 3 qualification or; (under construction)
- National Certificate in Chemical Manufacturing Processes: NQF Level 3. (under construction)

Vertical articulation allows for learners completing this qualification to proceed to the ID 58228: FETC: Sulphuric Acid Production, NQF Level 4.

MODERATION OPTIONS

- 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.

- Any institution offering learning that will enable the achievement of this qualification must be accredited as a provider with the relevant ETQA.

- Assessors registered with the relevant ETQA must carry out the assessment of candidates for any of the unit standards that make up this qualification.

- The assessor must comply with the expertise requirements as set out in the criteria for the registration of assessors by the relevant ETQA, viz: assessment expertise; technical/contextual/occupational expertise; interpersonal and communication skills; planning and administration skills and currency of competency.

- The assessor must have completed a similar qualification, which is one level above the level of the qualification; or a similar qualification at the level with a minimum of 12 months field experience after he/she has completed the qualification; or the subject matter experience of the assessor can be established by recognition of prior learning.

- 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 and exit level outcomes, as well as the integrated competence described in the qualification.

- Assessors and moderators should develop and conduct their own workplace specific assessments by making use of a range of formative and summative assessment methods and should assess combinations of foundational, practical and reflective competencies. Assessors should give credit for the evidence of learning that has already been acquired through formal, informal and non-formal learning and work experience.

- 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).

CRITERIA FOR THE REGISTRATION OF ASSESSORS

For an applicant to register as an assessor, the applicant needs:

- To be registered as an assessor with the relevant ETQA.
- The assessor must have completed a similar qualification or from the same family of qualifications, at or above NQF Level 4 in mining and minerals.

NOTES

N/A

UNIT STANDARDS

	ID	UNIT STANDARD TITLE	LEVEL	CREDITS
core	115093	Control workplace hazardous substances	Level 3	4
Core	120329	Respond to, implement and manage emergencies according to an emergency action plan in a workplace	Level3	2
Core	120331	Demonstrate knowledge pertaining to fires in working places	Level 3	3
Core	116534	Carry out basic first aid treatment in the workplace	Level 3	2
Core	243654	Control low strength sulphuric acid production by means of a tower process	Level 3	8
Core	243645	Maintain the sulphuric acid absorption system	Level 3	10
Core	110400	Transfer gas by means of a gas transfer pump	Level 3	6
Core	10542	Generate sulphur trioxide gas by means of a catalytic converting process	Level3	8
Core	115091	Monitor compliance to safety, health and environmental requirements in a workplace	Level 2	2
Core	243675	Maintain the drying acid absorption system	Level 3	7
Elective	11084	Produce sulphur dioxide gas by means of a fluo-solids roaster	Level 3	7
Elective	243644	Oversee a thickening process in a metallurgical plant	Level 4	22
Elective	243646	Maintain a gas-solid separation cyclone in a sulphuric acid process	Level 3	4
Elective	243547	Maintain oxygen levels in a roaster by means of roaster blowers	Level 3	7
Elective	243677	Separate sulphur dioxide gas from calcine effluent by means of a stripper system	Level 3	10
Elective	243674	Prepare oxygen for a converter by means of a cross flow stripping system	Level 3	8
Elective	243648	Heat up roaster from cold by means of fuel burners	Level 3	10
Elective	243652	Feed pyrite into a roaster by means of a feed system	Level3	7
Elective	9574	Maintain belt conveyor components	Level3	6
Elective	9575	Replace conveyor belting	Level3	6
Fundamental	119472	Accommodate audience and context needs in oral/signed communication	Level 3	5
Fundamental	119457	Interpret and use information from texts	Level3	5
Fundamental	119465	Write/present/sign texts for a range of communicative contexts	Level3	5
Fundamental	119458	Analyse and respond to a variety of literary texts	Level 3	5
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	Level3	2
Fundamental	7456	Use mathematics to investigate and monitor the financial aspects of personal, business and national issues	Level 3	5
Fundamental	9012	Investigate life and work related problems using data and probabilities	Level 3	5
Fundamental	9013	Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts	Level 3	4

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Oversee a thickening process in a metallurgical plant

SAQA US ID	UNIT STANDARD TITLE		
243644	Oversee a thickening process in a metallurgical plant		
SGB		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	22
REGISTRATION STATUS	REGISTRATION START DATE	REGISTRATION END DATE	SAQA DECISION NUMBER
Draft - Prep for P Comment			

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the overseeing *of* **a** thickening process.

SPECIFIC OUTCOME 2
Demonstrate knowledge relating to the operation of the thickening process.

SPECIFIC OUTCOME 3
Oversee **a** thickening process.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the overseeing of a thickening process.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Maintain the sulphuric acid absorption system

SAQA US ID	***UNIT STANDARD TITLE***		
243645	Maintain the sulphuric acid absorption system		
SGB		***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	10
REGISTRATION STATUS	***REGISTRATION START DATE***	***REGISTRATION END DATE***	***SAQA DECISION NUMBER***
Draft - Prep for P Comment			

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the maintenance of the sulphuric acid absorption system.

