Skill Council For Mining Sector

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

NCVET
कौशल गुणवत्ता प्रगति

N·S·D·C
RE IMAGINE FUTURE

Qualification Pack

Mine Electrician

Electives: U/G Metal/ Opencast/ U/G Coal/ Rare Earth Plant

Options: U/G Installation/ Rare Earth Installation

QP Code: MIN/Q3101

Version: 2.0

NSQF Level: 4

Skill Council for Mining Sector || FIMI House, B-311, Okhla Industrial Area, Phase-I
New Delhi-110020

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Qualification Pack

MIN/Q3101: Mine Electrician

Brief Job Description

Mine Electrician ensures installation, operation and maintenance (O&M) of the electrical substations, equipment and electrical supply system. The role holder also ensures that all the electrical systems and machinery work is in accordance with relevant specifications for opencast and underground mines (including gassy mines).

Personal Attributes

This job requires quality consciousness, safety orientation, physique to sustain strenuous conditions and dexterity.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. MIN/N3101: Identify work requirements, related processes and arrange equipment for electrical system
2. MIN/N3102: Install the electrical systems/sub-stations and equipment
3. MIN/N3103: Operate and maintain electrical systems/substation and equipment
4. DGT/VSQ/N0102: Employability Skills (60 Hours)

Electives*(mandatory to select at least one):*

Elective 1: U/G Metal

This unit is about adhering to health, safety and environmental guidelines in Underground Metalliferous Mines (UMM) during execution of various tasks, operations and maintenance.

1. MIN/N1702: Follow Health, Safety and Environmental guidelines for Underground Metalliferous Mines (UMM) (Including Mine Vocational Training Rule and Mine Rescue Rule)

Elective 2: Opencast

This unit is about adhering to health, safety and environmental guidelines in the Open Cast Mines during execution of various tasks, operations and maintenance.

1. MIN/N1703: Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule)

Elective 3: U/G Coal

This unit is about adhering to health, safety and environmental guidelines in Underground Coal Mines (UCM) during execution of various tasks, operations and maintenance.

1. MIN/N1704: Follow Health, Safety, and Environmental guidelines for underground coal mines (Including Mine Vocational Training Rule and Mine Rescue Rule)

Elective 4: Rare Earth Plant

This unit is about adhering to health, safety and environmental guidelines critical in RE chemical plants.

1. MIN/N1705: Follow Health, Safety and Environmental guidelines for Rare Earth (RE) Chemical plant

Options*(Not mandatory):*

Option 1: U/G Installation

This unit is about complying with unique requirements for installations, operations and maintenance (O&M) of electrical systems in U/G Mines.

1. MIN/N3104: Comply with unique requirements for installation and operations and maintenance (O&M) of electrical system in U/G Mines

Option 2: Rare Earth Installation

This unit is about installing, operating and maintaining the required electrical systems for substation machinery and electrical equipment as per the required specifications and industry standard in Rare Earth Chemical Plants.

1. MIN/N3105: Comply with unique requirements for Installation and O&M in Rare Earth Chemical Plant

Qualification Pack (QP) Parameters

Sector	Mining
Sub-Sector	Engineering Services
Occupation	Electrical Services
Country	India
NSQF Level	4
Credits	25

Qualification Pack

Aligned to NCO/ISCO/ISIC Code	NCO-2015/7411.0200
Minimum Educational Qualification & Experience	8th grade pass plus 2-year NTC plus 1 Year NAC OR 8th pass plus 1-year NTC plus 1-Year NAC plus CITS OR 10th grade pass and pursuing continuous schooling OR 10th grade pass (with 2 years relevant experience) OR Previous relevant Qualification of NSQF Level (3.0 Jr. Mine Electrician with minimum education as 5th Grade pass with 2 years relevant experience)
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	valid gas testing certificate (only for underground coal mines)
Minimum Job Entry Age	20 Years
Last Reviewed On	NA
Next Review Date	17/11/2025
NSQC Approval Date	17/11/2022
Version	2.0
Reference code on NQR	2022/MIN/SCMS/06981
NQR Version	1

Remarks:

Total Notional Duration: 450 Hours; Additional 60 hours for Optional NOS= Domain Theory Duration: 90 Hours; Additional 20 hours for Optional NOS Theory Duration+ Domain Practical Duration: 150 Hours; Additional 20 hours for Optional NOS Practical Duration+ Domain OJT (Mandatory) Duration: 150 Hours; Additional 20 hours for Optional NOS OJT Duration+ Employability Skills Duration: 60 Hours

MIN/N3101: Identify work requirements, related processes and arrange equipment for electrical system

Description

This unit is about identifying the work and the process requirements of electrical system operation, upkeep and maintenance and the activities & equipment associated with the process to complete the job requirement.

Scope

The scope covers the following :

- Identify the work and process requirements
- Arrange the electrical equipment/machinery/materials to conduct the processes

Elements and Performance Criteria

Identify the work and process requirements

To be competent, the user/individual on the job must be able to:

PC1. interpret all the work instructions/ work orders/ work related documents given by the supervisor to understand the requirements for electrical substations/ electrical equipment/ electrical wiring or fixtures

PC2. interpret the required work output

PC3. identify the safety requirement for mines as per CEA regulation 2010

PC4. interpret various electrical layout and discuss with supervisor, in case of any doubt

PC5. identify various type of fire protection system and its uses

PC6. interpret schematic line diagram of substation and associated installations

PC7. interpret the specifications of various systems within electrical substations/ transmission of electricity/operation of electrical equipment/ electrical wiring or fixtures as mentioned in the work instructions/ SOP/ Control Diagrams

PC8. prepare/follow sketches/blueprints to determine the location of wiring or equipment ensuring conformance to safety codes

Arrange the electrical equipment/machinery/materials to conduct the processes

To be competent, the user/individual on the job must be able to:

PC9. arrange the resources as per the specifications in the work instructions for installation of electrical substations/equipment/ wiring or fixtures

PC10. arrange various tools, equipment, measuring apparatus required to perform the job

PC11. ensure that the required electrical equipment are in proper working condition

PC12. check test equipment (Volt-Ohm Meter) on a known live source of same rating to ensure it works correctly

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. risk and impact of not following defined procedures/work instructions
KU2. cost of equipment and loss for the company that results from damage of equipment
KU3. implications of delays in the process
KU4. different types of mines and detail of the mine one is working in
KU5. code of practice in specific areas of the mine
KU6. about shot-firing / blasting related safety regulations including taking shelter during blasting
KU7. duties of workmen under the Mines Act-1952
KU8. provision of compensation and working hours, leaves, etc. as per Mines Act-1952
KU9. the outcome of violation of safety procedures
KU10. different types of electrical systems and their specifications
KU11. different types of electrical requirements in the mine
KU12. processes like procurement, store management, inventory management, quality management, etc.
KU13. key contact points for query resolution
KU14. different units of measurement related to electricity like Watt (for power), Ampere (for current), Ohm (for resistance), Volt (for potential difference), Hertz (for frequency) etc.
KU15. about various symbols for electrical drawings and circuit diagrams for the electrical systems/equipment for installation/maintenance
KU16. about different types of tools and tackles used in an electrical job
KU17. different types of measuring instruments
KU18. statutory provisions under relevant electrical laws and rules prescribed by relevant authority
KU19. hazards and safety aspects involved in electrical job and usage of relevant PPEs
KU20. basic working principle of equipment like transformers, switchgears, relays etc.
KU21. Indian Electricity Rules framework

