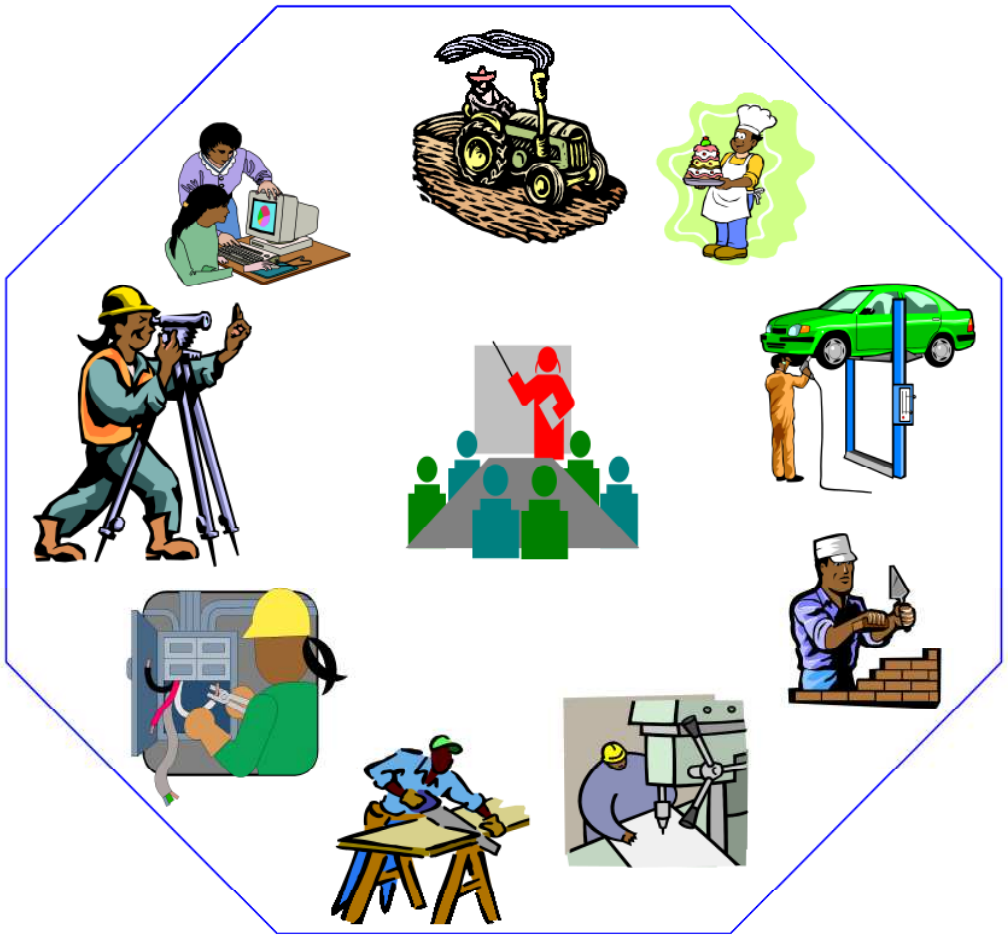
Federal Democratic Republic of Ethiopia

OCCUPATIONAL STANDARD

MINERAL PROCESSING

NTQF Level II, III and IV



Ministry of Education
January 2014

Introduction

Ethiopia has embarked on a process of reforming its TVET-System. Within the policies and strategies of the Ethiopian Government, technology transformation – by using international standards and international best practices as the basis, and, adopting, adapting and verifying them in the Ethiopian context – is a pivotal element. TVET is given an important role with regard to technology transfer. The new paradigm in the outcome-based TVET system is the orientation at the current and anticipated future demand of the economy and the labor market.

The Ethiopia Occupational Standards (EOS) is the core element of the Ethiopian National TVET-Strategy and an important factor within the context of the National TVET-Qualification Framework (NTQF). They are national Ethiopian standards, which define the occupational requirements and expected outcome related to a specific occupation without taking TVET delivery into account.

This document details the mandatory format, sequencing, wording and layout for the Ethiopia Occupational Standard which comprised of Units of Competence.
A Unit of Competence describes a distinct work activity. It is documented in a standard format that comprises:

- Occupational title and NTQF level
- Unit title
- Unit code
- Unit descriptor
- Elements and Performance criteria
- Variables and Range statement
- Evidence guide

Together all the parts of a Unit of Competence guide the assessor in determining whether the candidate is competent.

The ensuing sections of this EOS document comprise a description of the occupation with all the key components of a Unit of Competence:

- chart with an overview of all Units of Competence for the respective level including the Unit Codes and the Unit Titles
- contents of each Unit of Competence (competence standard)
- occupational map providing the Technical and Vocational Education and Training (TVET) providers with information and important requirements to consider when designing training programs for this standards and for the individual, a career path

UNIT OF COMPETENCE CHART

Occupational Standard: Mineral Processing

Occupational Code: MIN MPR

NTQF Level II

MIN MPR2 01 0114 Handle Reagents	**MIN MPR2 02 0114** Conduct Crushing, Screening and Conveying Operations	**MIN MPR2 03 0114** Conduct Milling or Grinding Operations
MIN MPR2 04 0114 Conduct Magnetic Separation	**MIN MPR2 05 0114** Operate Separation Equipment	**MIN MPR2 06 0114** Operate and Monitor Valve Systems
MIN MPR2 07 0114 Monitor, Operate and Maintain Pipeline Stations and Equipment	**MIN MPR2 08 0114** Conduct Aeration Process	**MIN MPR2 09 0114** Conduct Digestion Process
MIN MPR2 10 0114 Conduct Precipitation Operations	**MIN MPR2 11 0114** Conduct Stacker Operations	**MIN MPR2 12 0114** Conduct Roasting Operations
MIN MPR2 13 0114 Carryout Bore-field Operations	**MIN MPR2 14 0114** Operate Raw Material Feed Systems	**MIN MPR2 15 0114** Conduct Pump Operations
MIN MPR2 16 0114 Prepare for Sintering Activities	**MIN MPR2 17 0114** Conduct Sand Wash Plant Operations	**MIN MPR2 18 0114** Participate in Workplace Communication
MIN MPR2 19 0114 Work in Team Environment	**MIN MPR2 20 0114** Develop Business Practice	**MIN MPR2 21 0114** Standardize and Sustain 3S

NTQF Level III

MIN MPR3 01 0114 Apply Environmentally Sustainable Work Practices	**MIN MPR3 02 0114** Apply Risk Management Processes	**MIN MPR3 03 0114** Manage Steam Boiler Startup and Shut Down
MIN MPR3 04 0114 Operate Heat Exchangers	**MIN MPR3 05 0114** Transfer Bulk Fluids into/out of Storage Facility	**MIN MPR3 06 0114** Communicate Pipeline Control Centre Operations
MIN MPR3 07 0114 Conduct Operations with Integrated Tool Carrier	**MIN MPR3 08 0114** Control and Monitor Automated Plant/Machinery	**MIN MPR3 09 0114** Conduct Thickening and Clarifying Process
MIN MPR3 10 0114 Conduct Flotation and Leaching Process	**MIN MPR3 11 0114** Perform Process Control Room Operations	**MIN MPR3 12 0114** Prepare and Carryout Electrolytic Cleaning Process
MIN MPR3 13 0114 Monitor and Operate Auxiliary Plant and Equipment	**MIN MPR3 14 0114** Monitor and Maintain Crushing, Screening and Conveying Operations	**MIN MPR3 15 0114** Monitor and Maintain Milling or Grinding Operations
MIN MPR3 16 0114 Handle, Store and Use Cyanide	**MIN MPR3 17 0114** Monitor and Maintain Wet Gravity and Magnetic Separation	**MIN MPR3 18 0114** Monitor Implementation of Work Plan/Activities
MIN MPR3 19 0114 Apply Quality Control	**MIN MPR3 20 0114** Lead Workplace Communication	**MIN MPR3 21 0114** Lead Small Teams
MIN MPR3 22 0114 Improve Business Practice	**MIN MPR3 23 0114** Prevent and Eliminate MUDA	

NTQF Level IV

MIN MPR4 01 0114 Apply and Monitor Mine Operations Emergency Preparedness and Response Systems	**MIN MPR4 02 0114** Apply, Monitor and Report on Compliance Systems	**MINPRO4 03 0114** Implement Work Place Information System
MINPRO4 04 0114 Carryout the Risk Management Processes	**MIN MPR4 05 0114** Monitor and Coordinate Waste and Process Water Treatment	**MIN MPR4 06 0114** Implement Operational Plan
MIN MPR4 07 0114 Analyze Data and Report Results	**MIN MPR4 08 0114** Participate in Commission/ Recommission Plant	**MIN MPR4 09 0114** Manage Plant Shutdown and Restart
MIN MPR4 10 0114 Coordinate Implementation of Customer Service Strategies	**MIN MPR4 11 0114** Supervise Mobile Plant Operations	**MIN MPR4 12 0114** Plan and Organize Work
MIN MPR4 13 0114 Migrate to New Technology	**MIN MPR4 14 0114** Establish Quality Standards	**MIN MPR4 15 0114** Develop Individuals and Team
MIN MPR4 16 0114 Utilize Specialized Communication Skills	**MIN MPR4 17 0114** Manage and Maintain Small/Medium Business Operations	**MIN PRO4 18 0114** Apply Problem Solving Techniques and Tools

Occupational Standard: Mineral Processing Level II	
Unit Title	**Handle Reagents**
Unit Code	**MIN MPR2 01 0114**
Unit Descriptor	This unit covers the handling of reagents in the mineral processing and mining industries. It includes planning and preparing for reagent handling, starting up equipment in sequence, mixing reagents, adding reagents, transferring and storing reagents, shutting down in sequence and/or isolating equipment, and conducting housekeeping activities.

Elements	Performance Criteria
1. Plan and prepare for reagents handling	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Work is planned and prepared. 1.3. Shift changeover details are received, interpreted and clarified. 1.4. Communication is done with other personnel using approved communication methods. 1.5. Select personal protective equipment appropriate for work activities. 1.6. Appropriate type of ***auxiliary equipment*** is selected for work activities. 1.7. Equipment ***pre-start checks*** are performed. 1.8. Potential risks and hazards are identified, addressed and reported. 1.9. ***Environmental issues*** are identified, addressed and reported. 1.10. Appropriate reagents are selected. 1.11. Emergency procedures are adhered. 1.12. Approved fume suppression and extraction methods are used.
2. Start-up equipment in sequence	2.1. ***Start-up procedures*** are carried out and start-up checks completed according to plant configurations and system requirements. 2.2. Plant is confirmed to be operational.
3. Mix reagents	3.1. Reagents are safely ***mixed*** to required parameters. 3.2. Plant is continuously inspected and defects and potential problems are identified.

4. Add reagents	4.1. Reagent is added according to specified dosage and location recommended. 4.2. All required documentations are completed clearly, concisely and on time. 4.3. Shift changeover details are passed on to oncoming shift.
6. Shutdown in sequence and/or isolate equipment	6.1. Equipment is shutdown or isolated based on process and safety requirements. 6.2. Post a shutdown or isolation check is performed.
7. Conduct housekeeping activities	7.1. ***Plant is cleaned*** to maintain condition of all equipment. 7.2. Hazards are managed and reported.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Auxiliary equipment	May include: • feeders • gantry cranes and attachments and other mobile equipment • hand and power tools • hoses (water and air) • hydraulic units • pump systems • racks • radiation gauges • spray systems
Pre-start checks	May include: • availability of equipment (e.g. conveyor) • detection of conditions that are unusual • fluid levels • job requirements • personnel availability • walk through plant
Environmental issues	May include: • drainage • dust (dump) • emissions • flora and fauna • hazardous chemicals • noise

	• recycling • run-off • spills • waste management and disposal • water quality
Start-up procedures	may include: • auxiliary check equipment • establish relevant communications • plant checks • safety mechanisms • shift changeover details
Reagent mixing	May include: • automated • manual • some reagents may not require mixing
Post-shutdown checks	are like pre-start checks.
Plant cleaning	May include: • degreasing • high pressure cleaning • hosing with water • suction
Monitoring	May include the checking of: • blockages and spillages • pressures • temperatures
Storage	May include: • box • silo • tank
Transfer of reagents	May include: • conveyors • mobile equipment • pump-line

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for handling reagents • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of reagent handling • working with others to undertake and complete the handling of reagents that meets all of the required outcomes • consistent timely completion of reagent handling that safely, effectively and efficiently meets the required outcomes

Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • contaminant identification • emergency procedures • environmental procedures • equipment limitations and operating parameters • equipment safety requirements • hazardous goods procedures and consequences of spills • identifying repair requirements • isolation procedures • metallurgical and technical data (basic) • occupational health and safety procedures • operational procedures and checks • reagent types and how to mix them • site procedures • site safety requirements
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for handling reagents • operate, maintain and clean equipment • identify hazards • handle hazardous substances interpret reports • apply lifting techniques (manual, cranes and loads) • monitor operations • report defects • apply safe work practices • use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Mineral Processing Level II	
Unit Title	**Conduct Crushing, Screening and Conveying Operations**
Unit Code	**MIN MPR2 02 0114**
Unit Descriptor	This unit covers the conduct of crushing, screening and conveying operations in the mineral processing and mining industries. It includes the planning and preparation for operations; operating the plant; and carrying out post operational procedures.

Elements	Performance Criteria
1. Plan and prepare for operations	1.1. ***Compliance documentation*** relevant to the conduct of crushing operations is accessed, interpreted and applied. 1.2. ***Work requirements*** are obtained, interpreted and clarified for the satisfactory completion of operations. 1.3. ***Personal protective equipment*** appropriate for work activities is selected and used. 1.4. Ensure area is well ventilated before entry. 1.5. Work area and equipment are ***inspected and prepared in*** coordination with others. 1.6. A work plan is prepared. 1.7. Appropriate type of ***auxiliary equipment*** is selected for work activities. 1.8. ***Coordination*** requirements are resolved with others at the site prior to commencing and during work activities.
2. Operate the crushing plant	2.1. ***Pre-start***, ***start-up***, ***run and shutdown procedures*** are carried out. 2.2. The ***operating technique*** is selected and modified to appropriately meet ***changing work conditions***. 2.3. Dust suppression and extraction methods are used. 2.4. Operations are conducted, controlled and ***monitored*** within the equipment limitations, maintaining crushing efficiency and effectiveness. 2.5. Performance monitoring systems and alarms are acted on or reported. 2.6. Hazardous and emergency situations are recognized and given response. 2.7. Work is completed in accordance with the agreed plan and outcomes and within the operating capacity of the allocated equipment.
3. Operate the screening plant	3.1. Coordination requirements are resolved with others at the site prior to commencing and during work activities.

	3.2. Pre-start, start-up and shutdown procedures are carried out. 3.3. Plant is relocated (if applicable). 3.4. Plant is prepared for operation in accordance with work requirements. 3.5. The operating technique is selected and modified to appropriately meet changing work conditions. 3.6. Operations are conducted, controlled and monitored within the equipment limitations, maintaining screening efficiency and effectiveness. 3.7. Monitoring systems and alarms are acted on or reported. 3.8. Hazardous and emergency situations are recognized and given response. 3.9. Work is completed in accordance with the agreed plan and outcomes and within the operating capacity of the allocated equipment.
4. Carry out post-operational procedures	4.1. Fault-find and report faults are inspected. 4.2. Operational maintenance**,** servicing**,** lubricating and housekeeping tasks are carried out. 4.3. Process is maintained and records and reports are passed on.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Work requirements	May include: • product details • nature and scope of tasks • achievement targets • operational conditions • geological data • site survey data • site layout and out of bounds areas • worksite inspection requirements • lighting conditions • plant or equipment defects • hazards and potential hazards • coordination requirements or issues

Personal protective equipment	May include: • chemical/gas detectors • eye protection (e.g. glasses) • hearing protection (e.g. ear plugs) • protection from the elements (e.g. sun block) • protective clothing (e.g. gloves, safety boots, helmet, shin guards, long sleeved shirt and trousers)) • respiratory devices • safety harness when working at heights
Inspect and prepare work area	May include: • identification of hazards • selection and implementation of control measures for the hazards identified • safeguarding site and non-site personnel by: • erection of barricades, posting of signs and following of security procedures • selection of appropriate equipment to ensure personnel safety and protection • determination of appropriate path of movement for equipment • floor, pad, access roads, ramps and bench requirements
Auxiliary equipment	May include: • gantry cranes and attachments • hand and power tools • hoses (water and air) • mobile equipment • flexi pumps • air operated tools • boulder buster
Coordination with others	May include with: • yard persons • laboratory personnel • mobile plant operators • maintenance personnel
Pre-start and start-up procedures	May include: • walk around check of the plant • checking and toping up fluid levels (including fuel) • lubrication • inspection of attachments to ensure security and identify defects • instrument and control lever checks • reporting defects and damage • follow prescribed start-up sequence • confirm plant is operational • checking interlocks • check for tags • cameras and monitors

	• monitoring and control systems • drive belts • isolations • chutes • conveyor components • pipe and flanges • pumping system • water systems • hydraulic system • lighting • suppression system • visual and audio warning devices and lights • valves
Shutdown procedures	May include: • following prescribed shutdown sequence • securing equipment
Operating techniques	May include: • feed control • crusher adjustment • working safely around other machines and personnel
Changing work conditions	May include variations in: • rock types • feed grading • feed contamination • weather conditions • day and night
Monitoring	May include the checking of: • blockages and spillages • current draw • detecting noises and smells • flow rates • missing components • oil leaks • air flows • pressures • feed rates • wear and tear • contaminants, e.g.: oil, plastic, timber, misfire explosives, metal (e.g. bucket teeth etc)

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for conducting crushing operations • implementation of requirements, procedures and techniques for the safe, effective and efficient conducting of crushing

	operations • working with others to undertake and complete crushing operations that meet all of the required outcomes • consistent timely completion of crushing operations that safely, effectively and efficiently meets the required outcomes • knowledge of the requirements, procedures and instructions for the conducting of screening and conveying operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of screening and conveying operations • working with others to undertake and complete screening and conveying operations that meet all of the required outcomes • consistent timely completion of screening and conveying operations that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrates knowledge of: • site hazard identification and response procedures • site risk control procedures • site and equipment health and safety procedures • site environmental requirements and procedures • site quality requirements • site communication procedures • site product characteristics • site operational procedures • plant pre-start, start-up, operating and shutdown procedures and techniques • plant components functions, characteristics, technical capability and limitations • plant breakdown procedures • plant isolation procedures • site record keeping requirements • site confine space work procedures • site personal protective equipment requirements • contaminant identification • emergency procedures • crusher components • crushing principles • hazardous goods procedures and consequences of spills • repair requirements • mobile equipment operation • computer basic techniques • monitoring and control systems • spillage procedures
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • apply operational safety requirements

	• access, interpret and apply technical information • applying the plant operating procedures • apply production and equipment records maintenance requirements • apply diagnostic techniques • use relevant hand and power tools • work wearing personal protective equipment • apply hazard identification and management requirements and procedures • complete forms • apply hazardous goods handling techniques and management • interpret reports • use lifting techniques (manual, cranes and loads) • identify and report defects • apply procedures for working at heights and depths • apply work orders/purchase requisition preparation requirements
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Conduct Milling or Grinding Operations**
Unit Code	**MIN MPR2 03 0114**
Unit Descriptor	This unit covers the conduct of milling/grinding in the mineral processing and mining industries. It includes planning and preparing for milling/grinding processes, starting-up equipment in sequence, operating and monitoring equipment and lubrication systems, monitoring and controlling classification, charging the mill, conducting housekeeping activities, and shutting down in sequence and/or isolating equipment.

Elements	Performance Criteria
1. Plan and prepare for milling/grinding process.	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Work is planned and prepared. 1.3. Shift change is received, interpreted and clarified over details. 1.4. Communication is done with other personnel. 1.5. ***Personal protective equipment*** appropriate for work activities is selected. 1.6. Appropriate type of auxiliary equipment is selected for work activities. 1.7. Equipment pre-start checks are performed to ensure equipment is ready for operation. 1.8. ***Potential risks and hazards*** are identified, addressed and reported. 1.9. ***Environmental issues*** are identified, addressed and reported. 1.10. ***Safe operating procedures*** are adhered. 1.11. Emergency procedures are adhered. 1.12. Approved dust suppression and extraction methods are used. 1.13. Ensure area is well ventilated.
2. Start-up equipment in sequence.	2.1. Start-up procedures are carried out and start-up checks completed. 2.2. Plant is confirmed to be operational.
3. Operate and monitor equipment and lubrication system.	3.1. Data from equipment indicators is read and interpreted. 3.2. Plant is continuously inspected. 3.3. Equipment is adjusted to optimize plant performance. 3.4. Feed to plant is controlled. 3.5. Reagent additions are monitored.

	3.6. Lubrication system is monitored to ensure that oil and grease levels are maintained. 3.7. Operator level maintenance is carried out. 3.8. All required documentations are completed clearly, concisely and on time. 3.9. End of shift information is passed on to oncoming shift.
4. Monitor and control classification.	4.1. Density and/or size of ore is/are checked for according to specified parameters. 4.2. Equipment is adjusted and calibrated where required to meet density requirements. 4.3. Density of product is accurately sampled and recorded.
5. Charge mill.	5.1. Grinding media type and quantity are selected according to metallurgical requirements. 5.2. Mill is charged as required.
6. Conduct housekeeping activities.	6.1. Plant is cleaned. 6.2. Hazards are managed and reported.
7. Shut down in sequence and/or isolate equipment.	7.1. Ore from milling/grinding equipment is cleared before commencing shutdown. 7.2. Equipment is shut down or isolated based on process and safety requirements. 7.3. Perform post shut down or isolation checks.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Personal protective equipment	May include: • chemical/gas detectors • eye protection (e.g. glasses) • hearing protection (e.g. ear plugs) • protection from the elements (e.g. sun block) • protective clothing (e.g. gloves, safety boots, helmet, shin guards, long sleeved shirt and trousers)) • respiratory devices • safety harness when working at heights
Potential risks and hazards	May include: • personal safety (e.g. crush injuries, burns, slips, trips, falls, chemical exposure, fatigue)

	• plant (e.g. structural damage, emergency shutdown) • environment (e.g. seepage, emissions, chemical spills, pollution, anything detrimental to fauna and flora)
Environmental issues	May include: • drainage • dust • emissions • flora and fauna • hazardous chemicals • noise • run-off • spills • waste management and disposal • water quality
Safe operating procedures	May include: • adhering to all site procedures • awareness and access to emergency exits • emergency procedures • First Aid procedures • hazard identification and recognition procedures • hot work procedures • observing electrical and mechanical procedures • observing right of way of heavy equipment • observing site speed limits • occupational health safety and environment procedures around equipment, vehicles and personnel • use of 2-way radio • use of barricades and guards • use of fire extinguishers • use of Materials Safety Data Sheets (MSDS) • tagging procedures (e.g. service tags, danger tags, restrictive operations tags) • use of respiratory devices • wearing equipment restraints • wearing personal protective equipment • working in confined spaces • use of materials safety data sheets • carrying out safety checks (e.g. safety showers and eye washes) • hold worker access permit

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for conducting milling/grinding • implementation of requirements, procedures and techniques for

	the safe, effective and efficient completion of milling/grinding • working with others to undertake and complete the conduct of milling/grinding that meets all of the required outcomes • consistent timely completion of milling/grinding that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrates knowledge of: • contaminant identification • cooling system • emergency procedures • environmental principles • equipment processes, limitations and operating parameters • equipment safety requirements • grinding media • hazardous goods procedures and consequences of spills • isolation procedures • lubrication system • metallurgical and technical data • milling circuit components and functions/milling principles • operational procedures and checks • milling and grinding safety requirements • types of ores
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for conducting milling/grinding • operate, maintain and clean equipment • identify and manage hazards • interpret reports • apply lifting techniques (manual, cranes and loads) • maintain records • employ safe work practices • use Data Control Systems (DCS) • use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Conduct Magnetic Separation**
Unit Code	**MIN MPR2 04 0114**
Unit Descriptor	This unit covers the conduct of magnetic separation in the mineral processing and mining industries. It includes planning and preparing for magnetic separation, starting up equipment in sequence, operating and monitoring equipment, conducting housekeeping activities, and shutting down in sequence and/or isolating equipment.

Elements	Performance Criteria
1. Plan and prepare for magnetic separation	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Shift changeover details are received, interpreted and clarified. 1.3. Communication is done with other personnel. 1.4. Personal protective equipment appropriate for work activities is selected. 1.5. Appropriate type of auxiliary equipment is selected for work activities. 1.6. Equipment ***pre-start checks*** are performed. 1.7. Potential risks and hazards are identified, addressed and reported. 1.8. ***Environmental issues*** are identified, addressed and reported. 1.9. Emergency procedures are adhered. 1.10. Approved dust suppression and extraction methods are used. 1.11. Ensure area is well ventilated.
2. Start-up equipment in sequence	2.1. ***Start-up procedures*** are carried out and start-up checks completed according to plant configurations and system requirements. 2.2. ***Plant*** is confirmed to be operational.
3. Operate and monitor equipment	3.1. Data from equipment ***indicators is read*** to determine ***separation*** efficiency. 3.2. Plant is continuously inspected and ***monitored*** and defects and potential problems are identified. 3.3. Mineral content of ore is assessed according to separation parameters . 3.4. Appropriate adjustments are made to separation process.

	3.5. Equipment is adjusted to agreed parameters 3.6. Feed to separation equipment is controlled 3.7. Operator level maintenance is carried out to maintain condition of ***equipment*** 3.8. All required documentations are completed 3.9. End of shift information is passed on to oncoming shift
4. Conduct housekeeping activities	4.1. Plant is cleaned 4.2. Hazards are identified, addressed and reported
5. Shutdown in sequence and/or isolate equipment	5.1. Equipment is shutdown and/or isolated based on process and safety requirements 5.2. Post-shutdown and/or isolation checks are performed

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Pre-start checks	May include: • availability of equipment • detection of conditions that are unusual • personnel availability • walk through plant • isolation and/or lockout checks • job requirements
Environmental issues	May include: • drainage • dust • emissions • flora and fauna • hazardous chemicals • noise • recycling • run-off • spills • waste management and disposal • water quality
Start-up procedure	May include: • cameras and monitors • distribution systems • drive belts

	• screens • fluid levels (grease, oil) • hoppers and launders • interlocks • isolations • pipes and flanges • conveyor systems • elevators and screw feeders • valves • visual and audio warning devices
Plant	May include: • compressors and blowers • vibrating screens • induction roll magnets • cross belt magnets • weight meters • dryers and burners • conveyors, screw feeders and elevators
Indicator readings	May include: • current • grade • heat • unusual noises • levels • radiation
Separation methods	May include: • magnetic • sizing
Separation quality targets	May include: • grades • consumption targets • percentage of recovery
Monitoring	May include the checking of: • air flows • blockages and spillages • current draw • feed rates • power • pressures • wear and tear • temperatures • particle size • throughput
Equipment	May include: • gantry cranes and attachments • hand and power tools

	• hoses (air)
Methods used to optimize the plant	May include: • adjust mineral cuts • adjust feed input rate • adjust temperatures • adjust magnetic intensity
Equipment and plant cleaning methods	May include: • shovels • compressed air
Post-shutdown checks	are like pre-start checks
Materials	May include: • gas
Contaminants are anything other than the slurry. Common contaminant	May include: • wood fiber • gravel • silica
Site conditions	May include: • day and night • weather conditions • working at heights

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for conducting magnetic separation • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of magnetic separation • working with others to undertake and complete the magnetic separation in a way that meets all of the required outcomes • consistent timely completion of magnetic separation that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrates knowledge of: • contaminants • emergency procedures • environmental principles • equipment operating parameters • equipment safety requirements • separation plant • hazardous substance procedures and consequences of spills • identifying repair requirements • isolation procedures • metallurgical and technical data • operational procedures and checks • magnetic separation safety requirements

	• types of ores and grades
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • handle hazardous substances • identify hazards • interpret reports • use lifting techniques (manual, cranes and loads) • monitor operation • report defects • employ safe work practices • use hand and power tools • find operational faults
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Operate Separation Equipment**
Unit Code	**MIN MPR2 05 0114**
Unit Descriptor	This competency is typically performed by all operators and covers the operation of typical stand alone dual phase separation equipment as used in a chemical or oil/hydrocarbons processing plant, and solving of problems with separation processes.

Elements	Performance Criteria
1. Prepare for work.	1.1. Work requirements are identified. 1.2. Hazards are identified and controlled. 1.3. Coordination is done with appropriate personnel.
2. Operate separation equipment.	2.1. The type of separation equipment is identified. 2.2. Separation equipment is ***started up and shut down*** according to the separation equipment type and duty. 2.3. Plant is monitored frequently and critically throughout shift using measured/indicated data and senses (sight, hearing etc) as appropriate. 2.4. Flow and pressure are adjusted as appropriate to type of ***separation equipment***. 2.5. Routine checks, logs and paperwork, taking action on unexpected readings and trends are completed.
3. Isolate and de-isolate plant.	3.1. Plant is isolated. 3.2. Safety is made for required work. 3.3. Check plant is ready to be returned to service. 3.4. Plant is prepared for return to service.

Variable	Range
Start up shut down as required	Includes: • start up and shut down to/from normal operating conditions • start up and shut down to/from isolated, cold, empty • all other conditions experienced on the plant. • I.e. from any condition to any condition experienced on the plant.
Separation equipment	Includes: • cyclones • hydrocyclones • scrubbers • knockout drums • demisters/drift eliminators • filters (cartridge, basket, sand etc).

Appropriate action	Includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Problems	Include: • seal/gasket leaks • pressure loss/low flow • cartridge/filter change • blockages/build-up/fouling • erosion/wear.
Procedures	may be: • written, verbal, computer-based or in some other form. They include: ➢ all work instructions ➢ standard operating procedures ➢ formulas/recipes ➢ batch sheets ➢ temporary instructions ➢ any similar instructions provided for the smooth running of the plant.
Health, Safety and Environment (HSE)	• All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • early warning signs of equipment/processes needing attention or with potential problems are recognized • the range of possible causes can be identified and analyzed and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognized and an appropriate contribution made to their solution.
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • Comprehensive understanding of separation equipment principles and typical problems to a level needed to control

	the operation. In particular it includes a knowledge of: • principles of operation of plant/equipment • physics and chemistry relevant to the process unit • process parameters and limits, e.g. temperature, pressure, flow, pH • duty of care obligations • hierarchy of control • communication protocols, e.g. radio, phone, computer, paper, permissions/authorities • routine problems, faults and their resolution • relevant alarms and actions • plant process idiosyncrasies • all items on a schematic of the plant item and the function of each • correct methods of starting, stopping, operating and controlling separator • corrective action appropriate to the problem cause • types and causes of separation problems within operator's scope of skill level and responsibility. • behavior of solids, liquids and gases • function and troubleshooting of major internal components and their problems, such as cartridges, baskets, supports, nozzles, grids.
Underpinning Skills	Must demonstrate skills of: • efficient and effective operation of plant/equipment • hazard analysis • completing plant records • communication • problem solving.
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Operate and Monitor Valve Systems**
Unit Code	**MIN MPR2 06 0114**
Unit Descriptor	In a typical scenario an operator adjusts and monitors valves and ancillary equipment as part of controlling a process, e.g. hydrocarbons transport pipeline, gas distribution network.

Elements	Performance Criteria
1. Prepare for work.	1.1. Work requirements are identified. 1.2. Hazards are identified and controlled. 1.3. Coordination is done with appropriate personnel.
2. Prepare valves for operation.	2.1. Operation of valves and ***valve systems*** is checked by applying knowledge of valve operation and fundamental operating principles. 2.2. The valves required for operation are checked against the site specific operating pressures, temperatures, volume, velocities and materials requirements where applicable. 2.3. Valves required for operation, ensuring that they are either closed or opened are prepared or sequenced as required, to regulate the flow of liquids and systems flow rates in a safe and efficient manner. 2.4. The valve operational integrity is checked to minimize the risk of valve leakages and failures.
3. Operate valve systems.	3.1. Valve operation is monitored to ensure it is functioning correctly and such incidents are excluded as vibration, chatter, cycling, and sticking. 3.2. ***Appropriate action*** is taken. 3.3. Valve sequences are regulated or altered to control the flow rates of fluid during the process to meet changing production conditions and demands.
4. Conduct operational maintenance	4.1. Valve stems, threads and other operational parts are cleaned and lubricated to ensure the correct operational condition of the valve is maintained. 4.2. Valve bolting assembles are evenly tightened to prevent product leakage. 4.3. Valve and regulator faults are identified and appropriate action is taken. 4.4. Jammed or sticking valves are isolated from operation, and appropriate action is taken.
5. Isolate and de-isolate valves.	5.1. Plant is isolated. 5.2. Safe for required work is made.

	5.3. Check plant is ready to be returned to service. 5.4. Plant is prepared for return to service.

Variable	Range
Valve system	May include (select relevant items): • globe, butterfly, ball and gate valves • control valves • isolation valves • non-return or check valves • pressure relief valves • shutdown systems • hydraulic power units. Valve actuation may be: • pneumatic • hydraulic • electrical • manual.
Appropriate action	Includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Typical problems	May include: • vibration/resonance • blockages/hydrates • valve seat wear • valve seal leakage • valve stem leakage • mechanical failure, e.g. plug/gate • valve sticking.
Procedures	May be: • written, verbal, computer-based or in some other form. They include: ➢ all work instructions ➢ standard operating procedures ➢ formulas/recipes ➢ batch sheets ➢ temporary instructions ➢ any similar instructions provided for the smooth running of the plant.
Health, Safety and Environment (HSE)	• All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be

	imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • early warning signs of equipment/processes needing attention or with potential problems are recognized • the range of possible causes can be identified and analyzes and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognized and an appropriate contribution made to their solution.
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • identify all items on a schematic of the valve system and describe the function of each • physics related to the process • valve equipment operating parameters • process and product variables and reactions • operating pressures • operating temperatures • flow volume calculations • flow velocity calculations • fluid corrosive properties • fluid erosive properties. • principles of operation of valves • physics and chemistry relevant to the valves and the materials processed • process parameters and limits, e.g. temperature, pressure, flow, pH • duty of care obligations • hierarchy of control • communication protocols, e.g. radio, phone, computer, paper, permissions/authorities • routine problems, faults and their resolution • relevant alarms and actions • plant process idiosyncrasies • correct methods of, operating and controlling valves • corrective action appropriate to the problem cause • function and troubleshooting of major components and their problems • types and causes of problems within operator's scope of skill level and responsibility.
Underpinning Skills	Must demonstrate skills of: • instrument failure/malfunction

	• electrical failure/malfunction • mechanical failure/malfunction • equipment design deficiencies, e.g. wrong valve type for service • product parameters, e.g. temperature, viscosity, purity • fouling or contamination • erosion and corrosion.
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Monitor, Operate and Maintain Pipeline Stations and Equipment**
Unit Code	**MIN MPR2 07 0114**
Unit Descriptor	In a typical scenario, an operator is responsible for the operation and monitoring of pipeline stations and associated equipment within the parameters established. The competence includes examining the station and its equipment for signs of damage and/or need of maintenance, maintaining general cleanliness and reporting against specific requirements. Pipeline stations can include: • maintenance bases • compressor stations • scraper stations • inlet and delivery stations • mainline block valve sites.

