QUALIFICATIONS PACK - OCCUPATIONAL STANDARD FOR MINING INDUSTRY

What are Occupational Standard (OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standard that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack- Ore Processing Operator

SECTOR: MINING

SUB-SECTOR: Open Cast and Underground Mines

OCCUPATION: Ore Processing

REFERENCE ID: MIN/Q 0434

ALIGNED TO: NCO-2004/NIL

An ore processing operator executes end to end activities of mineral extraction from its ore.

Brief Job Description: This role is responsible for conducting end to end activities of extracting minerals from their ores including crushing and grinding of ore and recovering the minerals from them.

Personal Attributes: Technical knowledge of ore and its processing, ability to plan and prioritize, quality consciousness, sensitivity to problem solving, quick decision making, safety orientation, reading, writing and communication skills, Dexterity and high precision, ability to use internal ERP systems

Job Details

Qualifications Pack Code	**MIN/ Q 0434**		
Job Role	**Ore Processing Operator**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Mining**	**Drafted on**	**15/12/2014**
Sub-sector	**Open cast and Underground Mines**	**Last reviewed on**	**24/03/2015**
Occupation	**Ore Processing**	**Next review date**	**24/03/2017**

Job Role	**Ore Processing**
Role Description	This role is responsible for conducting end to end activities of extracting minerals from their ores including crushing and grinding of ore and recovering the minerals from them.
NSQF level **Minimum Educational Qualification** **Maximum Educational Qualification**	4 ITI Mechanical/ Electrical NA
Training (Suggested but not mandatory)	1. Different Ore Processing techniques used in organizations 2. 5S and Safety aspects 3. Problem Solving Techniques 4. Quality Management Systems
Experience	3-4 years in ore processing
Applicable National Occupational Standards	**Compulsory:** **Click on the hyperlink to read/download the required NOS** 1. MIN/ N 0493 (Understand process, reagents and equipment requirement to complete the task) 2. MIN/ N 0494 (Convey the material from the mine for processing) 3. MIN/ N 0495 (Crush the material/ feed from the mine) 4. MIN/ N 0496 (Grind the material/ feed) 5. MIN/ N 0497 (Recover the minerals) 6. MIN/ N 0498 (Manage the tailings) 7. MIN/ N 0901 (Health and Safety) **Optional:** Not Applicable
Performance Criteria	As described in the relevant OS units

Definitions

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standard of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standard are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standard which apply uniquely in the Indian context.
Qualification Pack Code	Qualification Pack Code is a unique reference code that identifies a qualification pack.
Qualification Pack	Qualification Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualification Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'.
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS , these include communication related skills that are applicable to most job roles.

Acronyms

Keywords /Terms	Description
SCMS	Skill council for Mining Sector
NOS	National Occupational Standard
NSQF	National Skill Qualification Framework
NVEQF	National Vocational Educational Qualification Framework
NVQF	National Vocational Qualification Framework
OS	Occupational Standard
PC	Performance Criteria
QP	Qualification Pack
SSC	Sector Skill Council

National Occupational Standard

Overview

This unit is about understanding the job requirement and hence understand the activities, reagents & equipment associated with the process to complete the task.

MIN/ N0493 Understand process, reagents and equipment requirement to complete the task

National Occupational Standard

Unit Code	MIN/ N0493
Unit Title (Task)	**Understand process, reagents and equipment requirement to complete the task**
Description	This OS unit is about understanding the job requirement, what processes need to be executed, what reagents will be used, what equipment/ machines will be used and what is the required output considering the standards specified
Scope	This unit/task covers the following: • Understand the ore processing requirements and related parameters

Performance Criteria (PC) w.r.t. the Scope

Element	Performance Criteria
Understand the ore processing requirements, related equipment and parameters to be set for the process	PC1. Understand the ore processing methodology and process to be adopted through discussions with the supervisor and reading the process manuals/ Work Instructions/Standard Operating Procedures PC2. Understand various reagents and their quantities to be used as well as effective reagents handling techniques PC3. Monitor the reagent addition rate and mix tank levels continuously during the ore processing PC4. Understand the various tools to be used at different steps of ore processing like hand & power tools, pneumatically & hydraulically powered tools, scaffolds, ladders etc PC5. Understand the operations of various equipment used at various stages like mobile equipment and lifting equipment. PC6. Understand the operations for various tools & equipment as well as the effective equipment handling guidelines PC7. Prepare for the emergency situations with required instructions and equipment in place

Knowledge and Understanding (K) w.r.t. the scope

Element	Knowledge and Understanding
A. **Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))**	The user/individual on the job needs to know and understand: KA1. Different types of mines and detail of the mine he is working in KA2. Mine Organisation, time keeping, need for discipline and punctuality KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Duties of workmen KA7. Provision of wages, working hours and accident compensation as per Mines act KA8. Knowledge of mining safety procedures KA9. Impact of violation of safely procedures

B. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KB1. relevant standards and procedures followed in the company KB2. processes like Ore Extraction, Procurement, Store management, inventory management, quality management and key contact points for query resolution
C. Technical Knowledge	The user/individual on the job needs to know and understand: KC1. different types of ore processing processes and associated equipment KC2. various types of reagents like acids, carbon, cyanide, calcium etc and their mixing proportions KC3. hazards and safety aspects involved in ore processing activities, handling reagents and usage of relevant PPEs
Skills (S) [Optional]	
Element	**Skills**
Element **A. Core Skills/ Generic Skills**	**Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA1. note down observations (if any) related to the ore processing SA2. write information documents to internal departments/ internal teams or enter the information in online ERP systems under guidance of the supervisor
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA3. read equipment manuals and process documents to understand the equipment and processes better SA4. read internal information documents sent by internal teams
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA5. discuss task lists, schedules and activities with the supervisor SA6. effectively communicate with the team members SA7. question the supervisor in order to understand the nature of the problem and to clarify queries SA8. attentively listen with full attention and comprehend the information given by the speaker
B. Professional Skills	**Plan and Organize**
	The user/individual on the job needs to know and understand how to: SB1. plan and organize the work order and jobs received from the Operator SB2. organize all process/ equipment manuals so that sorting/ accessing information is easy SB3. support the supervisor in scheduling tasks for helper and assistant supervisor
	Judgment and Critical Thinking
	The user/individual on the job needs to know and understand how to: SB4. use common sense and make judgments during day to day basis SB5. use reasoning skills to identify and resolve basic problems SB6. use intuition to detect any potential problems which could arise during operations

	Desire to learn and take initiatives
	The user/individual on the job needs to know and understand how to: SB7. follow instructions and work on areas of improvement identified SB8. complete the assigned tasks with minimum supervision SB9. complete the job defined by the supervisor within timelines and quality norms
	Problem Solving and Decision making
	The user/individual on the job needs to know and understand how to: SB10. detect problems in day to day tasks SB11. support supervisor in using specific problem solving techniques and detailing out the problems SB12. discuss possible solution with the supervisor for problem solving SB13. make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined by the organization)

NOS Version Control

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Industry Sub-sector	Open cast and Underground Mines	Last reviewed on	24/03/2015
Occupation	Ore Processing	Next review date	24/03/2017

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National Occupational Standard

Overview

This unit is about conveying the ores to the ore processing plant through the usage of conveyors

National Occupational Standard

MIN/ N0494 Convey the material from mine

Unit Code	MIN/ N0494
Unit Title (Task)	**Convey the material from mine**
Description	This OS unit is about conveying the ores to the ore processing plant through the usage of conveyors
Scope	This unit/task covers the following: • Operation of the conveyors • Operation of the feeders

Performance Criteria (PC) w.r.t. the Scope

Element	Performance Criteria
Operate the conveyors	PC1. Understand the layout and components of belt conveyor system including its principal components like screw, trough, scrapers, conveyor belt, clips, roller chains, guards, tensioners, feed and discharge chutes, head, tail and take-up pulleys, bearings, braking system, controls such as switches, trip cords, Inter locks, alarms, etc and operations of mechanical and electrical driving units including safety devices PC2. Conduct conveying of the ore to the processing unit considering parameters like feed/ material rate, alignment of conveyor belts, spillage amount and rate, conveyor jams etc PC3. Take corrective actions against any safety hazards like spillage etc PC4. Conduct operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction, lubrication of conveyors, leaks, ensure magnets are operative; Take corrective actions PC5. Ensure principal components of hoppers and bins, like grizzly rails, chutes, guardrails, etc are deployed to control stockpile levels, stability of stockpiles, clearing of the obstruction etc
Operate the feeders	PC6. Understand the layout and components of feeders including chains, pans, bearings, rollers, shafts, feed/discharge chute, drive mechanisms, lubrication systems, controls, drive belts, hangers/cables, etc PC7. Conduct feeding of the ore to the crusher considering parameters like feed/ material rate, tilt, jams etc PC8. Take corrective actions against any safety hazards like spillage etc and issues like unusual noises/ smells, blockages and obstruction, lubrication, leaks, etc

Knowledge and Understanding (K) w.r.t. the scope

Element	Knowledge and Understanding
A. **Regulatory context** (knowledge of safety guidelines specified by Director General of Mine Safety	The user/individual on the job needs to know and understand: KA1. Different types of mines and detail of the mine he is working in KA2. Mine Organisation, time keeping, need for discipline and punctuality KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Duties of workmen KA7. Provision of wages, working hours and accident compensation as per