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. note down observations (if any)
GS2. read and interpret symbols and readings
GS3. read information documents
GS4. effectively communicate, listen and comprehend the information given by various sources about the site
GS5. make decisions pertaining to the concerned area of work
GS6. plan and organize the work order and tasks
GS7. detect problems in day to day tasks
GS8. find solutions to problems and resolve them
GS9. make decisions in emergency conditions
GS10. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Identify the work and process requirements	**19**	**29**	**-**	**14**
PC1. interpret all the work instructions/ work orders/ work related documents given by the supervisor to understand the requirements for electrical substations/ electrical equipment/ electrical wiring or fixtures	2	4	-	3
PC2. interpret the required work output	3	2	-	2
PC3. identify the safety requirement for mines as per CEA regulation 2010	2	4	-	1
PC4. interpret various electrical layout and discuss with supervisor, in case of any doubt	3	3	-	1
PC5. identify various type of fire protection system and its uses	2	2	-	1
PC6. interpret schematic line diagram of substation and associated installations	2	4	-	2
PC7. interpret the specifications of various systems within electrical substations/ transmission of electricity/operation of electrical equipment/ electrical wiring or fixtures as mentioned in the work instructions/ SOP/ Control Diagrams	3	4	-	2
PC8. prepare/follow sketches/blueprints to determine the location of wiring or equipment ensuring conformance to safety codes	2	6	-	2
Arrange the electrical equipment/machinery/materials to conduct the processes	**11**	**21**	**-**	**6**
PC9. arrange the resources as per the specifications in the work instructions for installation of electrical substations/equipment/ wiring or fixtures	2	5	-	1
PC10. arrange various tools, equipment, measuring apparatus required to perform the job	3	5	-	2
PC11. ensure that the required electrical equipment are in proper working condition	3	5	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. check test equipment (Volt-Ohm Meter) on a known live source of same rating to ensure it works correctly	3	6	-	2
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N3101
NOS Name	Identify work requirements, related processes and arrange equipment for electrical system
Sector	Mining
Sub-Sector	Engineering Services
Occupation	Electrical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	27/01/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N3102: Install the electrical systems/sub-stations and equipment

Description

This NOS is about installing electrical systems/sub-stations and electrical equipment as per the specifications required and industry standards.

Scope

The scope covers the following :

- Installation of the electrical supply system and equipment

Elements and Performance Criteria

Installation of the electrical supply system and equipment

To be competent, the user/individual on the job must be able to:

PC1. use various types of electrical tools and measuring instruments for installation of various electrical system and equipment

PC2. install the required electrical supply systems including transformers, generators, circuit breakers, isolators, bus bars, etc., as per required specified voltage, current, power, energy, frequency, RPM, etc. by using measuring instruments

PC3. install required electrical equipment like motors, fans, lighting fixtures, ACs, heaters, compressors, pumps etc.

PC4. follow the procedure of obtaining work permit from competent person

PC5. conduct a test to ensure the performance of installed electrical equipment as per the defined specifications

PC6. make modifications in the parameters (by selecting the right program from the machine control system), if required, and ensure alignment with the prescribed standards

PC7. examine all conductors for adequate current carrying capacity and ensure that joints in conductors are properly soldered

PC8. check electrical insulation and protection of all live parts (parts carrying current)

PC9. ensure all equipment are flameproof

PC10. use special precautionary techniques, personal protective equipment (PPE), insulating and shielding materials and tools while working with energized parts

PC11. ensure that hand cords and receptacles are dry when plugging and unplugging power cables

PC12. identify the criticality of installation operation

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. risk and impact of not following defined procedures/work instructions

KU2. the hierarchy for reporting identified problems

KU3. cost of equipment and loss for the company that results from damage of equipment

KU4. implications of delays in the process

KU5. safety guidelines specified by Directorate General of MInes Safety (DGMS) specific to electricity related operations

KU6. benching in quarries, dressing of overhangs, undercuts, fencing

KU7. importance of safety in the vicinity of machinery

KU8. the electrical layout and the plan showing the position of all fixed apparatus and conductors therein (provisions of Indian Electricity Act, Mines Act, and other regulations)

KU9. technical concepts of different types of circuit breakers, switchgear, and their controls

KU10. technical concepts of various sensors, special wiring requirements, relays and single-phase preventers, step down system 550/110/9V (Volt) intrinsically safe low voltage equipment, etc.

KU11. manufacturer recommendations for troubleshooting and maintenance

KU12. the process of laying cables, cable jointing, vulcanizing of trailing cable

KU13. allowed voltage restrictions for hand-held portable apparatus (e.g. not exceeding 125 volts)

KU14. about maximum stresses, factors of safety and connection with earth-as per the Indian Electricity Rules (IER)

KU15. importance of the provision made for immediate and automatic discharge of every static condenser on disconnection of supply

KU16. provisions applicable for medium, high, or extra-high voltage installations as per section 51 of IER

KU17. sketches and engineering drawings for the installation of electrical systems

KU18. different types of electrical tools and machinery

KU19. hazards and safety aspects involved and usage of relevant PPEs

KU20. electrical defects and how they are generated and can be prevented

KU21. how to work with flameproof equipment

KU22. about clearance between equipment as per CEA (Central Electricity Authority) Regulations 2010

KU23. earthing system for underground mines (Restricted neutral earthing, Neutral Grounding Resistors (NGR), etc.)