Elements	Performance Criteria
1. Prepare for work.	1.1. Work requirements are identified. 1.2. Hazards are identified and controlled. 1.3. Coordination is done with appropriate personnel.
2. Plan and organize for activities.	2.1. Previous reports are reviewed and checked for outstanding work orders or notices. 2.2. Tools, equipment and testing devices needed are obtained to carry out the work and checked for correct operation and safety. 2.3. Operational area is checked to ensure that hazards are controlled. 2.4. Required safety checks and pre-start checks of the equipment are conducted. 2.5. Status of the system is determined through communication with relevant personnel prior to commencing start-up.
3. Start up/shut down the system.	3.1. The ***system*** is started up in accordance with ***procedures***. 3.2. The system is shutdown in accordance with procedures and conditions. 3.3. Emergency shutdown procedures are applied when appropriate. 3.4. Records/reports are maintained to procedures.
4. Monitor the system	4.1. Operating conditions of equipment are monitored through condition monitoring systems, gauge levels, temperatures and flow indicators in order to determine performance of

	equipment and system. 4.2. Systems are adjusted for the most efficient operation. 4.3. Equipment faults are identified through inspection and testing of the operational equipment. 4.4. ***Appropriate action*** is taken. 4.5. Pipeline system information is communicated to relevant personnel. 4.6. Emergency response is selected and applied when required.
5. Isolate and de-isolate plant.	5.1. Plant is isolated. 5.2. Plant is made safe for required work. 5.3. Plant is checked to be ready to be returned to service. 5.4. Plant is prepared for return to service.
6. Record and report results.	6.1. Maintenance results are documented and recorded to procedures. 6.2. Work completion is notified to procedures. 6.3. Permit to work and sign off is cancelled where appropriate at completion of repair.

Variable	**Range**
Pipeline system.	May include: • compressor systems and equipment, including monitoring systems, anti surge systems, safety systems and compressor control systems • prime movers, including turbine engines, reciprocating engines and electric motors, • instrument and control systems • valve systems.
Procedures	may be: • written, verbal, computer-based or in some other form. They include: ➢ all work instructions ➢ standard operating procedures ➢ formulas/recipes ➢ batch sheets ➢ temporary instructions ➢ any similar instructions provided for the smooth running of the plant.
Appropriate action	Includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has

	occurred • reporting problems outside area of responsibility to designated person.
Typical problems	May include: • gas/product leaks • incorrect valve positions • electrical problems • compressor or pump failure • out of current inspection status • gauge failure or hose rupture, leaks • instruments out of calibration • instruments and equipment requiring cleaning.
Health, Safety and Environment (HSE)	• All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • early warning signs of equipment/processes needing attention or with potential problems are recognized • the range of possible causes can be identified and analyzed and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognized and an appropriate contribution made to their solution.
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • station instrumentation • condition monitoring equipment • station power supplies • operations of metering equipment • functions of process control equipment • principles behind gas analysis equipment • purpose of valves, actuators and flanges • layout of piping systems • sumps and drains • station pressure vessels/filtration equipment • principles of operation of plant/equipment • physics and chemistry relevant to the process unit and the materials processed • process parameters and limits, e.g. temperature, pressure, flow, pH • duty of care obligations • hierarchy of control

	• communication protocols, e.g. radio, phone, computer, paper, permissions/authorities • routine problems, faults and their resolution • relevant alarms and actions • plant process idiosyncrasies • all items on a schematic of the plant item and the function of each • correct methods of starting, stopping, operating and controlling process • corrective action appropriate to the problem cause • function and troubleshooting of major components and their problems • types and causes of problems within operator's scope of skill level and responsibility.
Underpinning Skills	Must demonstrate skills of: • process gas variations • instrument failure/wrong reading • electrical failure • mechanical failure • operational problems.
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Conduct Aeration Process**
Unit Code	**MIN MPR2 08 0114**
Unit Descriptor	This unit covers the conduct of aeration processes in the mineral processing and mining industries. It includes planning and preparing for aeration activities, starting up equipment in sequence, operates and monitor equipment, conduct housekeeping activities, and shutting down in sequence and/or isolating equipment.

Elements	Performance Criteria
1. Plan and prepare for aeration activities	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Shift changeover details are received, interpreted and clarified. 1.3. Aeration activities are communicated with other personnel using approved communication methods. 1.4. Personal protective equipment appropriate for work activities is selected. 1.5. Equipment ***pre-start checks*** are performed. 1.6. Potential risks and hazards are identified, addressed and reported. 1.7. ***Environmental issues*** are identified, addressed and reported. 1.8. Emergency procedures are adhered to.
2. Start-up equipment in sequence	2.1. ***Start-up procedures*** are carried out and start-up checks completed according to plant configurations and system requirements. 2.2. ***Plant*** is confirmed to be operational.
3. Operate and monitor equipment	3.1. Data is ***read*** and interpreted from equipment indicators to determine ***aeration*** efficiency. 3.2. Operations/plant and catchment areas are continuously inspected and ***monitored*** to identify process defects and potential problems. 3.3. Equipment is adjusted to approve ***operating parameters*** to optimize and maintain efficient aeration to meet product quality targets. 3.4. End of shift information is passed on to oncoming shift.
4. Conduct housekeeping activities	4.1. ***Plant is cleaned*** to maintain condition of all equipment. 4.2. Hazards are managed and reported.

5. Shutdown in sequence and/or isolate equipment	5.1. Equipment is shutdown or isolated based on process and safety requirements. 5.2. Post a shutdown or isolation check is performed.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Pre-start checks	May include: • availability of equipment (e.g. conveyor) • detection of conditions that are unusual • personnel availability • job requirements • levels • walk through plant
Environmental issues	May include: • drainage • dust (dump) • emissions • flora and fauna • hazardous chemicals • noise • recycling • run-off • spills • waste management and disposal • water quality
Start-up procedures	May include the inspection of: • agitators • cameras and monitors • interlocks • distribution control system • launders • hydraulic system • pumping system • screen inspections • scuttling pumps • pipes and flanges • drive belts • valves • visual and audio warning devices and lights

	• suppression systems
Plant	• agitators • blowers • valves • pumps • hoppers • vessels (aerator) • hoses • air/slurry/water lines • silences • tank (process liquor, reagent holder) • conveyors • weight and vibrating feeder
Indicator readings	May measure: • flow • current (e.g. agitators) • density • levels • restrictions • air flows • pressure • speed (e.g. pumps) • unusual noises • vibrations • power • temperature
Aeration methods	May include: • batch • continuous
Monitoring	May include the checking of: • blockages and spillages • feed rates • mineral content • moisture levels • On Stream Analysis (OSA) • overloads • pressures (e.g. in air lines) • power draw • wear and tear • emission (e.g. cyanide) • levels • hydrogen bubbles • end point testing (batch) • temperature
Operating parameters	May include: • reagent additions

	• reduce produce/feed/tonnes • hectalilte of processes liquor
Equipment and plant cleaning methods	May include: • hosing with water • high pressure cleaning
Post-shutdown checks	are like pre-start checks.
Shutdown procedures	May include: • cleaning of sparge lines • charge and empty discharge lines
Tests	May include: • magnetic tests • on-line conductivity • temperature measurements
Materials	May include: • slurry (reagent, dry product, liquor)
Contaminants are anything other than the ore. Common contaminants	May include: • oil • fuel • gases • organic materials • moisture

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for conducting aeration processes • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of aeration processes • working with others to undertake and complete the aeration process in a way that meets all of the required outcomes • consistent timely completion of aeration processes that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge and skills of: • breakdown procedures • contaminant identification • aeration process • emergency procedures • environmental procedures • equipment limitations and operating parameters • equipment safety requirements • repair requirements • aeration plant isolation procedures • metallurgical and technical data

	• OHS procedures associated with conducting aeration processes • operational procedures and checks • site procedures • site safety requirements
Underpinning Skills	Must demonstrate knowledge and skills of: • apply legislative, organization and site requirements and procedures for conducting aeration processes • find faults • interpret reports • lift (manual, cranes and loads) • use safe work practices • use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Conduct Digestion Process**
Unit Code	**MIN MPR2 09 0114**
Unit Descriptor	This unit covers the conduct of digestion processes in the mineral processing and mining industries. It includes planning and preparing for digestion operations, starting up equipment in sequence, operating and monitoring equipment, conducting housekeeping operations, and shutting down in sequence and/or isolating equipment.

Elements	Performance Criteria
1. Plan and prepare for digestion operations	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Shift changeover details are received, interpreted and clarified. 1.3. Digestion operations are communicated with other personnel using approved communication methods. 1.4. Personal protective equipment appropriate for work activities is selected. 1.5. Appropriate type of ***auxiliary equipment*** is selected for work activities. 1.6. Equipment ***pre-start checks*** are performed to ensure equipment is ready for operation. 1.7. Potential risks and hazards are identified, addressed and reported. 1.8. ***Environmental issues*** are identified, addressed and reported. 1.9. Emergency procedures are adhered to ensure safety of personnel and plant. 1.10. Approved dust suppression and extraction methods are used. 1.11. Ensure area is well ventilated before entry into work area.
2. Start-up equipment in sequence	2.1. ***Start-up procedures*** are carried out and start-up checks completed according to plant configurations and system requirements. 2.2. ***Plant*** is confirmed to be operational.
3. Operate and monitor equipment	3.1. Data is ***read*** and interpreted from equipment indicators to determine efficiency. 3.2. Operations/plant and catchment areas are continuously inspected and ***monitored*** to digestion process defects and

	potential problems. 3.3. Equipment is adjusted to approve operating parameters to optimize and maintain efficient digestion and to meet product quality targets. 3.4. Reagents are added to approved operating parameters 3.5. Minor maintenance is carried out to maintain condition of equipment 3.6. All required documentations are completed clearly, concisely and on time 3.7. End of shift information is passed on to oncoming shift
4. Conduct housekeeping activities	4.1. ***Plant is cleaned*** to maintain condition of all equipment to ensure safe and efficient operations 4.2. Hazards are managed and reported to maintain a safe working environment
5. Shutdown in sequence and/or isolate equipment	5.1. Equipment is shutdown or isolated based on process and safety requirements 5.2. Post shutdown or isolation checks are performed

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Auxiliary equipment	May include: • compressors • Distribution Control Systems (DCS) • feeders • gantry cranes and attachments and other mobile equipment • hand and power tools • hoses
Pre-start checks	May include: • availability of equipment (e.g. conveyor) • detection of conditions that are unusual • personnel availability • job requirements • levels • walk through plant
Environmental issues	May include: • drainage • dust (dump)

	• emissions • flora and fauna • hazardous chemicals • noise • recycling • run-off • spills • waste management and disposal • water quality
Start-up procedures	May include: • cameras and monitors • interlocks • distribution control system • flash vessels • launders • heat exchangers • hydraulic system • pumping system • screen inspections • scuttling pumps • pipes and flanges • drive belts • valves • vessels • visual and audio warning devices and lights • suppression systems
Plant	May include: • heat exchanger • burners • lines • gas train • vessels • conveyors • valves
Indicator readings	May measure: • flow • current (e.g. agitators) • density • levels • restrictions • pressure • speed (e.g. pumps) • unusual noises • vibrations • power

	• temperature
Monitoring	May include: • blockages and spillages • feed rates • mineral content • moisture levels • On Stream Analysis (OSA) • overloads • pressures • power draw • temperature • wear and tear • emission (e.g. cyanide) • levels • laboratory results
Common contaminants	May include: • oil • fuel • gases • organic materials • moisture

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for conducting the digestion process • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of the digestion process • working with others to undertake and complete the digestion process in a way that meets all of the required outcomes • consistent timely completion of the digestion process that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • breakdown procedures • contaminant identification • digestion process (basic) • emergency procedures • environmental procedures • equipment limitations and operating parameters • equipment safety requirements • hazardous goods procedures and consequences of spills and hazardous goods • identifying repair requirements • isolation procedures

	• metallurgical and technical data (basic) • OHS procedures • operational procedures and checks • pumping system and flow charts (pipeline and sprinkler systems) • reagent types • sampling • site procedures • site safety requirements • types of ores (basic) • wet and dry working procedures
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for conducting the digestion process • diagnose faults • identify and manage hazards • handle hazardous goods • interpret reports • lift (manual, cranes and loads) • maintain records • report defects • apply safe work practices • troubleshoot • use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Conduct Precipitation Operations**
Unit Code	**MIN MPR2 10 0114**
Unit Descriptor	This unit covers the conduct of precipitation operations in the mineral processing and mining industries. It includes planning and preparing for precipitation operations, starting up equipment in sequence, operating and monitoring equipment, conducting housekeeping activities, and shutting down in sequence and/or isolating equipment.

Elements	Performance Criteria
1. Plan and prepare for digestion operations	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Shift changeover details are received, interpreted and clarified. 1.3. Digestion operations are communicated with other personnel using approved communication methods. 1.4. Personal protective equipment appropriate for work activities is selected. 1.5. Appropriate type of ***auxiliary equipment*** is selected for work activities. 1.6. Equipment ***pre-start checks*** are performed to ensure equipment is ready for operation. 1.7. Potential risks and hazards are identified, addressed and reported. 1.8. ***Environmental issues*** are identified, addressed and reported. 1.9. Emergency procedures are adhered to ensure safety of personnel and plant. 1.10. Approved dust suppression and extraction methods are used. 1.11. Ensure area is well ventilated before entry into work area.
2. Start-up equipment in sequence	2.1. ***Start-up procedures*** are carried out and start-up checks completed according to plant configurations and system requirements. 2.2. ***Plant*** is confirmed to be operational.
3. Operate and monitor equipment	3.1. Data is ***read*** and interpreted from equipment indicators to determine efficiency. 3.2. Operations/plant and catchment areas are continuously inspected and ***monitored*** to digestion process defects and potential problems.

	3.3. Equipment is adjusted to approve operating parameters to optimize and maintain efficient digestion and to meet product quality targets. 3.4. Reagents are added to approve operating parameters. 3.5. Minor maintenance is carried out to maintain condition of equipment. 3.6. All required documentations are completed clearly, concisely and on time. 3.7. End of shift information is passed on to oncoming shift.
4. Conduct housekeeping activities	4.1. ***Plant is cleaned*** to maintain condition of all equipment to ensure safe and efficient operations. 4.2. Hazards are managed and reported to maintain a safe working environment.
5. Shutdown in sequence and/or isolate equipment	5.1. Equipment is shutdown or isolated based on process and safety requirements. 5.2. Post shutdown or isolation checks are performed.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Auxiliary equipment	May include: • compressors • Distribution Control Systems (DCS) • feeders • gantry cranes and attachments and other mobile equipment • hand and power tools hoses
Pre-start checks	May include: • availability of equipment (e.g. conveyor) • detection of conditions that are unusual • personnel availability • job requirements • levels • walk through plant
Environmental issues	May include: • drainage • dust (dump) • emissions • flora and fauna

	• hazardous chemicals • noise • recycling • run-off • spills • waste management and disposal • water quality
Start-up procedures	May include: • agitators • cameras and monitors • interlocks • distribution control system • hydraulic system • pumping system • screen inspections • scuttling pumps • pipes and flanges • drive belts • valves • visual and audio warning devices and lights • suppression systems
Plant	• precipitators • liquor stream seeding equipment • thickeners • clarifiers • sand filters • heat exchanger • vessels • conveyors • valves • conglomerators • agitators • ejectors
Indicator readings	May include: • degree of separation • flow • current (e.g. agitators) • density • levels • restrictions • air flows • pressure • speed (e.g. pumps) • temperature • unusual noises • vibrations

	• power • temperature
Precipitation	Can cover: • sulphide and neutralisation processes, and a seed recycle, crystal growth process to precipitate metals or other items in solution.
Monitoring and control of the precipitation or crystallisation process	May include the checking of: • blockages and spillages • feed rates • mineral content • moisture levels • On Stream Analysis (OSA) • overloads • pressures • power draw • wear and tear • emission (e.g. cyanide) • laboratory results • levels • residual content in liquor stream • productivity of extraction
Equipment and plant cleaning methods	May include: • hosing with water • high pressure cleaning
Post-shutdown checks	are like pre-start checks.
Materials are wet and	May include: • slurry • effluent

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for conducting precipitation operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of precipitation operations • working with others to undertake and complete the precipitation operations that meets all of the required outcomes • consistent timely completion of precipitation operations that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • breakdown procedures • contaminant identification • precipitation process • chemistry - basic solubility

	• sulphide precipitation • neutralisation precipitation • liquid and solid separation processes in precipitation and crystallisation • flocculation agents • filtration methods • emergency procedures • environmental procedures • equipment limitations and operating parameters • equipment safety requirements • hazardous goods procedures and consequences of spills and hazardous goods • identifying repair requirements • isolation procedures • metallurgical and technical data (basic) • OHS procedures • operational procedures and checks • pumping system and flow charts (pipeline and sprinkler systems) • reagent types • seeding and crystallisation processes • sampling • site procedures • site safety requirements • types of ores (basic) • wet and dry working procedures
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for conducting precipitation operations • end-point identification • diagnose faults • identify and address hazards • handle hazardous goods • interpret reports • lift (manual, cranes and loads) • maintain records • report defects • apply safe work practices • use relevant hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Conduct Stacker Operations**
Unit Code	**MIN MPR2 11 0114**
Unit Descriptor	This unit covers the conduct of stacker operations in the mineral processing and mining industries. It includes planning and preparing for stacker operations, operating the stacker, and carrying out operator maintenance.

Elements	Performance Criteria
1. Plan and prepare for stacker operations	1.1. ***Compliance documentation*** relevant to the conducting of stacker operations is accessed, interpreted and applied. 1.2. ***Work requirements*** and ***shift details*** are obtained, interpreted and clarified/confirmed before proceeding. 1.3. ***Information on stockpile product***, ***formation and conditions*** required to complete the allocated work is accessed, interpreted and applied. 1.4. Worksite inspection is carried out and hazards or other notifiable conditions are rectified or reported. 1.5. ***Safety information and procedures*** are accessed and applied throughout the work.
2. Operate stacker	2.1. Activities are ***coordinated*** with others at the site prior to commencement of, and during, the work activity. 2.2. Pre-start, start-up, park-up and shutdown procedures are carried out. 2.3. Controls are operated to stack materials. 2.4. Monitoring systems and alarms or report is acted on. 2.5. ***Hazardous and emergency situations*** are recognized and responded. 2.6. Work is completed in accordance with the agreed plan and outcomes and within the operating capacities of the allocated equipment. 2.7. ***Reporting*** is carried out and documents are completed and processed.
3. Carry out operator maintenance	3.1. Plant and equipment inspections and faultfinding are carried out. 3.2. Routine operational servicing, lubrication and housekeeping tasks are carried out. 3.3. Minor maintenance is carried out to manufacturer's instructions and site requirements.

	3.4. Operator support is provided during preparation for, and conduct of, major maintenance tasks. 3.5. Structures and components are inspected and tested for fault conditions, wear and need of repair or replacement. 3.6. Maintenance records are processed.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Work requirements	May include: • work plans • shift briefings • handover details • work orders
Shift details	May include: • nature and scope of the work • working conditions • production targets • defects on equipment • hazards and potential hazards • coordination requirements/issues
Stockpile product**,** formation and conditions	May include: • stockpile residue • stockpile design and position • safety factors relating to natural falls • grades • levels • slips • drainage
Safety information and procedures	May include: • site-specific safety processes and documentation such as JSAs
Coordinate	May include: • communication with process control, maintenance, supervision, logistics scheduler, mobile operators, contractors etc • monitoring operation of stacker ensuring that it does not collide with other equipment
Hazardous and emergency situations	May include: • sinking • stockpile stabilisation • wet weather operation or severe storms

	• electrical start-up and shutdown • electrical fires • windy and dusty conditions • chute cleaning • working in close proximity to moving equipment and parts
Reporting	May include: • computer reports • accident/incident reports • pre-start equipment reports/defect reports • tags • work orders

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for conducting stacker operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of stacker operations • working with others to undertake and complete stacker operations that meets all of the required outcomes • consistent timely completion of stacker operations that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • site and equipment safety requirements and procedures • stockpile management processes • stacker characteristics, technical capabilities and limitations • stacker maintenance procedures/stacker operating procedures • ore / coal type and quality • blending specifications and techniques • environmental requirements and constraints related to stacker operations • recording and reporting processes • impact of stacker operations on customer quality requirements
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • access, interpret and apply technical information • apply diagnostic techniques • apply equipment hose down procedures • apply procedures for preparation and communication of reports • apply procedures for complying with environmental requirements • apply procedures for disposal of environmentally sensitive fluids and materials

	• apply records maintenance requirements • apply procedures for working at heights
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Conduct Roasting Operations**
Unit Code	**MIN MPR2 12 0114**
Unit Descriptor	This unit covers the conduct of roasting operations in the mineral processing and mining industries. It includes preparing for and conducting roaster operations, managing delivery of concentrate to the fluid bed roaster, monitoring operation of the fluid bed roaster, managing roaster products, and conducting housekeeping activities.

Elements	Performance Criteria
1. Prepare for and conduct roaster operations	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Shift changeover details are received, interpreted and clarified. 1.3. Roaster operations are communicated with other personnel using approved communication methods. 1.4. Personal protective equipment appropriate for work activities is selected. 1.5. Appropriate type of ***auxiliary equipment*** is selected for work activities. 1.6. Potential risks and hazards are identified, addressed and reported. 1.7. ***Environmental issues*** are identified, addressed and reported. 1.8. Emergency procedures are adhered to ensure safety of personnel and ***plant***. 1.9. Approved dust suppression and extraction methods are used. 1.10. Ensure area is well ventilated before entry into work area.
2. Manage delivery of concentrate to fluid bed roaster	2.1. Feed mechanism operation (e.g. conveyor systems) is ***monitored***. 2.2. Operating requirements are monitored. 2.3. Feed rate is adjusted in accordance with operating requirements.
3. Monitor operation of fluid bed roaster	3.1. Data is ***read*** and interpreted from equipment indicators to determine roaster efficiency. 3.2. Operations/plant and catchment areas are continuously inspected to identify ***roaster process*** defects and potential problems. 3.3. Cooling systems are adjusted to optimize roaster operation

	temperature. 3.4. All required documentations are completed clearly, concisely and on time. 3.5. End of shift information is passed on to oncoming shift.
4. Manage roaster products	4.1. Gas is monitored by-product output and cooling. 4.2. Calcine cooling systems are monitored. 4.3. The operation of calcine and gas cooling systems is regulated. 4.4. All roaster operating and cooling system alarms are reported. 4.5. Roaster products are communicated with personnel to ensure effective management of roaster products and by-products.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Auxiliary equipment	May include: • compressors • Distribution Control Systems (DCS) • feeders • gantry cranes and attachments and other mobile equipment • hand and power tools • hoses
Environmental issues	May include: • drainage • dust (dump) • emissions • flora and fauna • hazardous chemicals • noise • recycling • run-off • spills • waste management and disposal • water quality
Plant	May include: • roaster • boilers • cyclones • drum coolers • gas precipitators

	• heat exchanger • burners • gas train • vessels • conveyors • valves • ladders • rails
Monitoring the roasting process	May include the checking of: • product composition (e.g. sulphate/sulphide %)blockages and spillages • feed rates • moisture levels • overloads • pressures • power draw • wear and tear • emission (e.g. sulphides) • Contaminants, that is, anything other than the ore. Common contaminants may include oil, fuel, gases, organic materials, moisture
Indicator readings	May include: • temperature • gas pressure • air flows • speed (e.g. cooling system pumps) • unusual noises • vibrations • power
Roasting process	May include: • fluid bed roaster • tantaline roaster • filtrate roasting
Feed materials	May include: • ore concentrate • calcine • other feed material
Equipment or plant cleaning methods	May include: • hammer and bar • air lance • shovel and wheel barrow • vacuum • hosing with water • high pressure cleaning

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for conducting roasting operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of roasting operations • working with others to undertake and complete the roasting operations in a way that meets all of the required outcomes • consistent timely completion of roasting operations that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • breakdown procedures • contaminant identification • roasting process • operating parameters and roasting capacities • cooling systems • boiler operation • concentrate blending • calcine storage • gas management systems • emergency procedures • environmental procedures • equipment safety requirements • hazardous goods procedures and consequences of spills and hazardous goods • identifying repair requirements • isolation procedures • metallurgical and technical data (basic) • OHS procedures • pumping system • reagent types • sampling • site procedures • site safety requirements • types of ores (basic) • wet and dry working procedures
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for conducting roasting operations • diagnose faults • handle hazardous goods • interpret reports • lift (manual, cranes and loads) • maintain records • report defects • apply safe work practices

	• use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Carryout Bore-field Operations**
Unit Code	**MIN MPR2 13 0114**
Unit Descriptor	This unit covers the carrying out of bore-field operations in the mineral processing and mining industries. It includes planning and preparing for bore-field activities, monitoring water, operating and monitoring bore-field equipment, and conducting housekeeping activities.

Elements	Performance Criteria
1. Plan and prepare for bore-field activities	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Work is planned and prepared. 1.3. Shift changeover details are received, interpreted and clarified. 1.4. Bore-field activities are communicated with other personnel using approved ***communication*** methods. 1.5. Personal protective equipment appropriate for work activities is selected. 1.6. Appropriate type of equipment and reagents are selected according to job type to maximize efficiency and effectiveness of work activities. 1.7. Equipment ***pre-start checks*** are performed to ensure equipment is ready for operation. 1.8. Potential risks and hazards are identified, addressed and reported. 1.9. ***Environmental issues*** are identified, addressed and reported. 1.10. Emergency procedures are adhered to ensure safety of personnel and ***plant***.
2. Plan and prepare for bore-field activities	2.1. Bore is dipped and water level recorded. 2.2. Sample and test are taken according to site requirements. 2.3. Water quality and quantity are adjusted to meet processing requirements. 2.4. Water storage levels are ***monitored***.
3. Operate and monitor bore-field equipment	3.1. Data is taken and interpreted from equipment ***indicator readings*** and flow adjusted to maintain dam/tank levels. 3.2. Plant and pipelines are continuously inspected to identify defects and potential problems. 3.3. ***Contaminants*** to environmental and site requirements are

	identified, removed and disposed of. 3.4. Equipment is adjusted to approve operating parameters to optimize performance; efficient water treatment systems are maintained to meet water quality targets. 3.5. Safety procedures regarding protection from the elements and communication with site are observed.
4. Conduct housekeeping activities	4.1. ***Equipment is cleaned*** to maintain condition of equipment and safe and efficient operations are ensured. 4.2. ***Auxiliary service equipment*** is cleaned and stored. 4.3. Hazards are managed and reported to maintain a safe working environment. 4.4. All required documentations are completed clearly, concisely and on time. 4.5. Shift change-over details are passed on to oncoming shift.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Communication methods	May include: • telemetry system • satellite phone • two-way radio
Pre-start checks	May include: • availability of equipment • detection of conditions that are unusual • vehicle and equipment for remote travel • job requirements • personnel availability • walk through the plant/around settling pond/drive along pipe line
Environmental issues	May include: • drainage • dust • emissions • flora and fauna • hazardous chemicals • recycling • run-off • spills

	• waste management and disposal • water quality
Plant	May include: • pumps (fixed) • lines • storage tanks/dams
Monitor	May include the checking of: • leakage • blockages and spillages • water levels • road condition and accessibility • wear and tear of equipment • weather conditions • environmental problems
Indicator readings	May measure: • current • flow • level • pressure • unusual noises (e.g. cavitation) • vibrations
Contaminants	May include: • animals • containers and packaging • fuels and oils • rubbish
Clean equipment	May include: • dismantling • flushing • de-scaling
Auxiliary service equipment	May include: • discharge lines • sets (generator) • hand and power tools • hoses (water and air) • level and pressure indicators • pump system • strainers

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for carrying out bore-field operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of bore-field operations • working with others to undertake and complete the carrying

	out of bore-field operations that meets all of the required outcomes • consistent timely completion of bore-field operations that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • breakdown procedures • bore / catchment/dam procedures • contaminants • detoxification procedures • emergency procedures • environmental and heritage procedures • equipment processes, technical capability and limitations • equipment safety requirements • hazardous goods procedures and consequences of spills • identifying repair requirements • isolation procedures • occupational health and safety procedures • operational procedures and checks • pumping systems • reagents • site safety requirements
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for carrying out bore-field operations • identify hazards • handle hazardous goods • interpret reports • apply lifting techniques (manual, cranes and loads) • maintain records • use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Operate Raw Material Feed Systems**
Unit Code	**MIN MPR2 14 0114**
Unit Descriptor	This unit covers the operation of raw material feed systems In the mineral processing and mining industries. It Includes preparing for and delivering raw materials.

Elements	Performance Criteria
1. Prepare for delivery of raw materials	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Work is planned and prepared. 1.3. Shift changeover details are received, interpreted and clarified. 1.4. Delivery of raw materials is communicated with other personnel. 1.5. ***Personal protective equipment*** appropriate for work activities is selected. 1.6. ***Potential risks and hazards*** are identified, addressed and reported. 1.7. ***Environmental issues*** are identified, addressed and reported. 1.8. Visual and physical inspection of mobile equipment and plant are conducted before operations.
2. Deliver raw materials	2.1. Conveyor belts are cleared at the earliest opportunity when stopped in an emergency. 2.2. Conveyor belts are emptied prior to stopping. 2.3. Tramp metals are removed from materials to prevent damage to equipment and conveyors. 2.4. Materials are conveyed to bunkers minimizing spillage. 2.5. Mobile and fixed equipments are operated efficiently.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Personal protective equipment	May include: • helmet • eye/face protection

	• respiratory protection • gloves • hearing protection • safety footwear
Potential risks and hazards	May include: • rail and road movement • cranes • noise • wind borne dust • sharp objects • moving machinery • falling • falling objects • gases
Environmental issues	May include: • drainage • dust and fumes • emissions • hazardous chemicals • noise • run-off • spills • waste management and disposal • water quality

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for operating raw material feed systems • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of raw material feed systems operation • working with others to undertake and complete the operation of raw material feed systems that meets all of the required outcomes • consistent timely completion of raw material feed systems operation that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • precautions necessary for safe working • system for accessing safe working procedures • use of protective clothing and equipment • operating procedures • quality procedures • reclaiming operation • tramp metal detection and removal • conveyor belt procedures

	• dangers presented by specific plant and equipment • report faults • limits of authority • team working practices • minimizing conflict • information to be communicated, to whom and when • requirements on job holder of quality systems
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for operating raw material feed systems • reclaim materials • store materials • store/blend materials • deal with hazards • communicate within work group • report faults and variances
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Conduct Pump Operations**
Unit Code	**MIN MPR2 15 0114**
Unit Descriptor	This unit covers the conduct of pump operations in the mineral processing and mining industries. It includes planning and preparing for pumping operations, pumping material, and carrying out operator maintenance.

Elements	Performance Criteria
1. Plan and prepare for pumping operations	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Work is planned and prepared. 1.3. Shift changeover details are received, interpreted and clarified. 1.4. ***Potential risks and hazards*** are identified, addressed and reported. 1.5. Personal protective equipment appropriate for work activities is selected. 1.6. Equipment ***pre-start checks*** are conducted. 1.7. ***Environmental issues*** are identified, addressed and reported. 1.8. Pumping operations are communicated with other personnel. 1.9. Emergency procedures are adhered.
2. Pump material	2.1. Start-up and shutdown procedures are carried out. 2.2. Equipment is operated within recommended speed, engine capability and limitations. 2.3. Equipment performance is monitored by utilizing appropriate ***indicators***. 2.4. Work is completed according to agreed work plan and outcomes. 2.5. Pressure and flow of material are constantly monitored.
3. Carry out operator maintenance	3.1. ***Visual inspection and fault finding*** are conducted. 3.2. Routine operational servicing is conducted to ensure peak performance of equipment. 3.3. ***Equipment is cleaned***. 3.4. All required records and documentation are completed accurately and promptly.

Variable	Range

Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Potential risks and hazards	May include: • abandoned equipment • adjoining pit walls • adverse weather conditions (electrical storms, floods, fires) • chemicals • contaminants • equipment • fences • holes • materials • over-hanging rocks • personnel • pot holes • unsafe ground • unstable faces • vehicles
Pre-operational checks	May include: • computer systems • display instrumentation and gauges (indicators, gauges, laser levels) • pump and componentry • visual and audio warning devices and lights
Environmental issues	May include: • culturally-sensitive sites and artefacts • drainage • dust • emissions • flora and fauna • hazardous chemicals • heritage legislation • noise • runoff • spills • water quality
Indicators	May include: • computer indicators
Visual inspection and fault finding	May include: • danger tags • fire suppression unit (pins in position in triggers)

	• light positioning and cleanliness • oil leaks • personnel proximity • portable fire extinguisher (bracket, gauge, hose, ease of access) • stress in pipelines
Equipment cleaning methods	May include: • degreasing • forced air • steam cleaning • vacuum • water
Capacity of pump	May include: • duration of operation • efficient and safe operating speed • operating limitations • pressure limitations • type of activities performed
Site conditions	May include: • broken ground • day and night • degree of compaction • location of water table • slope of working surface • stable ground (compaction) amount of scale • wet and dry • working over old underground workings and voids
Materials in suspension	May include: • ore • organic solvents • contaminants • precipitates

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for conducting pump operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of pump operations • working with others to undertake and complete the conduct of pump operations that meets all of the required outcomes • consistent timely completion of pump operations that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • emergency procedures • environmental principles

	• equipment processes, technical capability and limitations • equipment safety requirements • isolation procedures • material under pressure • mine operational system • occupational health and safety procedures • operational procedures and checks • pumping operations • pumping safety requirements
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for conducting pump operations • maintain, clean and operate equipment • identify hazards • handle hazardous goods • maintain records • monitor operations • employ safe work practices • fault finding • use communications equipment • use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Prepare for Sintering Activities**
Unit Code	**MIN MPR2 16 0114**
Unit Descriptor	This unit covers the preparation of sintering activities in the mineral processing and mining industries. It includes preparing for sintering operations, discharging and storing raw materials, blending raw materials, and distributing raw materials in readiness for sintering.