(DGMS))	Mines act KA8. Knowledge of mining safety procedures KA9. Impact of violation of safely procedures
B. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KB1. relevant standards and procedures followed in the company KB2. processes like Ore Extraction, Procurement, Store management, inventory management, quality management and key contact points for query resolution
C. Technical Knowledge	The user/individual on the job needs to know and understand: KC1. different types of ore processing processes and associated equipment KC2. different types of conveyors like belt conveyors, drag conveyors, pneumatic conveyors, air-slid conveyors, screw conveyors, bucket elevators and pan conveyors KC3. different types of conveyor's principal components, such as screw, screw casing/trough, scrapers, conveyor belt, splices or clips, drive mechanisms, roller chains/belts, buckets, guards, tensioners, feed and discharge chutes, head, tail and take-up pulleys, idlers, bearings, braking system, controls (such as switches, trip cords, side travel switches, level probes, zero speed switches, Inter locks, crossovers, audible alarms, magnet, metal detectors, flush water, lubricating systems, weightometres) KC4. different types of principal components of hoppers and bins, such as: grizzly rails, chutes, guardrails, entry doors, level probes, covers etc KC5. different types of feeders include but are not limited to: pan feeder, screw feeder, belt feeder, pneumatic feeder, tube feeder, vibratory feeder, tripper, apron feeder, rotary valve feeder, drag feeder etc KC6. different feeder's principal components, such as: chains, pans, bearings, (support, hangers, pillow block bearings), sprockets, rollers, roller mounts, return rollers, shafts, centre support rail, feed/discharge chute, drive mechanisms, gear reducer, lubrication systems, guards, skirt boards, controls, scraper, fire extinguishing equipment, drive belts, hangers/cables, etc KC7. Specific safety instructions for coveying systems (pull chord, lable switch, fire alarm etc.) KC8. Use of hand drills, guards etc. KC9. Knowledge of belt mechanisms/systems (belt fastening, belt jointing etc.) KC10. hazards and safety aspects involved in ore processing activities, and usage of relevant PPEs
Skills (S) w.r.t. the scope	
Element	**Skills**
A. Core Skills/ Generic skills	**Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA1. document information from the sketches and engineering drawings SA2. prepare draft drawings for the final output product SA3. note down observations (if any) related to the process SA4. write information documents to internal departments/ internal teams or SA5. enter the information in online ERP systems under guidance of the supervisor
	Reading Skills

MIN/ N0494 Convey the material from mine

	The user/individual on the job needs to know and understand how to: SA6. read and interpret symbols and measurements used in the drawings SA7. read equipment manuals and process documents to understand the equipment and processes better SA8. read internal information documents sent by internal teams
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA9. discuss task lists, schedules and activities with the supervisor SA10. effectively communicate with the team members SA11. question the supervisor in order to understand the nature of the problem and to clarify queries SA12. attentively listen with full attention and comprehend the information given by the speaker
B. Professional Skills	**Plan and Organize**
	The user/individual on the job needs to know and understand how to: SB1. plan and organize the work order and jobs received from the Operator SB2. organize all process/ equipment manuals so that sorting/ accessing information is easy
	Analytical Thinking
	The user/individual on the job needs to know and understand how to: SB3. visualize the final job product after understanding the given drawing/ sketches SB4. co relate the type of job output required with the methodology to be used SB5. identify the strengths and weakness of various process
	Judgment and Critical Thinking
	The user/individual on the job needs to know and understand how to: SB6. use common sense and make judgments during day to day basis SB7. use reasoning skills to identify and resolve basic problems
	Desire to learn and take initiatives
	The user/individual on the job needs to know and understand how to: SB8. follow instructions and work on areas of improvement identified complete the assigned tasks with minimum supervision SB9. complete the job defined by the supervisor within the timelines and quality norms SB10. take self initiatives in driving small projects with the supervisor like operation improvement, training of helpers and assistant operators, etc

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Occupation	Ore Processing	Next review date	24/03/2017

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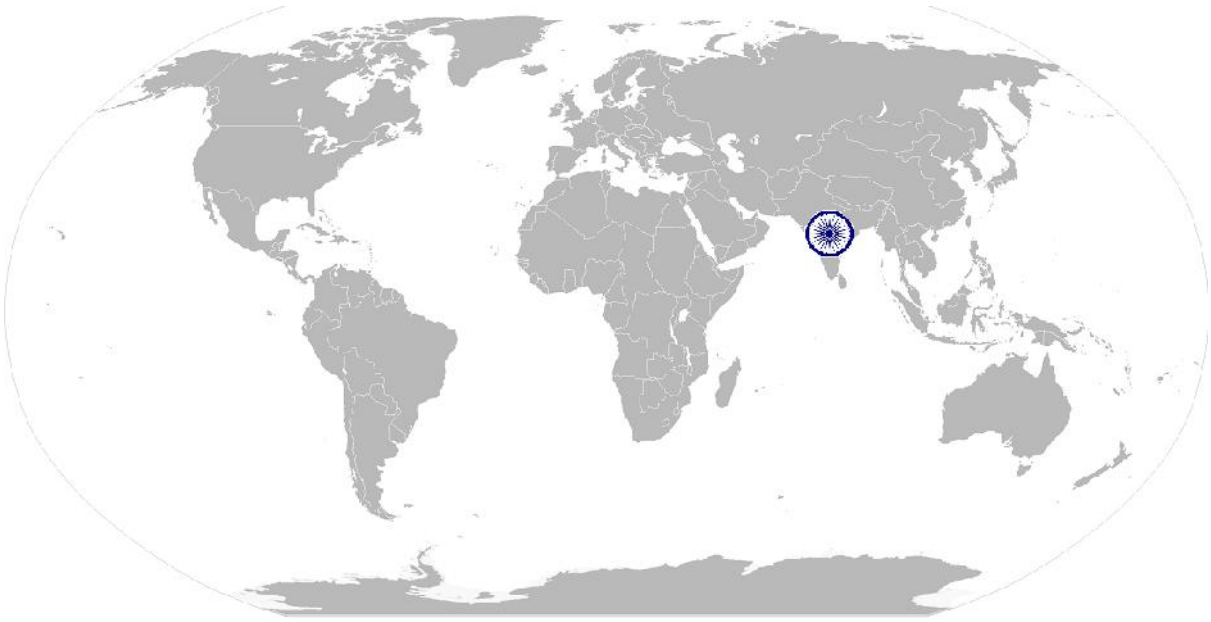
National Occupational Standard



Overview

This unit is about crushing the material/ feed from mine including operation of crushers and operating the screen

National Occupational Standard

MIN/ N0495 Crush the material/ feed from the mine

Unit Code	**MIN/ N0495**
Unit Title (Task)	**Crush the material/ feed from the mine**
Description	This unit is about crushing the material/ feed from mine including operation of crushers and operating the screen
Scope	This unit/task covers the following: • Operation of the crusher and screen

Performance Criteria(PC) w.r.t. the Scope

Element	Performance Criteria
Operate Crusher	PC1. Understand the components towards crushing of the material like drive mechanism, pulleys, crushers, etc PC2. Conduct crushing operations by controlling the feed/material by adjusting opening of gates, chutes and gaps, adjusting speed of feeder, adjusting speed of conveyor, controlling dust by using dust collectors, water sprays, remove and clean excess spillage, etc PC3. Conduct operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction, leaks etc; Take corrective actions PC4. Identify the areas of blockage and clear the crushing blockages periodically
Operate the screen	PC5. Understand the requirements for separating feed/material and working around screens, including reporting, control of dust, load limitations, control of feed/material flow rate PC6. Conduct operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction, leaks etc; Take corrective actions

Knowledge and Understanding (K)

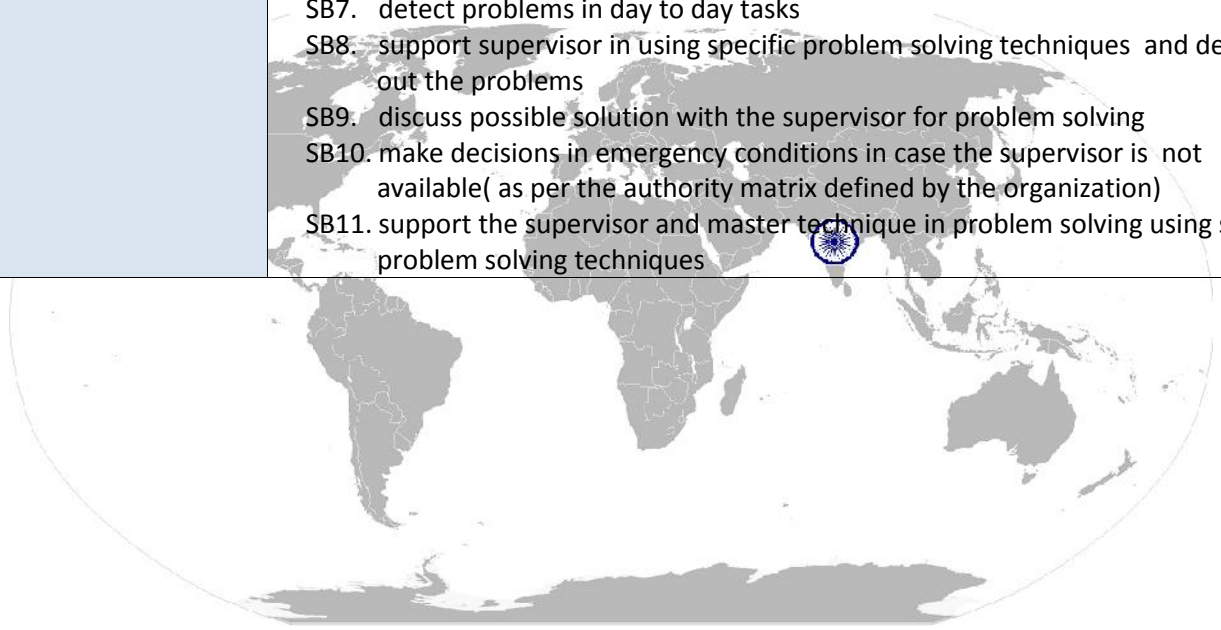
A. **Regulatory context** (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))	The user/individual on the job needs to know and understand: KA1. Different types of mines and detail of the mine he is working in KA2. Mine Organisation, time keeping, need for discipline and punctuality KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Duties of workmen KA7. Provision of wages, working hours and accident compensation as per Mines act KA8. Knowledge of mining safety procedures KA9. Impact of violation of safely procedures