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. note down observations (if any)

GS2. read and interpret symbols and readings

GS3. read information documents

GS4. effectively communicate, listen and comprehend the information given by various sources about the site

GS5. make decisions pertaining to the concerned area of work

GS6. plan and organize the work order and tasks

GS7. organize all operation and service manuals so that sorting/ accessing information is easy

GS8. detect problems in day to day tasks

GS9. find solutions to problems and resolve them
GS10. make decisions in emergency conditions
GS11. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Installation of the electrical supply system and equipment	**30**	**50**	**-**	**20**
PC1. use various types of electrical tools and measuring instruments for installation of various electrical system and equipment	3	5	-	1
PC2. install the required electrical supply systems including transformers, generators, circuit breakers, isolators, bus bars, etc., as per required specified voltage, current, power, energy, frequency, RPM, etc. by using measuring instruments	4	6	-	2
PC3. install required electrical equipment like motors, fans, lighting fixtures, ACs, heaters, compressors, pumps etc.	2	4	-	2
PC4. follow the procedure of obtaining work permit from competent person	2	2	-	1
PC5. conduct a test to ensure the performance of installed electrical equipment as per the defined specifications	2	6	-	1
PC6. make modifications in the parameters (by selecting the right program from the machine control system), if required, and ensure alignment with the prescribed standards	3	6	-	2
PC7. examine all conductors for adequate current carrying capacity and ensure that joints in conductors are properly soldered	2	4	-	1
PC8. check electrical insulation and protection of all live parts (parts carrying current)	2	6	-	2
PC9. ensure all equipment are flameproof	3	3	-	2
PC10. use special precautionary techniques, personal protective equipment (PPE), insulating and shielding materials and tools while working with energized parts	3	4	-	2

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC11. ensure that hand cords and receptacles are dry when plugging and unplugging power cables	3	2	-	2
PC12. identify the criticality of installation operation	1	2	-	2
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N3102
NOS Name	Install the electrical systems/sub-stations and equipment
Sector	Mining
Sub-Sector	Engineering Services
Occupation	Electrical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	27/01/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N3103: Operate and maintain electrical systems/substation and equipment

Description

This unit is about operations and maintenance (O&M) of electrical systems/ substations and electrical equipment.

Scope

The scope covers the following :

- Perform electrical operations
- Maintenance procedures

Elements and Performance Criteria

Perform electrical operations

To be competent, the user/individual on the job must be able to:

PC1. ensure that the electrical circuit is locked and tagged properly to make it safe to work, before starting the work

PC2. operate various electrical equipment such as motor, pump, fan etc.

PC3. maintain the records of electrical job related documents as per the statutory requirements

PC4. run the installed electrical equipment in the substation to generate and distribute the electricity to the entire mine area with back-ups and redundancies

Maintenance procedures

To be competent, the user/individual on the job must be able to:

PC5. follow the procedure to discharge electrical circuit before repair and maintenance

PC6. follow the maintenance schedule given by electrical supervisors/engineers

PC7. repair and maintain the different electrical equipment as per manufacturer's guidelines/SOPs and statutory requirements (if any)

PC8. carry out preventive and break down maintenance for generators, transformers, circuit breakers, isolators, bus bars, control panels, switchboards, wiring, protective relays etc.

PC9. inspect electrical equipment to identify electrical risks, hazards, defects or the need for adjustment /repair

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. job-specific documents e.g. daily maintenance checklist and importance of the same

KU2. risk and impact of not following defined procedures/work instructions

KU3. the hierarchy for reporting identified problems

KU4. cost of equipment and loss for the company that results from damage of equipment

KU5. implications of delays in the process
KU6. safety guidelines specified by Directorate General of MInes Safety (DGMS) specific to electricity relevant operations
KU7. basic principles of electrical energy, and O&M of electrical systems
KU8. about different types of tools and electrical equipment
KU9. electrical hazards and its safety aspects
KU10. statutory requirements for respective electrical systems
KU11. causes and prevention of electrical defects/malfunctions
KU12. working of electrical systems and machines
KU13. about Diesel Generator (DG), mobile lighting equipment, high mast etc.
KU14. installation and handling procedures of safety devices
KU15. use of PLC, RLC, ECM etc. (Logic controls)
KU16. the process of illumination survey and its standards
KU17. electrical defects and how they are generated and can be prevented
KU18. the interlocking of equipment as per Central Electricity Authority Regulations
KU19. importance of sensitization towards different genders and persons with disabilities (PWD)

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. note down observations (if any)
GS2. read and interpret symbols and readings
GS3. read information documents
GS4. effectively communicate, listen and comprehend the information given by various sources about the site
GS5. make decisions pertaining to the concerned area of work
GS6. plan and organize the work order and tasks
GS7. organize all operation and service manuals so that sorting/ accessing information is easy
GS8. detect problems in day to day tasks
GS9. find solutions to problems and resolve them
GS10. make decisions in emergency conditions
GS11. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Perform electrical operations	**15**	**24**	**-**	**8**
PC1. ensure that the electrical circuit is locked and tagged properly to make it safe to work, before starting the work	4	6	-	1
PC2. operate various electrical equipment such as motor, pump, fan etc.	4	6	-	2
PC3. maintain the records of electrical job related documents as per the statutory requirements	3	6	-	2
PC4. run the installed electrical equipment in the substation to generate and distribute the electricity to the entire mine area with back-ups and redundancies	4	6	-	3
Maintenance procedures	**15**	**26**	**-**	**12**
PC5. follow the procedure to discharge electrical circuit before repair and maintenance	3	4	-	1
PC6. follow the maintenance schedule given by electrical supervisors/engineers	3	4	-	3
PC7. repair and maintain the different electrical equipment as per manufacturer's guidelines/SOPs and statutory requirements (if any)	3	6	-	3
PC8. carry out preventive and break down maintenance for generators, transformers, circuit breakers, isolators, bus bars, control panels, switchboards, wiring, protective relays etc.	3	6	-	2
PC9. inspect electrical equipment to identify electrical risks, hazards, defects or the need for adjustment /repair	3	6	-	3
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N3103
NOS Name	Operate and maintain electrical systems/substation and equipment
Sector	Mining
Sub-Sector	Engineering Services
Occupation	Electrical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	27/01/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

DGT/VSQ/N0102: Employability Skills (60 Hours)

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- Introduction to Employability Skills
- Constitutional values - Citizenship
- Becoming a Professional in the 21st Century
- Basic English Skills
- Career Development & Goal Setting
- Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy
- Essential Digital Skills
- Entrepreneurship
- Customer Service
- Getting ready for Apprenticeship & Jobs

Elements and Performance Criteria

Introduction to Employability Skills

To be competent, the user/individual on the job must be able to:

PC1. identify employability skills required for jobs in various industries

PC2. identify and explore learning and employability portals

Constitutional values – Citizenship

To be competent, the user/individual on the job must be able to:

PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.

PC4. follow environmentally sustainable practices

Becoming a Professional in the 21st Century

To be competent, the user/individual on the job must be able to:

PC5. recognize the significance of 21st Century Skills for employment

PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life

Basic English Skills

To be competent, the user/individual on the job must be able to:

PC7. use basic English for everyday conversation in different contexts, in person and over the telephone

PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English

PC9. write short messages, notes, letters, e-mails etc. in English

Career Development & Goal Setting

To be competent, the user/individual on the job must be able to:

PC10. understand the difference between job and career

PC11. prepare a career development plan with short- and long-term goals, based on aptitude

Communication Skills

To be competent, the user/individual on the job must be able to:

PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings

PC13. work collaboratively with others in a team

Diversity & Inclusion

To be competent, the user/individual on the job must be able to:

PC14. communicate and behave appropriately with all genders and PwD

PC15. escalate any issues related to sexual harassment at workplace according to POSH Act

Financial and Legal Literacy

To be competent, the user/individual on the job must be able to:

PC16. select financial institutions, products and services as per requirement

PC17. carry out offline and online financial transactions, safely and securely

PC18. identify common components of salary and compute income, expenses, taxes, investments etc

PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation

Essential Digital Skills

To be competent, the user/individual on the job must be able to:

PC20. operate digital devices and carry out basic internet operations securely and safely

PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively

PC22. use basic features of word processor, spreadsheets, and presentations

Entrepreneurship

To be competent, the user/individual on the job must be able to:

PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research

PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion

PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity

Customer Service

To be competent, the user/individual on the job must be able to:

PC26. identify different types of customers

PC27. identify and respond to customer requests and needs in a professional manner.