Elements	Performance Criteria
1. Prepare for sintering operations	1.1 ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2 Shift changeover details are received, interpreted and clarified. 1.3 Sintering operations are communicated with other personnel using approved communication methods. 1.4 Personal protective equipment appropriate for work activities is selected. 1.5 Potential risks and ***hazards*** are identified, addressed and reported. 1.6 Computer systems and equipment pre-start checks are completed. 1.7 ***Environmental issues*** are identified, addressed and reported. 1.8 Record is checked and outstanding maintenance inspections are identified and identified defects recorded.
2. Blend raw materials	2.1 Materials are discharged from ***transportation*** minimizing spillage and/or delays constructed required bed size by bedding materials to specification. 2.2 Sufficient amount of materials is maintained to meet bed building requirements. 2.3 Materials are blended in specified sequence.
3. Distribute raw materials in readiness for sintering	3.1 Dust is suppressed using appropriate method. 3.2 Materials are supplied to required usage flow rates. 3.3 Materials ready for use are stored in designated area. 3.4 Blended materials are accurately identified and transferred to designated area.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications

	• Ethiopian standards • management plans • OHS policy
Hazards	May include: • rail and road movements • cranes • noise • wind borne dust • sharp objects • moving machinery • falling • falling objects
Environmental issues	May include: • drainage • dust and fumes • emissions • hazardous chemicals • noise • run-off • spills • waste management and disposal • water quality
Transportation	May include: • conveyor • truck

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for preparing for sintering activities • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of sintering activities preparation • working with others to undertake and complete the sintering activities preparation in a way that meets all of the required outcomes • consistent timely completion of sintering activities preparation that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • blending procedures • dangers presented by specified plant and equipment • discharging methods • information to be communicated, to whom and when • limits of authority/minimising conflict • operating procedures • precautions necessary for safe working

	• quality procedures • report faults • requirements on job holder of quality systems • system for accessing safe working procedures • team working practices • transportation types • use of protective clothing and equipment
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for preparing for sintering activities • bed materials • communicate within work group • discharge materials • report faults and variances • stock materials
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written exam • Observation/Demonstration with Oral questioning
Context for Assessment	Competence may be assessed in the workplace or in a simulated work environment.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Conduct Sand Wash Plant Operations**
Unit Code	**MIN MPR2 17 0114**
Unit Descriptor	This unit covers the conduct of sand wash plant operations in the mineral processing and mining industries. It includes the planning and preparing for operations, operating the sand wash plant and carrying out post operational procedures.

Elements	Performance Criteria
1. Plan and prepare for operations	1.1. ***Compliance documentation*** relevant to the conduct of sand wash plant operations is accessed, interpreted and applied. 1.2. ***Work requirements*** are obtained, interpreted and clarified for the satisfactory completion of operations. 1.3. ***Work area is inspected and prepared*** in ***coordination with others*** to work requirements and legislative, site and manufacturer's requirements and procedures.
2. Operate the sand wash plant	2.1. Coordination requirements are resolved with others at the site prior to commencing and during work activities. 2.2. ***Pre-start***, ***start-up and shutdown procedures*** are carried out. 2.3. The ***operating technique*** is selected and modified to appropriately meet ***changing work conditions***. 2.4. Operations within the equipment limitations are conducted, controlled and monitored maintaining sand wash efficiency and effectiveness. 2.5. Monitoring systems and alarms are acted on or reported. 2.6. ***Hazardous and emergency situations*** are recognized and responded. 2.7. Work is completed in accordance with the agreed plan and outcomes.
3. Carry out post-operational procedures	3.1. Inspection, fault finding and reporting have been done. 3.2. ***Operational maintenance***, ***servicing***, ***lubricating and housekeeping tasks*** are carried out. 3.3. Records and reports are maintained, processed and passed.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards

	• management plans • OHS policy
Work requirements	May include: • product details • nature and scope of tasks • achievement targets • operational conditions • site layout and out of bounds areas • work site inspection requirements • lighting conditions • plant or equipment defects • hazards and potential hazards • coordination requirements or issues
Inspect and prepare work area	May include: • identification of hazards • selection and implementation of control measures for the hazards identified • safeguarding site and non-site personnel by: ➢ erection of barricades and posting of signs ➢ selection of appropriate equipment to ensure personnel safety and protection
Coordination with others	May include: • yard persons • laboratory personnel • mobile plant operators • dredge operator • maintenance personnel
Pre-start**,** start-up and shutdown procedures	May include: • walk around check of the plant • checking and toping up fluid levels (including fuel) • lubrication • inspection of attachments to ensure security and identify defects • instrument and control lever checks • reporting defects and damage • follow prescribed start-up sequence • confirm plant is operational • following prescribed shutdown sequence • securing equipment
Operating technique	May include: • feed control adjustments • water flow adjustments in sprays, classifiers • working safely around other machines and personnel
Changing work	May include: • feed grading

conditions	• feed contamination • availability and cleanliness of water • weather conditions • day and night
Hazardous and emergency situation	May include: • confined spaces • working alone • personal injury • unplanned shutdown • environmental • chemical • fire • dust, noise and electrical
Operational maintenance**,** servicing**,** lubricating and housekeeping tasks	May include: • scheduled servicing • changing wear components • greasing • equipment adjustments • cleaning

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for the conducting of sand wash plant operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of sand wash plant operations • working with others to undertake and complete sand wash plant operations that meets all of the required outcomes • consistent timely completion of sand wash plant operations that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge	Must demonstrate knowledge of: • site hazard identification and response procedures • site risk control procedures • site and equipment health and safety procedures • site environmental requirements and constraints • site quality requirements • site communication procedures • site product characteristics • site geological and survey data • site operational procedures • plant pre-start, start-up, operating and shutdown procedures and techniques • plant components functions, characteristics, technical capability and limitations

	• plant breakdown procedures • plant isolation procedures • site record keeping requirements • site confine space work procedures • site personal protective equipment requirements • contaminant identification
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • apply operational safety requirements • access, interpret and apply technical information • applying the plant operating procedures • apply production and equipment records maintenance requirements • apply diagnostic techniques • use relevant hand tools • apply procedures for the disposal of environmentally sensitive fluids and materials • apply chemical and fuel safety measures • work wearing personal protective equipment
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context for Assessment	Competence may be assessed in the workplace or in a simulated work environment.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Participate in Workplace Communication**
Unit Code	**MIN MPR2 18 0114**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to gather, interpret and convey information in response to workplace requirements.

Elements	Performance Criteria
1. Obtain and convey workplace information	1.1 Specific and relevant information is accessed from ***appropriate sources***. 1.2 Effective questioning, active listening and speaking skills are used to gather and convey information. 1.3 Appropriate ***medium*** is used to transfer information and ideas. 1.4 Appropriate non- verbal communication is used. 1.5 Appropriate lines of communication with supervisors and colleagues are identified and followed. 1.6 Defined workplace procedures for the location and ***storage*** of information are used. 1.7 Personal interaction is carried out clearly and concisely.
2. Participate in workplace meetings and discussions	2.1 Team meetings are attended on time. 2.2 Own opinions are clearly expressed and those of others are listened to without interruption. 2.3 Meeting inputs are consistent with the meeting purpose and established ***protocols***. 2.4 ***Workplace interactions*** are conducted in a courteous manner. 2.5 Questions about simple routine workplace procedures and matters concerning working conditions of employment are asked and responded to. 2.6 Meetings outcomes are interpreted and implemented.
3. Complete relevant work related documents	3.1 Range of ***forms*** relating to conditions of employment is completed accurately and legibly. 3.2 Workplace data is recorded on standard workplace forms and documents. 3.3 Basic mathematical processes are used for routine calculations. 3.4 Errors in recording information on forms/ documents are identified and properly acted upon. 3.5 Reporting requirements to supervisor are completed according to organizational guidelines.

Variable	Range
Appropriate sources	May include but not limited to: • Team members • Suppliers • Trade personnel • Local government • Industry bodies
Medium	May include but not limited to: • Memorandum • Circular • Notice • Information discussion • Follow-up or verbal instructions • Face to face communication
Storage	May include but not limited to: • Manual filing system • Computer-based filing system
Protocols	May include but not limited to: • Observing meeting • Compliance with meeting decisions • Obeying meeting instructions
Workplace interactions	May include but not limited to: • Face to face • Telephone • Electronic and two way radio • Written including electronic, memos, instruction and forms, non-verbal including gestures, signals, signs and diagrams
Forms	May include but not limited to: • Personnel forms, telephone message forms, safety reports

Evidence Guide	
Critical Aspects of Competency	Demonstrates skills and knowledge to: • Prepare written communication following standard format of the organization • Access information using communication equipment • Make use of relevant terms as an aid to transfer information effectively • Convey information effectively adopting the formal or informal communication
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: • Effective communication • Different modes of communication • Written communication • Organizational policies • Communication procedures and systems • Technology relevant to the enterprise and the individual's work responsibilities

Underpinning Skills	Demonstrate skills to: • Follow simple spoken language • Perform routine workplace duties following simple written notices • Participate in workplace meetings and discussions • Complete work related documents • Estimate, calculate and record routine workplace measures • Do basic mathematical processes of addition, subtraction, division and multiplication • relate to people of social range in the workplace • Gather and provide information in response to workplace Requirements
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Work in Team Environment**
Unit Code	**MIN MPR2 19 0114**
Unit Descriptor	This unit covers the skills, knowledge and attitudes to identify role and responsibility as a member of a team.

Elements	Performance Criteria
1. Describe team role and scope	1.1 The ***role and objective of the team*** are identified from available ***sources of information***. 1.2 Team parameters, reporting relationships and responsibilities are identified from team discussions and appropriate external sources.
2. Identify own role and responsibility within team	2.1 Individual role and responsibilities within the team environment are identified. 2.2 Roles and responsibility of other team members are identified and recognized. 2.3 Reporting relationships within team and external to team are identified.
3. Work as a team member	3.1 Effective and appropriate forms of communications used and interactions undertaken with team members who contribute to known team activities and objectives. 3.2 Effective and appropriate contributions are made to complement team activities and objectives, based on individual skills and competencies and ***workplace context***. 3.3 Protocols are observed in reporting using standard operating procedures. 3.4 Contribute to the development of team work plans based on an understanding of team's role and objectives and individual competencies of the members.

Variable	Range
Role and objective of team	May include but not limited to: • Work activities in a team environment with enterprise or specific sector • Limited discretion, initiative and judgment maybe demonstrated on the job, either individually or in a team environment
Sources of information	May include but not limited to: • Standard operating and/or other workplace procedures • Job procedures • Machine/equipment manufacturer's specifications and instructions • Organizational or external personnel • Client/supplier instructions

	• Quality standards • OHS and environmental standards
Workplace context	May include but not limited to: • Work procedures and practices • Conditions of work environments • Legislation and industrial agreements • Standard work practice including the storage, safe handling and disposal of chemicals • Safety, environmental, housekeeping and quality guidelines

Evidence Guide	
Critical aspects of competence	Demonstrates skills and knowledge to: • Operate in a team to complete workplace activity • Work effectively with others • Convey information in written or oral form • Select and used appropriate workplace language • Follow designated work plan for the job • Report outcomes
Underpinning Knowledge and Attitude	Demonstrate knowledge of: • Communication process • Team structure • Team roles • Group planning and decision making
Underpinning Skills	Demonstrate skills to: • Communicate appropriately, consistent with the culture of the workplace
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Develop Business Practice**
Unit Code	**MIN MPR2 20 0114**
Unit Descriptor	This unit specifies the outcomes required to establish a business operation from a planned concept. It includes researching the feasibility of establishing a business operation, planning the setting up of the business, implementing the plan and reviewing operations once commenced.

Elements	Performance Criteria
1. Identify business opportunity	1.1 ***Business opportunities*** are investigated and identified. 1.2 Feasibility study is undertaken to determine likely ***business viability***. 1.3 Market research on product or service is undertaken. 1.4 Assistance with feasibility study of ***specialist and relevant parties*** is sought as required. 1.5 Impact of emerging or changing technology including e-commerce, on business operations is evaluated. 1.6 Practicability of business opportunity is assessed in line with perceived risks, returns sought and resources available. 1.7 Business plan is completed for operation.
2. Identify personal business skills	2.1 Financial and business skills available are identified and taken into account when business opportunities are researched. 2.2 ***Personal skills/attributes*** are assessed and matched against those perceived as necessary for a particular business opportunity. 2.3 ***Business risks*** are identified and assessed according to resources available and personal preferences.
3. Plan for establishment of business operation	3.1 Business structure and operations are determined and documented. 3.2 Procedures are developed and documented to guide operations. 3.3 Financial backing is secured for business operation. 3.4 Business legal and regulatory requirements are identified and complied. 3.5 ***Human and physical resources*** required to commence business operation are determined. 3.6 Recruitment strategies are developed and implemented.
4. Implement establishment	4.1 Marketing of business operation is undertaken. 4.2 Physical and human resources are obtained to implement

plan	business operation. 4.3 ***Operational unit*** is established to support and coordinate business operation. 4.4 Monitoring process is developed and implemented for managing operation. 4.5 ***Legal documents*** are carefully maintained and relevant records are kept and updated to ensure validity and accessibility. 4.6 Contractual procurement rights for goods and services including ***contracts with relevant people****,* negotiated and secured as required in accordance with the business plan. 4.7 Options for leasing/ownership of business premises identified and contractual arrangements are completed in accordance with the business plan.
5. Review implementation process	5.1 Review process for implementation of business operation is developed and implemented. 5.2 Improvements in business operation and associated management process are identified. 5.3 Identified improvements are implemented and monitored for effectiveness.

Variable	**Range**
Business opportunities	May include but not limited to: • expected financial viability • skills of operator • amount and types of finance available • returns expected or required by owners • likely return on investment • finance required • lifestyle issues
Business viability	May include but not limited to: • opportunities available • market competition • timing/ cyclical considerations • skills available • resources available • location and/ or premises available • risk related to a particular business opportunity, especially • in regard to Occupational Health and Safety and • environmental considerations
Specialist and relevant parties	May include but not limited to: • Chamber of commerce • Financial planners and financial institution representatives, business planning specialists and marketing specialists

	• accountants • lawyers and providers of legal advice • government agencies • industry/trade associations • online gateways • business brokers/business consultants
Personal skills/attributes	May include but not limited to: • technical and/ or specialist skills • business knowledge and skills • entrepreneurship • willingness to take risks
Business risks	May include but not limited to: • occupational health and safety and environmental • considerations • relevant legislative requirements • security of investment • market competition • security of premises/ location • supply and demand • resources available
Human and physical resources	May include but not limited to: • software and hardware • office premises • communications equipment • specialist services through outsourcing, contracting and • consultancy • staff • vehicles
Operational unit	May include but not limited to: • office location staffed with required personnel and equipped to service and support business • home-based site or other location such as leased or owned property
Legal documents	May include but not limited to: • partnership agreements, constitution documents, statutory books for companies (Register of Members, Register of Directors and Minute Books), Certificate of Incorporation, Franchise Agreements and financial documentation, appropriate software for financial records • recordkeeping including personnel, financial, taxation, OHS and environmental
Contracts with relevant people	May include but not limited to: • owners, suppliers, employees, landlords, agents, distributors, customers or any person with whom the business has, or seeks to have, a performance-based relationship

Evidence Guide	
Critical Aspects of Competence	Demonstrates skills and knowledge in: • that a business operation has been planned and implemented from initial research into feasibility of the business and completion of the plan, through to implementing the plan and commencing operations • the ability to evaluate the results of research and assess the likely viability and practicability of a business opportunity, taking into account the current business/market climate and resources available
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: • Federal and regional government legislative requirements affecting business operations, especially in regard to Occupational Health and Safety (OHS), Equal Employment Opportunity (EEO), industrial relations and anti-discrimination • Technical or specialist skills relevant to the business operation • Financing options • Business systems and operations • Relevant marketing, management, sales and financial concepts • Methods for researching business opportunities • Principles of risk management relevant to the business • Methods of identifying relevant specialist services to complement the business • Forms and administrative systems • Services available and charges • Planning and control systems (sales, • Advertising and promotion, distribution and logistics • Financial recording systems • Legal rights and responsibilities • Record keeping duties • Operational factors relating to the business (provision of professional services, products)
Underpinning Skills	Demonstrate skills of: • Literacy skills to interpret legal requirements, company policies and procedures and immediate, day-to-day demands • Marketing skills • Business planning skills • Entrepreneurial skills • Problem-solving skills • OHS skills • Time management skills • Belief in services and products offered by the business • Communication skills including questioning, clarifying, reporting, and giving and receiving constructive feedback • Technical and analytical skills to interpret business documents, reports and financial statements and projections

	• Ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities • Problem solving skills to develop contingency plans • Using computers and software packages to record and manage data and to produce reports • Literacy skills to enable interpretation of business information, numeracy skills for data analysis to aid research • Research skills to identify a business opportunity and to conduct a feasibility study • Analytical skills to assess personal attributes and to identify business risks • Observation skills for identifying appropriate people, resources and to monitor work
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Standardize and Sustain 3S**
Unit Code	**MIN MPR2 21 0114**
Unit Descriptor	This unit of competence covers the knowledge, skills and attitudes required by worker to standardize and sustain 3S to his/her workplace. It covers responsibility for the day- to-day operations of the workplace and ensuring that continuous improvements of Kaizen elements are initiated and institutionalized.

Elements	Performance Criteria
1. Prepare for work.	1.1 Work instructions are used to determine job requirements, including method, material and equipment. 1.2 Job specifications are read and interpreted following working manual. 1.3 ***OHS requirements***, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work. 1.4 ***Safety equipment and tools*** are identified and checked for safe and effective operation. 1.5 ***Tools and equipment*** are prepared and used to implement 3S.
2. Standardize 3S.	2.1 Plan is prepared and used to standardize 3S activities. 2.2 ***Tools and techniques*** to standardize 3S are prepared and implemented based on ***relevant procedures***. 2.3 Checklists are followed for standardize activities and ***reported*** to ***relevant personnel***. 2.4 The workplace is kept to the specified standard. 2.5 Problems are avoided by standardizing activities.
3. Sustain 3S.	3.1 Plan is prepared and followed to standardize 3S activities. 3.2 ***Tools and techniques*** to sustain 3S are discussed, prepared and implemented based on relevant procedures. 3.3 Workplace is inspected regularly for compliance to specified standard and sustainability of 3S techniques. 3.4 Workplace is cleaned up after completion of job and before commencing next job or end of shift. 3.5 Situations are identified where compliance to standards is unlikely and actions specified in procedures are taken. 3.6 Improvements are recommended to lift the level of compliance in the workplace. 3.7 Checklists are followed to sustain activities and reported

	to relevant personnel. 3.8 Problems are avoided by sustaining activities.

Variable	Range
OHS requirements	May include but not limited to: • Are to be in accordance with legislation/ regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances. • Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices. • Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with workplace organization. • Emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.
Safety equipment and tools	May include but not limited to: • dust masks / goggles • glove • working cloth • first aid • safety shoes
Tools and equipment	May include but not limited to: • paint • hook • sticker • signboard • nails • shelves • chip wood • sponge • broom • pencil • shadow board/ tools board
Tools and techniques	May include but not limited to: • 5S Job Cycle Charts • Visual 5S • The Five Minute 5S • Standardization level checklist • 5S checklist • The five Whys and one How approach(5W1H) • Suspension

	• Incorporation • Use Elimination
Relevant procedures	May include but not limited to: • Assign 3S responsibilities • Integrate 3S duties into regular work duties • Check on 3S maintenance level • OHS measures such as signage, symbols / coding and labeling of workplace and equipment • Creating conditions to sustain your plans • Roles in implementation
Reporting	May include but not limited to: • verbal responses • data entry into enterprise database • brief written reports using enterprise report formats
Relevant personnel	May include but not limited to: • supervisors, managers and quality managers • administrative, laboratory and production personnel • internal/external contractors, customers and suppliers
Tools and techniques	May include but not limited to: • 5S slogans • 5S posters • 5S photo exhibits and storyboards • 5S newsletter • 5S maps • 5S pocket manuals • 5S department/benchmarking tours • 5S months • 5S audit • Awarding system • Big cleaning day • Patrolling system may include: ➢ Top management Patrol ➢ 5S Committee members and Promotion office Patrol ➢ Mutual patrol ➢ Self-patrol ➢ Checklist patrol ➢ Camera patrol

Evidence Guide	
Critical Aspects of Competence	Demonstrates skills and knowledge to: • Discuss the relationship between Kaizen elements. • Standardize and sustain 3S activities by applying appropriate tools and techniques.
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Elements of Kaizen • Ways to improve Kaizen elements • Benefits of improving kaizen elements

	• Relationship between Kaizen elements • The fourth pillar of 5S • Benefits of standardizing and sustaining 3S • Procedures for standardizing and sustaining 3S activities • Tools and techniques to sustain 3S • Relevant Occupational Health and Safety (OHS) and environment requirements • Plan and report • Method of communication
Underpinning Skills	Demonstrates skills of: • improving Kaizen elements by applying 5S • standardizing and sustaining procedures and techniques to avoid problems • technical drawing • procedures to standardizing 3S activities • analyzing and preparing shop layout of the workplace • standardizing and sustaining checklists • preparing and implementing tools and techniques to sustain 3S • working with others • reading and interpreting documents • observing situations • solving problems by applying 5S • communication skills • preparing labels, slogans, etc. • gathering evidence by using different means • using Kaizen board properly in accordance the procedure • reporting activities and results using report formats
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

NTQF Level III

Occupational Standard: Mineral Processing Level III	
Unit Title	**Apply Environmentally Sustainable Work Practices**
Unit Code	**MIN MPR3 01 0114**
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to effectively implement environmentally sustainable work practices.

Elements	Performance Criteria
1. Identify current practices in relation to resource usage	1.1. ***Compliance documentation*** relevant to implementing and monitoring environmentally sustainable work practices is accessed, interpreted and applied. 1.2. Environmental regulations applying to the enterprise are identified. 1.3. Procedures are identified for assessing compliance with environmental/sustainability regulations.
2. Review and communicate identified improvements	2.1. Current work processes are reviewed to access information and data to assist in identifying areas for improvement. 2.2. Information is collected and organized from a range of ***sources*** to provide information/advice and tools/resources for improvement opportunities. 2.3. Input is sought from ***stakeholders***, ***key personnel and specialists***. 2.4. Proposed improvements are communicated according to site procedures.
3. Apply performance improvement strategies	3.1. Appropriate ***techniques and tools*** are sourced and used to assist in achieving efficiency targets. 3.2. Continuous improvement strategies are applied to own work area of responsibility through ***environmental and resource efficiency improvement plans***. 3.3. ***Suggestions*** and ideas about environmental and resource efficiency management from stakeholders are applied where appropriate.
4. Monitor performance	4.1. Evaluation and monitoring tools and technology are used. 4.2. Progress against efficiency targets is reported to key personnel and stakeholders. 4.3. Organizational improvement strategies are promoted.

Variable	Range
Compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications

	• Ethiopian standards • management plans • OHS policy
Sources	may include: • organization specifications • regulatory sources • relevant stakeholders • resource use
Stakeholders, key personnel and specialists	may include: • individuals and groups both inside and outside the organization who have direct or indirect interest in the organization's conduct, actions, products and services, including: ➢ customers ➢ employees at all levels of the organization ➢ government ➢ investors ➢ local community ➢ other organizations ➢ suppliers • key personnel within the organization, and specialists outside the organization who may have particular technical expertise
Techniques and tools	may include: • examination of invoices from suppliers • examination of relevant information and data • measurements made under different conditions • others as appropriate to the specific industry context
Environmental and resource efficiency improvement plans	may include: • addressing environmental and resource sustainability initiatives such as environmental management systems, action plans, green office programs, surveys and audits • applying the waste management hierarchy in the workplace • determining the organization's most appropriate waste treatment including waste to landfill, recycling, re use, recoverable resources and wastewater treatment • initiating and/or maintaining appropriate organizational procedures for operational energy consumption, including stationary energy and non stationary (transport) • preventing and minimizing risks, and maximizing opportunities such as: ➢ improving resource/energy efficiency ➢ reducing emissions of greenhouse gases • reducing use of non renewable resources • referencing standards, guidelines and approaches such as: ➢ ISO 14001:1996 Environmental management systems life cycle analyzes

	➢ supply chain management
Suggestions	may include ideas that help to: • prevent and minimize risks and maximize opportunities such as: ➢ usage of solar or renewable energies where appropriate ➢ reducing emissions of greenhouse gases ➢ reducing use of non renewable resources ➢ making more efficient use of resources, energy and water • maximizing opportunities to re use, recycle and reclaim materials • identifying strategies to offset or mitigate environmental impacts: ➢ purchasing carbon credits ➢ energy conservation ➢ reducing chemical use ➢ reducing material consumption • expressing purchasing power through the selection of suppliers with improved environmental performance e.g. purchasing renewable energy • eliminating the use of hazardous and toxic materials

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • accessing, interpreting and complying with a range of environment/sustainability legislation and procedural requirements relevant to daily responsibilities • knowledge of relevant compliance requirements within work area • accurately following organizational information to participate in and support an improved resource efficiency process and reporting as required • planning and organizing activities in relation to measuring current use and devising strategies to improve usage • developing and/or using tools such as inspection checklists, to collect and measure relevant information on organization resource consumption, within work role • identifying organizational improvements by applying efficient resource use to daily activities • knowledge of environmental and resource hazards/risks
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • change management/continuos improvement processes • best practice approaches relevant to own area of responsibility and industry • compliance requirements within work area for all relevant environmental/sustainability legislation, regulations and codes of practice including resource hazards/risks associated with work area, job specifications and

	procedures • environmental and energy efficiency issues, systems and procedures specific to industry practice • OHS issues and requirements • organizational structure and reporting channels and procedures • quality assurance systems relevant to own work area • sustainability in the workplace • terms and conditions of employment including policies and procedures, such as daily tasks, work area responsibilities, employee, supervisor and employer rights, equal opportunity.
Underpinning Skills	Must demonstrate skills to: • comply with all relevant legislation associated with job specifications and procedures • apply communication and problem solving skills to question, seek clarification and make suggestions relating to work requirements and efficiency • apply communication/consultation skills to support information flows • apply communication and teamwork skills to recognize procedures; to follow instructions; to respond to change, such as current workplace environmental/sustainability frameworks; and to support team work and participation in a sustainable organization • apply literacy, numeracy and technology skills to interpret workplace information in relation to work role, and to document and measure resource use • apply technology skills to select and use technology appropriate for a task
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Apply Risk Management Processes**
Unit Code	**MIN MPR3 02 0114**
Unit Descriptor	This unit covers the application of risk management processes in resources and infrastructure industries. It includes identifying hazards; assessing and identifying unacceptable risk; identifying and recommending treatments; contributing to the implementation of treatments; and reviewing safety system documentation.

Elements	Performance Criteria
1. Identify hazards	1.1 ***Compliance documentation*** relevant to the application of ***risk management*** processes is accessed, interpreted and applied. 1.2 Work area conditions are inspected and analyzed regularly and systematically to identify potential ***hazards***. 1.3 Existing procedures are accessed, interpreted and applied to control identified hazards. 1.4 Hazards not controlled by existing procedures are identified. 1.5 The type and scope of yet to be resolved hazards and their likely impact are recognized.
2. Assess and identify unacceptable risk	2.1 The ***likelihood*** of the event happening is considered and determined. 2.2 The ***consequence*** is evaluated and determined if the event should occur. 2.3 The ***risk*** level (likelihood and consequence combined) is considered and determined. 2.4 The ***criteria*** is identified or sourced for determining the acceptability/unacceptability of the risk. 2.5 The risk is evaluates against criteria to identify if it warrants 'unacceptable risk' status and refer the findings to the appropriate person.
3. Identify and recommend controls	3.1 The range of ***controls*** which may eliminate or minimize the risk are identified. 3.2 A detailed analysis of feasible options including the identification of ***resource*** requirements is conducted. 3.3 The most appropriate control is selected for dealing with the situation.
4. Contribute to the implementation of control	4.1 Selected control is planned in detail, including the identification of resource requirements. 4.2 Authorization is gained for selected control in accordance

	with site requirements. 4.3 Controls are documented and reviewed in accordance with ***site working instructions*** (or equivalent) for the job. 4.4 Procedures are applied to control recognized hazards. 4.5 Information on the control and its implementation is communicated to the relevant people.
5. Review safety system documentation	5.1 Site working instructions (or equivalent) are monitored and reviewed for adherence to compliance documentation and site requirements. 5.2 Amendments are done to the site working instructions (or equivalent) or the matter is referred to the appropriate party for follow up.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Risk Management	Is defined as: • the culture, processes and structures that are directed towards the effective management of potential opportunities and adverse effects
Hazards	Is defined as: • a source of potential harm or a situation with a potential to cause loss May involve: • equipment • methods/plans • people • the work environment • uncontrolled energy • changeover • nearby activities • different conditions
Likelihood	is defined as: • a qualitative description of probability and frequency
Consequence	is defined as: • The outcome of an event or situation expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain
Risk	Is defined as the chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and likelihood

Criteria	must be determined by: • the organization's internal policy, goals and/or objectives in reference to relevant legislation
Controls	may include option type in sequence such as: • eliminating the hazard • substitution • engineering controls • administrative controls (procedures, etc.) • PPE
Resources	may include: • people • finance • equipment • environment • buildings/facilities • technology • information
Site working instructions	may include: • applicable commonwealth/state/territory legislation and code of practice relating to the industry, dangerous and hazardous goods, environmental protection and safety and health • worksite safety management systems • manufacturer's documentation and handbooks • workplace operating procedures and policies • materials safety data sheet • emergency procedures • safety alert
Communications	may include: • face to face • in writing • by telephone or by other electronic means • formal • informal

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for applying risk management processes • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of risk management processes • working with others to undertake and complete the application of risk management processes that meets all of the required outcomes • consistent timely completion of risk management processes that safely, effectively and efficiently meets the required

	outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • OHS legislation and regulations • appropriate resources and infrastructure context and language • topics or subject areas which are target for assessment and treatment • site risk management systems and their application • conventions and requirements for written communications including report writing
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • research, analyze and apply relevant operational information • demonstrate and apply common industry terminology • interpret work procedures and processes • use effective communication skills, including questioning and active listening skills with supervisors and other employees • write reports • apply planning and organizing skills to the risk management processes • demonstrate teamwork to involve and engage the employers/supervisors in the risk management processes • apply problem solving skills to technical resources and infrastructure issues
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Manage Steam Boiler Startup and Shut Down**
Unit Code	**MIN MPR3 03 0114**
Unit Descriptor	This unit describes the outcomes required to manage steam boiler startup and shut down in the pulp and paper industry General legislation, regulatory, licensing and certification requirements applicable to this unit are detailed in the range statement.

Elements	Performance Criteria
1. Conduct pre-operational safety checks	1.1. Pre-operational safety checks are conducted within Occupational Health and Safety (OHS) regulations, environmental and safe working requirements/practices, Standard Operating Procedures (SOP), and housekeeping requirements. 1.2. Plant status is confirmed by inspection, observations and other information. 1.3. Potential work area hazards are identified, reported and prevention or control measures implemented. 1.4. Work and output requirements are established. 1.5. ***Pre-operational*** and safety checks are conducted. 1.6. Isolations are removed. 1.7. Availability of process supplies is confirmed.
2. Conduct startup procedures	2.1. Startup procedures are conducted within OHS regulations, environmental and safe working requirements/practices, SOP, and housekeeping requirements. 2.2. Pre-light conditions are established. 2.3. ***Boiler*** condition is monitored during startup to detect abnormal conditions. 2.4. Boiler is started and brought on-line. 2.5. System and plant are observed for correct operational response. 2.6. Deviations from required operating conditions are detected and corrective action is undertaken to rectify. 2.7. Responses are documented to corrective actions as required. 2.8. Startup information is recorded and reported as required.
3. Prepare boiler for shutdown	3.1 Boiler is prepared for shutdown within Occupational Health and Safety (OHS) regulations, environmental and safe working requirements/practices, Standard Operating

	Procedures (SOP), and housekeeping requirements. 3.2 Maintenance requirements are identified and reported. 3.3 Appropriate isolations are initiated. 3.4 Faulty plant is isolated/contained where possible to allow continued production as required. 3.5 Boiler and ancillary plant are shut down.
4. Store boiler in shutdown mode	4.1 Boiler is stored in shutdown mode within OHS regulations, environmental and safe working requirements/practices, SOP, and housekeeping requirements. 4.2 Storage time and condition of storage are established. 4.3 Boiler is stored in a safe condition for access in accordance with manufacturer's specifications. 4.4 Stored boiler water and chemicals are analyzed and handled when boiler is stored for extended periods.
5. Respond to unplanned or emergency shutdowns	5.1 Unplanned or emergency shutdowns are responded to within OHS regulations, environmental and safe working requirements/practices, SOP, and housekeeping requirements. 5.2 Shutdown requirement is responded to immediately. 5.3 Emergency conditions are complied with in accordance with legislative and enterprise procedures, where applicable. 5.4 Cause of shutdown is identified and located where possible. 5.5 Immediate safety of personnel and plant is ensured. 5.6 Continuing plant operation is monitored and maintained in safe working conditions and customers are notified. 5.7 Relevant personnel are notified to rectify and make plant ready for restart.