SPECIFIC OUTCOME *2*
Prepare to maintain the sulphuric acid absorption system.

SPECIFIC OUTCOME 3
Maintain the sulphuric acid absorption system.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the maintenance of the sulphuric acid absorption system.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Maintain a gas-solid separation cyclone in a sulphuric acid process

SAQA US ID	***UNIT STANDARD TITLE***		
243646	Maintain a gas-solid separation cyclone in a sulphuric acid process		
SGR		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***	**4**
REGISTRATION STATUS	***REGISTRATION START DATE***	***REGISTRATION END DATE***	***SAQA DECISION NUMBER***
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SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the maintenance of the gas-solid separation cyclone.

SPECIFIC OUTCOME 2
Prepare to maintain a gas-solid separation cyclone.

SPECIFIC OUTCOME 3
Maintain a gas-solid separation cyclone.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the maintenance of the gas-solid separation cyclone.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Maintain oxygen levels in a roaster by means of roaster blowers

SAQA US ID	***UNIT STANDARD TITLE***		
243647	Maintain oxygen levels in a roaster by means of roaster blowers		
SGB		***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	7
REGISTRATION STATUS	***REGISTRATION START DATE***	***REGISTRATION END DATE***	***SAQA DECISION NUMBER***
Draft - Prep for P Comment			

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the maintaining of oxygen levels in a roaster.

SPECIFIC OUTCOME 2
Prepare to maintain oxygen levels.

SPECIFIC OUTCOME 3
Maintain oxygen levels.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the oxygen level maintaining process.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Heat up roaster from cold by means of fuel burners

SAQA US ID	*UNIT STANDARD TITLE*		
243648	Heat up roaster from cold by means *of* fuel burners		
SGB		*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*	10
REGISTRATION STATUS	*REGISTRATION START DATE*	*REGISTRATION END DATE*	*SAQA DECISION NUMBER*
Draft - Prep for P Comment			

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the heating up process.

SPECIFIC OUTCOME 2
Prepare to heat up roaster.

SPECIFIC OUTCOME 3
Heat up roaster.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the heating up process.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Feed pyrite into a roaster by means of a feedsystem

SAQA US ID	UNIT STANDARD TITLE		
243652	Feed pyrite into a roaster by means of a feed system		
SGB		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	7
REGISTRATION STATUS	REGISTRATION START DATE	REGISTRATION END DATE	SAQA DECISION NUMBER
Draft - Prep for P Comment			

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the feeding of pyrite.

SPECIFIC OUTCOME 2
Prepare to feed pyrite.

SPECIFIC OUTCOME 3
Feed pyrite.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the pyrite feeding process.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Prepare oxygen for a converter by means of a cross flow stripping system

SAQA US ID	*UNIT STANDARD TITLE*		
243674	Prepare oxygen for a converter by means of a cross flow stripping system		
SGB		*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	8
REGISTRATION STATUS	*REGISTRATION START DATE*	*REGISTRATION END DATE*	*SAQA DECISION NUMBER*
Draft - Prep for P Comment			

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the preparation of oxygen for a converter by means of a cross flow stripping system.

SPECIFIC OUTCOME 2
Prepare the oxygen preparation process.

SPECIFIC OUTCOME 3
Prepare oxygen.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the oxygen preparation process.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Maintain the drying acid absorption system

SAQA US ID	***UNIT STANDARD TITLE***		
243675	Maintain the drying acid absorption system		
SGB		***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	7
REGISTRATION STATUS	***REGISTRATION START DATE***	***REGISTRATION END DATE***	***SAQA DECISION NUMBER***
Draft - Prep for P Comment			

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to maintaining of the drying acid absorption system.

SPECIFIC OUTCOME 2
Prepare to maintain the drying acid absorption system.

SPECIFIC OUTCOME 3
Maintain the drying acid absorption system.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the maintenance of the drying acid absorption system.

SOUTH AFRICAN QUALIFICATIONS AUTHORITY

UNIT STANDARD:

Separate sulphur dioxide gas from calcine effluent by means of a stripper system

SAQA US ID	*UNIT STANDARD TITLE*		
243677	Separate sulphur dioxide gas from calcine effluent by means of a stripper system		
SGB		*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	10
REGISTRATION STATUS	*REGISTRATION START DATE*	*REGISTRATION END DATE*	*SAQA DECISION NUMBER*
Draft - Prep for P Comment			

SPECIFIC OUTCOME 1
Demonstrate knowledge relating to the separation of sulphur dioxide gas from calcine effluent.

SPECIFIC OUTCOME 2
Prepare to separate sulphur dioxide gas from calcine effluent.

SPECIFIC OUTCOME 3
Separate sulphur dioxide gas from calcine effluent.

SPECIFIC OUTCOME 4
Complete the duties pertaining to the separation process.