PC28. follow appropriate hygiene and grooming standards

Getting ready for apprenticeship & Jobs

To be competent, the user/individual on the job must be able to:

PC29. create a professional Curriculum vitae (Résumé)

PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively

PC31. apply to identified job openings using offline /online methods as per requirement

PC32. answer questions politely, with clarity and confidence, during recruitment and selection

PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. need for employability skills and different learning and employability related portals

KU2. various constitutional and personal values

KU3. different environmentally sustainable practices and their importance

KU4. Twenty first (21st) century skills and their importance

KU5. how to use English language for effective verbal (face to face and telephonic) and written communication in formal and informal set up

KU6. importance of career development and setting long- and short-term goals

KU7. about effective communication

KU8. POSH Act

KU9. Gender sensitivity and inclusivity

KU10. different types of financial institutes, products, and services

KU11. how to compute income and expenditure

KU12. importance of maintaining safety and security in offline and online financial transactions

KU13. different legal rights and laws

KU14. different types of digital devices and the procedure to operate them safely and securely

KU15. how to create and operate an e- mail account and use applications such as word processors, spreadsheets etc.

KU16. how to identify business opportunities

KU17. types and needs of customers

KU18. how to apply for a job and prepare for an interview

KU19. apprenticeship scheme and the process of registering on apprenticeship portal

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. read and write different types of documents/instructions/correspondence

GS2. communicate effectively using appropriate language in formal and informal settings

GS3. behave politely and appropriately with all
GS4. how to work in a virtual mode
GS5. perform calculations efficiently
GS6. solve problems effectively
GS7. pay attention to details
GS8. manage time efficiently
GS9. maintain hygiene and sanitization to avoid infection

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Introduction to Employability Skills	**1**	**1**	**-**	**-**
PC1. identify employability skills required for jobs in various industries	-	-	-	-
PC2. identify and explore learning and employability portals	-	-	-	-
Constitutional values – Citizenship	**1**	**1**	**-**	**-**
PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
PC4. follow environmentally sustainable practices	-	-	-	-
Becoming a Professional in the 21st Century	**2**	**4**	**-**	**-**
PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
PC6. practice the 21st Century Skills such as Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-
Basic English Skills	**2**	**3**	**-**	**-**
PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
Career Development & Goal Setting	**1**	**2**	**-**	**-**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC10. understand the difference between job and career	-	-	-	-
PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-	-	-	-
Communication Skills	**2**	**2**	**-**	**-**
PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-	-	-	-
PC13. work collaboratively with others in a team	-	-	-	-
Diversity & Inclusion	**1**	**2**	**-**	**-**
PC14. communicate and behave appropriately with all genders and PwD	-	-	-	-
PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-	-	-	-
Financial and Legal Literacy	**2**	**3**	**-**	**-**
PC16. select financial institutions, products and services as per requirement	-	-	-	-
PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
Essential Digital Skills	**3**	**4**	**-**	**-**
PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Entrepreneurship	**2**	**3**	**-**	**-**
PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for the potential business opportunity	-	-	-	-
Customer Service	**1**	**2**	**-**	**-**
PC26. identify different types of customers	-	-	-	-
PC27. identify and respond to customer requests and needs in a professional manner.	-	-	-	-
PC28. follow appropriate hygiene and grooming standards	-	-	-	-
Getting ready for apprenticeship & Jobs	**2**	**3**	**-**	**-**
PC29. create a professional Curriculum vitae (Résumé)	-	-	-	-
PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	-	-	-
PC31. apply to identified job openings using offline /online methods as per requirement	-	-	-	-
PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	-	-	-
PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	-	-	-
NOS Total	**20**	**30**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	DGT/VSQ/N0102
NOS Name	Employability Skills (60 Hours)
Sector	Cross Sectoral
Sub-Sector	Professional Skills
Occupation	Employability
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	NA
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N1702: Follow Health, Safety and Environmental guidelines for Underground Metalliferous Mines (UMM) (Including Mine Vocational Training Rule and Mine Rescue Rule)

Description

This unit is about adhering to health, safety and environmental guidelines in Underground Metalliferous Mines (UMM) during the execution of various tasks and operations and maintenance.

Scope

The scope covers the following :

- Follow work-site health and safety measures
- Follow environmental guidelines

Elements and Performance Criteria

Follow work-site health and safety measures

To be competent, the user/individual on the job must be able to:

PC1. undertake "The Take-5 (Personal Risk Assessment)" before commencement of any work

PC2. comply with safety, health and security-related regulations/guidelines at the mine e.g. follow Standard Operating Procedure (SOP) for material handling in underground (U/G) mine

PC3. operate various types of fire extinguishers to control different types of fire at a worksite when required

PC4. check that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area

PC5. take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment

PC6. use self-rescue apparatus, appropriately when required

PC7. follow appropriate emergency response procedure during emergency such as fire, water inrush, fall of ground etc.

PC8. follow precautions against U/G electrical appliances

PC9. follow appropriate Standard Operating Procedure while working near any isolated and sealed off area of the mine

PC10. follow appropriate safety practices while traveling on U/G haul roads, incase of post blast fumes and misfire

PC11. follow the manufacturer’s instructions for care and safe operation of mine machinery and equipment

PC12. identify the working ventilation district from line diagram of ventilation circuit to direct air to the working face

PC13. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)

PC14. follow gas detecting alarm signal on leakage of inflammable gases and laid out procedure to ensure safety

PC15. follow process for reporting any unsafe act/condition in work area to the concerned person
PC16. use underground mine communication system
PC17. ensure positive isolation near the work place if applicable
PC18. use appropriate PPE as per the requirement
PC19. maintain hand hygiene by washing hands with alcohol based sanitisers/soap
PC20. disinfect the machine/tools before and after work/task
PC21. maintain hygiene at the work site
PC22. report any symptoms of illness to the shift-incharge
PC23. identify six directional hazards at workplace and take decisions accordingly

Follow environmental guidelines

To be competent, the user/individual on the job must be able to:

PC24. identify the environmental impact of mining related operations and follow steps to reduce those impact
PC25. follow the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery
PC26. ensure that the stowing practices produce minimum disturbance to the surface
PC27. ensure that the subgrade ore is carried out to surface and stacked separately at the earmarked place
PC28. ensure the productivity of the machine for material/fuel conservation
PC29. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines
PC30. follow the "5-S" practice at work site like cleaning oil from ground (to avoid soil from getting damaged), etc.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. safety guidelines specified by Directorate General of Mine Safety (DGMS)
KU2. duties and rights of workers
KU3. selection process of person for rescue training
KU4. about Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR)
KU5. isolation and sealed off area of the mine
KU6. various types of gases found in the mine and their effect
KU7. self-rescue apparatus and their uses
KU8. provision of medical examination (IME & PME) of person employed as per Mines Rules 1955
KU9. importance of first aid and hygiene
KU10. about different types of machinery used in U/G mines
KU11. different types of supporting systems used in U/G mines as per SSP and SSR
KU12. about precautions to be taken when handling heavy equipment
KU13. various problems/incidents likely to occur
KU14. role of Internal Safety Organization, safety committee, workman's inspector and DGMS

KU15. about mine safety standard including light illumination level, noise levels, dust level, pollutants, etc at the work-site
KU16. common sources of pollution in the mines and ways to minimize it
KU17. various types of fire extinguishers
KU18. safety equipment like safety shoes, safety belt, tight fit clothing, hand gloves, safety goggles, Gas Detector, Safety Lamp, Self-Contained Breathing Apparatus, gum boots, ear plugs, Face Mask, etc.
KU19. shot-firing / blasting related safety regulations including taking shelter during blasting
KU20. emergency response /disaster management plan prepared by the organization as per DGMS guideline
KU21. mining area-specific signs, and other safety and emergency signals
KU22. the outcome of violation of safety procedures
KU23. Take-5 (Personal Risk Assessment) training (DGMS Tech. circulars 2/2014)
KU24. rules and regulations for safety and security while handling hazardous materials
KU25. safety appliances and rescue equipment
KU26. importance and use of various communication system used in UG mines
KU27. importance of positive isolation at working site
KU28. safety and occupational health policy of organisation
KU29. six directional hazard identification process
KU30. basic personal and workplace hygiene
KU31. importance of FAB (Fresh Air Base)
KU32. basic provisions in Mines Creche Rules, 1966 (MCR) for females employed in the mines
KU33. the role and responsibilities of rescue room and rescue station and how to contact them in case of emergency
KU34. importance of taking shelter at the miner's station during blasting operation
KU35. importance of sensitization towards different genders and persons with disabilities (PWD)
KU36. importance of following infection control policies, '5-S' practices, and waste management
KU37. importance of water/material/energy conservation and management
KU38. importance of SMP and EMP, prepared by the organization, as per DGMS guideline

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up documentation applicable to one's role
GS2. make decisions on the concerned area of work
GS3. read basic English language
GS4. read and interpret manuals, health, and safety instructions, memos, etc.
GS5. use the digital information from machine
GS6. use basic applications of a computer
GS7. plan and organize the work order and tasks
GS8. use reasoning skills to identify and resolve fundamental problems

GS9. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow work-site health and safety measures	**24**	**42**	**-**	**17**
PC1. undertake "The Take-5 (Personal Risk Assessment)" before commencement of any work	-	2	-	2
PC2. comply with safety, health and security-related regulations/guidelines at the mine e.g. follow Standard Operating Procedure (SOP) for material handling in underground (U/G) mine	1	3	-	-
PC3. operate various types of fire extinguishers to control different types of fire at a worksite when required	1	4	-	1
PC4. check that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area	1	1	-	-
PC5. take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment	1	2	-	1
PC6. use self-rescue apparatus, appropriately when required	-	4	-	1
PC7. follow appropriate emergency response procedure during emergency such as fire, water inrush, fall of ground etc.	1	2	-	1
PC8. follow precautions against U/G electrical appliances	2	2	-	2
PC9. follow appropriate Standard Operating Procedure while working near any isolated and sealed off area of the mine	2	2	-	1
PC10. follow appropriate safety practices while traveling on U/G haul roads, incase of post blast fumes and misfire	2	4	-	-
PC11. follow the manufacturer's instructions for care and safe operation of mine machinery and equipment	1	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC12. identify the working ventilation district from line diagram of ventilation circuit to direct air to the working face	1	1	-	-
PC13. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)	1	-	-	-
PC14. follow gas detecting alarm signal on leakage of inflammable gases and laid out procedure to ensure safety	1	2	-	1
PC15. follow process for reporting any unsafe act/condition in work area to the concerned person	-	2	-	1
PC16. use underground mine communication system	-	1	-	-
PC17. ensure positive isolation near the work place if applicable	1	1	-	1
PC18. use appropriate PPE as per the requirement	2	4	-	2
PC19. maintain hand hygiene by washing hands with alcohol based sanitisers/soap	1	1	-	1
PC20. disinfect the machine/tools before and after work/task	1	1	-	-
PC21. maintain hygiene at the work site	1	1	-	1
PC22. report any symptoms of illness to the shift-incharge	1	-	-	-
PC23. identify six directional hazards at workplace and take decisions accordingly	2	-	-	-
Follow environmental guidelines	**6**	**8**	**-**	**3**
PC24. identify the environmental impact of mining related operations and follow steps to reduce those impact	1	2	-	-
PC25. follow the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery	-	1	-	-
PC26. ensure that the stowing practices produce minimum disturbance to the surface	1	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC27. ensure that the subgrade ore is carried out to surface and stacked separately at the earmarked place	1	-	-	1
PC28. ensure the productivity of the machine for material/fuel conservation	1	1	-	-
PC29. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines	1	1	-	1
PC30. follow the "5-S" practice at work site like cleaning oil from ground (to avoid soil from getting damaged), etc.	1	2	-	1
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N1702
NOS Name	Follow Health, Safety and Environmental guidelines for Underground Metalliferous Mines (UMM) (Including Mine Vocational Training Rule and Mine Rescue Rule)
Sector	Mining
Sub-Sector	Mining Operation
Occupation	HSE Functions, Mine Surveying, Drilling/Cutting, Shot firing/Blasting, Loading and Hauling - Underground, Specialized Operations, Electrical Services, Mechanical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/06/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N1703: Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule)

Description

This unit is about adhering to health, safety and environmental guidelines at the Open Cast Mines while executing various tasks, maintenance and operations.

Scope

The scope covers the following :

- Follow work-site health and safety measures
- Follow Environmental guidelines

Elements and Performance Criteria

Follow work-site health and safety measures

To be competent, the user/individual on the job must be able to:

PC1. comply with safety, health, and security-related regulations/guidelines at the opencast mine

PC2. follow the safety instructions given by the workman's inspector

PC3. follow adequate safety while working at haul roads, heights, overburden dumps, sump area, stockyard, near moving parts, etc.