Variable	**Range**
Pre-operational checks	May include: • low water level alarm • high water level alarm • low water level alarm lockout • hydrostatic test • burner management system • safety valve test
Boiler types	May include: • fire tube • water tube and may be operated in conjunction with other steam driven plant and operations including: • paper making machines

	• turbines • digesters • evaporators • heating plant
Equipment	May include: • boiler and auxiliary plant • boiler heating systems • steam distribution system • fuel and fuel delivery system plant • dust removal and combustion waste • fuel management system • extraction systems • water distribution systems • compressed air systems • steam temperature control plant • chemical dosing system • water treatment system • flame detection equipment • hand and power tools • computer systems • electronic screens and alarms • process control systems • analogue and digital instrumentation • fully automated, semi-automated, manually operated plant and equipment appropriate to steam generation operations
Electronic control systems	May include: • Digital Control System (DCS) • touch screens • robotics
Documentation, procedures and reports	May include: • SOP • quality procedures • environmental sustainability requirements/practices • plant manufacturing operating manuals • oil or chemical spills and disposal guidelines • plant isolation documentation • safe work documentation e.g. plant clearance, job safety analysis, permit systems • enterprise policies and procedures • job sheets • manufacturer's specifications • maintenance documentation • statutory requirements • Materials Safety Data Sheets (MSDS) • operator's log • process and instrument diagrams

Maintenance	May include: • operator level maintenance as per site agreements • operator maintenance schedules • maintenance systems • maintenance suppliers • proactive maintenance strategies e.g. Total Productive Maintenance (TPM), Reliability Centered Maintenance (RCM)
Actions	May include: • process adjustments • reporting to authorized person • rectifying problem within level of responsibility
Communications	May include interaction with: • internal/external customers and suppliers • team members • production/service coordinators • maintenance services • operational management • statutory authorities
Situational awareness	May include awareness of: • traffic • pedestrians • location of equipment • product • hazards • obstruction • unexpected movement
Forms of communication	May include: • written e.g. log books, emails, incident and other reports, run sheets, data entry • reading and interpreting documentation e.g. SOP, manuals, checklists, drawings • verbal e.g. radio skills, telephone, face to face, handover • non-verbal e.g. hand signals, alarms, observations • signage e.g. safety, access
Sensory information	May include: • visual • sound • feel • touch • smell • vibration • temperature

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • Conduct pre-operational safety checks • Conduct startup procedures

	• Prepare boiler for shutdown • Store boiler in shutdown mode • Respond to unplanned or emergency shutdowns
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • applicable OHS regulations, environmental and safe working requirements/practices, SOP and housekeeping requirements • applicable aspects of the range statement practical workplace demonstration of skills in the shutting down and banking of steam boilers • Working knowledge of steam generation plant, processes, layout and associated services sufficient to carry out shutdown activities within level of responsibility • Types, causes and effects of steam boiler shutdowns • Required responses to all unplanned shutdowns (e.g. power outage, mechanical breakdown, blockages, jamming, air supply, control system failure) to ensure safety quality and productivity • Process and procedures for plant shutdowns and unplanned shutdowns • Plant and machinery functions and operations • Emergency procedures and responses • Boiler water treatment system and reasons for treatment • Operation of plant and systems • Application of high risk equipment as required • Sensory information that indicates a deviation from standard operating parameters • Sufficient knowledge of electronic and other control systems, operation and application to make appropriate adjustments that control boiler plant operations, within level of responsibility
Underpinning Skills	Must demonstrate skills of: • Uses required forms of communication in managing a steam boiler startup • Uses required forms of communication in shutting down and banking steam boiler/s • Reads and interprets required documentation, procedures and reports • Interprets instruments, gauges and data recording equipment • Prepares written information and enters data to support groups and teams • Interprets specifications and customer orders • Accesses, navigates and enters computer-based information • Identifies and actions problems within level of responsibility • Identifies and monitors process control points • Maintains situational awareness in the work area • Implements isolation and access procedures • Maintains a clean and hazard free work area

	• Sets up and starts boiler within an appropriate time • Uses measuring equipment as required • Operates high risk equipment as required • Analyzes and uses sensory information to adjust process to maintain and co-ordinate safety, quality and productivity • Uses electronic and other control systems to control equipment and processes as required
Resources Implication	Assessment is required to take place in real or appropriate simulated situations, including work areas, materials and equipment, and information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Mineral Processing Level III	
Unit Title	**Operate Heat Exchangers**
Unit Code	**MIN MPR3 04 0114**
Unit Descriptor	This competency is typically performed by an operator and covers the operation of heat exchangers, including heat exchangers that form part of a heating, cooling or refrigeration system, and solving of heat exchanger problems.

Elements	Performance criteria
1. Prepare for work.	1.1. Work requirements are identified. 1.2. Hazards are identified and controlled. 1.3. Coordination is done with appropriate personnel.
2. Operate heat exchangers.	2.1. The type of heat exchanger is identified. 2.2. Heat exchanger is ***started up and shut down*** according to the ***heat exchanger type and duty***. 2.3. Flow rates, temperatures and pressure are adjusted as appropriate to type of heat exchanger. 2.4. Routine checks, logs and paperwork are completed taking action on unexpected readings and trends.
3. Isolate and de-isolate plant.	3.1. Plant is isolated. 3.2. Safe is made for required work. 3.3. Check plant is made ready to be returned to service. 3.4. Plant is prepared for return to service.

Variables	Ranges
Start up shut down as required	includes: • start up and shut down to/from normal operating conditions • start up and shut down to/from isolated, cold, empty • all other conditions experienced on the plant. • i.e. from any condition to any condition experienced on the plant.
heat exchangers	includes all types of such as: • plate • Utube • spiral • bayonet • air cooled fin • shell and tube (all variants of design) • scraped surface • vessel jackets/coils.
Heat exchanger	include:

duties	• heating • cooling • cryogenic • reboilers • condensers • gas dryers • gas coolers • refrigeration (evaporators/condensers).
Appropriate action	Appropriate action includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Procedures	may be: • written, verbal, computer-based or in some other form. They include: ➢ all work instructions ➢ standard operating procedures ➢ formulas/recipes ➢ batch sheets ➢ temporary instructions ➢ any similar instructions provided for the smooth running of the plant.
Health, Safety and Environment (HSE)	• All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • early warning signs of equipment/processes needing attention or with potential problems are recognized • the range of possible causes can be identified and analyzed and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognized and an appropriate contribution made to their solution.
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • all items on a schematic of the heat exchanger system and the function of each

	• principles of operation of heat exchangers • correct methods of starting, operating and shutting down heat exchangers • issues related to pressure vessels (regulations, requirements) • physics and chemistry relevant to the process unit • process parameters and limits, e.g. temperature, pressure, flow, pH • duty of care obligations • hierarchy of control • communication protocols, e.g. radio, phone, computer, paper, permissions/authorities • routine problems, faults and their resolution • relevant alarms and actions • plant process idiosyncrasies • causes of head loss and change in heat transfer coefficient/rates • corrective action appropriate to the problem cause • function and troubleshooting of major internal components and their problems, such as tubes and baffles.
Underpinning Skills	Must demonstrate skills of: • efficient and effective operation of plant/equipment • hazard analysis • completing plant records • communication • problem solving. • Operation of heat exchanger and the ability to recognize and resolve operational problems. This could include any of the following remedial actions: ➢ making adjustments ➢ carrying out minor maintenance ➢ identifying and reporting problems outside operator's scope of responsibility ➢ identifying and controlling hazards related to heat exchangers and their integral equipment, including pressure vessels.
Resources Implication	Assessment is required to take place in real or appropriate simulated situations, including work areas, materials and equipment, and information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Mineral Processing Level III	
Unit Title	**Transfer Bulk Fluids into/out of Storage Facility**
Unit Code	**MIN MPR3 05 0114**
Unit Descriptor	In a typical scenario involving land based tank farms or tankers at sea, the control room operator, from the main panel, will monitor and control the transfer of product into storage facilities including controlling product levels, flows, temperatures and pressures. The operations technician will also prepare and complete all necessary documentation for the control, transfer and calculation of product volumes.

Elements	Performance Criteria
1. Prepare for work.	1.1. Work requirements are identified. 1.2. Hazards are identified and controlled. 1.3. Coordination is done with appropriate personnel.
2. Prepare storage/transfer facilities	2.1. Products are managed within the tank farm or at the platform in accordance with the site/enterprise's storage types, products and locations. 2.2. Storage or docking facilities are inspected for leaks or damage. 2.3. Safety systems are checked and tested to verify their operational condition and status, and reported on all equipment faults. 2.4. Critical inspections of storage and tank farms (and ascertain seaworthiness of vessels at sea if required) are conducted by ensuring areas are safe, clean and equipment can't be compromised by debris. 2.5. All equipment requiring maintenance, follow up to satisfactory conclusion are identified and reported.
3. Monitor storage facilities.	3.1. Tank mixes, capacities and quality are confirmed, and determined if these are being maintained within the agreed product requirements prior to transfer. 3.2. Gas detection/environmental/safety systems are monitored to ensure the storage area is a safe environment and that the safety of the area or vessel is not compromised. 3.3. Storage conditions to transfer or other personnel are communicated to inform them of the operational condition and status of the storage facilities or vessel.
4. Monitor load-out/transfer platform or facility as required.	4.1. ***Load-out/transfer systems*** are monitored on the platform or in the terminal load-out/transfer area. 4.2. Gas detection/environmental/safety systems are monitored to ensure the load-out/transfer area is a safe environment.

	4.3. Appropriate personnel are informed of the load-out/transfer area status, and conditions of the storage facilities.
5. Conduct load-out/transfer.	5.1. Operational status is communicated to required personnel prior to loading. 5.2. Ensure that all start-up permissive have been satisfied and ***product*** is ready for transfer. 5.3. Pump flow rates are set and adjusted to keep within agreed capacities. 5.4. Loading pump performance is monitored to keep within stated operational ranges and vibration is in limits. 5.5. Product shipping/transfer samples is/are taken and recorded as required.
6. Isolate and de-isolate plant.	6.1. Plant is isolated. 6.2. Safe is made for required work. 6.3. Plant is checked to be ready to be returned to service. 6.4. Plant is prepared for return to service.
7. Resolve problems	7.1. Possible ***problems*** in equipment and process are identified. 7.2. Problems needing action is determined. 7.3. Possible fault causes are determined. 7.4. Problem is rectified using appropriate solution within area of responsibility. 7.5. Items are followed up until resolved. 7.6. Problems outside area of responsibility are reported to designated person.

Variable	**Range**
Load-out and storage system.	may include: • tanks, such as concrete bunded storage tanks, atmospheric pressure tanks, floating roof tanks, temperature controlled tanks (heated, chilled, refrigerated) • vessels, e.g. pressure storage vessels • pumps, e.g. transfer and circulation pumps, stripping pumps • compressors, e.g. boil-off gas compressors • gauges • fire protection and deluge systems, e.g. flare system • gas detection systems and equipment • tank dipping and measurement equipment. • instrumentation.
Products	Products may include hydrocarbons, oil, gas or bulk liquid chemicals/petrochemicals.

Problems	Typical problems for your facility may include: • insufficient/inappropriate storage for product/material • interruptions to loading through adverse weather conditions • product surging • control of temperature and pressure • variations in feed • vibration • tank capacities and space.
Safety equipment	may include: • main fire pumps • jockey pumps • fire monitors • deluge systems • sub-surface foam injection • gas detection and reporting systems • fire detection and reporting systems • emergency shutdown systems
Start up shut down as required	includes: • start up and shut down to/from normal operating conditions • start up and shut down to/from isolated, cold, empty • all other conditions experienced on the plant. • i.e. from any condition to any condition experienced on the plant.
Appropriate action	includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Procedures	may be : • written, verbal, computer-based or in some other form. They include: ➢ all work instructions ➢ standard operating procedures ➢ formulas/recipes ➢ batch sheets ➢ temporary instructions ➢ any similar instructions provided for the smooth running of the plant.
Health, Safety and Environment (HSE)	• All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • early warning signs of equipment/processes needing attention or with potential problems are recognized • the range of possible causes can be identified and analyzed and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognized and an appropriate contribution made to their solution.
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • principles of operation of plant/equipment • physics and chemistry relevant to the process unit • process parameters and limits, e.g. temperature, pressure, flow, pH • duty of care obligations • hierarchy of control • communication protocols, e.g. radio, phone, computer, paper, permissions/authorities • routine problems, faults and their resolution • relevant alarms and actions • plant process idiosyncrasies • all items on a schematic of the plant item and the function of each • correct methods of starting, stopping, operating and controlling flow • causes of head loss in piping systems, including comparison of fittings using Le/d concept, fluid and pipe material properties, flow geometry etc • corrective action appropriate to the problem cause • function and troubleshooting of major internal components and their problems, such as impellors, seals or bearings • types and causes of problems within operator's scope of skill level and responsibility. • testing techniques • equipment isolation and purging • use and operation of safety equipment, including breathing apparatus • tank and product mixes • flow rates and measures • tank capacities and percentages • static electricity principles. • Sound knowledge of storage and transfer techniques required to transport oil, gas or water is expected.
Underpinning Skills	Must demonstrate skills of: • efficient and effective operation of plant/equipment • hazard analysis

	• completing plant records • communication • problem solving
Resources Implication	Assessment is required to take place in real or appropriate simulated situations, including work areas, materials and equipment, and information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Communicate Pipeline Control Centre Operations**
Unit Code	**MIN MPR3 06 0114**
Unit Descriptor	In this scenario operation technicians maintain a watching brief over the pipeline from the pipeline control centre. The centre will be the hub for pipeline activities in order to achieve minimum risk to continued safe and efficient operation of the pipeline system. The pipeline control centre operations technician will communicate with field personnel to obtain information and direct field operators to check and maintain pipeline operations.

Elements	Performance Criteria
1. Gather information about pipeline operation needs.	1.1. Messages and information received from field operations and pipeline system stations are given response and recorded. 1.2. Alarm codes are interpreted and acknowledged correctly to ensure the correct response strategy is selected and applied to the situation. 1.3. Additional information needs are clarified and an appropriate communication medium is selected to deliver the information required. 1.4. Operational efficiency is improved through adequate and timely application of information provided. 1.5. Customer/shipper gas forecasts are interpreted to ensure correct gas flow rates into the ***pipeline system***.
2. Communicate pipeline information.	2.1. Activities of pipeline personnel in the field and data are monitored from the control centre. 2.2. Internal messages and response communications concerning system alarms/incidents are evaluated to establish the scope and severity of the alarm/ incident. 2.3. Pipeline system operation information is conveyed to relevant personnel in other work areas to ensure safe and efficient operation of the pipeline system. 2.4. Information is relayed to technicians and other services/parties so that fault finding or safety checks can be conducted to identify risks to product supply, pipeline equipment, environment and personnel. 2.5. Permits are authorized, recorded and monitored to work to allow operational activities to be undertaken or cancelled.
3. Coordinate pipeline systems operations.	3.1. Field and pipeline station operations data is monitored. 3.2. Equipment operating conditions, pressures and temperatures are monitored and observed, and correct equipment operating parameters maintained.

	3.3. Faults are identified and the required repair or reporting of the fault is initiated. 3.4. Identified faults in the pipeline are isolated as appropriate. 3.5. System alarms and emergencies are responded. 3.6. The required course of action or emergency response is determined to the identified system condition/ emergency. 3.7. Pre-shutdown checks are completed and documented. 3.8. The pipeline system is shut down under either normal or emergency conditions in accordance with operating ***procedures***. 3.9. All identified maintenance is confirmed in compliance with the permit to work system and administer to ensure that all work complies with all issued permits.
4. Record and report.	4.1. Field personnel movements are recorded and monitored to ensure the safety of all personnel in the field. 4.2. Safety and environmental risks or faulty equipment are/is reported to designated personnel for further action or advice concerning the selection of the appropriate response or course of action. 4.3. Field inspection records and reports are interpreted and maintained. 4.4. Operations and production reports are completed. 4.5. Shift handover procedures are performed.
5. Control hazards.	5.1. Hazards in work area are identified. 5.2. The risks arising from those hazards are assessed. 5.3. Measures are implemented to control those risks in line with procedures and duty of care.
6. Resolve problems.	6.1. Possible ***problems*** in equipment or process are identified. 6.2. Problems needing action are determined. 6.3. Possible fault causes are determined. 6.4. Problem is rectified using appropriate solution within area of responsibility. 6.5. Items initiated up are followed until final resolution has occurred. 6.6. Problems outside area of responsibility are reported to designated person.

Variable	**Range**
Pipeline control system	may include:

	• heaters, furnaces and exchangers • station instrumentation/metering equipment • condition monitoring equipment • process control equipment • gas quality and analysis equipment • valves, actuators and flanges • piping systems • pressure vessels/filtration equipment • compressors and prime movers • cathodic protection systems.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant. For the purposes of this Training Package, 'procedures' also includes good operating practice as may be defined by industry codes of practice (e.g. Responsible Care) and government regulations.
Typical problems	may include: • communications disruptions • corrosion/hydrate formation • variations in flow temperature and/or pressure • failures of piping, valves or flanges • pipeline leakages.
Appropriate action	includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Occupational Health and Safety (OHS)	• The identification and control of hazards and the application of OHS is to be in accordance with current, applicable legislation and regulations and company procedures. All work is carried out at all times in accordance with these requirements

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • early warning signs of equipment/processes needing attention or with potential problems are recognized

	• the range of possible causes can be identified and analyzed and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognized and an appropriate contribution made to their solution
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • pipeline system functions within the design parameters and design philosophy • process information schemata of the pipeline system and associated facilities • pipeline operating principles, parameters and product specifications • relevant workplace documentation • SCADA systems • alarm systems and emergency systems, including fire and shutdown • the 'permit to work' system • architecture of the pipeline system • pipeline system operating parameters • gas quality/analysis equipment operation • MSDS information. • physics and chemistry relevant to the process unit and the materials processed • process parameters and limits, e.g. temperature, pressure, flow, pH • duty of care obligations • hierarchy of control • communication protocols, e.g. radio, phone, computer, paper, permissions/authorities • routine problems, faults and their resolution • relevant alarms and actions • plant process idiosyncrasies • correct methods of starting, stopping, operating and controlling process • corrective action appropriate to the problem cause • function and troubleshooting of major components and their problems • types and causes of problems within operator's scope of skill level and responsibility.
Underpinning Skills	Must demonstrate skills to: • isolate the causes of problems to an item of equipment within the compressor system and distinguish between causes of problems/alarm/fault indications such as: ➢ pipeline pressure variations ➢ instrument failure/wrong reading ➢ electrical failure

	➢ mechanical failure ➢ operational problems.
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Conduct Operations with Integrated Tool Carrier**
Unit Code	**MIN MPR3 07 0114**
Unit Descriptor	This unit covers the conduct of integrated tool carrier operations in the resources and infrastructure industries. It includes planning and preparing for work; lifting and moving loads; selecting, removing and fitting attachments; and carrying out post-operational procedures.

Elements	Performance Criteria
1. Plan and prepare for operations and other safety measures	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Work is planned and prepared according to site procedures and relevant legislation. 1.3. Shift changeover details are received, interpreted and clarified. 1.4. Personal protective equipment and other ***safety*** measures appropriate for work activities are selected. 1.5. Appropriate ***tools and equipment*** are selected according to job type and specifications to maximize efficiency and effectiveness of work activities. 1.6. Site conditions are inspected and assessed and action is taken according to site requirements. 1.7. Equipment ***pre-start checks*** are performed. 1.8. Potential ***risks and hazards*** are identified, addressed and reported. 1.9. Start-up procedures are carried out according to manufacturer's specifications and site procedures. 1.10. Safety measures are communicated with other equipment operators and personnel using approved ***communication methods***. 1.11. ***Environmental issues*** are identified, addressed and reported. 1.12. Emergency procedures are adhered to in case of fire and/or accident according to manufacturer's guidelines and site procedures.
2. Lift and move load	2.1. Equipment is operated safely within ***work environment***, limitations, site conditions and capacity of equipment and attachments. 2.2. Equipment performance is monitored and managed using appropriate ***indicators*** to aid efficient operations.

	2.3. ***Site conditions*** and position equipment are assessed to ensure safety of other equipment and personnel. 2.4. Weight of load is established and appropriate slings and lifting gear are selected accordingly. 2.5. Load utilizing approved method is secured to ensure stability of the load and equipment and safety of other equipment and personnel. 2.6. Safety of site is maintained by implementing appropriate safety provisions. 2.7. Movement of equipment is guided using approved signals. 2.8. All required documentations are completed clearly, concisely and on time.
3. Complete operations	3.1. Integrated tool carrier between worksites, observing relevant codes and traffic management requirements are safely moved. 3.2. Integrated tool carrier is prepared for relocation in accordance with the manufacturer's specifications. 3.3. Integrated tool carrier is safely parked and prepared for maintenance and shutdown in accordance with manufacturer's manual and organizational requirements. 3.4. Integrated tool carrier is inspected for faults in accordance with manufacturer's specifications and/or organizational requirements.
4. Select, remove and fit attachments	4.1. Attachment is selected for the task. 4.2. Attachment, fit and test are removed. 4.3. Attachment is used in accordance with manufacturer's recommendations and design limits. 4.4. Attachments are removed, cleaned and stored in designated location.
5. Carry out post-operational procedures	5.1. Faults are inspected, found and reported. 5.2. Routine ***operator servicing***, ***maintenance and housekeeping tasks*** are carried out. 5.3. ***Records and reports*** are maintained and processed. 5.4. Regular programmed maintenance is carried out in accordance with manufacturers and/or organizational requirements.

Variable	**Range**
Compliance documentation	May include: • legislative, organizational and site requirements and procedures

	• manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Safety	means: • OHS requirements are to be in accordance with state or territory legislation and regulations, organizational safety policies and procedures, and site or project safety plan, including protective clothing and equipment, use of tools and equipment, workplace environment and safety, handling of materials, use of firefighting equipment, use of First Aid equipment, hazard control, hazardous materials and substances • personal protective equipment is to include that prescribed under legislation, regulation and workplace policies and practices • safe operating procedures are to include the following: ➢ recognizing and preventing hazards associated with underground and overhead services ➢ other machines ➢ personnel ➢ restricted access barriers ➢ traffic control ➢ working at heights ➢ working in proximity to others ➢ worksite visitors and the public • safe parking practices including ensuring : ➢ access ways are clear ➢ equipment/machinery is away from overhangs and refueling sites, a safe distance from excavations and secured from unauthorized access or movement • hazards and risks including ➢ uneven/unstable terrain ➢ trees ➢ fires ➢ overhead and underground services ➢ bridges ➢ buildings ➢ excavations ➢ traffic ➢ embankments ➢ cuttings ➢ structures ➢ hazardous materials • ventilation • dust suppression may include: ➢ watering down site ➢ use of water trucks

	➢ mobile/fixed sprays ➢ screens (vent doors, vent blinds) • ventilation bags operational emergency procedures related to this unit are: ➢ emergency shutdown and stopping ➢ extinguishing fires ➢ organizational First Aid requirements ➢ evacuation
Tools and equipment	May include: • lifting and maintenance equipment relevant to the integrated tool carrier
Pre-start checks	May include: • visual and audio warning devices and lights • engine and stop engine lights (orange and red) • fluid levels (windscreen washer tank, hydraulic oil, coolant, grease, water, engine oil, fuel transmission) • cab (horn, lights, air conditioner) • air filter restriction indicator • display instrumentation and gauges (indicators, gauges, laser levels) • computer system • vehicle number • danger tags • personnel proximity • tyres and rim condition/wheel nuts and studs • light positioning and cleanliness • radiator top up tank • oil leaks (engine, transmission, hydraulic hoses, on ground) fuel leaks (engine, on ground) • water leaks (radiator, hoses) • no combustible material around exhaust • damage to equipment • portable fire extinguisher (bracket, gauge, hose, ease of access) • fire suppression unit (pins in position in triggers) • cab mounts • windows (clean, emergency exit tag in place) • engine oil to be checked before starting engine • grease lines • cab condition (no rags in air conditioner vent, dirt around brake and accelerator pedals, seat condition, all gear secured)
Risks and hazards	May include: • equipment malfunction • unsafe ground • adjoining pit walls • road conditions

	• rocks • pot holes • spillage • decline traffic • visibility • unauthorized personnel • mount dismount injuries
Communication methods	May include: • signage • hand signals • horn and/or whistles • radio • telephone • lights • written and verbal • flags • emergency communication and signaling procedures
Environmental issues	May include: • dust • fumes • noise • water
Work environment	May include: • confined spaces • working within capacity of equipment • road clearances • ample vision
Indicators	May include: • brake air pressure • brake oil temperature • computer indicators • engine oil pressure • service meter • speedometer/odometer • tachometer • oil temperature • voltometer • water temperature
Site conditions	May include: • wet • dry • stability of ground • broken ground • stable ground (compaction), amount of scale • slope of working surface • location of water table

	• ventilation characteristics (fumes, dust) • visibility • noise
Operator service**,** maintenance and housekeeping tasks	May include: • cleaning, • authorized servicing and the monitoring • recording and reporting of faults • conduct of authorized minor replacements • provision of assistance to maintenance personnel during maintenance and repair activities
Records and reports	May include: • fuel usage • computer readings • end of shift documentation • supplies logs • work logs stockpile information • quality information • dispatch details

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for conducting integrated tool carrier operations • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of integrated tool carrier operations • working with others to undertake and complete the conduct of integrated tool carrier operations that meet all of the required outcomes • consistent timely completion of integrated tool carrier operations that safely, effectively and efficiently meet the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • site and equipment safety requirements • techniques for calculating safe working loads • materials safety data sheet and materials handling methods • safe operating techniques in all terrain • basic earthworks calculations • site procedures • geological and technical data (basic) • equipment parking • primary and secondary ventilation • isolation procedures • site safety requirements • equipment safety requirements • start-up and shutdown procedures • operational procedures and checks

	• equipment processes, technical capability and limitations • lifting procedures/loading procedures • slinging • towing procedures
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • interpret ground conditions • use hand and power tools • employ driving techniques • use lifting techniques/tow • refuel vehicle
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Control and Monitor Automated Plant/Machinery**
Unit Code	**MIN MPR3 08 0114**
Unit Descriptor	This unit covers the control and monitoring of automated plant/machinery in the mineral processing industry. It includes applying control and data acquisition systems, controlling and monitoring plant/equipment with control and data acquisition systems, fault finding and correcting routine and non routine mine control and data acquisition system operation and maintenance problems, and maintaining mine control and data acquisition systems and associated accessories.

Elements	Performance Criteria
1. Apply control and data acquisition systems	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Safe work practices are maintained. 1.3. Potential risks, hazards, accidents and injury are identified, managed and reported according to site reporting procedures, safety guidelines and SOPs. 1.4. Safety issues and work area hazards are communicated/reported and end of shift is reported to the incoming shift. 1.5. Safety issues and hazards are identified and logged as they occur according to site SOPs. 1.6. Safety issues and hazards are reported as they occur and are reported to the Team Leader and/or appropriate personnel according to SOPs. 1.7. Appropriate PPE is selected and used according to procedures and manufacturers' guidelines. 1.8. Emergency procedures are given response appropriately. 1.9. Cleaning/housekeeping of plant and area is performed and associated hazards are reported. 1.10. Via UHF radio control methods in the underground and surface areas are operated and communicated according to SOPs. 1.11. Defective equipment is reported and rectified/isolated according to site isolation and tagging procedures. 1.12. Barricades and signs around hazardous areas are raised and reported to control and data acquisition system and/or relevant personnel. 1.13. ***Environmental requirements*** are maintained according to Company/site environmental policy.

2. Control and monitor plant/equipment with control and data acquisition system	2.1. Control and data acquisition system and ***closed circuit television*** operation are planned and prepared according to SOPs. 2.2. Data acquisition system control is performed and room p controlled re operation and visual checks according to SOPs. 2.3. ***Control and data acquisition system*** are started-up and logged on to operate ore handling system and equipment according to manufacturer's specifications and SOPs. 2.4. The ore handling system, equipment operation and personnel safety are monitored through control and data acquisition system and closed circuit television. 2.5. Data acquisition system is communicated to technicians, team leaders and/or supervisors when staring or shutting down ore handling systems and equipment according to standard communication practice and site SOPs.
3. Fault find and correct routine and non routine mine control and data acquisition system operational and maintenance problems	3.1. Minor deviations of equipment systems normal operating parameters are identified and corrected according to manufacturers' specifications and SOPs. 3.2. Emergency shutdown procedures are followed according to SOPs. 3.3. Abnormal conditions are reported to control room/system and/or supervisory staff. 3.4. Mine ***control and data acquisition system equipment*** and associated accessories are isolated and tagged before conducting maintenance according to site isolation and tagging procedure.
4. Maintain mine control and data acquisition system and associated accessories	4.1. Routine planned inspections and preventative maintenance is conducted as per maintenance schedules, SOPs and safe working practices. 4.2. Cleaning/housekeeping of plant and area is performed and associated hazards are reported. 4.3. All necessary ***documentations*** are completed according to site reporting procedures. 4.4. Technicians, team leader and/or supervisors are notified of any abnormal operational conditions within mine as per site SOPs.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications

	• Ethiopian standards • management plans • OHS policy
Environmental requirements	May include: • drainage • dust • emissions • flora and fauna • hazardous chemicals • noise • recycling e.g. water • run off • spills • waste management and disposal • water quality
Closed circuit television	May include: • video monitors • CCTV control panel • video cameras
Control and data acquisition system	May include: • conveyor controls (motor control centre) • over head magnet • winder control • electrical distribution switch gear control • crusher control • loading station feeders • air conditioning control • ventilation system control • mine dewatering control • lighting control • fire/dust suppression control • sirens and alarms • ore car dumping
Control and data acquisition system	May include: • monitors • reports • bay boards • mouse • 2-way radio • battery charging racks • telephone • First Aid kit • fire extinguisher
Documentation	May include: • work orders • end of shift reports

	• logs • registers • team leader's daily report • information sheet • computers and computer software

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for controlling and monitoring automated plant/machinery • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of automated plant/machinery control and monitoring • working with others to undertake and complete the control and monitoring of automated plant/machinery that meets all of the required outcomes • consistent timely completion of automated plant/machinery control and monitoring that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • OHS • hazardous standards • plant/machinery operating principles and practices • site agreements • legislative regulations • DC circuit principles • storage • equipment protection (mechanical, electrical) • power supplies • electrical circuit control principles • material handling control principles • programmable controllers • electrical distribution • electrical accessories • measurement concepts • detection sensors • cables and wiring systems • circuit protection • final control elements • transmitters and converters • distributive control • solving problems associated with material • interpretation of engineering drawings • material handling control networks and associated accessories
Underpinning Skills	Must demonstrate o skills to:

	• apply legislative, organization and site requirements and procedures for controlling and monitoring automated plant/machinery • initiate work clearance • use PPE and safeguards • work to industry, community and environmental standards • apply knowledge of mine emergency procedures and alarms • apply standards to work operations • plan work sequence for a given job • employ prescribed safe work practices • monitor ore transfer systems • participate in team activities • undertake hygiene/housekeeping tasks • solve problems in electrical circuits • solve problems and adjust controls • access and use engineering drawings • operate automatic ore handling equipment • operate manual ore handling equipment • prepare documentation • work in a team • write technical reports • maintain equipment records • diagnose problems • apply environmental constraints and procedures
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Conduct Thickening and Clarifying Process**
Unit Code	**MIN MPR3 09 0114**
Unit Descriptor	This unit covers the conduct of thickening and clarifying processes in the mining industry. It includes planning and preparing for thickening and clarifying processes, starting up equipment in sequence, operating and monitoring equipment, conducting housekeeping activities, and shutting down and/or isolating equipment.

Elements	Performance Criteria
1. Plan and prepare for thickening and clarifying process	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Shift changeover details are received, interpreted and clarified. 1.3. Thickening and clarifying process is communicated with other personnel. 1.4. Personal protective equipment appropriate for work activities is selected. 1.5. Appropriate type of ***auxiliary equipment*** is selected for work activities. 1.6. Equipment ***pre-start checks*** are performed to ensure equipment is ready for operation. 1.7. Potential risks and hazards are identified, addressed and reported. 1.8. ***Environmental issues*** are identified, addressed and reported. 1.9. Emergency procedures are adhered. 1.10. Dust suppression and extraction methods are used. 1.11. Ensure area is well ventilated.
2. Start-up equipment in sequence	2.1. ***Start-up procedures*** are carried out and start-up checks completed according to plant configurations and system requirements. 2.2. Plant is confirmed to be operational.
3. Operate and monitor equipment	3.1. Data is ***read*** and interpreted from equipment indicators to determine torque, bed characteristics, flow characteristics and reagent dosage. 3.2. ***Plant*** is continuously inspected. 3.3. Discharge of underflow/overflow agents is controlled to agree operating parameters. 3.4. Underflow/overflow is directed to alternate location according to work specifications. 3.5. Performance of thickener is monitored to meet agreed operating

	parameters. 3.6. All required documentations are completed. 3.7. Shift changeover details are passed on to oncoming shift.
4. Conduct housekeeping activities	4.1. ***Plant is cleaned***. 4.2. Hazards are identified, addressed and reported to maintain a safe working environment.
5. Shutdown in sequence and/or isolate equipment	5.1. Equipment is shutdown and/or isolated based on process and safety requirements. 5.2. ***Post-shutdown*** and/or isolation checks is/are performed.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Auxiliary equipment	May include: • air spears • hand and power tools • hydraulic units (e.g. porta-paks) • pump systems
Pre-start checks	• availability of equipment (e.g. conveyor) • detection of conditions that are unusual • fluid levels • job requirements • personnel availability • walk through plant
Environmental issues	May include: • drainage • dust (dump) • emissions • flora and fauna • hazardous chemicals • noise • recycling • run-off • spills • waste management and disposal • water quality
Start-up procedures	May include: • auxiliary check equipment • establish relevant communications • plant checks

	• safety mechanisms • shift changeover details
Indicator readings	May include: • concentrations • current • densities • flow • levels • power • pressure • size • speed • temperature • unusual noises • vibrations • weight • overflow clarity • bed levels • reagent additions • flow recycles
Plant	May include: • compressors • Distribution Control Systems (DCS) • feeders • froth beams and sprays • gantry cranes • hoses (water and air) • lubrication • racks • radiation gauges • spray systems
Equipment and plant cleaning methods	May include: • (plant cleaning normally occurs during shutdown) • degreasing • forced air • hosing with water • high pressure cleaning • suction
Post-shutdown checks	are like pre-start checks
Materials	May include: • reagents • slurry
Reagents	May include: • depressant (e.g. flocculent)

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for conducting thickening and clarifying processes • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of thickening and clarifying processes • working with others to undertake and complete the thickening and clarifying processes in a way that meets all of the required outcomes • consistent timely completion of thickening and clarifying processes that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • contaminant identification and treatment • depressant principles • emergency procedures • environmental principles • equipment limitations and operating parameters • equipment safety requirements • hazardous substance procedures and consequences of spills • identifying repair requirements • isolation procedures • metallurgical and technical data • operational procedures and checks • reagent types • thickener/clarifier safety requirements • types of ores
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • handle hazardous substances • identify hazards • interpret reports • use lifting techniques (manual, cranes and loads) • report defects • employ safe work practices • use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Conduct Flotation and Leaching Process**
Unit Code	**MIN MPR3 10 0114**
Unit Descriptor	This unit covers the conduct of flotation and leaching processes in the mineral processing industry. It includes planning and preparing for flotation processes, starting up equipment in sequence, operating and monitoring flotation equipment, conducting housekeeping activities, and shutting down in sequence and/or isolating equipment.