MIN/ N0495 Crush the material/ feed from the mine

B. Organizational Context (Knowledge of the company / organization and processes	The user/individual on the job needs to know and understand: KB1. relevant standards and procedures followed in the company KB2. processes like Ore Extraction, Procurement, Store management, inventory management, quality management and key contact points for query resolution
C. Technical Knowledge	The user/individual on the job needs to know and understand: KC1. different types of ore processing processes and associated equipment KC2. different types of crushing principal components, such as gates, chutes and gaps, feeder, conveyor, dust collectors, water sprays etc KC3. different types of screening equipment like drive mechanism, balance wheel, rocker arms, conveyor belts, guards, Mechanism of screening equipment etc KC4. Knowledge of troubleshooting KC5. Knowledge of pumps KC6. Knowledge of rejects and their disposal along with other waste KC7. Knowledge of water level and other systems like scrubbers, ball mills, hydro cyclones etc.) KC8. Checking and testing of all equipment KC9. hazards and safety aspects involved in ore processing activities and usage of relevant PPEs
Skills (S) [Optional]	
Element	**Skills**
A. Core Skills/ Generic Skills	**Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA1. document information from the sketches and engineering drawings SA2. note measurements, equipment panel readings for various process parameters in the required reporting formats
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA3. read equipment manuals and process documents to understand the equipment and processes better SA4. read internal information documents send by internal customers (other functions within the organization) the equipment in the plant area SA5. read parameter reading on various types of monitoring panels
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA6. discuss task lists, schedules and activities with the supervisor SA7. effectively communicate with the team members and clearly instruct the helper and assistant operator in completing their allocated tasks SA8. question the supervisor in order to understand the nature of the problem and to clarify queries SA9. attentively listen with full attention and comprehend the information given by the speaker

MIN/ N0495 Crush the material/ feed from the mine

B. Professional Skills	**Plan and Organize**
	The user/individual on the job needs to know and understand how to: SB1. plan and organize the work order and jobs received from the supervisor SB2. organize all process/ equipment manuals so that sorting/ accessing information is easy SB3. support the supervisor in scheduling tasks for helper and assistant operator
	Judgment and Critical Thinking
	The user/individual on the job needs to know and understand how to: SB4. use common sense and make judgments during day to day basis SB5. use reasoning skills to identify and resolve basic problems SB6. use intuition to detect any potential problems which could arise
	Problem Solving and Decision making
	The user/individual on the job needs to know and understand how to: SB7. detect problems in day to day tasks SB8. support supervisor in using specific problem solving techniques and detailing out the problems SB9. discuss possible solution with the supervisor for problem solving SB10. make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined by the organization) SB11. support the supervisor and master technique in problem solving using specific problem solving techniques



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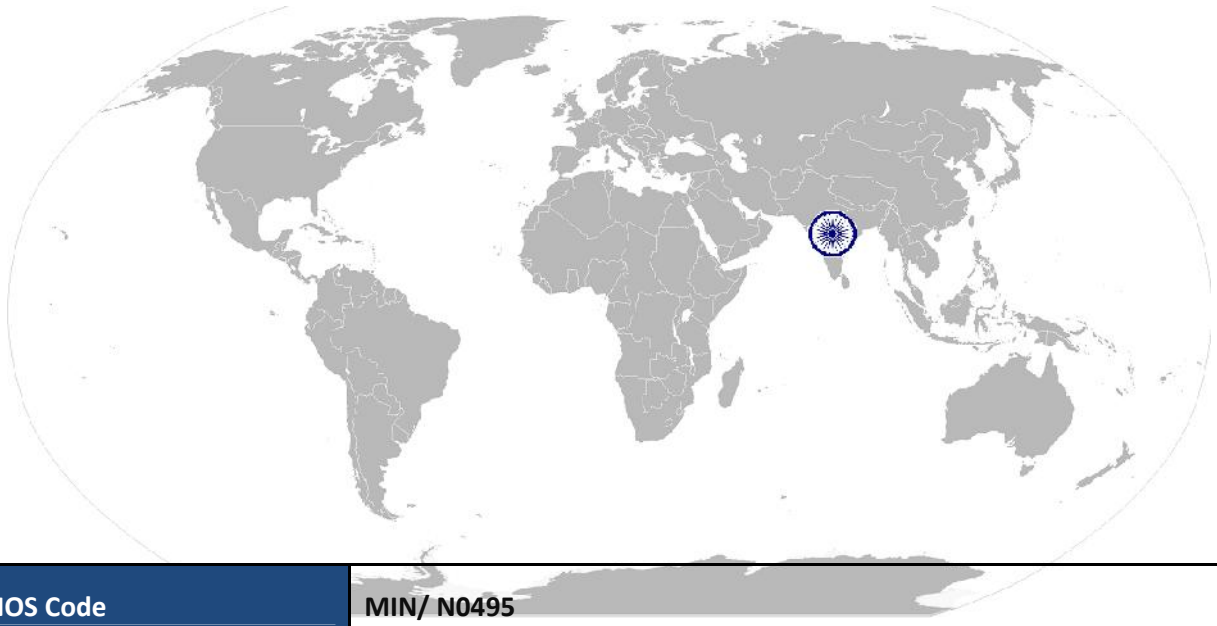

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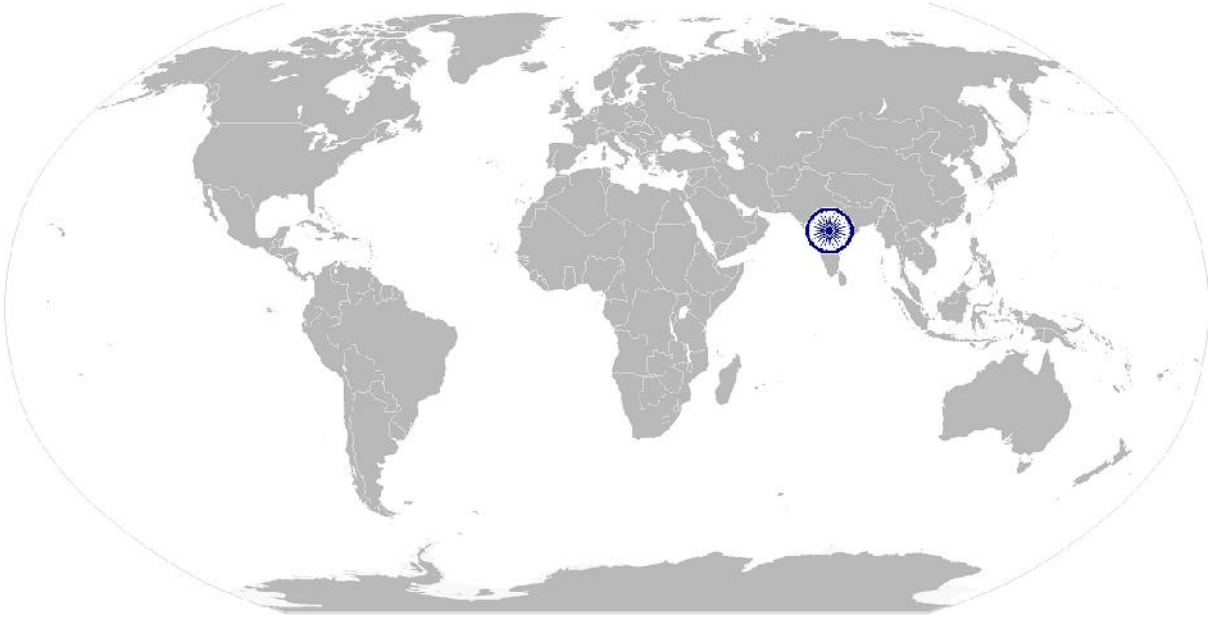
National Occupational Standard



Overview

This unit is about grinding the feed/ material obtained from crushing unit

National Occupational Standard

Unit Code	MIN/ N0496
Unit Title (Task)	Grind the material/ feed
Description	This QP is about grinding the feed/ material obtained from crushing unit
Scope	This unit/task covers the following: • Operate the mills