PC4. take safety precautions while working on sites (sub-station, workshop etc.), with equipment, and conducting welding and cutting operations

PC5. follow appropriate Safe Operating Procedure (SOP) while dealing with explosives

PC6. respond promptly and appropriately to an accident/ incident or an emergency situation, within limits of the role and responsibility

PC7. provide first aid to an injured person

PC8. operate various types of fire extinguishers to control different types of fire at a worksite when required

PC9. use appropriate PPE as per the requirement

PC10. maintain hand hygiene by washing hands with alcohol based sanitisers/soap

PC11. disinfect the machine/tools before and after work/task

PC12. maintain hygiene at the work site

PC13. report any symptoms of illness to the shift-incharge

Follow Environmental guidelines

To be competent, the user/individual on the job must be able to:

PC14. identify the environmental impact of related opencast mining operations

PC15. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines

PC16. ensure not to mix topsoil with waste in day to day tasks

PC17. ensure that HEMM is washed at the designated location

PC18. ensure the productivity of the machine for material/fuel conservation

PC19. follow the mineral conservation practices specified by the organization in accordance with MCDR-2017 (Mineral Conservation and Development Rules)

PC20. assist supervisor for reducing environmental impact caused due to related mining operations

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. about various environmental awareness program related to mining, organized by the various government bodies/company

KU2. safety guidelines specified by Directorate General of Mine Safety (DGMS)

KU3. basic mining terminologies and definitions

KU4. means of access and egress from the mines, location of workshop, haul roads and working face including dump yards

KU5. duties of workers under The Mines act-1952

KU6. working hours and accident compensation as per The Mines act-1952

KU7. about precautions to be taken when handling heavy equipment

KU8. various problems/incidents likely to occur

KU9. hierarchy of the reporting

KU10. machine operation, condition of the machine and worksite

KU11. proper documents specific to the machine

KU12. role of workmen inspector, safety committee and internal safety organization

KU13. the process of top soil removal and management

KU14. mine sump and pumping system of the mines

KU15. about mine safety standard including light illumination level, noise levels, dust level, pollutants, etc at the work-site

KU16. common sources of pollution in the mines and ways to minimize it

KU17. safety equipment like safety shoes, safety belt, tight fit clothing, hand gloves, safety goggles, gas detector, safety lamp, self-contained breathing apparatus, gum boots, ear plugs, face mask, etc.

KU18. shot-firing / blasting related safety regulations including taking shelter during blasting

KU19. emergency response /disaster management plan prepared by the organization

KU20. signages, mining area-specific signs, and other safety and emergency signals

KU21. the outcome of violation of safety procedures

KU22. basic personal and workplace hygiene

KU23. importance of sensitization towards different genders and PWD (Persons with Disabilities)

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up documentation applicable to one's role

GS2. make decisions on the concerned area of work
GS3. read and interpret manuals, health, and safety instructions, memos, etc.
GS4. plan and organize the work order and jobs
GS5. use reasoning skills to identify and resolve fundamental problems
GS6. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow work-site health and safety measures	**20**	**34**	**-**	**15**
PC1. comply with safety, health, and security-related regulations/guidelines at the opencast mine	2	2	-	1
PC2. follow the safety instructions given by the workman's inspector	1	3	-	1
PC3. follow adequate safety while working at haul roads, heights, overburden dumps, sump area, stockyard, near moving parts, etc.	3	3	-	1
PC4. take safety precautions while working on sites (sub-station, workshop etc.), with equipment, and conducting welding and cutting operations	1	3	-	1
PC5. follow appropriate Safe Operating Procedure (SOP) while dealing with explosives	2	3	-	2
PC6. respond promptly and appropriately to an accident/ incident or an emergency situation, within limits of the role and responsibility	2	3	-	1
PC7. provide first aid to an injured person	2	3	-	1
PC8. operate various types of fire extinguishers to control different types of fire at a worksite when required	1	3	-	1
PC9. use appropriate PPE as per the requirement	2	4	-	2
PC10. maintain hand hygiene by washing hands with alcohol based sanitisers/soap	1	2	-	1
PC11. disinfect the machine/tools before and after work/task	1	2	-	1
PC12. maintain hygiene at the work site	1	1	-	1
PC13. report any symptoms of illness to the shift-incharge	1	2	-	1
Follow Environmental guidelines	**10**	**16**	**-**	**5**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. identify the environmental impact of related opencast mining operations	2	2	-	1
PC15. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines	1	2	-	1
PC16. ensure not to mix topsoil with waste in day to day tasks	2	2	-	1
PC17. ensure that HEMM is washed at the designated location	2	2	-	1
PC18. ensure the productivity of the machine for material/fuel conservation	1	3	-	-
PC19. follow the mineral conservation practices specified by the organization in accordance with MCDR-2017 (Mineral Conservation and Development Rules)	1	3	-	1
PC20. assist supervisor for reducing environmental impact caused due to related mining operations	1	2	-	-
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N1703
NOS Name	Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule)
Sector	Mining
Sub-Sector	Mining Operation
Occupation	HSE Functions, , Exploration, Mineral Estimation, Planning, Mine Surveying, Drilling/Cutting, Shot firing/Blasting, Loading and Hauling - Opencast, Specialized Operations, Electrical Services, Mechanical Services, Instrumentation and Control Systems, Ore Processing
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/06/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N1704: Follow Health, Safety, and Environmental guidelines for underground coal mines (Including Mine Vocational Training Rule and Mine Rescue Rule)

Description

This unit is about adhering to health, safety and environmental guidelines in Underground Coal Mines (UCM) during execution of various tasks, operations and maintenance.

Scope

The scope covers the following :

- Follow work-site health and safety measures
- Follow environmental guidelines

Elements and Performance Criteria

Follow work-site health and safety measures

To be competent, the user/individual on the job must be able to:

PC1. follow preventive measures against firedamp, whitedamp, blackdamp etc.

PC2. use the flame safety lamp for detecting the methane gas as per Standard Operating Procedure (SOP)

PC3. undertake "The Take-5 (Personal Risk Assessment)" before commencement of any work

PC4. comply with safety, health and security-related regulations/guidelines at the mine e.g. SOP for material handling in underground (U/G) mine

PC5. ensure that oil, grease, canvas or other inflammable material are stored in fire-proof receptacle

PC6. ensure that every instrument, apparatus and equipment are DGMS approved before these are used

PC7. ensure that Armoured face conveyor (AFC) and chocks must be kept in a straight line for every cycle of operations and tightened up to the setting pressure while keeping it in full contact with the roof, applicable for longwall mining

PC8. provide first aid to an injured person

PC9. follow safety precautions against spontaneous heating of the coal

PC10. operate various types of fire extinguishers to control different types of fire at worksite, if required

PC11. ensure that no person is traveling/working/staying under unsupported roof

PC12. check that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area

PC13. take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment

PC14. use self-rescue apparatus appropriately when required

PC15. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)