Elements	Performance Criteria
1. Plan and prepare for flotation process	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Shift changeover details are received, interpreted and clarified. 1.3. Flotation process is communicated with other personnel. 1.4. Personal protective equipment appropriate for work activities is selected. 1.5. Appropriate type of ***auxiliary equipment*** is selected for work activities. 1.6. Equipment ***pre-start checks*** are performed to ensure equipment is ready for operation. 1.7. Potential risks and hazards are identified, addressed and reported. 1.8. ***Environmental issues*** are identified, addressed and reported. 1.9. Emergency procedures are adhered.
2. Start-up equipment in sequence	2.1. ***Start-up procedures*** are carried out and start-up checks completed according to plant configurations and system requirements. 2.2. ***Plant*** is confirmed to be operational.
3. Operate and monitor equipment	3.1. Data is ***read*** and interpreted from equipment indicators to determine leaching efficiency. 3.2. Operations/plant and containment areas are continuously inspected and ***monitored***. 3.3. Equipment is adjusted to optimize leaching. 3.4. Reagents are added to achieve operating parameters. 3.5. Flows are adjusted to meet downstream requirements. 3.6. Operator level maintenance is carried out to maintain condition of equipment. 3.7. All required documentations are completed.

	3.8. End of shift information is passed on to oncoming shift
4. Operate and monitor flotation equipment	4.1 Data is read and interpreted from equipment indicators. 4.2 Plant is continuously inspected and ***flotation*** process defects and potential problems are monitored and identified. 4.3 Mineral content of ore is assessed according to flotation parameters. 4.4 Appropriate adjustments are made to flotation process. 4.5 Equipment is adjusted to prescribed operating parameters. 4.6 Feed to flotation equipment is controlled. 4.7 Reagents are added according to operating parameters. 4.8 Operator level maintenance is carried out. 4.9 All required documentations are completed. 4.10 End of shift information is passed on to oncoming shift.
5. Conduct housekeeping activities	5.1 ***Plant is cleaned***. 5.2 Hazards are identified, addressed and reported.
6. Shut down in sequence and/or isolate equipment	6.1 Equipment is shut down and/or isolated based on process and safety requirements. 6.2 ***Post shut down*** and/or an isolation check is/are performed.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Auxiliary equipment	May include: • gantry cranes and attachments (e.g. overhead) • hand and power tools • hoses (water and air) • pump systems
Pre-start checks	May include: • availability of equipment • detection of conditions that are unusual • fluid levels • job requirements • personnel availability • walk through plant

Environmental issues	May include: • drainage • dust • emissions • flora and fauna • hazardous chemicals • noise • recycling • run-off • spills • waste management and disposal • water quality
Start-up procedures	May include the inspection of: • cameras and monitors • Distribution Control System (DCS) • drive belts • filters • fluid levels (grease, oil, water) • hoppers and launders • interlocks • isolations • pipes and flanges • pumping system • valves • visual and audio warning devices and lights • water systems (e.g. sprays and columns)
Plant	May include: • compressors and blowers • conditioning tanks • flotation cells and columns • reagent dosing
Indicator readings	May include: • concentrations • current • densities • grade • heat • levels • pressure flows • unusual noises
Monitoring	May include: • air flows • blockages and spillages • check current draw • feed rates

	• in stream analysis (ISA) • On Stream Analysis (OSA) • particle size indicators (PSI) • power • pressures • pulp density • pulp levels • temperatures • wear and tear
Floatation methods	May include: • bulk flotation • controlled potential sulphide (CPS) • pre-float
Floatation quality targets	• concentrate grade • consumption targets • density • Eh (electro chemical potential) • percentage of recovery • pH level
Equipment and plant cleaning methods	May include: • hosing with water
Post-shutdown	checks are like pre-start checks.
The methods used to optimize the plant	May include: • adjustment to reagent usage
Materials may be wet and	include: • air • reagents • slurry
Contaminants are anything other than the slurry and reagents. Common contaminants	May include: • oil • plastic • wood fibre
Site conditions	May include: • day and night • weather conditions • working at heights

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for conducting

	flotation processes • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of the flotation process • working with others to undertake and complete the flotation process in a way that meets all of the required outcomes • consistent timely completion of flotation processes that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • contaminants • emergency procedures • environmental principles • equipment and operating parameters • equipment safety requirements • flotation plant • hazardous substances and consequences of spills • isolation procedures • metallurgical and technical data • operational procedures and checks • reagent types • site procedures/flotation safety requirements • types of ores and grades • sampling • leaching principles
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for conducting flotation processes • handle hazardous substances • identify hazards • use lifting techniques (manual, cranes and loads) • maintain records • monitor operations • report defects • employ safe work practices • use hand and power tools • find plant operating faults
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Perform Process Control Room Operations**
Unit Code	**MIN MPR3 11 0114**
Unit Descriptor	This unit covers the performance process control room operations in the mining and extractive industries. It includes: planning and preparing for operations; performing start-up operations; monitoring and managing operations; conducting housekeeping activities; shutting down in sequence and/or isolating plant and equipment.

Elements	Performance Criteria
1. Plan and prepare for operations	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Shift changeover details are received, interpreted and clarified. 1.3. Communications are established and maintained with other ***personnel*** using approved communication methods 1.4. Personal protective equipment appropriate for work activities is selected. 1.5. Potential risks and hazards are identified, addressed and reported. 1.6. Computer systems and ***equipment*** pre-start checks are completed. 1.7. ***Environmental issues*** are identified, addressed and reported. 1.8. Records are checked and outstanding maintenance inspections and identified defects recorded.
2. Perform start-up operations	2.1. Plant readiness is confirmed for operation. 2.2. ***Start-up checks*** and procedures are carried out according to plant configurations and system requirements. 2.3. Individual plant and process and entire system are started-up. 2.4. Production rate is built steadily with no surges and lulls. 2.5. Plant operation is stabilized to meet process output and quality requirements.
3. Monitor and manage operations	3.1. Processing utilizing appropriate indicators are ***monitored*** and managed for safe and efficient operations. 3.2. Data is ***read*** and interpreted from equipment indicators**,** programmable logic and SCADA, and action taken where required to maintain operations according to operating parameters.

	3.3. Faults are identified, managed and reported to appropriate personnel in a timely manner. 3.4. Support personnel are coordinated to ensure continuity of process. 3.5. Material flow is managed within specified parameters. 3.6. Respond to alarms to, investigates conditions, and corrective action is taken. 3.7. All required documentations are completed clearly, concisely and on time. 3.8. Shift changeover details are passed on to oncoming shift.
4. Conduct housekeeping activities	4.1. Control room is maintained and ***cleaned*** by ensuring work area is free of obstructions. 4.2. Hazards are reported to maintain a safe working environment.
5. Shutdown in sequence and/or isolate plant and equipment	5.1. Plant and equipment are shutdown or isolated based on process or safety requirements. 5.2. Post ***a shutdown or isolation check*** is performed.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Personnel	May include: • operators • transport • maintenance • plant attendants
Equipment	May include: • communication devices • computers and database management system accessories • desks and chairs • monitors • power controls • touch pad
Environmental issues	May include: • drainage • dust and fumes • emissions • hazardous chemicals

	• noise • run-off • spills • waste management and disposal • water quality
Start-up checks	May include: • availability of equipment • detection of conditions that are unusual • job requirements • personnel availability • levels • pressures • flows • vibration • communications • agitators • cameras and monitoring • interlocks • distribution control system • launders • hydraulic systems • pumps and pumping systems • screen, pipe, valve • valves • visual and audible warning devices and lights • suppression systems • motors • availability of oxygen and blower and plant air • cooling water supply • fans and draft systems
Monitoring	May include: • blockages and spillages • feed rates • overloads • pressures • power draw • wear and tear • emissions • levels • temperatures • moisture content • On-Stream Analysis (OSA) • filtering • corrosion
Equipment indicator readings	May include: • current

	• flow • levels • pressure • weight • speed • unusual noises • vibrations
Equipment and plant cleaning methods	May include: • cleaning agents and chemicals • dusting • mopping • screen cleaning • vacuuming • wiping
Post shutdown	May include: • distribution control system (panel) • equipment fluid levels • isolations (electronic) • light positioning and cleanliness • pages through equipment • personal proximity • possible faults and problems • safety equipment

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for performing process control room operations • implementation of requirements, procedures and techniques for the safe, effective and efficient performing of process control room operations • working with others to undertake control room operations that meet all of the required outcomes • consistent timely performing of process control room operations that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • colour codes (ex. pipes) • contaminant identification • emergency procedures • environmental procedures • equipment processes, limitations and operating parameters • distribution control system operation • equipment safety requirements • function of plant • hazardous goods procedures and consequences of spills • identifying repair requirements

	• isolation procedures • metallurgical and technical data (basic) • occupational health and safety procedures • operational procedures and checks • optimal plant capacity and throughput • physical layout of plant • shutdown procedures • site procedures • site safety requirements • start-up and shutdown procedures • wet and dry working procedures
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • identify hazards • handle hazardous goods • interpret plans, reports, specifications • apply operations monitoring techniques • apply problem solving techniques • apply defects reporting procedures • apply safe work practices • use computer and database management systems • apply operational safety requirements • access, interpret and apply technical information • applying the plant operating procedures • apply production and equipment records maintenance requirements • apply diagnostic techniques • work wearing personal protective equipment
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Prepare and Carryout Electrolytic Cleaning Process**
Unit Code	**MIN MPR3 12 0114**
Unit Descriptor	This unit covers the preparation and carrying out of electrolytic cleaning processes in the mineral processing industry. It includes preparing for the electrolytic cleaning process, and conducting the electrolytic cleaning process.

Elements	Performance Criteria
1. Prepare for electrolytic cleaning process	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Shift changeover details are received, interpreted and clarified. 1.3. Electrolytic cleaning process is communicated with other personnel using approved communication methods. 1.4. ***Personal protective equipment*** appropriate for work activities is selected. 1.5. Potential risks and ***hazards*** are identified, addressed and reported. 1.6. ***Environmental issues*** are identified, addressed and reported. 1.7. Tanks and scrubbing equipment are prepared. 1.8. Temperature and chemical composition of cleaning solution are prepared and set. 1.9. Terminals are renewed or replaced.
2. Conduct electrolytic cleaning	2.1. Solution is monitored during process. 2.2. Cleaning process is monitored according to specifications. 2.3. Cleaning process end-point is identified. 2.4. Electrolysis is shutdown according to specification.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy

Personal protective equipment	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Hazards	May include: • rail and road movement • cranes • noise • wind borne dust • sharp objects • moving machinery • falling/falling objects
Environmental issues	May include: • drainage • dust and fumes/emissions • hazardous chemicals • noise • run-off/spills • waste management and disposal • water quality

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for preparing and carrying out electrolytic cleaning processes • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of electrolytic cleaning processes • working with others to undertake and complete the electrolytic cleaning process in a way that meets all of the required outcomes • consistent timely completion of electrolytic cleaning processes that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • precautions necessary to ensure safety • potential dangers inherent in specific plant and equipment • safe working procedures and systems • use of protective clothing and equipment • handling of chemicals/dispatch of waste products • storage and scheduling requirements for production • plant requirements for various schedules • service requirements and specifications • manning and competence requirements

	• fault finding, rectification and reporting • materials specifications • optimization of processing • standard operating procedures • tolerances allowable in the quality system and when action should be taken • production documentation requirements and procedures • relevant quality assurance and inspection procedures and systems • limits of authority • teamwork practices and team building techniques • minimizing conflict and conflict resolution
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for preparing for and carrying out electrolytic cleaning processes • reschedule materials to meet plant availability • receive and deploy materials • store scheduled materials • facilitate smooth product flow • communicate with work group, suppliers and customers • deal with faults and variances
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Monitor and Operate Auxiliary Plant and Equipment**
Unit Code	**MIN MPR3 13 0114**
Unit Descriptor	This unit covers the monitoring and operation of auxiliary plant and equipment in the mineral processing industry. It includes preparing for plant equipment monitoring and operation, carrying out plant and equipment inspections and checks, operating and monitoring plant and equipment, maintaining plant and equipment efficiency, and shutting down and/or isolating plant and equipment.

Elements	Performance Criteria
1. Prepare for plant and equipment monitoring and operation	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Work is planned and prepared. 1.3. Shift changeover details are received, interpreted and clarified. 1.4. Communication is established and maintained with other personnel using approved communication methods. 1.5. ***Personal protective equipment*** appropriate for work activities is selected. 1.6. Equipment ***pre-start checks*** are carried out. 1.7. Potential risks and hazards are identified, addressed and reported. 1.8. ***Environmental issues*** are identified, addressed and reported. 1.9. Emergency procedures are followed. 1.10. Dust suppression and extraction methods are used.
2. Carry out plant and equipment inspections and checks	2.1. Correct plant operation is checked prior to start-up. 2.2. Condition of ***plant and equipment*** is checked for fault, damaged and inoperable equipment is identified and reported to relevant personnel. 2.3. Inspection outcomes are recorded and handed over to oncoming shift personnel. 2.4. Plant is checked physically, continuously inspected, ***equipment indicator readings*** are taken and defects and potential problems are identified and rectified.
3. Operate and monitor plant and equipment	3.1. Plant and equipment ***start-up checks and procedures*** are carried out according to plant/equipment configurations and system requirements.

	3.2. Operating plant and equipment are ***monitored*** for correct, efficient performance. 3.3. Over auxiliary/ancillary plant is changed to meet operational and maintenance requirements. 3.4. Plant alarms are interpreted and responded, remedial actions are taken and appropriate personnel notified. 3.5. Basic faults and adjustments are identified and repairs made to running/operating plant where necessary to maintain plant performance. 3.6. All required documentations are completed clearly, concisely and on time. 3.7. Pass on end of shift information to oncoming shift.
4. Maintain plant and equipment efficiency	4.1. Plant and equipment ***maintenance*** is carried out. 4.2. Plant condition is checked and adjusted to maintain efficient operation. 4.3. Pipeline and pumping system blockages are cleared. 4.4. Materials storage vessel levels are maintained to meet plant operating demands. 4.5. Plant is ***cleaned*** to maintain condition of all equipment and work area hygiene. 4.6. Hazards are identified and reported. 4.7. Samples are taken and tested.
5. Shutdown and/or isolate plant and equipment	5.1. Plant and equipment shutdown procedures are carried out according to plant/equipment configurations, system or safety requirements. 5.2. Plant and equipment are isolated for maintenance and plant configuration purposes. 5.3. Post a shutdown or isolation check is performed. 5.4. Support is provided for maintenance personnel and activities. 5.5. Shift change-over details are passed on to oncoming shift.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Personal Protective	May include:

Equipment	• rubber gloves • rubber boots • safety boots • goggles/face shield • PVC overalls and apron • heat jacket • spats • hearing protection • respirator • clean are supply equipment
Pre-start checks	May include: • availability of equipment • detection of conditions that are unusual • job requirements • personnel availability • levels • communications
Environmental issues	May include: • drainage • dust (dump) • emissions • flora and fauna • hazardous chemicals • noise • recycling • run-off/spills • waste management and disposal • water quality
Plant and equipment	May include: • Distribution Control System (DCS) • motors/pumps and pumping systems • hydraulic systems and equipment • conveyors and conveyor systems • compressors and compressed air systems • pipes and flanges • storage vessels/tanks • valves • heat exchangers • fans and guards • dampers • pulleys • lCUs • drive belts • compressors • burners • gas train

	• conveyors/conveyor systems • rollers • grates • thickener plant • hand and power tools • hoses (air and water) • scrubbers • gauges and meters • agitators • silos/bins • cranes • screens • feeders • sumps • limit switches
Equipment indicator readings	May include: • current • flow • levels • pressure • speed • unusual noises • vibrations
Start-up checks and procedures	May include the inspection of: • agitators • cameras and monitoring • interlocks • distribution control system • launders • hydraulic systems • pumps and pumping systems • screen inspections • pipes and flanges • drive belts • valves • visual and audible warning devices and lights • suppression systems
Monitor	May include: • blockages and spillages • feed rates • overloads • pressures • power draw • wear and tear • emissions (e.g. cyanide) • levels

	• temperatures • moisture content • On-Stream Analysis (OSA) • filtering • corrosion
Maintenance	May include: • lubrication • minor adjustments to operational plant • temporary small repairs • cleaning plant, equipment and work area • fixing leaks • adjusting seals
Cleaning	May include: • hosing with water • high pressure cleaning • manual removal of build-up • air spear • de-greasing • forced air • suction

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for monitoring and operating auxiliary plant and equipment • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of auxiliary plant and equipment monitoring and operation • working with others to undertake and complete the monitoring and operation of auxiliary plant and equipment that meets all of the required outcomes • consistent timely completion of auxiliary plant and equipment monitoring and operation that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • plant configuration and function • auxiliary equipment configuration and function • breakdown procedures • emergency procedures • troubleshooting techniques • sampling and testing purpose and procedures • plant and equipment limitations and operating parameters • plant and equipment safety requirements • isolation procedures • metallurgical processes and effects on product • occupational health and safety procedures

	• operational procedures and checks • site procedures • site safety requirements • environmental requirements and procedures
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for monitoring and operating auxiliary plant and equipment • operate auxiliary equipment • lift loads (manual handling, cranes and loads) • apply safe work practices • use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Monitor and Maintain Crushing, Screening and Conveying Operations**
Unit Code	**MIN MPR3 14 0114**
Unit Descriptor	This unit covers the conduct of crushing operations in the mining and extractive industries. It includes the planning and preparation for operations; operating the plant; and carrying out post operational procedures.

Elements	Performance Criteria
1. Plan and prepare for operations	1.1. ***Compliance documentation*** relevant to the conduct of crushing operations is accessed, interpreted and applied. 1.2. ***Work requirements*** are obtained, interpreted and clarified for the satisfactory completion of operations. 1.3. ***Personal protective equipment*** appropriate for work activities is selected and used. 1.4. Ensure area is well ventilated before entry. 1.5. ***Work area and equipment are inspected and prepared*** in ***coordination with others***. 1.6. A work plan is prepared. 1.7. Appropriate type of ***auxiliary equipments*** is selected for work activities. 1.8. Coordination requirements are resolved with others at the site prior to commencing and during work activities.
2. Operate the crushing plant	2.1. ***Pre-start***, ***start-up***, ***run and shutdown procedures*** are carried out. 2.2. The ***operating technique*** are selected and modified to appropriately meet ***changing work conditions***. 2.3. Dust suppression and extraction methods are used. 2.4. Operations are conducted, controlled and ***monitored*** within the equipment limitations, maintaining crushing efficiency and effectiveness. 2.5. Performance monitoring systems and alarms are acted on or reported. 2.6. Hazardous and emergency situations are recognized. 2.7. Work is completed in accordance with the agreed plan and outcomes and within the operating capacity of the allocated equipment.
3. Carry out post-operational	3.1. Fault-find and report faults are inspected. 3.2. Operational maintenance, servicing, lubricating and

procedures	housekeeping tasks are carried out. 3.3. Process is maintained and records and reports are passed on.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Work requirements	May include: • product details • nature and scope of tasks • achievement targets • operational conditions • geological data • site survey data • site layout and out of bounds areas • worksite inspection requirements • lighting conditions • plant or equipment defects • hazards and potential hazards • coordination requirements or issues
Personal protective equipment	May include: • chemical/gas detectors • eye protection (e.g. glasses) • hearing protection (e.g. ear plugs) • protection from the elements (e.g. sun block) • protective clothing (e.g. gloves, safety boots, helmet, shin guards, long sleeved shirt and trousers)) • respiratory devices • safety harness when working at heights
Inspect and prepare work area	May include: • identification of hazards • selection and implementation of control measures for the hazards identified • safeguarding site and non-site personnel by: • erection of barricades, posting of signs and following of security procedures • selection of appropriate equipment to ensure personnel safety and protection • determination of appropriate path of movement for equipment • floor, pad, access roads, ramps and bench requirements

Coordination with others	May include with: • yard persons • laboratory personnel • mobile plant operators • maintenance personnel
Auxiliary equipment	May include: • gantry cranes and attachments • hand and power tools • hoses (water and air) • mobile equipment • flexi pumps • air operated tools • boulder buster
Pre-start and start-up procedures	May include: • walk around check of the plant • checking and toping up fluid levels (including fuel) • lubrication • inspection of attachments to ensure security and identify defects • instrument and control lever checks • reporting defects and damage • follow prescribed start-up sequence • confirm plant is operational • checking interlocks • check for tags • cameras and monitors • monitoring and control systems • drive belts • isolations • chutes • conveyor components • pipe and flanges • pumping system • water systems • hydraulic system • lighting • suppression system • visual and audio warning devices and lights • valves
Changing work conditions	May include variations in: • rock types • feed grading • feed contamination • weather conditions • day and night

Monitoring	May include the checking of: • blockages and spillages • current draw • detecting noises and smells • flow rates • missing components • oil leaks • air flows • pressures • feed rates • wear and tear • contaminants, e.g.: oil, plastic, timber, misfire explosives, metal (e.g. bucket teeth etc)
Shutdown procedures	May include: • following prescribed shutdown sequence • securing equipment
Operating techniques	May include: • feed control • crusher adjustment • working safely around other machines and personnel

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for conducting crushing operations • implementation of requirements, procedures and techniques for the safe, effective and efficient conducting of crushing operations • working with others to undertake and complete crushing operations that meet all of the required outcomes • consistent timely completion of crushing operations that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrates knowledge of: • site hazard identification and response procedures • site risk control procedures • site and equipment health and safety procedures • site environmental requirements and procedures • site quality requirements • site communication procedures • site product characteristics • site operational procedures • plant pre-start, start-up, operating and shutdown procedures and techniques • plant components functions, characteristics, technical capability and limitations • plant breakdown procedures • plant isolation procedures

	• site record keeping requirements • site confine space work procedures • site personal protective equipment requirements • contaminant identification • emergency procedures • crusher components • crushing principles • hazardous goods procedures and consequences of spills • repair requirements • mobile equipment operation • computer basic techniques • monitoring and control systems • spillage procedures
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • apply operational safety requirements • access, interpret and apply technical information • applying the plant operating procedures • apply production and equipment records maintenance requirements • apply diagnostic techniques • use relevant hand and power tools • work wearing personal protective equipment • apply hazard identification and management requirements and procedures • complete forms • apply hazardous goods handling techniques and management • interpret reports • use lifting techniques (manual, cranes and loads) • identify and report defects • apply procedures for working at heights and depths • apply work orders/purchase requisition preparation requirements
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Monitor and Maintain Milling or Grinding Operations**
Unit Code	**MIN MPR3 15 0114**
Unit Descriptor	This unit covers the conduct of milling/grinding in the mineral processing industry. It includes planning and preparing for milling/grinding processes, starting-up equipment in sequence, operating and monitoring equipment and lubrication systems, monitoring and controlling classification, charging the mill, conducting housekeeping activities, and shutting down in sequence and/or isolating equipment.

Elements	Performance Criteria
1. Plan and prepare for milling/grinding process	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Work is planned and prepared. 1.3. Shift change over details are received, interpreted and clarified. 1.4. Milling/grinding process is communicated with other personnel. 1.5. ***Personal protective equipment*** appropriate for work activities is selected. 1.6. Appropriate type of auxiliary equipment is selected for work activities. 1.7. Equipment pre-start checks are performed to ensure equipment is ready for operation. 1.8. ***Potential risks and hazards*** are identified, addressed and reported. 1.9. ***Environmental issues*** are identified, addressed and reported. 1.10. ***Safe operating procedures*** are adhered. 1.11. Emergency procedures are adhered. 1.12. Approved dust suppression and extraction methods are used. 1.13. Ensure area is well ventilated.
2. Start-up equipment in sequence	2.1. Start-up procedures are carried out and start-up checks completed. 2.2. Plant is confirmed to be operational.
3. Operate and monitor equipment and lubrication system	3.1. Data is read and interpreted from equipment indicators. 3.2. Plant is continuously inspected. 3.3. Equipment is adjusted to optimize plant performance.

	3.4. Feed to plant is controlled. 3.5. Reagent additions are monitored. 3.6. Lubrication system is monitored to ensure that oil and grease levels are maintained. 3.7. Operator level maintenance is carried out. 3.8. All required documentations are completed clearly, concisely and on time. 3.9. End of shift information is passed on to oncoming shift.
4. Monitor and control classification	4.1. Density and/or size of ore is/are checked for according to specified parameters. 4.2. Equipment is adjusted and calibrated where required to meet density requirements. 4.3. Density of product is accurately sampled and recorded.
5. Charge mill	5.1. Grinding media type and quantity are selected according to metallurgical requirements. 5.2. Mill is charges as required.
6. Conduct housekeeping activities	6.1. Plant is cleaned. 6.2. Hazards are managed and reported.
7. Shut down in sequence and/or isolate equipment	7.1. Ore is cleared from milling/grinding equipment before commencing shutdown. 7.2. Equipment is shut down or isolated based on process and safety requirements. 7.3. Post shut down or an isolation check is performed.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Personal protective equipment	May include: • chemical/gas detectors • eye protection (e.g. glasses) • hearing protection (e.g. ear plugs) • protection from the elements (e.g. sun block) • protective clothing (e.g. gloves, safety boots, helmet, shin guards, long sleeved shirt and trousers)) • respiratory devices

	• safety harness when working at heights
Potential risks and hazards	May include: • personal safety (e.g. crush injuries, burns, slips, trips, falls, chemical exposure, fatigue) • plant (e.g. structural damage, emergency shutdown) • environment (e.g. seepage, emissions, chemical spills, pollution, anything detrimental to fauna and flora)
Environmental issues	May include: • drainage • dust • emissions • flora and fauna • hazardous chemicals • noise • run-off • spills • waste management and disposal • water quality
Safe operating procedures	May include: • adhering to all site procedures • awareness and access to emergency exits • emergency procedures • First Aid procedures • hazard identification and recognition procedures • hot work procedures • observing electrical and mechanical procedures • observing right of way of heavy equipment • observing site speed limits • occupational health safety and environment procedures around equipment, vehicles and personnel • use of 2-way radio • use of barricades and guards • use of fire extinguishers • use of Materials Safety Data Sheets (MSDS) • tagging procedures (e.g. service tags, danger tags, restrictive operations tags) • use of respiratory devices • wearing equipment restraints • wearing personal protective equipment • working in confined spaces • use of materials safety data sheets • carrying out safety checks (e.g. safety showers and eye washes) • hold worker access permit

Evidence Guide	
Critical Aspects of	Must demonstrate knowledge and skills of:

Competence	• knowledge of the requirements, procedures and instructions for conducting milling/grinding • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of milling/grinding • working with others to undertake and complete the conduct of milling/grinding that meets all of the required outcomes • consistent timely completion of milling/grinding that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrates knowledge of: • contaminant identification • cooling system • emergency procedures • environmental principles • equipment processes, limitations and operating parameters • equipment safety requirements • grinding media • hazardous goods procedures and consequences of spills • isolation procedures • lubrication system • metallurgical and technical data • milling circuit components and functions/milling principles • operational procedures and checks • milling and grinding safety requirements • types of ores
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures for conducting milling/grinding • operate, maintain and clean equipment • identify and manage hazards • interpret reports • apply lifting techniques (manual, cranes and loads) • maintain records • employ safe work practices • use Data Control Systems (DCS) • use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level II	
Unit Title	**Handle, Store and Use Cyanide**
Unit Code	**MIN MPR3 16 0114**
Unit Descriptor	This unit covers the safe handling, storage and use of cyanide within the gold mining industry. It includes accessing and applying site cyanide safety procedures; applying personal safety measures; identifying and reporting incidents/hazards; protecting workers and the environment during cyanide handling and storage; managing cyanide process solutions and HCN gas emissions to protect human health and the environment; protecting workers' health and safety from exposure to cyanide solutions and HCN gas; and applying emergency procedures.

Elements	Performance Criteria
1. Access and apply site Cyanide safety procedures	1.1. ***Compliance documentation*** relevant to the safe handling, storage and use of ***cyanide*** is accessed, interpreted and applied. 1.2. ***Mine site safe operating procedures*** are applied for managing ***potential hazards***, ***risks and emergencies***. 1.3. Mine site safety reporting procedures are applied.
2. Apply personal safety measures	2.1. A clean and tidy workplace is maintained. 2.2. Appropriate ***personal protective equipment*** is used. 2.3. Correct hazardous substance safety procedures are applied. 2.4. Permits and clearance are obtained before specialized work is carried out, according to site procedures.
3. Identify and report incidents/hazards	3.1. Potential hazards, risks and emergencies are identified, managed and reported. 3.2. Incidents are reported to approve personnel. 3.3. The details of any incident, hazards and/or injury are recorded clearly and concisely.
4. Protect workers and the environment during cyanide handling and storage	4.1. Quality control and quality assurance procedures, spill prevention and spill containment measures are identified 4.2. Unloading, storage and mixing facilities are maintained and controlled using routine inspections, preventive maintenance and contingency plans to prevent or contain releases and control and respond to worker exposures
5. Manage cyanide process solutions and HCN gas	5.1. Operating systems and procedures designed to protect human health and the environment are identified and applied 5.2. Management and operating systems designed to monitor and minimize ***cyanide*** use are identified and applied

emissions to protect human health and the environment	5.3. Measures are identified and applied to protect birds, other wildlife and livestock from adverse effects of cyanide process solutions 5.4. Measures designed to manage seepage from cyanide facilities are identified and applied to protect the beneficial uses of ground water 5.5. Spill prevention or containment measures is/are identified and applied for process tanks and pipelines
6. Protect workers' health and safety from exposure to cyanide solutions and HCN gas	6.1. Potential cyanide exposure scenarios and measures necessary for their elimination, reduction and control are identified 6.2. Cyanide facilities are operated and monitored to protect worker health and safety and periodically evaluate the effectiveness of health and safety measures 6.3. Emergency response plans or procedures regarding worker exposure are identified and applied to cyanide
7. Apply emergency procedures	7.1. Alarms and warning devices are recognized and responded according to mine site procedures 7.2. ***Self rescue equipment*** is identified and correctly used in accordance with manufacturer's instructions and site procedures 7.3. Basic fire fighting techniques are applied according to mine site procedures 7.4. Familiarity with emergency escape route(s) is maintained according to mine site procedures 7.5. Mine site emergency response plans and procedures are applied

Variables	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Mine site safe operating procedures	May include: • awareness and access to emergency exits • carrying out safety checks (e.g. checking HCN levels) • emergency procedures (e.g. Cyanide spills) • First Aid procedures • hazard identification and recognition procedures • work access permit • housekeeping standards • decontamination procedures

	• cyanide destruction procedures • cyanide disposal procedures • change management procedures • observing smoking restrictions at certain locations or times or during specific activities • observing site speed limits • occupational health, safety and environment procedures around equipment, vehicles and personnel • isolation and tagging procedures (e.g. out-of-service tags, danger tags, restrictive operations tags) • use of barricades and guards • use of fire extinguishers • hazardous substances safety procedures, including use of material safety data sheets (MSDS) • use of two-way radios and site telephones • wearing personal protective equipment • control of and working in confined spaces • ensuring ventilation is operating • ensuring safety showers are operating • awareness of and access to escape ways • sign and barricade erection (including cleaning of signs)
Potential hazards**,** risks and emergencies	May include: • personal safety including cyanide or HCN exposure • plant emergency shut down in the event of a cyanide spill • environment (e.g. seepage, emissions, chemical spills, pollution, anything detrimental to fauna and flora) • changes, which may include: ➢ delivery of unknown materials ➢ broken down vehicles or equipment ➢ changes by suppliers ➢ changes of personnel
Personal protective equipment	May include: • eye protection (e.g. glasses) • protective clothing (e.g. gloves, safety boots, helmet, long sleeved shirt, trousers and disposable clothing) • chemical/gas detectors HCN • respiratory devices
Cyanide	May include: • sodium cyanide briquettes • flake calcium cyanide • liquid sodium cyanide • cyanide slurry solution
Self rescue equipment	May include: • respiratory devices / breathing apparatus • oxygen therapy units

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for the safe handling, storage and use of cyanide within the gold mining industry • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of the handling, storage and use of cyanide within the gold mining industry • working with others to undertake and complete the safe handling, storing and using of cyanide within the gold mining industry that meets all of the required outcomes • consistent timely completion of the safe handling, storage and use of cyanide in the gold mining industry that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • emergency procedures • equipment safety requirements • hazardous substances procedures and handling techniques, including understanding of: • material safety data sheets (MSDSs) and their use • Dangerous Goods requirements and procedures • isolation procedures • mine site safety requirements • occupational health and safety procedures • site safety procedures • participative procedures for workplace management of OHS (e.g. consultation, safety representatives, committees, dispute resolution) • International Cyanide Management Code
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • apply hazards identification and control procedures • apply incidents reporting requirements and procedures • apply personal protective equipment requirements and procedures • apply cyanide measurement systems (e.g. Titrations) • apply personal and co-worker safety requirements and procedures • apply cyanide Materials Safety Data Sheets (MSDS)
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Demonstration/ Observation with Oral Questioning
Context of Assessment	Competence may be assessed in the workplace or in a simulated workplace setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Monitor and Maintain Wet Gravity and Magnetic Separation**
Unit Code	**MIN MPR3 17 0114**
Unit Descriptor	This unit covers the conduct of wet gravity and magnetic separation in the mining industry. It includes planning and preparing for magnetic separation, starting up equipment in sequence, operating and monitoring equipment, conducting housekeeping activities, and shutting down in sequence and/or isolating equipment.

Elements	Performance Criteria
1. Plan and prepare for magnetic separation	1.1. ***Compliance documentation*** relevant to the work activity is accessed, interpreted and applied. 1.2. Shift changeover details are received, interpreted and clarified. 1.3. Magnetic separation is communicated with other personnel. 1.4. Personal protective equipment appropriate for work activities is selected. 1.5. Appropriate type of auxiliary equipment is selected for work activities. 1.6. Equipment ***pre-start checks*** are performed. 1.7. Potential risks and hazards are identified, addressed and reported. 1.8. ***Environmental issues*** are identified, addressed and reported. 1.9. Emergency procedures are adhered. 1.10. Approved dust suppression and extraction methods are used. 1.11. Ensure area is well ventilated.
2. Start-up equipment in sequence	2.1. ***Start-up procedures*** are carried out and start-up checks completed according to plant configurations and system requirements. 2.2. ***Plant*** is confirmed to be operational.
3. Operate and monitor equipment	3.1. Data is ***read*** and interpreted from equipment indicators to determine ***separation*** efficiency. 3.2. Plant is continuously inspected and ***monitored*** and defects and potential problems are identified. 3.3. Mineral content of ore is assessed according to separation parameters .