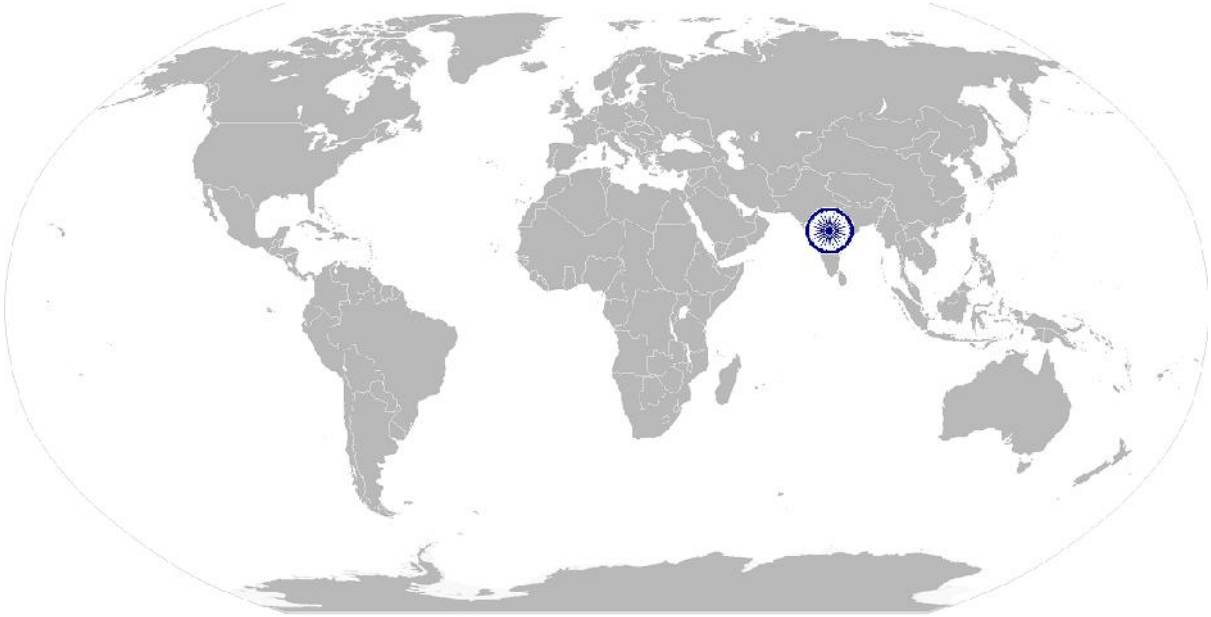
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Operate the mills	PC1. Understand the layout and components of mills including its principal components like drive motor, motor cooling fan, drive shaft and bearings, clutch, pinion gear, feed chute, shell, liners, lifters and bolts, ring/bull gear, trunnion and bearings, trommel screen, lubrication system, grinding media, controls, like main disconnect, Interlocks, stop/start switches (remote/local), selector switch (remote/local), cooling system(s), sound boxes etc PC2. Conduct grinding/ classifier operations considering parameters like load limitations, charging grinding media as required, control of dust, control of feed/material flow rate, control and maintenance of densities, sampling and testing, proper grind, reagent addition etc PC3. Ensure the following: • control switches are operative and free of build-up and/or obstructions • lubrication system(s) are at required levels • cooling system(s) are operative and at required levels • feed and discharge points are free of obstructions and blockages PC4. Guard all identified hazards using rope/bafflers and/or signs, clean up spills and leaks, etc PC5. Inspect classifier and components, such as: feed gate, discharge point, trash screen, guards, cyclone, feed lines, launders, skirting, upstream and downstream equipment and related systems, rollers, Spirals PC6. Ensure wear fall arrest system, control required quantity/quality of discharge by: sampling and testing as required, adjusting water flow, adjusting feed rate, control dust by using: dust collectors, water sprays, ensure minimum spillage, etc PC7. Control density (percent solid, SG) by sampling PC8. Conduct operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction; Take corrective actions

Knowledge and Understanding (K) w.r.t. the scope	
Element	**Knowledge and Understanding**
A. **Regulatory**	The user/individual on the job needs to know and understand:

context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))	KA1. Different types of mines and detail of the mine he is working in KA2. Mine Organisation, time keeping, need for discipline and punctuality KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Duties of workmen KA7. Provision of wages, working hours and accident compensation KA8. Knowledge of mining safety procedures KA9. Impact of violation of safely procedures
B. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KB1. relevant standards and procedures followed in the company KB2. processes like Ore Extraction, Procurement, Store management, inventory management, quality management and key contact points for query resolution
C. Technical Knowledge	The user/individual on the job needs to know and understand: KC1. different types of ore processing processes and associated equipment KC2. different types of mills include: ball mill, pebble mill, autogenous mill/scrubber, semi-autogenous mill, rod mill, regrind mill KC3. different components of mills including its principal components like drive motor, motor cooling fan, drive shaft and bearings, clutch, pinion gear, feed chute, shell, liners, lifters and bolts, ring/bull gear, trunnion and bearings, trommel screen, lubrication system, grinding media, controls, like Interlocks, stop/start switches (remote/local), selector switch (remote/local), cooling system(s), sound boxes etc KC4. different types of classifiers include but are not limited to: cyclone classifier, screw classifier, jig classifier, vibrating screens, trommel screens KC5. different components, such as feed gate, discharge point, trash screen, guards, cyclone, feed lines, launders, skirting, upstream and downstream equipment and related systems, rollers, Spirals KC6. hazards and safety aspects involved in ore processing activities and usage of relevant PPEs
Skills (S) w.r.t. the scope	
Elements	**Skills**
A. Core Skills/ Generic Skills	**Writing Skills** The user/ individual on the job needs to know and understand how to: SA1. document information from the sketches and engineering drawings

	SA2. note measurements, equipment panel readings for various process parameters in the required reporting formats
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA3. read and interpret engineering drawing and sketches SA4. read equipment manuals and process documents to understand the equipment and processes better SA5. read internal information documents send by internal customers (other functions within the organization) the equipment in the plant area) SA6. read parameter reading on various types of monitoring panels
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA7. discuss task lists, schedules and activities with the operator and supervisor SA8. effectively communicate with the team members Question the operator/ supervisor in order to understand the nature of the problem and to clarify queries SA9. attentively listen with full attention and comprehend the information given by the speaker
B. Professional Skills	**Plan and Organize**
	The user/individual on the job needs to know and understand how to: SB1. plan and organize the work order and jobs received from the supervisor SB2. organize all process/ equipment manuals so that sorting/ accessing information is easy SB3. support the supervisor in scheduling tasks for helper and assistant operator
	Judgment and Critical Thinking
	The user/individual on the job needs to know and understand how to: SB4. use common sense and make judgments during day to day basis SB5. use reasoning skills to identify and resolve basic problems SB6. use intuition to detect any potential problems which could arise during operations
	Desire to learn and take initiatives
	The user/individual on the job needs to know and understand how to: SB7. follow instructions and work on areas of improvement identified SB8. complete the assigned tasks with minimum supervision SB9. complete the job defined by the supervisor within the timelines and quality norms
	Problem Solving and Decision making

	The user/individual on the job needs to know and understand how to: SB10. how to detect problems in day to day activities SB11. support supervisor in using specific problem solving techniques and detailing out the problems SB12. discuss possible solution with the supervisor for problem solving SB13. make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined by the organization) SB14. support the supervisor and master technique in problem solving using specific problem solving techniques



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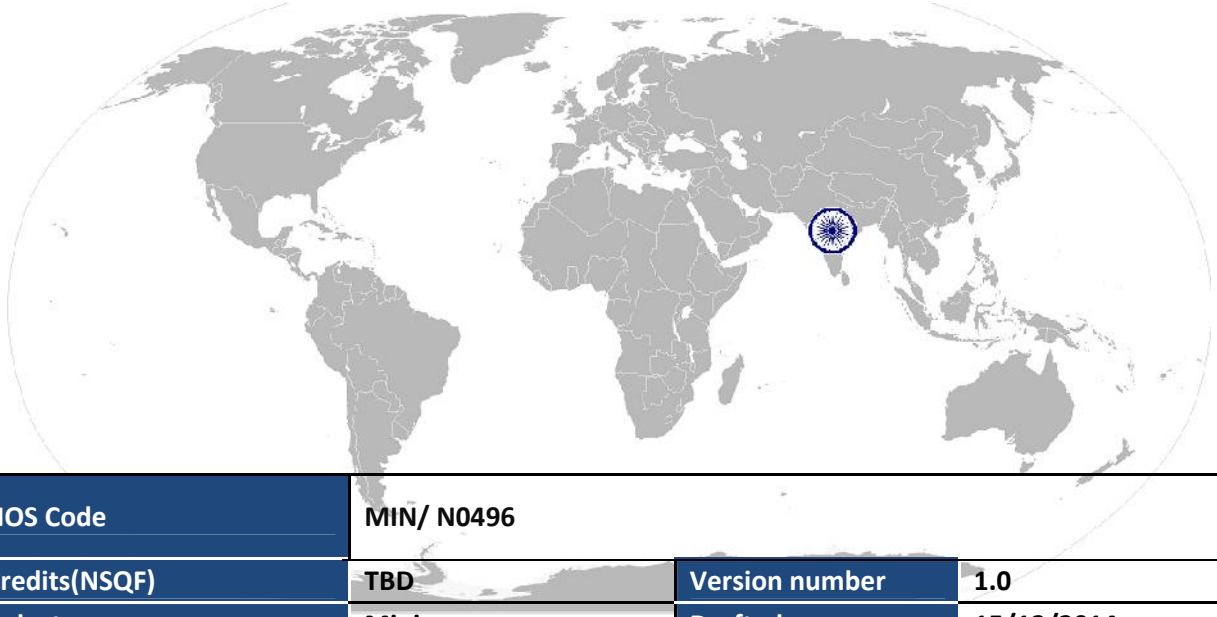

NOS Code	MIN/ N0496		
Credits(NSQF)	TBD	Version number	1.0
Industry	Mining	Drafted on	15/12/2014
Industry Sub-sector	Open cast and Underground Mines	Last reviewed on	24/03/2015
Occupation	Ore Processing	Next review date	24/03/2017