PC16. follow precautions against U/G electrical appliances

PC17. take proper care against damage and accidents while loading, transporting, dismantling and erecting of roof supports

PC18. follow appropriate SOP while working near any isolated and sealed off area of the mine

PC19. ensure that the roof and the sidewalls of the mine face (or newly exposed area of the mines) have been scaled/dressed properly

PC20. take relevant safety precautions during depillaring operation in UCM

PC21. follow appropriate safety practices while traveling on U/G haul roads, incase of post blast fumes and misfire

PC22. follow the manufacturer's instructions for care and safe operation of mine machinery and equipment

PC23. identify the working ventilation district from line diagram of ventilation circuit to direct air to the working face

PC24. follow laid out SOP in case of alarm signal for leakage of inflammable gases

PC25. follow the process of reporting any unsafe act/condition in the working area to the concerned person

PC26. use underground mine communication system

PC27. ensure positive isolation near the work place if applicable

PC28. use appropriate Personal Protective Equipment (PPE) as per the requirement

PC29. maintain hand hygiene by washing hands with alcohol based sanitisers/soap

PC30. disinfect the machine/tools before and after work/task

PC31. maintain hygiene at the work site

PC32. report any symptoms of illness to the shift-incharge

PC33. identify six directional hazards at workplace and take decisions accordingly

Follow environmental guidelines

To be competent, the user/individual on the job must be able to:

PC34. identify the environmental impact of mining related operations and follow steps to reduce those impact

PC35. follow the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery

PC36. ensure that the stowing practices produce minimum disturbance to the surface

PC37. ensure that the subgrade coal is carried out to surface and stacked separately at the earmarked place

PC38. ensure the productivity of the machine for material/fuel conservation

PC39. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines

PC40. follow the "5-S" practice at work site like cleaning oil from ground (to avoid soil from getting damaged), etc.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. safety guidelines specified by Directorate General of Mine Safety (DGMS)
KU2. duties and rights of workers
KU3. selection process of person for rescue training
KU4. about Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR)
KU5. isolation and sealed off area of the mine
KU6. various types of gases available in the mine and their effects; and their control measures
KU7. self-rescue apparatus and their uses
KU8. provision of medical examination (Initial Medical Examination (IME) & Periodical Medical Examination (PME)) of a person employed, as per Mines Rules 1955
KU9. importance of first aid and hygiene
KU10. about different types of machineries used in U/G mines
KU11. different types of supporting system used in U/G mines as per SSP and SSR
KU12. about precautions to be taken when handling heavy equipment
KU13. various problems/incidents likely to occur
KU14. role of Internal Safety Organization, safety committee, workman's inspector and DGMS
KU15. about mine safety standard including light illumination level, noise levels, dust level, pollutants, etc at the work-site
KU16. common sources of pollution in the mines and ways to minimize it
KU17. various types of fire extinguishers
KU18. safety equipment like safety shoes, safety belt, tight fit clothing, hand gloves, safety goggles, Gas Detector, Safety Lamp, Self-Contained Breathing Apparatus, gum boots, ear plugs, Face Mask, etc.
KU19. shot-firing / blasting related safety regulations including taking shelter during blasting
KU20. mining area-specific signs, and other safety and emergency signals
KU21. the outcome of violation of safety procedures
KU22. Take-5 (Personal Risk Assessment) training (DGMS Tech. circulars 2/2014)
KU23. hazardous material safety, security rules and regulations
KU24. safety appliances and rescue equipment
KU25. importance and use of various communication system used in UG mines
KU26. importance of positive isolation at working site
KU27. safety and occupational health policy of organisation
KU28. six directional hazard identification process
KU29. basic personal and workplace hygiene
KU30. importance of FAB (Fresh Air Base)
KU31. basic provisions in Mines Creche Rules, 1966 (MCR) for any females employed in the mines
KU32. about basic safety regulations of Coal Mines Regulation,2017 (CMR)
KU33. types of stone dust barrier and its importance
KU34. coal dust explosion and its preventive measures
KU35. classification of coal mines as per the degree of gassiness of coal seams such as first degree, second degree, and third-degree mines
KU36. precautions as per the gassiness of the coal mines

KU37. use of flame safety lamp and its parts

KU38. about coal mines occupational disease such as pneumoconiosis or 'black lung' and their preventive measures

KU39. Standard of Ventilation as per the section 153 of the CMR 2017

KU40. Standard of Lighting as per the section 178 of the CMR 2017

KU41. the roles, duties and responsibilities of rescue team members, rescue room and rescue station and how to contact them in case of emergency

KU42. the correct steps for conducting any rescue work as per Mine Rescue Rule (MRR)

KU43. importance of taking shelter at the miner's station during blasting operation

KU44. importance of sensitization towards different genders and persons with disabilities (PWD)

KU45. importance of following infection control policies, '5-S' practices, and waste management

KU46. importance of water/material/energy conservation and management

KU47. importance of SMP and EMP, prepared by the organization, as per DGMS guideline

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up documentation applicable to one's role

GS2. make decisions on the concerned area of work

GS3. read basic English language

GS4. read and interpret manuals, health, and safety instructions, memos, etc.