	3.4. Appropriate adjustments are made to separation process. 3.5. Equipment is adjusted to agreed parameters. 3.6. Feed to separation equipment is controlled. 3.7. Operator level maintenance is carried out to maintain condition of ***equipment***. 3.8. All required documentations are completed. 3.9. End of shift information is passed on to oncoming shift.
4. Conduct housekeeping activities	4.1. ***Plant is cleaned***. 4.2. Hazards are identified, addressed and reported.
5. Shutdown in sequence and/or isolate equipment	5.1. Equipment is shutdown and/or isolated based on process and safety requirements. 5.2. ***Post-shutdown*** and/or isolation checks is/are performed.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Pre-start checks	May include: • availability of equipment • detection of conditions that are unusual • personnel availability • walk through plant • isolation and/or lockout checks • job requirements
Environmental issues	May include: • drainage • dust • emissions • flora and fauna • hazardous chemicals • noise • recycling • run-off • spills • waste management and disposal • water quality
Start-up procedure	May include: • cameras and monitors • distribution systems

	• drive belts • screens • fluid levels (grease, oil) • hoppers and launders • interlocks • isolations • pipes and flanges • conveyor systems • elevators and screw feeders • valves • visual and audio warning devices
Plant	May include: • compressors and blowers • vibrating screens • induction roll magnets • cross belt magnets • weightometers • dryers and burners • conveyors, screw feeders and elevators
Indicator readings	May include: • current • grade • heat • unusual noises • levels • radiation
Separation methods	May include: • magnetic • sizing
Separation quality targets	May include: • grades • consumption targets • percentage of recovery
Monitoring	May include the checking of: • air flows • blockages and spillages • current draw • feed rates • power • pressures • wear and tear • temperatures • particle size • throughput
Equipment	• gantry cranes and attachments • hand and power tools

	• hoses (air)
Equipment and plant cleaning methods	May include: • shovels • compressed air
Post-shutdown checks	are like pre-start checks
Materials	May include: • gas
Contaminants are anything other than the slurry. Common contaminant	May include: • wood fiber • gravel • silica
Site conditions	May include: • day and night • weather conditions • working at heights
Methods used to optimize the plant	May include: • adjust mineral cuts • adjust feed input rate • adjust temperatures • adjust magnetic intensity

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for conducting magnetic separation • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of magnetic separation • working with others to undertake and complete the magnetic separation in a way that meets all of the required outcome • consistent timely completion of magnetic separation that safely, effectively and efficiently meets the required outcomes
Underpinning Knowledge and Attitudes	Must demonstrates knowledge of: • contaminants • emergency procedures • environmental principles • equipment operating parameters • equipment safety requirements • separation plant • hazardous substance procedures and consequences of spills • identifying repair requirements • isolation procedures • metallurgical and technical data • operational procedures and checks • magnetic separation safety requirement • types of ores and grades

Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • handle hazardous substances • identify hazards • interpret reports • use lifting techniques (manual, cranes and loads) • monitor operation • report defects • employ safe work practices • use hand and power tools • find operational faults
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Demonstration/ Observation with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Underground Mining Level III	
Unit Title	**Monitor Implementation of Work Plan/Activities**
Unit Code	**MIN MPR3 18 0114**
Unit Descriptor	This unit covers competence required to oversee and monitor the quality of work operations within an enterprise. This unit may be carried out by team leaders or supervisors.

Elements	Performance Criteria
1. Monitor and improve workplace operations	1.1 Efficiency and service levels are monitored on an ongoing basis. 1.2 Operations in the workplace support overall enterprise goals and quality assurance initiatives. 1.3 Quality ***problems*** and issues are promptly identified and adjustments are made accordingly. 1.4 Procedures and systems are changed in consultation with colleagues to improve efficiency and effectiveness. 1.5 Colleagues are consulted about ways to improve efficiency and service levels.
2. Plan and Organize workflow	2.1 Current workload of colleagues is accurately assessed. 2.2 Work is scheduled in a manner which enhances efficiency and customer service quality. 2.3 Work is delegated to appropriate people in accordance with principles of delegation. 2.4 Workflow is assessed against agreed objectives and timelines and colleagues are assisted in prioritisation of workload. 2.5 Input is provided to appropriate management regarding staffing needs.
3. Maintain workplace records	3.1 ***Workplace records*** are accurately completed and submitted within required timeframes. 3.2 Where appropriate completion of records is delegated and monitored prior to submission.
4. Solve problems and make decisions	4.1 Workplace problems are promptly identified and considered from an operational and customer service perspective. 4.2 Short term action is initiated to resolve the immediate problem where appropriate. 4.3 Problems are analyzed for any long term impact and potential solutions are assessed and actioned in consultation with relevant colleagues. 4.4 Where problem is raised by a team member, they are encouraged to participate in solving the problem.

	4.5 Follow up action is taken to monitor the effectiveness of solutions in the workplace.

Variables	**Range**
Problems	May include but not limited to: • difficult customer service situations • equipment breakdown/technical failure • delays and time difficulties • competence
Workplace records	May include but is not limited to: • staff records and regular performance reports

Evidence Guide	
Critical Aspects of Competence	Assessment must confirm appropriate knowledge and skills to: • ability to effectively monitor and respond to a range of common operational and service issues in the workplace • understanding of the role of staff involved in workplace monitoring • knowledge of quality assurance, principles of workflow planning, delegation and problem solving
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: • roles and responsibilities in monitoring work operations • overview of leadership and management responsibilities • principles of work planning and principles of delegation • typical work organization methods appropriate to the sector • quality assurance principles and time management • problem solving and decision making processes • industrial and/or legislative issues which affect short term work organization as appropriate to industry sector
Underpinning Skills	Demonstrate skills to: • monitoring and improving workplace operations • planning and organizing workflow • maintaining workplace records
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Apply Quality Control**
Unit Code	**MIN MPR3 19 0114**
Unit Descriptor	This unit covers the knowledge, attitudes and skills required in applying quality control in the workplace.

Elements	Performance Criteria
1. Implement quality standards	1.1 Agreed quality standard and procedures are acquired and confirmed. 1.2 Standard procedures are introduced to organizational staff/personnel. 1.3 Quality standard and procedures documents are provided to employees in accordance with the organization policy. 1.4 Standard procedures are revised / updated when necessary.
2. Assess quality of service delivered	2.1 Services delivered are ***quality checked*** against organization ***quality standards*** and specifications. 2.2 Service delivered are evaluated using the appropriate evaluation ***quality parameters*** and in accordance with organization standards. 2.3 Causes of any identified faults are identified and corrective actions are taken in accordance with organization policies and procedures.
3. Record information	3.1 Basic information on the quality performance is recorded in accordance with organization procedures. 3.2 Records of work quality are maintained according to the requirements of the organization.
4. Study causes of quality deviations	4.1 Causes of deviations from final outputs or services are investigated and reported in accordance with organization procedures. 4.2 Suitable preventive action is recommended based on organization quality standards and identified causes of deviation from specified quality standards of final service or output.
5. Complete documentation	5.1 Information on quality and other indicators of service performance is recorded. 5.2 All service processes and outcomes are recorded.

Variable	Range
Quality check	May include but not limited to: • Check against design / specifications • Visual inspection and Physical inspection

Quality standards	May include but not limited to: • Materials • Components • Process • Procedures
Quality parameters	May include but not limited to: • Standard Design / Specifications • Material Specification

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Check completed work continuously against organization standard • Identify and isolate faulty or poor service • Check service delivered against organization standards • Identify and apply corrective actions on the causes of identified faults or error • Record basic information regarding quality performance • Investigate causes of deviations of services against standard • Recommend suitable preventive actions
Underpinning Knowledge	Demonstrates knowledge of: • Relevant quality standards, policies and procedures • Characteristics of services • Safety environment aspects of service processes • Evaluation techniques and quality checking procedures • Workplace procedures and reporting procedures
Underpinning Skills	Demonstrates skills to: • interpret work instructions, specifications and standards appropriate to the required work or service • carry out relevant performance evaluation • maintain accurate work records • meet work specifications and requirements • communicate effectively within defined workplace procedures
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Lead Workplace Communication**
Unit Code	**MIN MPR3 20 0114**
Unit Descriptor	This unit covers the knowledge, attitudes and skills needed to lead in the dissemination and discussion of information and issues in the workplace.

Elements	Performance Criteria
1. Communicate information about workplace processes	1.1 Appropriate ***communication method*** is selected. 1.2 Multiple operations involving several topics areas are communicated accordingly. 1.3 Questions are used to gain extra information. 1.4 Correct sources of information are identified. 1.5 Information is selected and organized correctly. 1.6 Verbal and written reporting is undertaken when required. 1.7 Communication skills are maintained in all situations.
2. Lead workplace discussion	2.1 Response to workplace issues is sought. 2.2 Response to workplace issues are provided immediately. 2.3 Constructive contributions are made to workplace discussions on such issues as production, quality and safety. 2.4 Goals/objectives and action plan undertaken in the workplace are communicated.
3. Identify and communicate issues arising in the workplace	3.1 Issues and problems are identified as they arise. 3.2 Information regarding problems and issues are organized coherently to ensure clear and effective communication. 3.3 Dialogue is initiated with appropriate staff/personnel. 3.4 Communication problems and issues are raised as they arise.

Variable	Range
Methods of communication	May include but not limited to: • Non-verbal gestures • Verbal • Face to face • Two-way radio • Speaking to groups • Using telephone • Written • Using Internet • Cell phone

Evidence Guide	
Critical Aspects of Competence	Demonstrates skills and knowledge to: • Deal with a range of communication/information at one time • Make constructive contributions in workplace issues • Seek workplace issues effectively • Respond to workplace issues promptly • Present information clearly and effectively written form • Use appropriate sources of information • Ask appropriate questions • Provide accurate information
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Organization requirements for written and electronic communication methods • Effective verbal communication methods
Underpinning Skills	Demonstrates skills to: • Organize information • Understand and convey intended meaning • Participate in variety of workplace discussions • Comply with organization requirements for the use of written and electronic communication methods
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Lead Small Teams**
Unit Code	**MIN MPR3 21 0114**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required to determine individual and team development needs and facilitate the development of the work group.

Elements	Performance Criteria
1. Provide team leadership	1.1 ***Learning and development needs*** are systematically identified and implemented in line with ***organizational requirements***. 1.2 Learning plan to meet individual and group training and developmental needs is collaboratively developed and implemented. 1.3 Individuals are encouraged to self-evaluate performance and identify areas for improvement. 1.4 ***Feedback on performance*** of team members is collected from relevant sources and compared with established team learning process.
2. Foster individual and organizational growth	2.1 Learning and development program goals and objectives are identified to match the specific knowledge and skills requirements of Competence standards. 2.2 ***Learning delivery methods*** are appropriate to the learning goals, the learning style of participants and availability of equipment and resources. 2.3 Workplace learning opportunities and coaching/ mentoring assistance are provided to facilitate individual and team achievement of competencies. 2.4 Resources and timelines required for learning activities are identified and approved in accordance with organizational requirements.
3. Monitor and evaluate workplace learning	3.1 Feedback from individuals or teams is used to identify and implement improvements in future learning arrangements. 3.2 Outcomes and performance of individuals/teams are assessed and recorded to determine the effectiveness of development programs and the extent of additional support. 3.3 Modifications to learning plans are negotiated to improve the efficiency and effectiveness of learning. 3.4 Records and reports of Competence are maintained within organizational requirement
4. Develop team commitment and	4.1 Open communication processes to obtain and share information is used by team.

cooperation	4.2 Decisions are reached by the team in accordance with its agreed roles and responsibilities. 4.3 Mutual concern and camaraderie are developed in the team.
5. Facilitate accomplishment of organizational goals	5.1 Team members actively participated in team activities and communication processes. 5.2 Teams members developed individual and joint responsibility for their actions. 5.3 Collaborative efforts are sustained to attain organizational goals.

Variable	**Range**
Learning and development needs	May include but not limited to: • Coaching, mentoring and/or supervision • Formal/informal learning program • Internal/external training provision • Work experience/exchange/opportunities • Personal study • Career planning/development • Performance appraisals • Workplace skills assessment • Recognition of prior learning
Organizational requirements	May include but not limited to: • Quality assurance and/or procedures manuals • Goals, objectives, plans, systems and processes • Legal and organizational policy/guidelines and requirements • Safety policies, procedures and programs • Confidentiality and security requirements • Business and performance plans • Ethical standards • Quality and continuous improvement processes and standards
Feedback on performance	May include but not limited to: • Formal/informal performance appraisals • Obtaining feedback from supervisors and colleagues • Obtaining feedback from clients • Personal and reflective behavior strategies • Routine and organizational methods for monitoring service delivery
Learning delivery methods	May include but not limited to: • On the job coaching or mentoring • Problem solving • Presentation/demonstration • Formal course participation • Work experience and Involvement in professional networks • Conference/seminar attendance and induction

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • identify and implement learning opportunities for others • give and receive feedback constructively • facilitate participation of individuals in the work of the team • negotiate learning plans to improve the effectiveness of learning • prepare learning plans to match skill needs • access and designate learning opportunities
Underpinning Knowledge and Attitude	Demonstrates knowledge of: • coaching and mentoring principles • understanding how to work effectively with team members who have diverse work styles, aspirations, cultures and perspective • understanding how to facilitate team development and improvement • understanding methods and techniques for eliciting and interpreting feedback • understanding methods for identifying and prioritizing personal development opportunities and options • knowledge of career paths and competence standards in the industry
Underpinning Skills	Demonstrates skills to: • ability to read and understand a variety of texts, prepare general information and documents according to target audience; spell with accuracy; use grammar and punctuation effective relationships and conflict management • communication skills including receiving feedback and reporting, maintaining effective relationships and conflict management • planning skills to organize required resources and equipment to meet learning needs • coaching and mentoring skills to provide support to colleagues • reporting skills to organize information; assess information for relevance and accuracy; identify and elaborate on learning outcomes • facilitation skills to conduct small group training sessions • ability to relate to people from a range of social, cultural, physical and mental backgrounds
Resource Implications	Access to relevant workplace or appropriately simulated environment where assessment can take place
Methods of Assessment	Competence may be assessed through: • Interview / Written exam • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the workplace or in a simulated workplace setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Improve Business Practice**
Unit Code	**MIN MPR3 22 0114**
Unit Descriptor	This unit covers the skills, knowledge and attitudes required in promoting, improving and growing business operations.

Elements	Performance Criteria
1. Diagnose the business	1.1 ***Data required*** for diagnosis is determined and acquired. 1.2 ***Competitive advantage*** of the business is determined from the data. 1.3 ***SWOT analysis*** of the data is undertaken.
2. Benchmark the business	2.1 Sources of relevant benchmarking data are identified. 2.2 ***Key indicators*** for benchmarking are selected in consultation with key stakeholders. 2.3 Like indicators of own practice are compared with benchmark indicators. 2.4 Areas for improvement are identified.
3. Develop plans to improve business performance	3.1 A consolidated list of required improvements is developed. 3.2 Cost-benefit ratios for required improvements are determined. 3.3 Work flow changes resulting from proposed improvements are determined. 3.4 Proposed improvements are ranked according to agreed criteria. 3.5 An action plan is developed and agreed to implement the top ranked improvements. 3.6 ***Organizational structures*** are checked to ensure they are suitable.
4. Develop marketing and promotional plans	4.1 The practice vision statement is reviewed. 4.2 Practice ***objectives*** are developed/reviewed. 4.3 Target markets are identified/refined. 4.4 ***Market research data*** is obtained. 4.5 ***Competitor analysis*** is obtained. 4.6 ***Market position*** is developed/reviewed. 4.7 ***Practice brand*** is developed. 4.8 ***Benefits*** of practice/practice products/services are identified. 4.9 ***Promotion tools*** are selected/developed.

5. Develop business growth plans	5.1 Plans are developed to increase ***yield per existing client***. 5.2 Plans are developed to add new clients. 5.3 Proposed plans are ranked according to agreed criteria. 5.4 An action plan is developed and agreed to implement the top ranked plans. 5.5 Practice work practices are reviewed to ensure they support growth plans.
6. Implement and monitor plans	6.1 Implementation plan is developed in consultation with all relevant stakeholders. 6.2 Indicators of success of the plan are agreed. 6.3 Implementation is monitored against agreed indicators. 6.4 Implementation is adjusted as required.

Variable	**Range**
Data required	May include but not limited to: • organization capability • appropriate business structure • level of client service which can be provided • internal policies, procedures and practices • staff levels, capabilities and structure • market, market definition • market changes/market segmentation • market consolidation/fragmentation • revenue • level of commercial activity • expected revenue levels, short and long term • revenue growth rate • break even data • pricing policy • revenue assumptions • business environment • economic conditions • social factors • demographic factors • technological impacts • political/legislative/regulative impacts • competitors, competitor pricing and response to pricing • competitor marketing/branding • competitor products
Competitive advantage	May include but not limited to: • services/products • fees • location

	• timeframe
SWOT analysis includes:	May include but not limited to: • internal strengths such as staff capability, recognized • quality • internal weaknesses such as poor morale, • under-capitalization, poor technology • external opportunities such as changing market and • economic conditions • external threats such as industry fee structures, strategic • alliances, competitor marketing
Key indicators	May include but not limited to: • salary cost and staffing • personnel productivity (particularly of principals) • profitability • fee structure • client base • size staff/principal • overhead/overhead control
Organizational structures	May include but not limited to: • Legal structure (partnership, Limited Liability Company, etc.) • organizational structure/hierarchy • reward schemes
Objectives should be 'SMART' , that:	May include but not limited to: • S: Specific • M: Measurable • A: Achievable • R: Realistic • T: Time defined
Market research data	May include but not limited to: • data about existing clients • data about possible new clients • data from internal sources • data from external sources such as: ➢ trade associations/journals ➢ Yellow Pages small business surveys ➢ libraries ➢ Internet ➢ Chamber of Commerce ➢ client surveys ➢ industry reports ➢ secondary market research • primary market research such as: ➢ telephone surveys ➢ personal interviews ➢ mail surveys
Competitor analysis	May include but not limited to: • competitor offerings

	• competitor promotion strategies and activities • competitor profile in the market place
Market position	May include but not limited to: • product • the good or service provided • product mix • the core product - what is bought • the tangible product - what is perceived • the augmented product - total package of consumer • features/benefits • product differentiation from competitive products • new/changed products • Price and pricing strategies (cost plus, supply/demand, ability to pay, etc.) • Pricing objectives (profit, market penetration, etc.) • cost components • market position • distribution strategies • marketing channels • promotion • promotional strategies • target audience • communication • promotion budget
Practice brand	May include but not limited to: • practice image • practice logo/letter head/signage • phone answering protocol • facility decor • slogans • templates for communication/invoicing • style guide • writing style • AIDA (attention, interest, desire, action)
Benefits	May include but not limited to: • features as perceived by the client • benefits as perceived by the client
Promotion tools	May include but not limited to: • networking and referrals • seminars • advertising • press releases • publicity and sponsorship • brochures • newsletters (print and/or electronic) • websites

	• direct mail • telemarketing/cold calling
Yield per existing client	May include but not limited to: • raising charge out rates/fees • packaging fees • reduce discounts • sell more services to existing clients

Evidence Guide	
Critical Aspects of Competence	The candidate must be able to demonstrate: • ability to identify the key indicators of business performance • ability to identify the key market data for the business • knowledge of a wide range of available information sources • ability to acquire information not readily available within a business • ability to analyze data and determine areas of improvement • ability to negotiate required improvements to ensure implementation • ability to evaluate systems against practice requirements • and form recommendations and/or make recommendations • ability to assess the accuracy and relevance of information
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • data analysis • communication skills • computer skills to manipulate data and present information • negotiation skills • problem solving • planning skills • marketing principles • ability to acquire and interpret relevant data • current product and marketing mix • use of market intelligence • development and implementation strategies of promotion and growth plans
Underpinning Skills	Demonstrates skill in: • data analysis and manipulation • ability to acquire and interpret required data, current practice systems and structures and sources of relevant benchmarking data • applying methods of selecting relevant key benchmarking indicators • communication skills • working and consulting with others when developing plans for the business • planning skills, negotiation skills and problem solving • using computers to manipulate, present and distribute information

Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level III	
Unit Title	**Prevent and Eliminate MUDA**
Unit Code	**MIN MPR3 23 0114**
Unit Descriptor	This unit of competence covers the knowledge, skills and attitude required by a worker to prevent and eliminate MUDA/wastes in his/her their workplace. It covers responsibility for the day-to-day operation of the work and ensures Kaizen elements are continuously improved and institutionalized.

Elements	Performance Criteria
1. Prepare for work.	1.1 Work instructions are used to determine job requirements, including method, material and equipment. 1.2 Job specifications are read and interpreted following working manual. 1.3 ***OHS requirements***, including dust and fume collection, breathing apparatus and eye and ear personal protection needs are observed throughout the work. 1.4 Appropriate material is selected for work. 1.5 ***Safety equipment and tools*** are identified and checked for safe and effective operation.
2. Identify MUDA.	2.1 Plan of MUDA identification is prepared and implemented. 2.2 Causes and effects of MUDA are discussed. 2.3 ***Tools and techniques*** are used to draw and analyze current situation of the work place. 2.4 Wastes/MUDA are identified and measured based on ***relevant procedures***. 2.5 Identified and measured wastes are reported to relevant personnel.
3. Eliminate wastes/MUDA.	3. 1. Plan of MUDA elimination is prepared and implemented. 3. 2. Necessary attitude and ***the ten basic principles for improvement*** are adopted to eliminate waste/MUDA. 3. 3. Tools and techniques are used to eliminate wastes/MUDA based on the procedures and OHS. 3. 4. Wastes/MUDA are reduced and eliminated in accordance with OHS and organizational requirements. 3. 5. Improvements gained by elimination of waste/MUDA are reported to relevant bodies.
4. Prevent occurrence of wastes/MUDA.	4.1 Plan of MUDA prevention is prepared and implemented. 4.2 Standards required for machines, operations, defining normal and abnormal conditions, clerical procedures and procurement are discussed and prepared.

	4.3 Occurrences of wastes/MUDA are prevented by using ***visual and auditory control methods***. 4.4 Waste-free workplace is created using ***5W and 1H***sheet. 4.5 The completion of required operation is done in accordance with standard procedures and practices. 4.6 The updating of standard procedures and practices is facilitated. 4.7 The capability of the work team that aligns with the requirements of the procedure is ensured.

Variable	**Range**
OHS requirements	May include but not limited to: • Are to be in accordance with legislation/ regulations/codes of practice and enterprise safety policies and procedures. This may include protective clothing and equipment, use of tooling and equipment, workplace environment and safety, handling of material, use of fire fighting equipment, enterprise first aid, hazard control and hazardous materials and substances. • Personal protective equipment is to include that prescribed under legislation/regulations/codes of practice and workplace policies and practices. • Safe operating procedures are to include, but are not limited to the conduct of operational risk assessment and treatments associated with workplace organization. • Emergency procedures related to this unit are to include but may not be limited to emergency shutdown and stopping of equipment, extinguishing fires, enterprise first aid requirements and site evacuation.
Safety equipment and tools	May include but not limited to: • dust masks / goggles • glove • working cloth • first aid • safety shoes
Tools and techniques	May include but not limited to: • Plant Layout • Process flow • Other Analysis tools • Do time study by work element • Measure Travel distance • Take a photo of workplace • Measure Total steps • Make list of items/products, who produces them and who uses them & those in warehouses, storages etc.

	• Focal points to Check and find out existing problems • 5S • Layout improvement • Brainstorming • Andon • U-line • In-lining • Unification • Multi-process handling & Multi-skilled operators • A.B. control (Two point control) • Cell production line • TPM (Total Productive Maintenance)
Relevant procedures	May include but not limited to: • Make waste visible • Be conscious of the waste • Be accountable for the waste. • Measure the waste.
The ten basic principles for improvement	May include but not limited to: • Throw out all of your fixed ideas about how to do things. • Think of how the new method will work- not how it won. • Don't accept excuses. Totally deny the status quo. • Don't seek perfection. A 5o percent implementation rate is fine as long as it's done on the spot. • Correct mistakes the moment they are found. • Don't spend a lot of money on improvements. • Problems give you a chance to use your brain. • Ask "why?" at least five times until you find the ultimate cause. • Ten people's ideas are better than one person's. • Improvement knows no limits.
Visual and auditory control methods	May include but not limited to: • Red Tagging • Sign boards • Outlining • Andons • Kanban, etc.
5W and 1H	May include but not limited to: • Who • What • Where • When • Why • How

Evidence Guide	
Critical Aspects of	Demonstrates skills and knowledge to:

Competence	• discuss why wastes occur in the workplace • discuss causes and effects of wastes/MUDA in the workplace • analyze the current situation of the workplace by using appropriate tools and techniques • identify, measure, eliminate and prevent occurrence of wastes by using appropriate tools and techniques • use 5W and 1H sheet to prevent
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • Targets of customers and manufacturer/service provider • Traditional and kaizen thinking of price setting • Kaizen thinking in relation to targets of manufacturer/service provider and customer • value • The three categories of operations • the 3“MU” • waste/MUDA • wastes occur in the workplace • The 7 types of MUDA • The Benefits of identifying and eliminating waste • Causes and effects of 7 MUDA • Procedures to identify MUDA • Necessary attitude and the ten basic principles for improvement • Procedures to eliminate MUDA • Prevention of wastes • Methods of waste prevention • Definition and purpose of standardization • Standards required for machines, operations, defining normal and abnormal conditions, clerical procedures and procurement • Methods of visual and auditory control • TPM concept and its pillars. • Relevant Occupational Health and Safety (OHS) and environment requirements • Plan and report • Method of communication
Underpinning Skills	Demonstrates skills to: • draw & analyze current situation of the work place • use measurement apparatus (stop watch, tape, etc.) • calculate volume and area • use and follow checklists to identify, measure and eliminate wastes/MUDA • identify and measure wastes/MUDA in accordance with OHS and procedures • use tools and techniques to eliminate wastes/MUDA in accordance with OHS procedure

	• apply 5W and 1H sheet • update and use standard procedures for completion of required operation • work with others • read and interpret documents • observe situations • solve problems • communicate • gather evidence by using different means • report activities and results using report formats
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

NTQF Level IV

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Apply and Monitor Mine Operations Emergency Preparedness and Response Systems**
Unit Code	**MIN MPR4 01 0114**
Unit Descriptor	This unit covers applying and monitoring emergency preparedness and response systems in the underground coal mining operations. It includes: planning and preparing for the application of the plan; applying the plan; and applying routine plan maintenance procedures.

Elements	Performance Criteria
1. Plan and prepare for the application of the plan	1.1. ***Compliance documentation*** relevant to underground coal mine emergency preparedness and response systems is accessed, interpreted and applied. 1.2. The emergency preparedness and response plans are accessed, interpreted and explained. 1.3. Roles and responsibilities are identified and explained as specified in the emergency preparedness and response plans. 1.4. Work group and individual responsibilities and tasks are ***communicated*** and explained in an effective and timely manner. 1.5. ***Resources*** required for the application of the emergency preparedness and response plans are identified, obtained and allocated. 1.6. Individual training needs are identified.
2. Apply the plan	2.1. ***Incident*** information is received and communicated in accordance with the emergency plan. 2.2. The nature and scope of the incident are assessed and communicated in accordance with the emergency plan. 2.3. Emergency response and evacuation plans and procedures are applied and monitored in accordance with the emergency plan. 2.4. Procedures are applied for monitoring, recording and reporting on emergency incidents according to the emergency plan. 2.5. Apply procedures for the collection, analysis and validation of ***emergency preparedness and response data***. 2.6. Contribute to the management of the situation/incident in accordance with the emergency plan. 2.7. Action plans are applied and monitored in accordance with the emergency plans.

	2.8. Communicate incident information in accordance with the emergency plan. 2.9. Participate in ***audit*** and review requirements in accordance with the emergency plan as per site requirements.
3. Apply routine plan maintenance procedures	3.1. Inspections, equipment repair and maintenance activities are scheduled and carried out in accordance with the emergency preparedness and response plans. 3.2. Maintenance requirements / activities are recorded and reported in accordance with the emergency preparedness and response plans.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Communications	Can include: • radio/PED • telephone/DAC • telemetry • oral • written • computers • runners
Required services and resources	Can include, but are not limited to: • internal mine services and resources • contractors • local community • Inspectorate • police • Mines Rescue Service • fire brigades • ambulance • hospitals • critical incident stress debriefing organizations • media • district check inspector • other mines • entrapment procedures

Incidents	Can be caused by: • explosion • fire • strata failure • inrush • outburst • irrespirable atmosphere • environmental incident • hazardous chemicals • explosives • vehicle accidents • wind blast • failure of ventilation control devices/appliances
Types of incident	Can be identified as: • minor accident • major accident or fatality • underground explosion • fire • ignition • spontaneous combustion • surface fire which disrupts operations • environmental incidents • bomb threat • terrorist attack • high potential incidents • biological incidents • sabotage
Emergency preparedness and response data	May include: • gas levels and trends • change in temperature • change in ventilation • visibility • escape route conditions • status of caches, quick fill stations and first response stations • root cause of the emergency incident • status of communication equipment • status of monitoring equipment • location and condition of persons • hazards identified on escape
Audit	• Is defined as a systematic examination against defined criteria to determine whether activities and related results conform to planned arrangement, and whether these arrangements are implemented effectively and are suitable to achieve the organization's policy and objectives
Equipment	Refers to that needed to control the incident and includes but is not restricted to:

	• self escape and first response equipment • firefighting equipment • rescue equipment • mining equipment • transport • specialized equipment from external sources • monitoring and analysis equipment

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • knowledge of the requirements, procedures and instructions for applying and monitoring mineral processing emergency preparedness and response systems • implementation of appropriate procedures and techniques for the safe, effective and efficient application and monitoring of mineral processing emergency preparedness and response systems • working with others to plan, prepare, apply and monitor mineral processing emergency preparedness and response systems • provision of clear and timely instruction and supervision by the individual of those involved in mineral processing emergency preparedness and response systems • evidence of the consistent successful application and monitoring of mineral processing emergency preparedness and response systems
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • legislative and site requirements for emergency preparedness and response • audit and review processes and techniques • training and assessment principles • training systems • emergency response and evacuation planning processes and techniques • structure of emergency procedures guidelines • legal requirements of incident management teams • self escape, aided rescue and respond to incident philosophies, systems and equipment • risk management principles and techniques • structure of emergency organizations • intervention and control techniques for heating, fires, explosions, outburst, or inrushes • effects of heat and humidity • effects of visibility • escape strategies and technology • mine environmental risks and controls • equipment requirements for different types of emergency

	• ventilation and its influence on incidents • deployment of personnel underground under deputies control • procedure/policy for re-deployment of personnel underground after evacuation • call-out procedures • emotional effects of emergencies on rescuers and mine personnel • titles and roles of members of incident management team • the requirements and structure for place of safety/fresh air base • equipment handling • sealing procedures and the legislative implications
Underpinning Skills	Must demonstrate skills of: • apply legislative, organization and site requirements and procedures • access, interpret and apply technical information relevant to emergency preparedness and response • access, interpret and apply emergency preparedness and response information related to the mine • apply emergency preparedness and response systems and plans • collect, collate, interpret and report incident / emergency data • perform basic mathematical calculations • apply investigation and report preparation procedures • communicate effectively in the workplace • access, interpret and apply data from monitoring systems and equipment • operate hand held monitoring equipment • apply risk management processes and techniques • initiate the emergency preparedness and response training
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Apply, Monitor and Report on Compliance Systems**
Unit Code	**MIN MPR4 02 0114**
Unit Descriptor	This unit covers applying, monitoring and reporting on compliance systems in the mining industries. It includes identifying, sharing, planning and implementing legislation, codes, standards and business requirements; and monitoring, revising and reporting performance to ensure legal and contractual compliance.

Elements	Performance Criteria
1. Identify, share and implement legislation, codes, standards and business requirements	1.1. ***Compliance documentation*** relevant to the work activity including ***workplace legal compliance*** is accessed, interpreted and applied. 1.2. Information is provided in a language, style and format which are understood by colleagues. 1.3. Implications of non-compliance are clarified to all in the workplace.
2. Plan and implement legislation, codes, standards and business requirements	2.1. Systems of work with colleagues are planned to ensure compliance with ***legislation***, ***codes***, ***standards and business requirements***. 2.2. Systems of work are implemented with work colleagues to ensure compliance with legislation, codes, standards and business requirements. 2.3. Training needs of colleagues are identified and supported while managing the ***legal rights and responsibilities of the enterprise*** in which they work.
3. Monitor, revise and report performance to ensure legal and contractual compliance	3.1. Actual and potential problems are identified, revised and reported promptly to ensure legal and contractual compliance within the workplace. 3.2. Activities are managed to ensure maximum legal and contractual compliance resulting in the protection of business interests. 3.3. Recommendations on improvements are submitted to comply with legal and contractual requirements. 3.4. Contractual procurement rights are secured for goods and services and a business plan that is shared is supported with all members of the workplace. 3.5. Systems, records and reporting procedures are maintained.
4. Investigate and report non-compliance	4.1. Non-compliance is investigated and dealt with according to legislative requirements and enterprise policies and procedures.

	4.2. Training needs are identified and the training of colleagues is supported in the acquisition of competencies to meet legal requirements and the associated standards. 4.3. Training programs and workplace practices are implemented to ensure that non-compliance is not repeated.

Variable	**Range**
Compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Workplace legal compliance	May include: • requirements for the maintenance and confidentiality of records of non-compliance • requirements for the maintenance of records of breaches • provision of information and training • regulations and code of practice relating to hazards present in work area • site/work/groups representatives and committees • issue resolution
Legislation**,** codes**,** standards and business requirements	May include: • OHS • business registration • taxation • legal • insurance • environmental • business structure
Legal rights and responsibilities of the enterprise	May include: • marketing the business in accordance with consumer legislation • operating the business with a duty of care (Law of Torts) • obligations imposed by choice of business structure

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for applying, monitoring and reporting on compliance systems • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of compliance system requirements • working with others to plan, prepare and conduct compliance system requirements

	• evidence of the consistent successful application, monitoring and reporting on compliance systems
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • national, state/territory and local government legislative requirements affecting business operation • business registration and licensing requirements • legal rights and obligations of alternative ownership structures • relevant taxation and related legislative requirements and legal rights and responsibilities related to the business • bookkeeping and record keeping procedures to meet minimum financial and legal requirements • award and enterprise agreements, where required • industrial law relevant to recruitment and dismissal of employees • creation and termination of relevant legal contracts • duty of care imposed by the Law of Torts • work procedure/instruction writing in compliance with legal requirements and company policy
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements to compliance systems • display effective communication skills to report, consult and negotiate processes that satisfy legal requirements • display time management skills to prioritise tasks and meet targets • provide coaching and mentoring support • identify and clearly communicate key compliance issues
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Implement Work Place Information System**
Unit Code	**MINPRO4 03 0114**
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to implement the workplace information system. It involves the identification, acquisition, initial analysis and use of appropriate information, which plays a significant part in the organization's effectiveness.