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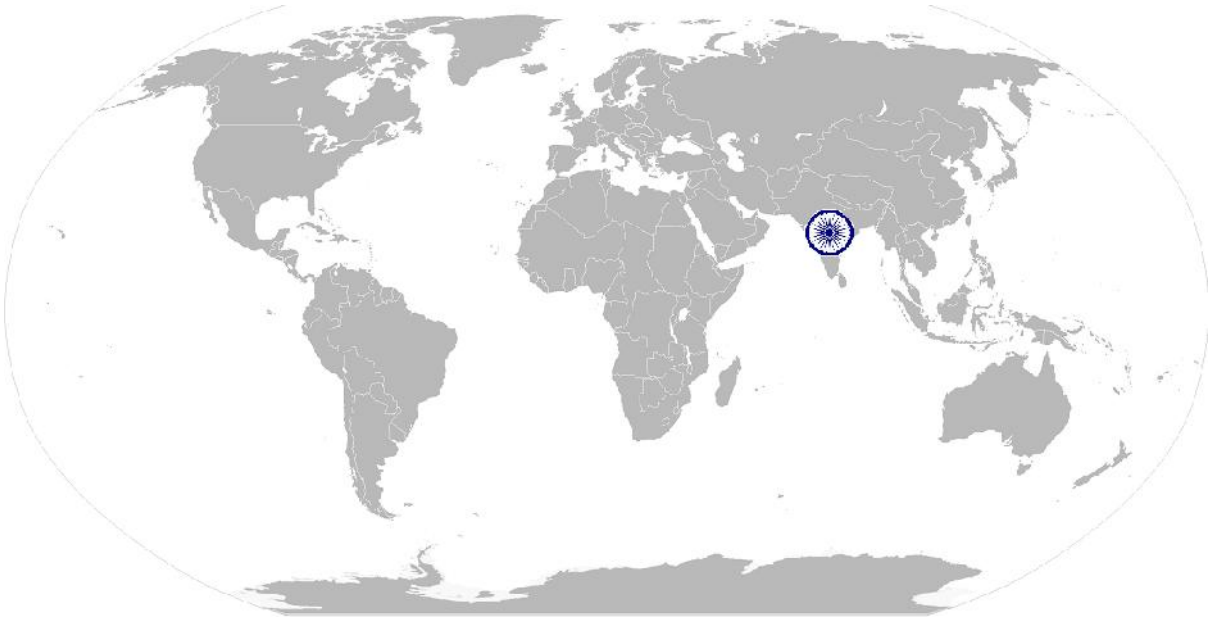
National Occupational Standard



Overview

This unit is about conducting Quality Checks and inspection of the finished products produced and repair the bad quality items produced in the manufacturing process

National Occupational Standard

Unit Code	MIN/ N0497
Unit Title (Task)	Recover the minerals
Description	This OS unit is about inspecting the finished goods produced for any damages, deformities and Further repairing the parts produced so that the damaged/ defective pieces can be corrected
Scope	This unit/task covers the following: • Leaching, Separation, Floatation, Dewatering and Filtration

Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Conduct leaching	PC1. Conduct checks on various operational parameters like tank level, pH level, reagent usage, air parameters, alarms, pumps, screens, monitors etc PC2. Add reagents as required, such as acids, carbon, cyanide, calcium as per the process requirements PC3. Conduct leaching/ ore beneficiation process to extract the minerals from the grinded ores PC4. Check and monitor Threshold Limit Values (TLVs) PC5. Guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel
Conduct separation	PC6. Check various separation systems like drive system, drums, concentrators, jigs, classifiers etc PC7. Check various operating parameters like operating levels, pressures, cleanliness PC8. Ensure the maintenance of flow rate PC9. Check and monitor Threshold Limit Values (TLVs) PC10. Guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel
Conduct floatation	PC11. Identify the different types of floatation equipment including floatation air, bank of cells, conditioner, collector, floatation column, cells, such as: roughers, scavenger, cleaners, pumping system, in-line assay system PC12. Start the floatation system and ensure adequate flow PC13. Control the quantity of reagents, percent solid, addition of air, level of froth/pulp, launder water, pump speed, pH level PC14. Stop floatation circuit in sequence PC15. Guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel
Conduct dewatering	PC16. Ensure that the reagent systems contain proper amount, type and strength of reagents PC17. Identify different types of dewatering systems include: stock tanks, decanters, pumping systems, sampling systems, rakes, drive system, feed wells PC18. Operate and maintain dewatering system while checking the shell,

	rakes (e.g. height, integrity), motor and gear box for unusual noises, U/F pumps, water supply, pumps and valves etc PC19. Guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel
Conduct filtration	PC20. Identify the different types of filtration systems and components including stock tanks, pumping systems, sampling systems, drive systems, lubrication systems, hydraulic systems, pneumatic systems, vacuum systems, filter cloth PC21. Check the functioning of vacuum system, gear box, bearings etc PC22. Check the condition of the filter (e.g. thickness of filter cake) PC23. Conduct filtration while controlling the moisture, filtrate, wash water, pump speed, pressure, density etc PC24. Monitor boot levels and agitation PC25. Guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel
Knowledge and Understanding (K) w.r.t. the scope	
Element	**Knowledge and Understanding**
A. **Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))**	The user/individual on the job needs to know and understand: KA1. Different types of mines and detail of the mine he is working in KA2. Mine Organisation, time keeping, need for discipline and punctuality KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Duties of workmen KA7. Provision of wages, working hours and accident compensation KA8. Knowledge of mining safety procedures KA9. Impact of violation of safely procedures
B. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KB1. relevant standards and procedures followed in the company KB2. processes like Ore Extraction, Procurement, Store management, inventory management, quality management and key contact points for query resolution
C. Technical Knowledge	The user/individual on the job needs to know and understand: KC1. different types of ore processing processes and associated equipment KC2. Various alarms, pumps, screens, monitors etc KC3. Reagents such as acids, carbon, cyanide, calcium as per the process requirements KC4. various separation systems like drive system, drums, concentrators, jigs, classifiers etc KC5. different types of floatation equipment including floatation air,

	bank of cells, conditioner, collector, floatation column, cells, such as: roughers, scavenger, cleaners, pumping system, in-line assay system, scrubbers etc KC6. different types of dewatering systems include: stock tanks, decanters, pumping systems, sampling systems, rakes, drive system, feed wells KC7. equipment like shell, rakes (e.g. height, integrity), motor and gear box for unusual noises, U/F pumps, etc KC8. different types of filtration systems and components including stock tanks, pumping systems, sampling systems, drive systems, lubrication systems, hydraulic systems, pneumatic systems, vacuum systems, filter cloth KC9. vacuum system, gear box, bearings, PLC, RLC operation (Logic controls), Pump, hydraulic systems, motors, valves etc KC10. hazards and safety aspects involved in ore processing activities and usage of relevant PPEs
Skills (S) w.r.t. the scope	
Element	**Skills**
A. Core Skills/ Generic Skills	**Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA1. document information from the sketches and engineering drawings SA2. prepare draft drawings for the final output product note down observations (if any) related to the welding process SA3. write information documents to internal departments/ internal teams or enter the information in online ERP systems under guidance of the supervisor
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA4. read and interpret engineering drawing and sketches SA5. read and interpret symbols and measurements used in the drawings SA6. read equipment manuals and process documents to understand the equipment and processes better SA7. read internal information documents sent by internal teams
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA8. discuss task lists, schedules and activities with the supervisor SA9. effectively communicate with the team members SA10. question the operator/ supervisor in order to understand the nature of the problem and to clarify queries SA11. attentively listen with full attention and comprehend the information given by the speaker
B. Professional Skills	**Plan and Organize**
	The user/individual on the job needs to know and understand how to:

	SB1. plan and organize the work order and jobs received from the Operator SB2. organize all process/ equipment manuals so that sorting/ accessing information is easy SB3. support the supervisor in scheduling tasks for helper and assistant supervisor
	Judgment and Critical Thinking
	The user/individual on the job needs to know and understand how to: SB4. use common sense and make judgments during day to day basis SB5. use reasoning skills to identify and resolve basic problems SB6. use intuition to detect any potential problems which could arise during operations
	Desire to learn and take initiatives
	The user/individual on the job needs to know and understand how to: SB7. follow instructions and work on areas of improvement identified SB8. complete the assigned tasks with minimum supervision SB9. complete the job defined by the supervisor within the timelines and quality norms
	Problem Solving and Decision making
	The user/individual on the job needs to know and understand how to: SB10. detect problems in day to day tasks SB11. support supervisor in using specific problem solving techniques and detailing out the problems SB12. discuss possible solution with the supervisor for problem solving SB13. make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined)

NOS Version Control

NOS Code	MIN/ N0497		
Credits(NSQF)	TBD	Version number	1.0
Industry	Mining	Drafted on	15/12/2014
Industry Sub-sector	Open cast and Underground Mines	Last reviewed on	24/03/2015
Occupations	Ore Processing	Next review date	24/03/2017

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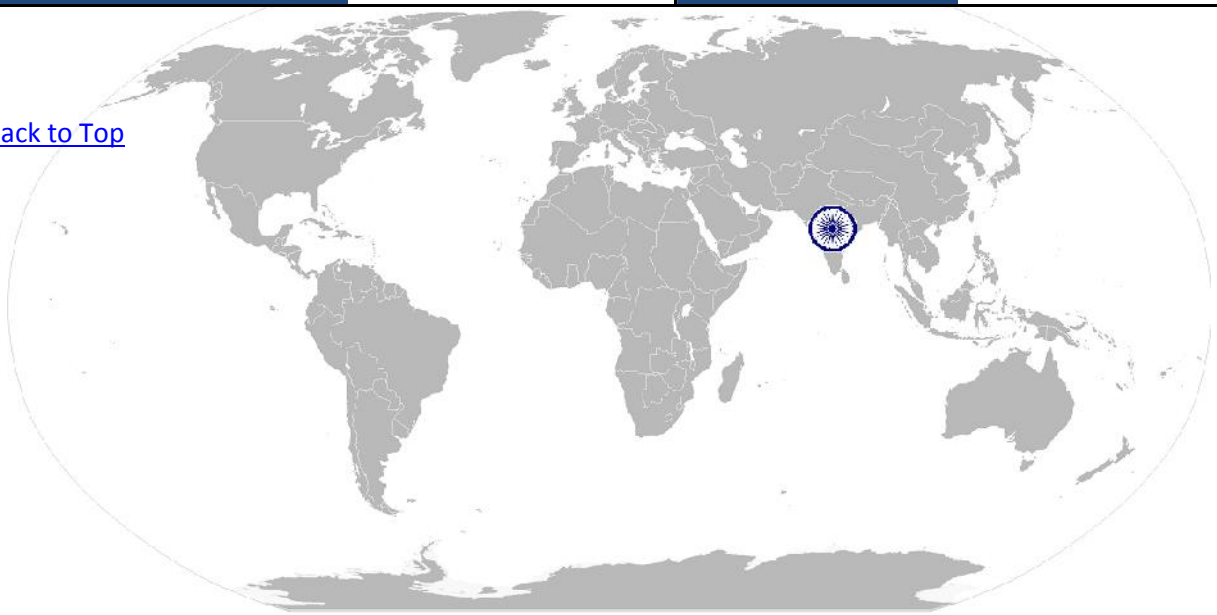

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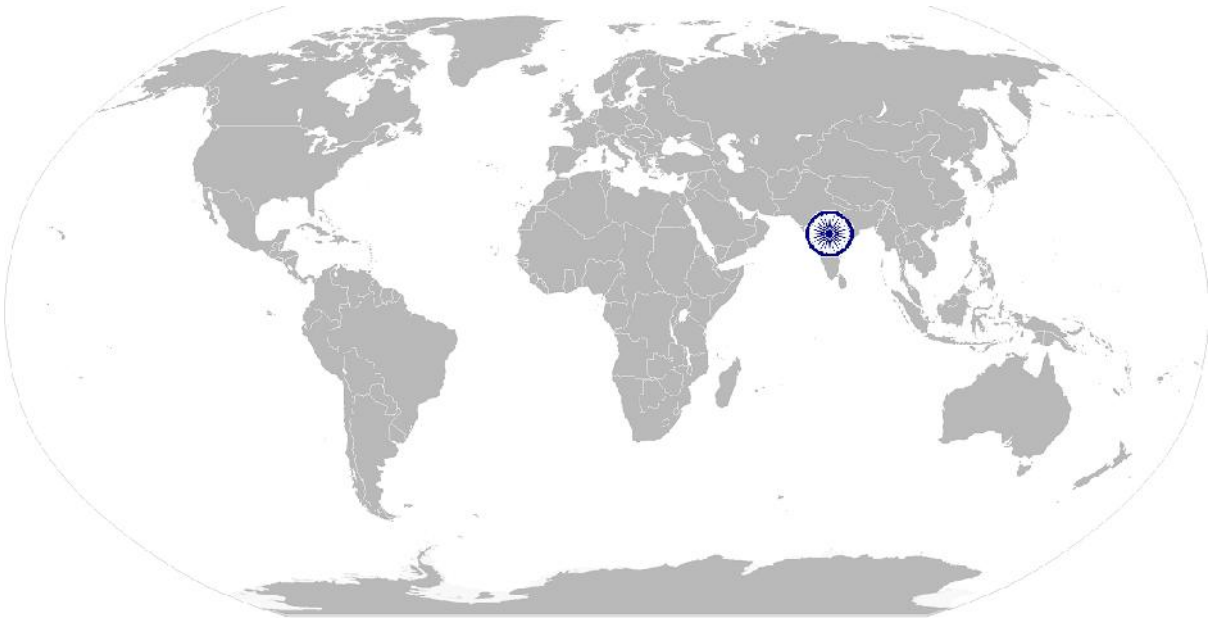

Overview

This unit is about treating the water and managing the tailings post filtration

MIN/ N0498 Manage Tailings

National Occupational Standard

Unit Code	MIN/ N0498
Unit Title (Task)	Manage tailings
Description	This OS unit is about treating the water and managing the tailings post filtration
Scope	This unit/task covers the following: • Treating the water and managing the tailings

Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Treat the water	PC1. Obtain water from the mineral recovery unit and send the same to treatment area PC2. Treat water for chemicals and purify the same to make it fit for reclamation purposes PC3. Send water to reclamation area (settling ponds) PC4. Sample water and monitor levels of ponds
Manage the tailings	PC5. Treat the tailings to reduce the toxin levels PC6. Check the pH level PC7. Dispose of tailings to the appropriate area

Knowledge and Understanding (K) w.r.t. the scope	
Element	**Knowledge and Understanding**
A. **Regulatory context** (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))	The user/individual on the job needs to know and understand: KA1. Different types of mines and detail of the mine he is working in KA2. Mine Organisation, time keeping, need for discipline and punctuality KA3. Benching in quarries, Dressing of overhangs, Undercuts, Fencing, First aid and Hygiene KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Duties of workmen KA7. Provision of wages, working hours and accident compensation KA8. Knowledge of mining safety procedures KA9. Impact of violation of safely procedures
B. Organizational Context (Knowledge of the company / organization and its processes)	The user/individual on the job needs to know and understand: KB1. relevant standards and procedures followed in the company KB2. processes like Ore Extraction, Procurement, Store management, inventory management, quality management and key contact points for query resolution
D. Technical	The user/individual on the job needs to know and understand: KC1. different types of ore processing processes and associated

MIN/ N0498 Manage Tailings

Knowledge	equipment KC2. Various water purifying agents KC3. Various waste treatment agents KC4. hazards and safety aspects involved in ore processing activities and usage of relevant PPEs
Skills (S) w.r.t. the scope	
Element	**Skills**
C. Core Skills/ Generic Skills	**Writing Skills**
	The user/ individual on the job needs to know and understand how to: SA1. document information from the sketches and engineering drawings SA2. prepare draft drawings for the final output product note down observations (if any) related to the welding process SA3. write information documents to internal departments/ internal teams or enter the information in online ERP systems under guidance of the supervisor
	Reading Skills
	The user/individual on the job needs to know and understand how to: SA4. read and interpret engineering drawing and sketches SA5. read and interpret symbols and measurements used in the drawings SA6. read equipment manuals and process documents to understand the equipment and processes better SA7. read internal information documents sent by internal teams
	Oral Communication (Listening and Speaking skills)
	The user/individual on the job needs to know and understand how to: SA8. discuss task lists, schedules and activities with the supervisor SA9. effectively communicate with the team members SA10. question the operator/ supervisor in order to understand the nature of the problem and to clarify queries SA11. attentively listen with full attention and comprehend the information given by the speaker
D. Professional Skills	**Plan and Organize**
	The user/individual on the job needs to know and understand how to: SB1. plan and organize the work order and jobs received from the Operator SB2. organize all process/ equipment manuals so that sorting/ accessing information is easy SB3. support the supervisor in scheduling tasks for helper and assistant supervisor
	Judgment and Critical Thinking
	The user/individual on the job needs to know and understand how to: SB4. use common sense and make judgments during day to day basis SB5. use reasoning skills to identify and resolve basic problems

	SB6. use intuition to detect any potential problems which could arise during operations
	Desire to learn and take initiatives
	The user/individual on the job needs to know and understand how to: SB7. follow instructions and work on areas of improvement identified SB8. complete the assigned tasks with minimum supervision SB9. complete the job defined by the supervisor within the timelines and quality norms
	Problem Solving and Decision making
	The user/individual on the job needs to know and understand how to: SB10. detect problems in day to day tasks SB11. support supervisor in using specific problem solving techniques and detailing out the problems SB12. discuss possible solution with the supervisor for problem solving SB13. make decisions in emergency conditions in case the supervisor is not available(as per the authority matrix defined)

NOS Version Control

NOS Code	**MIN/ N0498**		
Credits(NSQF)	**TBD**	**Version number**	**1.0**
Industry	**Mining**	**Drafted on**	**15/12/2014**
Industry Sub-sector	**Open cast and Underground Mines**	**Last reviewed on**	**24/03/2015**
Occupations	**Ore Processing**	**Next review date**	**24/03/2017**