Elements	Performance Criteria
1. Identify and source information needs.	1.1. ***Information*** required by teams is determined and located. 1.2. Information held by the organization is acquired and reviewed to determine suitability, accessibility, currency and reliability according to ***organizational policies***.
2. Collect, analyze and report information.	2.1. Information which is adequate and relevant to the needs of teams is collected in a timely manner. 2.2. Ensure information is collected in a format suitable for analysis, interpretation and dissemination. 2.3. Information is analyzed to identify and report relevant trends and developments in terms of the needs for which it was acquired.
3. Implement information systems.	3.1. Management information systems are implemented effectively to store, retrieve and regularly review data for decision making purposes. 3.2. ***Technology*** available in the work area is used to manage information effectively. 3.3. Recommendations are submitted for improving the information system to ***designated persons and/or groups***.
4. Prepare for information system changes.	4.1. Information about information system future needs is collected in consultation with ***colleagues***, including those who have a specialist role in resource management. 4.2. Estimates of information system future needs that reflect the organization's ***business plans***, and customer and supplier requirements are ensured. 4.3. Proposals are supported to secure resources by clearly presenting submissions that describe realistic options, benefits, costs and outcomes. 4.4. Team members are prepared to work with new technology and information system changes.

Variable	Range
Information	May include: • archived, filed and historical background data

	• continuous improvement and quality assurance data • data available internally or externally • data shared and retrieved in various forms such as in writing or verbally, electronically or manually • financial and contractual data • marketing and customer-related data • organizational performance data • planning and organizational documents • policies and procedures
Organizational policies	May include: • guidelines for decision making throughout the organization that link the formulation of strategy with its implementation • sets of accepted actions approved by the organization • Standard Operating Procedures
Technology	May include: • computerised systems and software such as databases, project management and word processing • telecommunications devices • any other technology used to carry out work roles and responsibilities
Designated persons and/or groups	May include: • groups designated in workplace policies and procedures • managers or supervisors with management roles and responsibilities concerning information systems • other stakeholders accessing the information system such as customers and service providers • other work groups or teams whose work will be affected by the system
Colleagues	May include: • employees at the same level or more senior managers • occupational health and safety committee members and other specialists • people from a range of social, cultural and ethnic backgrounds and with a range of physical and mental abilities • team members
Business plans	May include: • cash flow projections • long-term budgets/plans • operational plans • short-term budgets/plans • spreadsheet-based financial projections • targets or key performance indicators for production, productivity, wastage, sales, income and expenditure

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • analysis of the information that is required for the effective

	functioning of the team's work together • knowledge of the range of information systems that are, or should be, available in the workplace • ability to recognize what information system changes and improvements will be required in the future.
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • information management systems and technology that would be associated with the workplace such as: ➢ budgets and financial management systems ➢ customer information software or records ➢ databases ➢ Personal Digital Assistant (PDA) ➢ product and service information ➢ project management software ➢ record management systems ➢ spreadsheets.
Underpinning Skills	Must demonstrate of: • literacy skills to work with information, and to research and present information in ways that are appropriate to the work team • technology skills to work with a range of information systems.
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Carryout the Risk Management Processes**
Unit Code	**MIN PRO4 04 0114**
Unit Descriptor	This unit covers the skills and knowledge required to carry out risk management processes in the coal and mining industries. It includes: determining the risk management process; identifying hazards; assessing risk; identifying unacceptable risk and potential actions; deciding on, implementing or facilitating of actions; reviewing the implementation of action; auditing the risk management process; and completing records and reports.

Elements	Performance Criteria
1. Determine the risk management process	1.1. ***Compliance documentation*** relevant to carry out risk management processes is accessed, interpreted and applied. 1.2. The process to be used for ***risk management*** is identified and determined. 1.3. ***Parameters of the risk assessment task*** are identified, developed and documented. 1.4. The data required to complete the risk assessment task is accessed, interpreted and applied.
2. Identify hazards	2.1. Types of potential ***hazards*** are identified and confirmed by reference to site circumstances, history and/or precedence. 2.2. Process is broken into steps or parts for detailed hazard identification. 2.3. The defined process of any potential variations from changes is added to work practices, systems or technology. 2.4. The steps or parts of the process are analyzed, and ***loss scenarios*** identified and documented.
3. Assess risk	3.1. The ***likelihood*** of the loss scenario is determined. 3.2. The ***consequence*** is analyzed and determined if the loss scenario should occur. 3.3. The ***risk level*** of the loss scenario is determined.
4. Identify unacceptable risk	4.1. Site criteria is sourced or determined for assessing the ***acceptability of risks*** in conjunction with the appropriate party. 4.2. The risk level or score is determined by the application of the approved site criteria. 4.3. Findings which are ambiguous, unclear or of doubtful accuracy are clarified by seeking expert advice.
5. Identify potential actions	5.1. Existing controls are identified.

	5.2. The range of ***risk controls*** which may be appropriate for identified unacceptable risks are identified, analyzed and documented. 5.3. Possible options are identified for risk control by the use of the ***hierarchy of controls***, considering the potential for operational effectiveness. 5.4. Feasible options for risk control are verified by preliminary analysis and consideration, including potential to provide an integrated response to the range of issues.
6. Decide on action	6.1. Most appropriate risk controls for the situation are selected from the feasible options. 6.2. The selected course of action is confirmed following analysis of resource requirements, cost, safety and welfare issues within site constraints. 6.3. The selected course of action is documented.
7. Implement or facilitate action	7.1. The course of action is implemented directly, or facilitated through others. 7.2. All ***safety regulations and procedures*** are observed and applied. 7.3. Communicate to all involved parties relevant information related to the new/revised ***work procedures*** and their implementation in accordance with site requirements.
8. Review the implementation of action	8.1. An ongoing review process is determined and facilitated to ensure implementation and application of risk controls in accordance with risk assessment outcomes, new or revised work procedures and accident investigation outcomes. 8.2. Process, actions and controls are reviewed to ensure continuing effectiveness in the changing work environment. 8.3. Respond to, or refer to the appropriate party for follow-up action, anomalies and shortcomings identified during the review process.
9. Audit the risk management process	9.1. Audits of risk management processes and work procedures are conducted to ensure compliance and effectiveness. 9.2. Changed requirements identified during audits are responded in a systematic and timely manner. 9.3. All risk management documentation covering the reason for, and changes made are completed and retained.

Variable	**Range**
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures

	• manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Risk	Is defined as: • the chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and likelihood
Risk Management	Is defined as: • the systematic application of management policies, procedures and practices to the tasks of identifying, analyzing, assessing, treating and monitoring risk
Parameters of the risk management task	May include: • objectives • system boundaries • hazard and consequence type • methods/team processes • timing, venue/locations • consultation and communication processes
Risk Assessment	Is defined as: • the process used to determine risk management priorities by evaluating and comparing the level of risk against predetermined standards, target risk levels or other criteria
Hazards	Is defined as: • a source of potential harm or a situation with a potential to cause loss May involve: • equipment and materials • people • methods/plans/work systems • the work environment
Loss scenarios	May include: • hazards described as: ➢ incidents ➢ events or ➢ accidents
Likelihood	Is used as: • a qualitative description of probability and frequency
Consequence	Is defined as: • the outcome of an event or situation expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain
Risk level	Is determined by: • combination of likelihood and consequence
Risk Acceptance	Is defined as: • an informed decision to accept the likelihood and the consequences of a particular risk. The criteria for acceptability of risks must be determined by the organization's internal

	policy, goals and/or objectives
Risk Control	Is defined as: • that part of risk management which involves the provision of policies, standards and 2procedures to eliminate, avoid or minimize adverse risks facing an enterprise
Risk controls	May include: • those focussed on personal safety - e.g., personal protective equipment, medical standards, drug and alcohol, stress management, evacuation procedures, fitness for duty • those focussed on equipment/machinery safety - e.g., isolation, protection and guarding • hazard identification and monitoring • procedures for incident/emergency circumstances e.g. fire safety procedures, chemical safety procedures
Hierarchy of control	Should be considered using option types in sequence from: • eliminating the hazard • substitution • engineering controls • administrative controls (work procedures, etc), and finally • Personal Protective Equipment (PPE)
Safety regulations and procedures	May contain: • legislation and regulations • management plans • OHS policies • code of practice • manufacturer's instructions
Work procedures	May include: • Standard Operating Procedures (SOPs) • Safe Operating Procedures (SOPs) • Safe Work Procedures (SWPs) • Safe Job Procedures (SJPs)

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions to carry out the risk management processes • implementation of appropriate procedures and techniques for the safe, effective and efficient carrying out of risk management processes • working with others to plan, prepare and conduct risk management processes • provision of clear and timely instruction and supervision by the individual of those involved in carrying out the risk management processes • evidence of the consistent successful application in carrying out the risk management processes

Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • relevant site and equipment safety requirements • statutory and site rules, policies, procedures and regulations • the risk management process • risk assessment scoping methods • risk assessment methods including: • identifying hazards • assessing risks • determining acceptability of risks • identifying existing controls • determining adequacy of current controls • identifying new potential controls • risk management documentation and reporting methods used at a mine site • methods of identifying Risk Control actions based on cost, safety and welfare issues • action planning and implementation methods • review and auditing methods • basic human physiology • the effects of hazards on people's health and hygiene • causes and effects of common diseases and disabilities
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures risk management processes • read, interpret, apply and communicate technical information, procedures, regulations in the workplace • apply effective communication with a range of people in the workplace • facilitate a group of people to achieve a required outcome • apply interview processes • facilitate and document scoping sessions for risk assessment • facilitate risk assessment exercises • participate in a risk assessment as team members • apply proactive hazard identification • apply hazard analyze to identify and score the risk • select the appropriate treatments reduce unacceptable risk • apply Risk Assessment documentation requirements • apply Risk Management documentation requirements and procedures • maintain relevant records and documents • audit systems for compliance and effectiveness, and recommend changes to improve effectiveness • monitor and recommend changes to processes • identify hazards which may have acute and long-term effects on people

Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Monitor and Coordinate Waste and Process Water Treatment**
Unit Code	**MIN MPR4 05 0114**
Unit Descriptor	This unit covers monitoring and coordinating of waste and process water treatment in the mineral processing industry. It includes: monitoring treatment plant performance; controlling chemical use; monitoring and controlling processes; and compiling process records.

Elements	Performance Criteria
1. Monitor treatment plant performance	1.1. ***Compliance documentation*** relevant to the monitoring and coordinating of waste and process water treatment is accessed, interpreted and applied. 1.2. Routine plant ***inspections*** are carried out. 1.3. Samples are collected and ***process tests*** are conducted and analyzed to determine performance against plant operational requirements. 1.4. ***Process data*** is collected, interpreted, recorded and reported. 1.5. Calculations are conducted to determine ***process*** performance.
2. Control chemical use	2.1. Chemicals are used, handled and stored in accordance with organizational and statutory requirements. 2.2. Chemical dosing is determined, prepared and conducted in accordance with plant processes. 2.3. Information related to chemical supply and usage is maintained.
3. Monitor and control processes	3.1. Processes are monitored to maintain parameters of operation. 3.2. Process faults and operational condition of plant are identified and reported. 3.3. Integrated processes are adjusted to optimize system performance. 3.4. ***Records*** and reports from plant and system data are compiled.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy
Inspection	May include: • interaction and communication with other employees, authorities, general public • visual observation

	• implementation of reporting procedures, which may also include procedures for implementation of by-laws, organizational policy, statutory requirements
Process tests	May include: • gravimeteric analysis • spectrophotometric analysis • volumetric analysis • digestion techniques • ion selective electrodes • microscopy and routine jar testing • microbiology • settling tests • microscopic observation • single bugger pH • dissolved oxygen • chlorine residuals
Process data	May include: • plant performance data • environmental reports • chemical usage
Process	May include: • pre-treatment (e.g. screens, grit removal, shredding, odour control) • primary treatment (e.g. primary sedimentation) • secondary treatment (e.g. tickling filters, rotating biological contractors, activated sludge and lagoon systems) • solids handling (e.g. aerobic or anaerobic digesters and sludge disposal) • disinfection (e.g. maturation ponds, chlorination, ultraviolet irradiation, osonation) • tertiary treatment (e.g. chemical nitrogen removal, biological nitrogen removal, biological phosphorus removal)
Process records	May include: • plant performance data • environmental reports • chemical usage

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for the monitoring and coordinating of waste and process water treatment • implementation of appropriate procedures and techniques for the safe, effective and efficient monitoring and coordinating of waste and process water treatment • working with others to plan, prepare and conduct waste and process water treatment • provision of clear and timely instruction and supervision by the

	individual of those involved in waste and process water treatment • evidence of the consistent successful monitoring and coordinating of waste and process water treatment
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • water system hydraulics • system layout • lock out procedures for mechanical and electrical installations • policies and procedures and legislation • relevant utilities and service bodies • communication systems • materials handling • environmental, landscape, ground structure of work area • risk factors and potential hazards • equipment operation, capacity and limitations • effect of weather and conditions on operation of site or plant • mathematical calculations • pipes and fittings/pumping and valve systems • mechanical and electrical control systems • shutdown and recharging requirements • chemical usage
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • use electronic monitoring and metering systems • use manual chart recording systems • use laboratory testing and sampling equipment • use computerized equipment • operate communication equipment • interpret reports • apply procedures for identifying and managing hazards • apply hazardous goods handling techniques and management • apply lifting techniques (manual, cranes and loads) • apply records maintenance requirements • apply safe work practices • use hand and power tools
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Implement Operational Plan**
Unit Code	**MIN MPR4 06 0114**
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to implement the operational plan by monitoring and adjusting operational performance, producing short term plans for the department/section, planning and acquiring resources and providing reports on performance as required.

Elements	Performance Criteria
1. Implement operational plan	1.1. Details of ***resource requirements*** are collated, analyzed and organized in consultation with ***relevant personnel***, ***colleagues and specialist resource managers***. 1.2. ***Operational plans*** are implemented to contribute to the achievement of organization's performance/business plan. 1.3. ***Key Performance Indicators*** (KPIs) are identified and used to monitor operational performance. 1.4. ***Contingency planning*** and ***consultation processes*** are undertaken. 1.5. Assistance in the development and presentation of proposals is provided for resource requirements in line with operational planning processes.
2. Implement resource acquisition	2.1. Employees are recruited and inducted within ***organization's policies***, ***practices and procedures***. 2.2. Plans are implemented for acquisition of physical resources and services within organization's policies, practices and procedures and in consultation with relevant personnel.
3. Monitor operational performance	3.1. ***Performance systems and processes*** are monitored to assess progress in achieving profit/productivity plans and targets. 3.2. Budget and actual financial information is analyzed and used to monitor profit/productivity performance. 3.3. Unsatisfactory performance is identified and prompt action taken to rectify the situation according to organizational policies. 3.4. Mentoring, coaching and supervision are provided to support individuals and teams to use resources effectively, economically and safely. 3.5. Recommendations for variation to operational plans are presented to the ***designated persons/groups*** and approval is gained. 3.6. ***Systems***, ***procedures and records*** associated with performance are implemented in accordance with organization's requirements.

Variable	Range
Resource requirements	May refer to: • goods and services to be purchased and ordered • human, physical and financial resources - both current and projected • stock requirements and requisitions
Relevant personnel**,** colleagues and specialist resource managers	May include: • colleagues and specialist resource managers • managers • occupational health and safety committees and other people with specialist responsibilities • other employees • people from a wide range of social, cultural and ethnic backgrounds, and people with a range of physical and mental abilities • supervisors
Operational plans	May refer to: • organizational plans • tactical plans developed by the department or section to detail product and service performance
Key performance indicators	May refer to: • measures for monitoring or evaluating the efficiency or effectiveness of a system, and which may be used to demonstrate accountability and to identify areas for improvements
Contingency planning	May refer to: • contracting out or outsourcing human resources and other functions or tasks • diversification of outcomes • finding cheaper or lower quality raw materials and consumables • increasing sales or production • recycling and re-use • rental, hire purchase or alternative means of procurement of required materials, equipment and stock • restructuring of organization to reduce labour costs • risk identification, assessment and management processes • seeking further funding • strategies for reducing costs, wastage, stock or consumables • succession planning
Consultation processes	May refer to: • mechanisms used to provide feedback to the work team in relation to outcomes of consultation • meetings, interviews, brainstorming sessions, email/intranet communications, newsletters or other processes and devices which ensure that all employees have the opportunity to

	contribute to team and individual operational plans
Organization's policies, practices and procedures	May include: • organizational culture • Standard Operating Procedures • organizational guidelines which govern and prescribe operational functions, such as the acquisition and management of human and physical resources • undocumented practices in line with organizational operations
Performance systems and processes	May refer to: • informal systems used by frontline managers for the work team in the place of existing organization-wide systems • formal processes within the organization to measure performance, such as: ➢ feedback arrangements ➢ individual and teamwork plans ➢ KPIs ➢ specified work outcomes
Designated persons/groups	May include: • other affected work groups or teams and groups designated in workplace policies and procedures • those who have the authority to make decisions and/or recommendations about operations such as workplace supervisors, other managers
Systems, procedures and records	May include: • databases and other recording mechanisms for ensuring records are kept in accordance with organizational requirements • individual and team performance plans • organizational policies and procedures relative to performance

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • ability to monitor and adjust operational performance, produce short-term plans for the department or section, plan and acquire resources, and provide reports on performance as required • knowledge of principles and techniques associated with monitoring and implementing operations and procedures.
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • principles and techniques associated with: ➢ contingency planning ➢ methods for monitoring and reporting on performance ➢ monitoring and implementing operations and procedures ➢ problem identification and methods of resolution ➢ relevant budgeting and financial analysis, interpretation and reporting requirements ➢ resource management systems at the tactical

	implementation level ➢ resource planning and acquisition ➢ tactical risk analysis including identification and reporting requirements.
Underpinning Skills	Must demonstrate skills of: • coaching and mentoring skills to provide support to colleagues • literacy skills to access and use workplace information, and to prepare reports • planning and organizing skills to monitor performance and to sequence work of self and others to achieve planned outcomes.
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Analyze Data and Report Results**
Unit Code	**MIN MPR4 07 0114**
Unit Descriptor	This unit of competency covers the ability to perform scientific calculations, analyze trends and uncertainty in data and report results within the required timeframe.

Elements	Performance Criteria
1. Perform scientific calculations	1.1. Raw data are ensured to be consistent with expectations and reasonable ranges. 1.2. Scientific quantities involving algebraic, power, exponential and/or logarithmic functions are calculated. 1.3. Calculated quantities are ensured to be consistent with estimations. 1.4. Results are presented using the appropriate units, uncertainties and number of significant figures.
2. Analyze trends and relationships in data	2.1. Linear and non-linear relationships between sets of data are determined. 2.2. Control charts are prepared and analyzed to determine if a process is in control. 2.3. Possible causes are identified for out-of-control condition. 2.4. Enterprise procedures are followed to return process to in-control operation.
3. Determine variation and/or uncertainty in data distributions	3.1. Raw data is organized into appropriate frequency distributions. 3.2. Means, medians, modes, ranges and standard deviations are calculated for ungrouped and grouped data. 3.3. Frequency distributions are interpreted to determine the characteristics of the sample or population. 3.4. Standard deviations and confidence limits are calculated for means and replicates. 3.5. The uncertainty in measurements is estimated using statistical analysis. 3.6. Data acceptability is determined using statistical tests and enterprise procedures.
4. Check for aberrant results	4.1. Results that cannot be reconciled are identified with sample, sample documentation, testing procedures and/or expected outcomes. 4.2. Appropriate actions are determined in consultation with supervisor as required.

5. Report results	5.1. Charts, tables and graphs are used to present results in the required format. 5.2. Entry of data and results is verified to be correct. 5.3. Reports are prepared in a format and style consistent with their intended use and enterprise guidelines. 5.4. Results are communicated within the specified time and in accordance with enterprise confidentiality and security guidelines.

Variable	**Range**
Data records	May include: • worksheets • spreadsheets or databases linked to information management systems • the results of tests, measurements, analyzes and surveys
Scientific and technical terminology	May include: • variables • dispersion • central tendency • process control • process stability • normal distribution • confidence level • replication
Laboratory computations	May include: • algebraic, logarithmic, exponential and power functions • calculations involving fractions, decimals, ratios, proportions and percentages • evaluation of formulae containing powers, exponents and logarithms functions • use of scientific notation, correct units and correct number of significant figures • calculation of uncertainties • preparation and interpretation of linear, semi-log and log-log graphs • calculation and interpretation of statistical quantities, such as mean, median, mode, range, variance and standard deviation • determination of regression line equations and correlation coefficients • preparation and interpretation of more complex control charts and frequency distribution plots

Calculations of scientific quantities	May include: • percentage and absolute uncertainties in measurements and test results • dose (mg), dilution(1:10), concentration (molarity, g/mL, mg/L, ppm, ppb) • pH, [H+], [OH-], buffer calculations, Ka, pKa, Kb, pKb, Kw • solubility constants Ks, pKs • radioactivity: ➢ half life, dose, activity and exposure • optical properties: ➢ absorbance/transmittance, path length, extinction coefficient, concentration (Beers law) and detection limits • electrical properties: ➢ conductivity, resistivity and dielectric constants • mechanical properties: ➢ stress, strain, elastic moduli, yield strength and hardness • thermal properties: ➢ heat capacity, thermal expansion, thermal conductivity and thermal resistance • food content (%) of water, ash, dietary and crude fibre, carbohydrate, protein, fat and specific vitamin • quantities associated with quality control monitoring, assessment and reporting
Graphical analysis	May include: • determination of linear, logarithmic, exponential and power relationships • regression lines and interpretation of correlation coefficients • preparing frequency distributions for given data • calculating and interpreting measures of central tendency and dispersion
Calculations	May be performed: • with a calculator • without a calculator • with computer software such as: ➢ spreadsheets ➢ databases ➢ statistical packages
Statistical analysis	May include the use of: • histograms, frequency plots, stem and leaf plots, boxplots and scatter plots • probability and normal probability plots • Pareto diagrams, Stewhart control charts and CuSum control charts • regression methods for calibration, linearity checks and comparing analytical methods • analysis of variance (ANOVA) • data acceptability tests, such as Q, T and Youden

Records	May include information associated with: • purchase of equipment and materials • service records • safety procedures • history of calibration and test results
Occupational Health and Safety (OHS) and environmental management requirements	OHS and environmental management requirements: • all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through state/territory or federal legislation - these requirements must not be compromised at any time • all operations assume the potentially hazardous nature of samples and require standard precautions to be applied • where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • store, retrieve and manipulate data following document traceability procedures • calculate scientific quantities relevant to their work and present accurate results in the required format • analyze data to determine relationships between variables • prepare frequency distributions for given data, calculate and interpret measures of central tendency and dispersion • prepare and interpret control charts and take appropriate actions • maintain the security and confidentiality of data in accordance with workplace and regulatory requirements • report results in the required formats and expected timeframe.
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • relevant scientific and technical terminology such as: variables, dispersion, central tendency, process control, process stability, normal distribution, confidence level and replication • calculations involving evaluation of formulae containing algebraic, power, exponential and/or logarithmic functions • preparation and interpretation on linear and non-linear graphs, complex control charts and frequency distribution plots • determination of regression line equations, correlation coefficients • statistical analysis and significance tests, such as t-test, f-test, analysis of variance (ANOVA) • data acceptability tests, such as Q, T and Youden • the characteristics of a valid measurement • relevance/importance of the national measurement legislation

	and guidelines to laboratory measurement • sources and estimates of uncertainty in measurements • procedures for data traceability • procedures for verifying data and rectifying mistakes • procedures for maintaining and filing records, and maintaining security of data
Underpinning Skills	Must demonstrate skills of: • performing laboratory computations • calculating scientific quantities • statistical analysis • graphical analysis • reporting results in the required formats and expected timeframe • storing, retrieving and manipulating data following document traceability procedures • maintaining the security and confidentiality of data in accordance with workplace and regulatory requirements
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Participate in Commission/ Recommission Plant**
Unit Code	**MIN MPR4 08 0114**
Unit Descriptor	This unit covers the commissioning and recommissioning of plant in the mineral processing industry. It includes: contributing to the design of plant and/or equipment; participating in hazard and operability studies; participating in acceptance of plant and/or equipment; conducting test runs and/or trials; evaluating the results and identify modifications.

Elements	Performance Criteria
1. Contribute to the design of plant/equipment	1.1. ***Compliance documentation*** relevant to commissioning and recommissioning of plant is accessed, interpreted and applied. 1.2. Process understanding is applied to the design process. 1.3. The role and purpose of the plant and equipment are identified. 1.4. Design is ensured to be meeting the identified need.
2. Participate in hazard and operability studies	2.1. Process conditions are identified and applied to ***hazard*** and operability studies. 2.2. Investigations are undertaken by following hazard studies. 2.3. Findings are recorded and reported.
3. Participate in acceptance of plant/equipment	3.1. Pre-commissioning activities are undertaken. 3.2. Safety acceptance ***documentation*** is completed. 3.3. Problems or non-conformances are identified, recorded and reported.
4. Conduct test runs/trials	4.1. Trials/test runs are conducted. 4.2. Performance data is recorded and reported.
5. Evaluate results and identify modifications	5.1. Modifications and improvements required are identified. 5.2. Documentation is completed and reported to appropriate personnel.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans • OHS policy

Hazards	May include: • rail and road movement • cranes • molten metal • hot materials • noise • air pollution • sharp objects • moving machinery • heights • falling objects • gases
Documentation	May include: • tonnages • quality • analysis/testing • identity • tracking

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for the commissioning and recommissioning of plant • implementation of appropriate procedures and techniques for the safe, effective and efficient commissioning or recommissioning of plant • working with others to plan, prepare and conduct commission or recommission plant • provision of clear and timely instruction and supervision by the individual of those involved in commissioning or recommissioning of plant • evidence of the consistent successful commissioning or recommissioning of plant
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • HAZOP study process and the interpretation of findings • results and impact of a HAZAN study • the process of hazard identification, risk assessment and control • hierarchy of control • sources of hazard information (such as material safety data sheets) • principles of operation of equipment • interpretation of design drawings, schematics and manuals • principles of operation of instrumentation • principles of basic control systems • distinguish between the following problem sources, and their avoidance:

	➢ chemical ➢ instrument ➢ equipment (electrical/mechanical) • maintenance as is relevant to the practical operation of equipment at that job level • identifying and clearly communicating key issues
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • apply policy management procedures • liaise with other parties • coordinate others • manage information • apply problem solving techniques • apply clear report writing techniques • access, interpret and apply technical and safety information • communicate and coordinate activities with others • apply plant and equipment record keeping requirements and procedures • apply diagnostic/faultfinding techniques • apply environmental compliance requirements and procedures • apply task analyzes • apply atmospheric contaminant measure requirements and procedures • apply First Aid • apply fire fighting techniques • apply negotiation procedures with employers and employees • provide information, instruction, training and supervision • apply procedures for proposing practical recommendations for identified key issues
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Manage Plant Shutdown and Restart**
Unit Code	**MIN MPR4 09 0114**
Unit Descriptor	This unit covers the co-ordination of the shutdown and restarting of a production process in a safe and efficient manner due to a planned or an unplanned shutdown or emergency situation. It does not apply to individual plant operators shutting down individual production units or following directions during a shutdown, as this is included in the normal unit of competency for operating that production unit.

Elements	Performance Criteria
1. Manage shutdown sequence.	1.1. Safety systems are checked and verified to ensure that the unit has been made safe. 1.2. The reason for, or ***cause of the shutdown*** is identified by troubleshooting the system and by utilizing all available data and information systems. 1.3. Confirmation of the identified shutdown is obtained from field based operators to verify both the nature and the reliability of the shutdown. 1.4. Procedures are rectified or initiated to rectify the fault or shutdown cause through either repair of the operational fault or readjustment before returning the system to start-up status.
2. Conduct start-up process.	2.1. All start-up permissives are satisfied prior to start- up process being commenced. 2.2. Start-up is conducted according to ***procedures*** and in a safe and efficient manner, ensuring a return to steady state operation is achieved.
3. Document shutdown and start-up process.	3.1. All logs and workplace documentation relating to the shutdown/start-up process, ensuring all details, actions and responses are accurately recorded. 3.2. Any further ongoing production problems are recorded and reported to appropriate persons or authority.

Variable	Range
Causes of shutdown	May be: • planned, e.g. for maintenance or other planned work • unplanned, e.g. in response to a plant upset or equipment failure • emergency, e.g. in response to an automatic shutdown sequence or plant trip. The shutdown may be: • shutdown 'to cold', e.g. complete plant shutdown and purging of all process materials from equipment • short shutdown to allow minor work 'warm shutdown', e.g. partial shutdown, with retention of some or all of process materials

	• managing a plant trip and restart 'hot shutdown', e.g. short duration shutdown in response to a plant upset or trip This competency also includes: • coordinating the shift team • implementing emergency procedures • using the permit to work system (for repairs required). • This competency may apply to: • panel technicians • outside technicians • technicians seconded to a shut down role • other relevant personnel All operations are performed according to procedures.
Procedures	Procedures may be written, verbal, computer-based or in some other form. They include: • all work instructions • standard operating procedures • formulas/recipes • batch sheets • temporary instructions • any similar instructions provided for the smooth running of the plant.
Appropriate action	Appropriate action includes: • determining problems needing action • determining possible fault causes • rectifying problem using appropriate solution within area of responsibility • following through items initiated until final resolution has occurred • reporting problems outside area of responsibility to designated person.
Health, Safety and Environment (HSE)	• All operations to which this unit applies are subject to stringent health, safety and environment requirements, which may be imposed through State or Federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between Performance Criteria and HSE requirements, the HSE requirements take precedence.

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • early warning signs of equipment/processes needing attention or with potential problems are recognized • the range of possible causes can be identified and analyzed and the most likely cause determined • appropriate action is taken to ensure a timely return to full performance • obvious problems in related plant areas are recognized and an appropriate contribution made to their solution.

Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • principles of operation of plant/equipment • physics and chemistry relevant to the process unit and the materials processed • process parameters and limits, e.g. temperature, pressure, flow, pH • duty of care obligations • hierarchy of control • communication protocols, e.g. radio, phone, computer, paper, permissions/authorities • routine problems, faults and their resolution • relevant alarms and actions • plant process idiosyncrasies • all items on a schematic of the plant item and the function of each • correct methods of starting, stopping, operating and controlling process • corrective action appropriate to the problem cause • function and troubleshooting of major components and their problems • types and causes of problems within operator's scope of skill level and responsibility. • architecture of the process/production systems • the plant • product specifications and tolerances • systems operating parameters • process control philosophies and strategies • the process • emergency shutdown procedures • physics, chemistry and mathematics relevant to the process • outside process knowledge and equipment operation • as is relevant to the practical operation of equipment at that job level.
Underpinning Skills	Must demonstrate skills of: • efficient and effective planning of shut down/start up • hazard analysis • completing plant records • communication • problem solving
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Coordinate Implementation of Customer Service Strategies**
Unit Code	**MIN MPR4 10 0114**
Unit Descriptor	This unit describes the performance outcomes, skills and knowledge required to advise on, carry out and evaluate customer service strategies, including the design of improvement strategies based on feedback. Operators may have responsibility to provide guidance or to delegate aspects of these tasks to others.

Elements	Performance Criteria
1. Advise on customer service needs	1.1 ***Customer needs*** are clarified and accurately assessed using appropriate ***communication techniques***. 1.2 Problems matching service delivery is diagnosed to ***customers*** and options developed for improved service within ***organizational requirements***. 1.3 Relevant and constructive advice is provided to promote the improvement of customer service delivery. 1.4 ***Business technology*** and/or ***online services*** is/are used to structure and present information on customer service needs.
2. Support implementation of customer service strategies	2.1 Ensure customer service strategies and opportunities are promoted to ***designated individuals and groups***. 2.2 Available budget resources are identified and allocated to fulfill customer service objectives. 2.3 ***Procedures*** are promptly used to resolve customer difficulties and ***complaints*** within organizational requirements. 2.4 Ensure that decisions are taken to implement ***strategies*** in consultation with designated individuals and groups.
3. Evaluate and report on customer service	3.1 Client satisfaction is reviewed with service delivery using verifiable data in accordance with organizational requirements. 3.2 Changes necessary to maintain service standards are identified and reported to designated individuals and groups. 3.3 Conclusions and recommendations are prepared from verifiable evidence and constructive advice on future directions of client service strategies is provided. 3.4 Systems, records and reporting procedures are maintained to compare changes in customer satisfaction.

Variable	Range
Customer needs	May relate to: • accuracy of information

	• advice or general information • complaints • fairness/politeness • further information • making an appointment • prices/value • purchasing organization's products and services • returning organization's products and services • specific information.
Communication techniques	May include: • analyzing customer satisfaction surveys • analyzing quality assurance data • conducting interviews • consultation methods, techniques and protocols • making recommendations • obtaining management decisions • questioning • seeking feedback to confirm understanding • summarising and paraphrasing.
Customers	May include: • corporate customers • individual members of the organization • individual members of the public • internal or external • other agencies.
Organizational requirements	May include: • access and equity principles and practice • anti-discrimination and related policy • confidentiality and security requirements • defined resource parameters • ethical standards • goals, objectives, plans, systems and processes • legal and organizational policies, guidelines and requirements • OHS policies, procedures and programs • payment and delivery options • pricing and discount policies • quality and continuous improvement processes and standards • quality assurance and/or procedures manuals • replacement and refund policy and procedures • who is responsible for products or services.
Business technology	May include: • answering machine • binder • computer • fax machine • photocopier

	• printer • shredder • telephone.
Online services	May include: • access to product database by customers online • access to purchase, delivery and account records • contact centre • online ordering • online payments • online registration • quick/reasonable response • two-way communication online.
Designated individuals and groups	May include: • colleagues • committee • customers • external organization • line management • supervisor.
Procedures	May include: • external agencies (e.g. Ombudsman) • item replacement • referrals to supervisor • refund of monies • review of products or services • using conflict management techniques.
Customer complaints	May include: • administrative errors such as incorrect invoices or prices • customer satisfaction with service quality • damaged goods or goods not delivered • delivery errors • products not delivered on time • service errors • specific e-business problems and issues: ➢ difficulty accessing services ➢ inactive links ➢ not appreciating differing hardware and software ➢ services not available ➢ supply errors such as incorrect product delivered ➢ time taken to access services ➢ unfriendly website design ➢ website faults • warehouse or store room errors such as incorrect product delivered.
Strategies	May include: • courtesy/politeness

	• delivery times • merchandise characteristics • price offers • product/refund guarantees • product/service availability.