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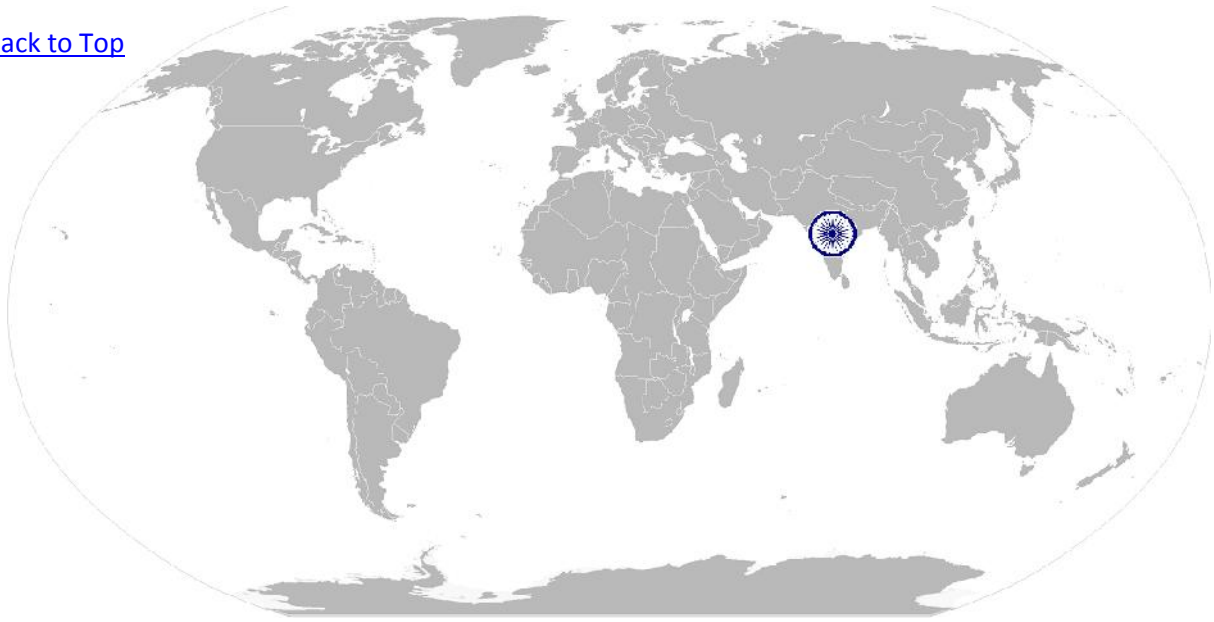

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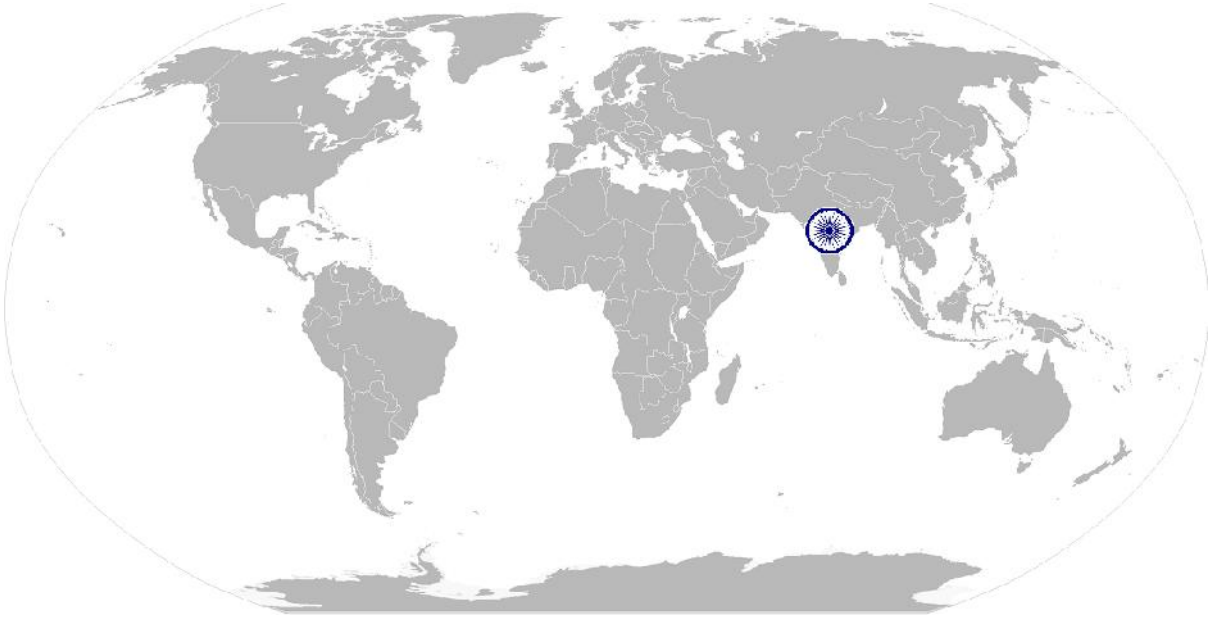

Overview

This unit is about health and safety measures critical in mines

National Occupational Standard

Unit Code	MIN/N 0901
Unit Title (Task)	**Health and Safety**
Description	This unit is about health and safety measures critical in mines
Scope	This OS unit/task covers the following: • Health and safety measures critical in mines
Performance Criteria (PC) w.r.t. the Scope	
Element	**Performance Criteria**
Safety, Security and Administrative	To be competent, the user/individual on the job must be able to: PC1. Comply with occupational health and safety regulations adopted by the employer. PC2. Follow mining operations procedures with respect to materials handling and accidents PC3. Follow the correct safety steps in case of accident or major failure PC4. Comply with safety regulations and procedures in case of fire hazard. PC5. Operate various grades of fire extinguishers. PC6. Work responsibly and as safe and careful as possible so as not to put the health and safety of self or others at risk, including members of the public PC7. Perform storage and transport of hazardous materials compliant with safety guidelines prescribed by DGMS. PC8. Deal with misfires as per statutory requirement PC9. Identify characteristics of post-blast fumes and take necessary precautions. PC10. Wears safety gear such as hard hat, respiratory protection, eye protection, ear protection PC11. Follow the manufacturer's instructions for care and safe operation of the equipment.

Knowledge and Understanding (K)	
A. **Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))**	The user/individual on the job needs to know and understand: KA1. Benching in quarries, Dressing of overhangs, undercuts, Fencing KA2. First aid and Hygiene KA3. Code of traffic in specific areas of mine. Significance of fences KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Knowledge of mining safety procedures KA7. Impact of violation of safety procedures KA8. Locally prepared Emergency Preparedness / Disaster Management Plan. KA9. Environmental impact of mining KA10. Sources of dust, noise and vibration and measures to minimise KA11. Hazardous material safety and security rules and regulations as prescribed by DGMS KA12. Code of practice for safe handling and transport of dangerous material and heavy equipment.

NOS Version Control

NOS Code	MIN/N 0901		
Credits(NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	15/12/2014
Sub-sector	Open cast and Underground Mines	Last reviewed on	24/03/2015
Occupation	Ore Processing	Next review date	24/03/2017

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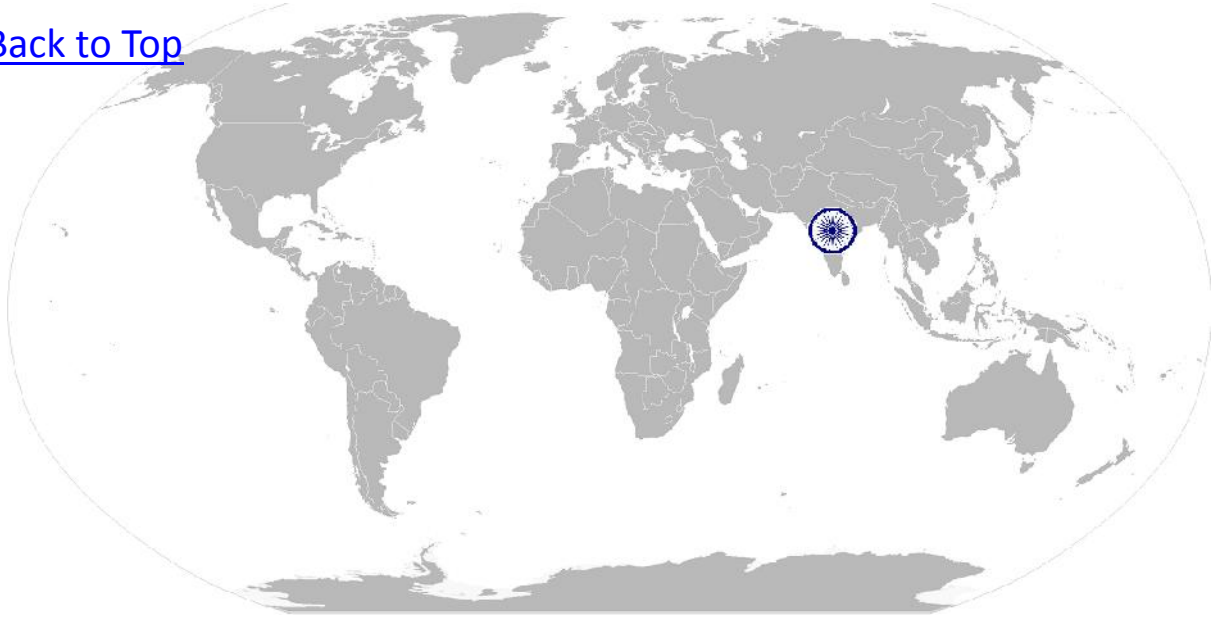

CRITERIA FOR ASSESSMENT OF TRAINEES

Ore Processing Operator

MIN/ Q 0434

Skill Council for Mining Sector

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

				Marks Allocation	
Assessable Outcome	**Assessment criteria**	**Total Mark (100)**	**Out Of**	**Theory**	**Skills Practical**
1. MIN/ N 0493 (Understand process, reagents and equipment requirement to complete the task)	PC1. Understand the ore processing methodology and process to be adopted through discussions with the supervisor and reading the process manuals/ Work Instructions/Standard Operating Procedures	**15**	2	1	1
	PC2. Understand various reagents and their quantities to be used as well as effective reagents handling techniques		2	1	1
	PC3. Monitor the reagent addition rate and mix tank levels continuously during the ore processing		2	1	1
	PC4. Understand the various tools to be used at different steps of ore processing like hand & power tools, pneumatically & hydraulically powered tools, scaffolds, ladders etc		3	2	1
	PC5. Understand the operations of various equipment used at various stages like mobile equipment and lifting equipment.		2	1	1
	PC6. Understand the operations for various tools & equipment as well as the effective equipment handling guidelines		2	1	1

	PC7. Prepare for the emergency situations with required instructions and equipment in place		2	1	1
		Total	**15**	**8**	**7**
2. MIN/ N 0494 (Convey the material from the mine for processing)	PC1. Understand the layout and components of belt conveyor system including its principal components like screw, trough, scrapers, conveyor belt, clips, roller chains, guards, tensioners, feed and discharge chutes, head, tail and take-up pulleys, bearings, braking system, controls such as switches, trip cords, Inter locks, alarms, etc. and operations of mechanical and electrical driving units including safety devices	**15**	2	1	1
	PC2. Conduct conveying of the ore to the processing unit considering parameters like feed/ material rate, alignment of conveyor belts, spillage amount and rate, conveyor jams etc.		2	1	1
	PC3. Take corrective actions against any safety hazards like spillage etc.		1	1	0
	PC4. Conduct operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction, lubrication of conveyors, leaks, ensure magnets are operative; Take corrective actions		2	1	1
	PC5. Ensure principal components of hoppers and bins, like grizzly rails, chutes, guardrails, etc. are deployed to control stockpile levels, stability of stockpiles, clearing of the obstruction etc.		2	1	1
	PC6. Understand the layout and components of feeders including chains, pans, bearings, rollers, shafts, feed/discharge chute, drive mechanisms, lubrication systems, controls, drive belts, hangers/cables, etc.		2	1	1
	PC7. Conduct feeding of the ore to the crusher considering parameters like feed/ material rate, tilt, jams etc.		2	1	1
	PC8. Take corrective actions against any safety hazards like spillage etc and issues like unusual noises/ smells, blockages and obstruction, lubrication, leaks, etc.		2	1	1
		Total	**15**	**8**	**7**

3. MIN/ N 0495 (Crush the material/ feed from the mine)	PC1. Understand the components towards crushing of the material like drive mechanism, pulleys, crushers, etc.	**15**	2	1	1
	PC2. Conduct crushing operations by controlling the feed/material by adjusting opening of gates, chutes and gaps, adjusting speed of feeder, adjusting speed of conveyor, controlling dust by using dust collectors, water sprays, remove and clean excess spillage, etc.		3	2	1
	PC3. Conduct operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction, leaks etc., take corrective actions		3	2	1
	PC4. Identify the areas of blockage and clear the crushing blockages periodically		2	1	1
	PC5. Understand the requirements for separating feed/material and working around screens, including reporting, control of dust, load limitations, control of feed/material flow rate		3	2	1
	PC6. Conduct operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction, leaks etc., take corrective actions		2	1	1
		Total	**15**	**9**	**6**
4. MIN/ N 0496 (Grind the material/ feed)	PC1. Understand the layout and components of mills including its principal components like drive motor, motor cooling fan, drive shaft and bearings, clutch, pinion gear, feed chute, shell, liners, lifters and bolts, ring/bull gear, trunnion and bearings, trommel screen, lubrication system, grinding media, controls, like main disconnect, Interlocks, stop/start switches (remote/local), selector switch (remote/local), cooling system(s), sound boxes etc.	**15**	2	1.5	0.5
	PC2. Conduct grinding/ classifier operations considering parameters like load limitations, charging grinding media as required, control of dust, control of feed/material flow rate, control and maintenance of densities, sampling and testing, proper grind,		2	1.5	0.5

	reagent addition etc.				
	PC3. Ensure the following: control switches are operative and free of build-up and/or obstructions lubrication system(s) are at required levels cooling system(s) are operative and at required levels feed and discharge points are free of obstructions and blockages.		2	1.5	0.5
	PC4. Guard all identified hazards using rope/bafflers and/or signs, clean up spills and leaks, etc.		2	1	1
	PC5. Inspect classifier and components, such as: feed gate, discharge point, trash screen, guards, cyclone, feed lines, launders, skirting, upstream and downstream equipment and related systems, rollers, Spirals.		2	1	1
	PC6. Ensure wear fall arrest system, control required quantity/quality of discharge by: sampling and testing as required, adjusting water flow, adjusting feed rate, control dust by using: dust collectors, water sprays, ensure minimum spillage, etc.		2	1	1
	PC7. Control density (percent solid, SG) by sampling.		1	1	0
	PC8. Conduct operational checks on areas of potential issues like unusual noises/ smells, blockages and obstruction; Take corrective actions.		2	1	1
		Total	**15**	**9.5**	**5.5**
5. MIN/ N 0497 (Recover the minerals)	PC1. Conduct checks on various operational parameters like tank level, pH level, reagent usage, air parameters, alarms, pumps, screens, monitors etc.	**15**	0.6	0.4	0.2
	PC2. Add reagents as required, such as acids, carbon, cyanide, calcium as per the process requirements.		0.6	0.4	0.2
	PC3. Conduct leaching/ ore beneficiation process to extract the minerals from the grinded ores.		0.6	0.4	0.2
	PC4. Check and monitor Threshold Limit Values (TLVs).		0.6	0.4	0.2
	PC5. Guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel.		0.6	0.4	0.2
	PC6. Check various separation systems like drive system, drums, concentrators, jigs, classifiers etc.		0.6	0.4	0.2

	PC7. Check various operating parameters like operating levels, pressures, cleanliness	0.6	0.4	0.2
	PC8. Ensure the maintenance of flow rate	0.6	0.4	0.2
	PC9. Check and monitor Threshold Limit Values (TLVs)	0.6	0.4	0.2
	PC10. Guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel	0.6	0.4	0.2
	PC11. Identify the different types of floatation equipment including floatation air, bank of cells, conditioner, collector, floatation column, cells, such as: roughers, scavenger, cleaners, pumping system, in-line assay system	0.6	0.4	0.2
	PC12. Start the floatation system and ensure adequate flow	0.6	0.4	0.2
	PC13. Control the quantity of reagents, percent solid, addition of air, level of froth/pulp, launder water, pump speed, pH level	0.6	0.4	0.2
	PC14. Stop floatation circuit in sequence	0.6	0.4	0.2
	PC15. Guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel	0.6	0.4	0.2
	PC16. Ensure that the reagent systems contain proper amount, type and strength of reagents	0.6	0.4	0.2
	PC17. Identify different types of dewatering systems include: stock tanks, decanters, pumping systems, sampling systems, rakes, drive system, feed wells	0.6	0.4	0.2
	PC18. Operate and maintain dewatering system while checking the shell, rakes (e.g. height, integrity), motor and gear box for unusual noises, U/F pumps, water supply, pumps and valves etc.	0.6	0.4	0.2
	PC19. Guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel	0.6	0.4	0.2
	PC20. Identify the different types of filtration systems and components including stock tanks, pumping systems, sampling systems, drive systems, lubrication	0.6	0.4	0.2

	systems, hydraulic systems, pneumatic systems, vacuum systems, filter cloth				
	PC21. Check the functioning of vacuum system, gear box, bearings etc.		0.6	0.4	0.2
	PC22. Check the condition of the filter (e.g. thickness of filter cake)		0.6	0.4	0.2
	PC23. Conduct filtration while controlling the moisture, filtrate, wash water, pump speed, pressure, density etc.		0.6	0.4	0.2
	PC24. Monitor boot levels and agitation		0.6	0.4	0.2
	PC25.Guard all identified hazards using rope/barriers and/or signs, clean up spills and leaks, report condition to appropriate personnel		0.6	0.4	0.2
		Total	**15**	**10**	**5**
6. MIN/ N 0498 (Manage the tailings)	PC1. Obtain water from the mineral recovery unit and send the same to treatment area	**15**	2	1.5	0.5
	PC2. Treat water for chemicals and purify the same to make it fit for reclamation purposes		3	2	1
	PC3. Send water to reclamation area (settling ponds)		2	1.5	0.5
	PC4. Sample water and monitor levels of ponds		2	1.5	0.5
	PC5. Treat the tailings to reduce the toxin levels		2	1.5	0.5
	PC6. Check the pH level		2	1.5	0.5
	PC7. Dispose of tailings to the appropriate area		2	1.5	0.5
		Total	**15**	**11**	**4**
7. MIN/ N 0901 (Health and Safety)	PC1. Comply with occupational health and safety regulations adopted by the employer.	**10**	1	0.5	0.5
	PC2. Follow mining operations procedures with respect to materials handling and accidents		1	0.5	0.5
	PC3. Follow the correct safety steps in case of accident or major failure		1	0.5	0.5
	PC4. Comply with safety regulations and procedures in case of fire hazard.		0.5	0.5	0
	PC5. Operate various grades of fire extinguishers.		0.5	0.5	0
	PC6. Work responsibly and safely and careful as possible so as not to put the health and safety of self or others at risk, including members of the public		0.5	0.5	0

	PC7. Perform storage and transport of hazardous materials compliant with safety guidelines prescribed by DGMS.		0.5	0.5	0
	PC8. Deal with misfires as per statutory requirement		1	0.5	0.5
	PC9. Identify characteristics of post-blast fumes and take necessary precautions.		1	0.5	0.5
	PC10. Wears safety gear such as hard hat, respiratory protection, eye protection, ear protection		2	0.5	1.5
	PC11. Follow the manufacturer's instructions for care and safe operation of the equipment.		1	0.5	0.5
		Total	**10**	**5.5**	**4.5**