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • identifying needs and priorities of the organization in delivering services to customers • responding to and reporting on customer feedback • designing strategies to improve delivery of products and services • knowledge of the principles of customer service.
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • key provisions of relevant legislation from all levels of government that may affect aspects of business operations, such as: ➢ anti-discrimination legislation ➢ ethical principles ➢ codes of practice ➢ privacy laws ➢ environmental issues ➢ Occupational Health and Safety (OHS) • principles of customer service • organizational business structure, products and services • product and service standards and best practice models.
Underpinning Skills	Must demonstrate: • communication skills to ➢ communicate effectively with personnel and clients at all levels ➢ articulate customer service strategies • interpersonal skills to: ➢ build relationships with customers ➢ establish rapport • literacy skills to: ➢ prepare general information and papers ➢ read a variety of texts ➢ write formal and informal letters according to target audience • planning skills to develop implementation schedules • problem-solving skills to diagnose organizational problems relating to customer services • self-management skills to: ➢ comply with policies and procedures

	➢ consistently evaluate and monitor own performance ➢ seek learning opportunities.
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Supervise Mobile Plant Operations**
Unit Code	**MIN MPR4 11 0114**
Unit Descriptor	This unit covers supervising mobile plant operations in the mineral processing industries. It includes: planning, preparing for and initiating, monitoring, adjusting and reporting on execution of the operations.

Elements	Performance Criteria
1. Plan, prepare for and initiate the operations	1.1. Access, interpret, apply and share with team members' ***compliance documentation*** relevant to ***mobile plant operations***. 1.2. Access and share with team members the ***geological and survey data*** required to complete the mobile plant operations. 1.3. Prepare an action plan, in consultation with team members, which makes best use of the available resource and meets the site operational requirements. 1.4. Acquire and make available the necessary ***resources*** for the safe, effective and efficient conduct of mobile plant operations. 1.5. Issue clear and timely ***instructions*** to team members and others involved for the safe, effective and efficient conduct in the mobile plant operations to meet site operational requirements.
2. Monitor, adjust and report on execution of the operations	2.1. Ensure safe, effective and efficient execution of plant operational tasks. 2.2. Monitor operations performance to ensure achievement of planned outcomes. 2.3. Initiate adjustments to work programs to take into account non-achievement of planned outcomes. 2.4. Complete and submit reports. 2.5. Recommend changes to improve the safety, efficiency and effectiveness of the mobile plant operations.

Variable	Range
Relevant compliance documentation	May include: • legislative, organizational and site requirements and procedures • manufacturer's guidelines and specifications • Ethiopian standards • management plans

	• OHS policy
Mobile plant operations	May cover: • land clearing • overburden stripping and stockpiling • face loading • raw feed haul and dumping • sales loading • raw feed and product stockpiling • road, pavement, drainage and dam construction and maintenance • rehabilitation and environmental works • raw feed and product blending • tailings deposition and treatment
Geological data	May include relevant site-specific information in relation to: • rock and soil type and characteristics • faults and joints • water tables or other water sources
Survey data	May include relevant site-specific information in relation to: • floor heights • bench widths • grades
Resources	May include: • labour • materials • services • equipment
Instructions may be issued in briefings, handovers, and work orders and	May include: • nature and scope of tasks • achievement targets • refuelling arrangements • operational conditions • obtaining permits required • site layout • out of bounds areas • worksite inspection requirements, • plant or equipment defects • hazards and potential hazards • coordination requirements or issues

Evidence Guide	
Critical Aspects of Competence	Must demonstrate knowledge and skills of: • the requirements, procedures and instructions for the supervising mobile plant operations • implementation of appropriate procedures and techniques for the safe, effective and efficient supervision of mobile plant operations

	• working with others to plan, prepare and conduct mobile plant operations • provision of clear and timely instruction and supervision by the individual of those involved in mobile plant operations • evidence of the consistent successful supervision of mobile plant operations
Underpinning Knowledge and Attitudes	Must demonstrate knowledge of: • risk, statutory compliance, health, safety, environmental, quality and communication requirements and procedures • site operational requirements • team leadership techniques • operational techniques required for execution of the mobile plant tasks • plant and equipment capabilities • work planning techniques • work monitoring methods
Underpinning Skills	Must demonstrate skills to: • apply legislative, organization and site requirements and procedures • provide team leadership • apply procedures to choose appropriate operational techniques • apply procedures to choose and assign appropriate plant and equipment • apply procedures to develop and administer work plans
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessing through: • Interview / Written Test • Observation / Demonstration and Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Plan and Organize Work**
Unit Code	**MIN MPR4 12 0114**
Unit Descriptor	This unit covers the knowledge, skills and attitude required in planning and organizing work activities in a production application. It may be applied to a small independent operation or to a section of a large organization.

Elements	Performance Criteria
1. Set objectives	1.1 ***Objectives*** are planned consistent with and linked to work activities in accordance with organizational aims. 1.2 Objectives are stated as measurable targets with clear time frames. 1.3 Support and commitment of team members are reflected in the objectives. 1.4 Realistic and attainable objectives are identified.
2. Plan and schedule work activities	2.1 Tasks/work activities to be completed are identified and prioritized as directed. 2.2 Tasks/work activities are broken down into steps in accordance with set time frames and achievable components. 2.3 Task/work activities are assigned to appropriate team or individuals in accordance with agreed functions. 2.4 ***Resources*** are allocated as per requirements of the activity. 2.5 ***Schedule of work activities*** is coordinated with personnel concerned.
3. Implement work plans	3.1 ***Work methods and practices*** are identified in consultation with personnel concerned. 3.2 ***Work plans*** are implemented in accordance with set time frames, resources and ***standards***.
4. Monitor work activities	4.1 Work activities are monitored and compared with set objectives. 4.2 Work performance is monitored. 4.3 Deviations from work activities are reported and recommendations are coordinated with appropriate personnel and in accordance with set standards. 4.4 Reporting requirements are complied with in accordance with recommended format. 4.5 Timeliness of report is observed. 4.6 Files are established and maintained in accordance with standard operating procedures.

5. Review and evaluate work plans and activities	5.1 Work plans, strategies and implementation are reviewed based on accurate, relevant and current information. 5.2 Review is done based on comprehensive consultation with appropriate personnel on outcomes of work plans and reliable feedback. 5.3 Results of review are provided to concerned parties and formed as the basis for adjustments/simplifications to be made to policies, processes and activities. 5.4 Performance appraisal is conducted in accordance with organization rules and regulations. 5.5 Performance appraisal report is prepared and documented regularly as per organization requirements. 5.6 Recommendations are prepared and presented to ***appropriate personnel/authorities***. 5.7 ***Feedback mechanisms*** are implemented in line with organization policies.

Variable	**Range**
Objectives	May include but not limited to: • Specific • General
Resources	May include but not limited to: • Personnel • Equipment and technology • Services • Supplies and materials • Sources for accessing specialist advice • Budget
Schedule of work activities	May include but not limited to: • Daily • Work-based • Contractual • Regular May include but not limited to: • Daily • Work-based • Contractual • Regular
Work methods and practices	May include but not limited to: • Legislated regulations and codes of practice • Industry regulations and codes of practice • Occupational health and safety practices
Work plans	May include but not limited to: • Daily work plans • Project plans • Program plans • Resource plans • Skills development plans • Management strategies and objectives

Standards	May include but not limited to: • Performance targets • Performance management and evaluation systems • Occupational standards • Employment contracts • Client contracts • Discipline procedures • Workplace assessment guidelines • Internal quality assurance • Internal and external accountability and auditing requirements • Training Regulation Standards • Safety Standards
Appropriate personnel/ authorities	May include but not limited to: • Appropriate personnel include: • Management • Line Staff
Feedback mechanisms	May include but not limited to: • Verbal feedback • Informal feedback • Formal feedback • Questionnaire • Survey • Group discussion

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • set objectives • plan and schedule work activities • implement work plans • monitor work activities • review and evaluate work plans and activities
Underpinning Knowledge and Attitudes	Demonstrates knowledge of: • organization's strategic plan, policies rules and regulations, laws and objectives for work unit activities and priorities • organizations policies, strategic plans, guidelines related to the role of the work unit • team work and consultation strategies
Underpinning Skills	Demonstrates skill of: • planning • leading • organizing • coordinating • communication skills • inter-and intra-person/motivation skills • presentation skills
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information

	on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Migrate to New Technology**
Unit Code	**MIN MPR4 13 0114**
Unit Descriptor	This unit defines the competence required to apply skills and knowledge in using new or upgraded technology. The rationale behind this unit emphasizes the importance of constantly reviewing work processes, skills and techniques in order to ensure that the quality of the entire business process is maintained at the highest level possible through the appropriate application of new technology. To this end, the person is typically engaged in on-going review and research in order to discover and apply new technology or techniques to improve aspects of the organization's activities.

Elements	Performance Criteria
1. Apply existing knowledge and techniques to technology and transfer	1.1 Situations are identified where existing knowledge can be used as the basis for developing new skills. 1.2 New or upgraded technology skills are acquired and used to enhance learning. 1.3 New or upgraded equipment are identified, classified and used where appropriate, for the benefit of the organization.
2. Apply functions of technology to assist in solving organizational problems	2.1 Testing of new or upgraded equipment is conducted according to the specification manual. 2.2 Features of new or upgraded equipment are applied within the organization 2.3 Features and functions of new or upgraded equipment are used for solving organizational problems 2.4 Sources of information relating to new or upgraded equipment are accessed and used
3. Evaluate new or upgraded technology performance	3.1 New or upgraded equipment is evaluated for performance, usability and against OHS standards**.** 3.2 ***Environmental considerations*** are determined from new or upgraded equipment. 3.3 ***Feedback*** is sought from users where appropriate.

Variables	Range
Environmental Considerations	May include but is not limited to: • recycling, safe disposal of packaging (e.g. cardboard, polystyrene, paper, plastic) and correct disposal of waste materials by an authorized body
Feedback	May include but is not limited to: • surveys, • questionnaires,

	• interviews and meetings.

Evidence Guide	
Critical Aspects of Competence	Competence must confirm the ability to transfer the application of existing skills and knowledge to new technology
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: • Broad awareness of current technology trends and directions in the industry (e.g. systems/procedures, services, new developments, new protocols) • Knowledge of vendor product directions • Ability to locate appropriate sources of information regarding metal manufacturing and new technologies • Current industry products/services, procedures and techniques with knowledge of general features • Information gathering techniques
Underpinning Skills	Demonstrate skills of: • Research skills for identifying broad features of new technologies • Ability to assist in the decision making process • Literacy skills in regard to interpretation of technical manuals • Ability to solve known problems in a variety of situations and locations • Evaluate and apply new technology to assist in solving organizational problems • General analytical skills in relation to known problems
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Establish Quality Standards**
Unit Code	**MIN MPR4 14 0114**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to establish quality specifications for work outcomes and work performance. It includes monitoring and participation in maintaining and improving quality, identifying critical control points in the production of quality output and assisting in planning and implementing of quality assurance procedures.

Elements	Performance Criteria
1. Establish quality specifications for product	1.1 Market specifications are ***sourced*** and ***legislated requirements*** identified. 1.2 Quality specifications are developed and agreed upon 1.3 Quality specifications are documented and introduced to organization staff / personnel in accordance with the organization policy 1.4 Quality specifications are updated when necessary
2. Identify hazards and critical control points	2.1. Critical control points impacting on quality are identified. 2.2. Degree of risk for each hazard is determined. 2.3. Necessary documentation is accomplished in accordance with organization quality procedures
3. Assist in planning of quality assurance procedures	3.1 Procedures for each identified control point are developed to ensure optimum quality. 3.2 Hazards and risks are minimized through application of appropriate controls. 3.3 Processes are developed to monitor the effectiveness of quality assurance procedures.
4. Implement quality assurance procedures	4.1 Responsibilities for carrying out procedures are allocated to staff and contractors. 4.2 Instructions are prepared in accordance with the enterprise's quality assurance program. 4.3 Staff and contractors are given induction training on the quality assurance policy. 4.4 Staff and contractors are given in-service training relevant to their allocated ***safety procedures***.
5. Monitor quality of work outcome	5.1 Quality requirements are identified 5.2 Inputs are inspected to confirm capability to meet quality requirements 5.3 Work is conducted to produce required outcomes

	5.4 Work processes are monitored to confirm quality of output and/or service 5.5 Processes are adjusted to maintain outputs within specification.
6. Participate in maintaining and improving quality at work	6.1 Work area, materials, processes and product are routinely monitored to ensure compliance with quality requirements 6.2 Non-conformance in inputs, process, product and/or service is identified and reported according to workplace reporting requirements 6.3 Corrective action is taken within level of responsibility, to maintain quality standards 6.4 Quality issues are raised with designated personnel
7. Report problems that affect quality	7.1 Potential or existing quality problems are recognized. 7.2 Instances of variation in quality are identified from specifications or work instructions. 7.3 Variation and potential problems are reported to supervisor/manager according to enterprise guidelines.

Variable	**Range**
Sourced	May include but is not limited to: • End-users • Customers or stakeholders
Legislated requirements	May include but is not limited to: • Verification of product quality as part of consumer legislation or specific legislation related to product content or composition.
Safety procedures.	May include but is not limited to: • Use of tools and equipment for fabrication/production/ manufacturing works • Workplace environment and handling of material safety, • Following occupational health and safety procedures designated for the task • Respect the policies, regulations, legislations, rule and procedures for manufacturing/production/fabrication works

Evidence Guide	
Critical Aspect of Competence	Assessment requires evidence that the candidate: • Monitor quality of work • Establish quality specifications for product • Participate in maintaining and improving quality at work • Identify hazards and critical control points in the production of quality product • Assist planning of quality assurance procedures • Report problems that affect quality • Implement quality assurance procedures

Underpinning Knowledge	Demonstrates knowledge of: • work and product quality specifications • quality policies and procedures • improving quality at work • hazards and critical points of operation • obtaining and using information • applying federal and regional legislation within day-today work activities • accessing and using management systems to keep and maintain accurate records • requirements for correct preparation and operation • technical writing
Underpinning Skills	Demonstrates skills in: • monitoring quality of work • establishing quality specifications for product • participating in maintaining and improving quality at work • identifying hazards and critical control points in the production of quality product • assisting in planning of quality assurance procedures • reporting problems that affect quality • implementing quality assurance procedures
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Develop Individuals and Team**
Unit Code	**MIN MPR4 15 0114**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to determine individual and team development needs and facilitate the development of the workgroup.

Elements	Performance Criteria
1. Provide team leadership	1.1 ***Learning and development needs*** are systematically identified and implemented in line with ***organizational requirements***. 1.2 Learning plan to meet individual and group training and developmental needs is collaboratively developed and implemented. 1.3 Individuals are encouraged to self-evaluate performance and identify areas for improvement. 1.4 ***Feedback on performance*** of team members is collected from relevant sources and compared with established team learning process.
2. Foster individual and organizational growth	2.1 Learning and development program goals and objectives are identified to match the specific knowledge and skills requirements of Competence standards. 2.2 ***Learning delivery methods*** are made appropriate to the learning goals, the learning style of participants and availability of equipment and resources. 2.3 Workplace learning opportunities and coaching/ mentoring assistance are provided to facilitate individual and team achievement of competencies. 2.4 Resources and timelines required for learning activities are identified and approved in accordance with organizational requirements.
3. Monitor and evaluate workplace learning	3.1 Feedback from individuals or teams is used to identify and implement improvements in future learning arrangements. 3.2 Outcomes and performance of individuals/teams are assessed and recorded to determine the effectiveness of development programs and the extent of additional support. 3.3 Modifications to learning plans are negotiated to improve the efficiency and effectiveness of learning. 3.4 Records and reports of competence are maintained within organizational requirement.
4. Develop team commitment and cooperation	4.1 Open communication processes to obtain and share information is used by team.

	4.2 Decisions are reached by the team in accordance with its agreed roles and responsibilities. 4.3 Mutual concern and camaraderie are developed in the team.
5. Facilitate accomplishment of organizational goals	5.1 Team members are actively participated in team activities and communication processes. 5.2 Individual and joint responsibility is developed by teams' members for their actions. 5.3 Collaborative efforts are sustained to attain organizational goals.

Variable	**Range**
Learning and development needs	May include but is not limited to: • Coaching, monitoring and/or supervision • Formal/informal learning program • Internal/external training provision • Work experience/exchange/opportunities • Personal study • Career planning/development • Performance evaluation • Workplace skills assessment • Recognition of prior learning
Organizational requirements	May include but is not limited to: • Quality assurance and/or procedures manuals • Goals, objectives, plans, systems and processes • Legal and organizational policy/guidelines and requirements • Safety policies, procedures and programs • Confidentiality and security requirements • Business and performance plans • Ethical standards • Quality and continuous improvement processes and standards
Feedback on performance	May include but is not limited to: • Formal/informal performance evaluation • Obtaining feedback from supervisors and colleagues • Obtaining feedback from clients • Personal and reflective behavior strategies • Routine and organizational methods for monitoring service delivery
Learning delivery methods	May include but is not limited to: • On the job coaching or monitoring • Problem solving • Presentation/demonstration • Formal course participation • Work experience and involvement in professional networks • Conference and seminar attendance

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Identify and implement learning opportunities for others • give and receive feedback constructively • facilitate participation of individuals in the work of the team • negotiate plans to improve the effectiveness of learning • prepare learning plans to match skill needs • access and designate learning opportunities
Underpinning Knowledge and Attitude	Demonstrates knowledge of: • coaching and monitoring principles • understanding how to work effectively with team members who have diverse work styles, aspirations, cultures and perspective • understanding how to facilitate team development and improvement • understanding methods and techniques to obtain and interpreting feedback • understanding methods for identifying and prioritizing personal development opportunities and options • knowledge of career paths and competence standards in the industry
Underpinning Skills	Demonstrates skills in: • reading and understanding a variety of texts, preparing general information and documents according to target audience; spell with accuracy; use grammar and punctuation effective relationships and conflict management • communication including receiving feedback and reporting, maintaining effective relationships and conflict management • planning skills to organize required resources and equipment to meet learning needs • coaching and mentoring skills to provide support to colleagues • reporting to organize information; assess information for relevance and accuracy; identify and elaborate on learning outcomes • facilitation to conduct small group training sessions • relating to people from a range of social, cultural, physical and mental backgrounds
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competency may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Utilize Specialized Communication Skills**
Unit Code	**MIN MPR4 16 0114**
Unit Descriptor	This unit covers the knowledge, skills and attitudes required to use specialized communication skills to meet specific needs of internal and external clients, conduct interviews, facilitate group discussions, and contribute to the development of communication strategies.

Elements	Performance Criteria
1. Meet common and specific communication needs of clients and colleagues	1.1 Specific communication needs of clients and colleagues are identified and met. 1.2 Different approaches are used to meet communication needs of clients and colleagues. 1.3 Conflict is addressed promptly and in a timely way and in a manner which does not compromise the standing of the organization.
2. Contribute to the development of communication strategies	2.1 ***Strategies*** for internal and external dissemination of information are developed, promoted, implemented and reviewed as required. 2.2 Channels of communication are established and reviewed regularly. 2.3 Coaching in effective communication is provided. 2.4 Work related network and relationship are maintained as necessary. 2.5 Negotiation and conflict resolution strategies are used where required. 2.6 Communication with clients and colleagues is appropriate to individual needs and organizational objectives.
3. Represent the organization	3.1 When participating in internal or external fora, presentation is relevant, appropriately researched and presented in a manner to promote the organization. 3.2 Presentation is made clear and sequential and delivered within a predetermined time. 3.3 Appropriate media is utilized to enhance presentation. 3.4 Differences in views are respected. 3.5 Written communication is made consistent with organizational standards. 3.6 Inquiries are responded in a manner consistent with organizational standard.

4. Facilitate group discussion	4.1 Mechanisms which enhance ***effective group interaction*** are defined and implemented. 4.2 Strategies which encourage all group members to participate are used routinely. 4.3 Objectives and agenda are routinely set and followed for meetings and discussions. 4.4 Relevant information is provided to group to facilitate outcomes. 4.5 Evaluation of group communication strategies is undertaken to promote participation of all parties. 4.6 Specific communication needs of individuals are identified and addressed.
5. Conduct interview	5.1 A range of appropriate communication strategies are employed in ***interview situations***. 5.2 Different ***types of interview*** are conducted in accordance with the organizational procedures. 5.3 Records of interviews are made and maintained in accordance with organizational procedures. 5.4 Effective questioning, listening and nonverbal communication techniques are used to ensure that required message is communicated.

Variable	**Range**
Strategies	May include but is not limited to: • Recognizing own limitations • Utilizing techniques and aids • Providing written drafts • Verbal and non verbal communication
Effective group interaction	May include but is not limited to: • Identifying and evaluating what is occurring within an interaction in a non-judgmental way • Using active listening • Making decision about appropriate words, behavior • Putting together response which is culturally appropriate • Expressing an individual perspective • Expressing own philosophy, ideology and background and exploring impact with relevance to communication
Interview situations	May include but is not limited to: • Establish rapport • obtain facts and information • Facilitate resolution of issues • Develop action plans • Diffuse potentially difficult situation
Types of Interview	May include but is not limited to:

	• Related to staff issues • Routine • Confidential • Evidential • Non-disclosure • Disclosure

Evidence Guide	
Critical Aspects of Competence	Assessment requires evidence that the candidate: • Demonstrate effective communication skills with clients and work colleagues accessing service • Adopt relevant communication techniques and strategies to meet client particular needs and difficulties
Underpinning Knowledge and Values	Demonstrates knowledge of: • communication process • dynamics of groups and different styles of group leadership • communication skills relevant to client groups
Underpinning Skills	Demonstrates skills to: • full range of communication techniques including: ➢ active listening ➢ feedback ➢ interpretation ➢ role boundaries setting ➢ negotiation ➢ establishing empathy ➢ communication strategies • communication required to fulfill job roles as specified by the organization
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Manage and Maintain Small/Medium Business Operations**
Unit Code	**MIN MPR4 17 0114**
Unit Descriptor	This unit covers the operation of day-to-day business activities in a micro or small business. The strategies involve developing, monitoring and managing work activities and financial information, developing effective work habits, and adjusting work schedules as needed.

Elements	Performance Criteria
1. Identify daily work requirements	1.1 Work requirements are identified for a given time period by taking into consideration ***resources*** and constraints. 1.2 Work activities are prioritized based on business needs, requirements and deadlines. 1.3 If appropriate, work is allocated to relevant staff or contractors to optimize efficiency.
2. Monitor and manage work	2.1 People, resources and/or equipment are coordinated to provide optimum results. 2.2 Staff, clients and/or contractors are communicated within a clear and regular manner, to monitor work in relation to ***business goals*** or timelines. 2.3 ***Problem solving techniques*** are applied to work situations to overcome difficulties and achieve positive outcomes.
3. Develop effective work habits	3.1 Work and personal priorities are identified and a balance is achieved between competing priorities using appropriate ***time management strategies***. 3.2 Input from ***internal and external sources*** is sought and used to develop and refine new ideas and approaches. 3.3 Business or inquiries is/are responded to promptly and effectively. 3.4 Information is presented in a format appropriate to the industry and audience.
4. Interpret financial information	4.1 Relevant documents and reports are identified. 4.2 Documents and reports are read and understood and any implications discussed with appropriate persons. 4.3 Data and numerical calculations are analyzed, checked, evaluated, organized and reconciled. 4.4 Daily financial records and cash flow are maintained correctly and in accordance with legal and accounting requirements. 4.5 Invoices and payments are prepared and distributed in a timely manner and in accordance with legal requirements.

	4.6 Outstanding accounts are collected or followed-up on.
5. Evaluate work performance	5.1 Opportunities for improvements are monitored according to business demands. 5.2 Work schedules are adjusted to incorporate necessary modifications to existing work and routines or changing needs and requirements. 5.3 Proposed changes are clearly communicated and recorded to aid in future planning and evaluation. 5.4 Relevant codes of practice are used to guide an ethical approach to workplace practices and decisions.

Variable	Range
Resources	May include but is not limited to: • staff • money • time • equipment • space
Business goals	May include but is not limited to: • sales targets • budgetary targets • team and individual goals • production targets • reporting deadlines
Problem solving techniques	May include but is not limited to: • gaining additional research and information to make better informed decisions • looking for patterns • considering related problems or those from the past and how they were handled • eliminating possibilities • identifying and attempting sub-tasks • collaborating and asking for advice or help from additional sources
Time management strategies	May include but is not limited to: • prioritizing and anticipating • short term and long term planning and scheduling • creating a positive and organized work environment • clear timelines and goal setting that is regularly reviewed and adjusted as necessary • breaking large tasks into smaller tasks • getting additional support if identified and necessary
Internal and external sources	May include but is not limited to: • staff and colleagues • management, supervisors, advisors or head office • relevant professionals such as lawyers, accountants, management consultants

	• professional associations

Evidence Guide	
Critical Aspects of Competence	A person must be able to demonstrate: • ability to identify daily work requirements and allocate work appropriately • ability to interpret financial documents in accordance with legal requirements
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: • Federal and Local Government legislative requirements affecting business operations, especially in regard to Occupational Health and Safety (OHS), equal employment opportunity, industrial relations and anti-discrimination • technical or specialist skills relevant to the business operation • relevant industry code of practice • planning techniques to establish realistic timelines and priorities • identification of relevant performance measures • quality assurance principles and methods • relevant marketing, management, sales and financial concepts • methods for monitoring performance and implementing improvements • structured approaches to problem solving, idea management and time management
Underpinning Skills	Demonstrate skills to: • interpret legal requirements, company policies and procedures and immediate, day-to-day demands • communication skills including questioning, clarifying, reporting, and giving and receiving constructive feedback • numeracy skills for performance information, setting targets and interpreting financial documents and reports • technical and analytical skills to interpret business document, reports and financial statements and projections • ability to relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities • problem solving skills to develop contingency plans • using computers and software packages to record and manage data and to produce reports • evaluation skills for assessing work and outcomes • observation skills for identifying appropriate people, resources and to monitor work
Resource Implications	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

Occupational Standard: Mineral Processing Level IV	
Unit Title	**Apply Problem Solving Techniques and Tools**
Unit Code	**MIN PRO4 18 0114**
Unit Descriptor	This unit of competency covers the knowledge, skills and attitude required to apply scientific problem solving techniques and tools to enhance quality, productivity and other kaizen elements on continual basis.

Elements	Performance criteria
1. Identify and select theme/problem.	1.1 ***Safety requirements*** are followed in accordance with safety plans and procedures. 1.2 All possible problems related to the process /Kaizen elements are listed using ***statistical tools and techniques***. 1.3 All possible problems related to kaizen elements are identified and listed on Visual Management Board/Kaizen Board. 1.4 Problems are classified based on obviousness of cause and action. 1.5 Critical factors like the number of customers affected, Potentials for bottlenecks, and number of complaints etc… is selected. 1.6 Problems related to priorities of ***Kaizen Elements*** are given due emphasis and selected.
2. Grasp current status and set goal.	2.1 The extent of the problem is defined. 2.2 Appropriate and achievable goal is set.
3. Establish activity plan.	3.1 The problem is confirmed. 3.2 High priority problem is selected. 3.3 The extent of the problem is defined. 3.4 Activity plan is established as per ***5W1H***.
4. Analyze causes of a problem.	4.1 All possible causes of a problem are listed. 4.2 Cause relationships are analyzed using***4M1E***. 4.3 Causes of the problems are identified. 4.4 Root causes are selected. 4.5 The root cause which is most directly related to the problem is selected. 4.6 All possible ways are listed using ***creative idea generation*** to eliminate the most critical root cause. 4.7 The suggested solutions are carefully tested and

	evaluated for potential complications. 4.8 Detailed summaries of the action plan are prepared to implement the suggested solution.
5. Examine countermeasures and their implementation.	5.1 Action plan is implemented by ***medium KPT*** members. 5.2 Implementation is monitored according to the agreed procedure and activities are checked with preset plan.
6. Assess effectiveness of the solution.	6.1 ***Tangible and intangible results*** are identified. 6.2 The results are verified over time. 6.3 Tangible results are compared with targets using ***various types of diagram***.
7. Standardize and sustain operation.	7.1 If the goal is achieved, the new procedures are standardized and made part of daily activities. 7.2 All employees are trained on the new ***Standard Operating Procedures (SOPs)***. 7.3 SOP is verified and followed by all employees. 7.4 The next problem is selected to be tackled by the team.

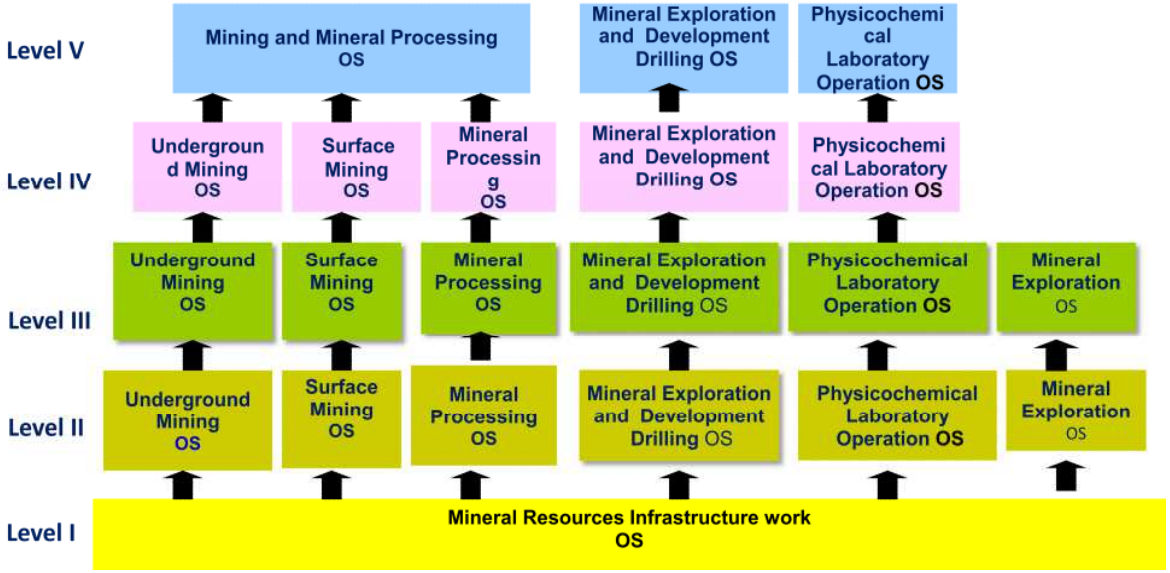
Variables	**Range**
Safety requirements	may include but not limited to: • OHS requirements include legislation, material safety, managements system, hazardous substances and dangerous goods code and local safe operating procedures • Work is carried out in accordance with legislative obligations, environmental legislations, relevant health regulation, manual handling procedure and organization insurance requirements
Statistical tools and techniques	may include but not limited to: • 7 QC tools may include: ➢ Stratification ➢ Pareto Diagram ➢ Cause and Effect Diagram ➢ Check Sheet ➢ Control Chart/Graph ➢ Histogram ➢ Scatter Diagram • QC techniques may include: ➢ Brain storming ➢ Why analysis ➢ What if analysis ➢ 5W1H
Kaizen Elements	may include but not limited to: • Quality • Cost • Productivity • Delivery

	• Safety • Moral • Environment • Gender equality
5W1H	may include but not limited to: • Who: person in charge • Why: objective • What: item to be implemented • Where: location • When: time frame • How: method
4M1E	may include but not limited to: • Man • Machine • Method • Material and • Environment
Creative idea generation	may include but not limited to: • Brainstorming • Exploring and examining ideas in varied ways • Elaborating and extrapolating • Conceptualizing
Medium KPT	may include but not limited to: • 5S • 4M (machine, method, material and man) • 4P (Policy, procedures, People and Plant) • PDCA cycle • Basics of IE tools and techniques
Tangible and intangible results	may include but not limited to: • Tangible result may include: ➢ Quantifiable data • Intangible result may include: ➢ Qualitative data
Various types of diagram	may include but not limited to: • Line graph • Bar graph • Pie-chart • Scatter diagram • Affinity diagram
Standard Operating Procedures (SOPs)	may include but not limited to: • The customer demand • The most efficient work routine (steps) • The cycle times required to complete work elements • All process quality checks required to minimize defects/errors • The exact amount of work in process required

Evidence Guide

Critical Aspects of Assessment	Demonstrates skills and knowledge competencies to: • Apply all relevant procedures and regulatory requirements to ensure quality and productivity of an organization. • Detect non-conforming products/services in the work area • Apply effective problem solving approaches/strategies. • Implement and monitor improved practices and procedures • Apply statistical quality control tools and techniques.
Underpinning Knowledge and Attitude	Demonstrates knowledge of: • QC story/PDCA cycle/ • QC story/ Problem solving steps • QCC techniques • 7 QC tools • Basic IE tools and techniques. • SOP • Quality requirements associated with the individual's job function and/or work area • Workplace procedures associated with the candidate's regular technical duties • Relevant health, safety and environment requirements • organizational structure of the enterprise • Lines of communication • Methods of making/recommending improvements. • Reporting procedures
Underpinning Skills	Demonstrates skills to: • Apply problem solving techniques and tools • Apply statistical analysis tools • Apply Visual Management Board/Kaizen Board. • Detect non-conforming products or services in the work area • Document and report information about quality, productivity and other kaizen elements. • Contribute effectively within a team to recognize and recommend improvements in quality, productivity and other kaizen elements. • Implement and monitor improved practices and procedures. • Organize and prioritize activities and items. • Read and interpret documents describing procedures • Record activities and results against templates and other prescribed formats.
Resources Implication	Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices.
Methods of Assessment	Competence may be assessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting.

MINERAL EXPLORATION, MINING AND MINERAL PROCESSING



Acknowledgement

We wish to extend thanks and appreciation to the many representatives of business, industry, academe and government agencies who donated their time and expertise to the development of this occupational standard.

We would like also to express our appreciation to Federal TVET Agency, Ministry of Education (MoE), Ministry of Mining who made the development of this occupational standard possible.

This occupational standard was developed in January 2014 at Addis Ababa, Ethiopia.

COMMENT TEMPLATE

The Federal TVET Agency values your feedback of the document.
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