GS5. use the digital information from a machine

GS6. plan and organize the work order and tasks

GS7. use basic applications of the computer

GS8. use reasoning skills to identify and resolve fundamental problems

GS9. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow work-site health and safety measures	**24**	**43**	**-**	**14**
PC1. follow preventive measures against firedamp, whitedamp, blackdamp etc.	1	1	-	-
PC2. use the flame safety lamp for detecting the methane gas as per Standard Operating Procedure (SOP)	-	1	-	-
PC3. undertake "The Take-5 (Personal Risk Assessment)" before commencement of any work	1	1	-	1
PC4. comply with safety, health and security-related regulations/guidelines at the mine e.g. SOP for material handling in underground (U/G) mine	1	1	-	1
PC5. ensure that oil, grease, canvas or other inflammable material are stored in fire-proof receptacle	-	1	-	-
PC6. ensure that every instrument, apparatus and equipment are DGMS approved before these are used	1	1	-	-
PC7. ensure that Armoured face conveyor (AFC) and chocks must be kept in a straight line for every cycle of operations and tightened up to the setting pressure while keeping it in full contact with the roof, applicable for longwall mining	3	3	-	-
PC8. provide first aid to an injured person	1	2	-	1
PC9. follow safety precautions against spontaneous heating of the coal	1	1	-	-
PC10. operate various types of fire extinguishers to control different types of fire at worksite, if required	-	2	-	-
PC11. ensure that no person is traveling/working/staying under unsupported roof	1	-	-	-
PC12. check that roof supporting is as per Systematic Support Plan (SSP) and approved Systematic Support Rules (SSR) while undertaking work in an area	-	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. take precaution against occupational health hazards (like dust, water, mine gases etc.) due to U/G working environment	-	1	-	1
PC14. use self-rescue apparatus appropriately when required	-	2	-	-
PC15. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)	1	2	-	1
PC16. follow precautions against U/G electrical appliances	2	2	-	1
PC17. take proper care against damage and accidents while loading, transporting, dismantling and erecting of roof supports	1	2	-	-
PC18. follow appropriate SOP while working near any isolated and sealed off area of the mine	1	1	-	1
PC19. ensure that the roof and the sidewalls of the mine face (or newly exposed area of the mines) have been scaled/dressed properly	1	1	-	-
PC20. take relevant safety precautions during depillaring operation in UCM	-	2	-	1
PC21. follow appropriate safety practices while traveling on U/G haul roads, incase of post blast fumes and misfire	1	1	-	-
PC22. follow the manufacturer's instructions for care and safe operation of mine machinery and equipment	-	1	-	1
PC23. identify the working ventilation district from line diagram of ventilation circuit to direct air to the working face	-	1	-	1
PC24. follow laid out SOP in case of alarm signal for leakage of inflammable gases	1	1	-	-
PC25. follow the process of reporting any unsafe act/condition in the working area to the concerned person	-	1	-	1
PC26. use underground mine communication system	-	1	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC27. ensure positive isolation near the work place if applicable	1	1	-	-
PC28. use appropriate Personal Protective Equipment (PPE) as per the requirement	2	2	-	1
PC29. maintain hand hygiene by washing hands with alcohol based sanitisers/soap	-	1	-	-
PC30. disinfect the machine/tools before and after work/task	1	1	-	-
PC31. maintain hygiene at the work site	1	1	-	-
PC32. report any symptoms of illness to the shift-incharge	1	1	-	-
PC33. identify six directional hazards at workplace and take decisions accordingly	-	1	-	1
Follow environmental guidelines	**6**	**7**	**-**	**6**
PC34. identify the environmental impact of mining related operations and follow steps to reduce those impact	1	1	-	1
PC35. follow the mineral conservation practices in U/G mining operations to achieve optimum ore or mineral recovery	1	1	-	1
PC36. ensure that the stowing practices produce minimum disturbance to the surface	1	1	-	-
PC37. ensure that the subgrade coal is carried out to surface and stacked separately at the earmarked place	1	1	-	1
PC38. ensure the productivity of the machine for material/fuel conservation	1	1	-	1
PC39. follow the process for collecting, storing and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines	-	1	-	1
PC40. follow the "5-S" practice at work site like cleaning oil from ground (to avoid soil from getting damaged), etc.	1	1	-	1

Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N1704
NOS Name	Follow Health, Safety, and Environmental guidelines for underground coal mines (Including Mine Vocational Training Rule and Mine Rescue Rule)
Sector	Mining
Sub-Sector	Mining Operation
Occupation	HSE Functions, Mine Surveying, Drilling/Cutting, Shot firing/Blasting, Loading and Hauling - Underground, Specialized Operations, Electrical Services, Mechanical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/06/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N1705: Follow Health, Safety and Environmental guidelines for Rare Earth (RE) Chemical plant

Description

This unit is about adhering to health, safety and environmental guidelines critical in RE chemical plants

Scope

The scope covers the following :

- Follow work-site health and safety measures
- Follow environmental guidelines

Elements and Performance Criteria

Follow work-site health and safety measures

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 the correct safety steps in case of accident or major failure

PC3. operate various grades of fire extinguishers

PC4. follow general safety precautions while handling cables; working near electrical installations, overhead lines and while working with various electrical equipment in the plant

PC5. provide first-aid to an injured person

PC6. use appropriate PPE as per the requirement

PC7. identify the hazards and risks

PC8. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)

PC9. maintain hand hygiene by washing hands with alcohol based sanitisers/soap

PC10. disinfect the site/panel/tools before and after work/task

PC11. maintain hygiene at the work site

PC12. report any symptoms of illness to the shift-incharge

PC13. identify six directional hazards at workplace and take decisions accordingly

Follow environmental guidelines

To be competent, the user/individual on the job must be able to:

PC14. identify the environmental impact of operations related to RE chemical plant and take steps to reduce the impact

PC15. ensure the productivity of the machine for material/fuel conservation

PC16. follow the process for collecting, storing, and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines and safety guidelines as prescribed by regulatory authorities like Atomic Energy Regulatory Board (AERB), United Nations Development Group (UNDG), etc.

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. the outcome of violation of safety procedures
KU2. duties and rights of workers
KU3. process for reporting any unsafe act/condition in work area
KU4. different types of RE chemical factories and detail of the plant one is working in
KU5. fencing, guarding, spillage control, etc.
KU6. importance of first aid and hygiene
KU7. provision of wages, working hours and accident compensation as per Atomic Energy Factory Rules
KU8. various types of chemical processes carried out in the plant
KU9. RE chemical plant safety procedures
KU10. about installation and handling of safety devices
KU11. code of practice for safe handling and transport of dangerous material and heavy equipment
KU12. safety and occupational health policy of organisation
KU13. basic personal and workplace hygiene
KU14. six directional hazard identification process
KU15. Internal Safety Organisation and role of safety committee, workman's inspector and AERB etc.
KU16. importance of sensitization towards different genders and persons with disabilities (PWD)
KU17. importance of following infection control policies, '5-S' practices, and waste management as prescribed by regulatory authorities like Atomic Energy Regulatory Board (AERB), United Nations Development Group (UNDG), etc.
KU18. importance of water/material/energy conservation and management
KU19. importance of SMP and EMP, prepared by the organization, as per DGMS guideline

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. fill up documentation applicable to one's job role
GS2. make decisions on the concerned area of work
GS3. read and explain manuals, health, and safety instructions, memos, etc.
GS4. plan and organize the work order and jobs
GS5. use reasoning skills to identify and resolve fundamental problems
GS6. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Follow work-site health and safety measures	**26**	**44**	**-**	**17**
PC1. comply with occupational health and safety regulations adopted by the employer	2	3	-	1
PC2. follow the correct safety steps in case of accident or major failure	2	4	-	1
PC3. operate various grades of fire extinguishers	2	4	-	1
PC4. follow general safety precautions while handling cables; working near electrical installations, overhead lines and while working with various electrical equipment in the plant	3	4	-	2
PC5. provide first-aid to an injured person	3	4	-	2
PC6. use appropriate PPE as per the requirement	2	5	-	2
PC7. identify the hazards and risks	3	6	-	1
PC8. follow Safety Management Plan (SMP) and Emergency Management Plan (EMP)	3	5	-	2
PC9. maintain hand hygiene by washing hands with alcohol based sanitisers/soap	1	1	-	1
PC10. disinfect the site/panel/tools before and after work/task	2	2	-	1
PC11. maintain hygiene at the work site	1	2	-	1
PC12. report any symptoms of illness to the shift-incharge	1	2	-	1
PC13. identify six directional hazards at workplace and take decisions accordingly	1	2	-	1
Follow environmental guidelines	**4**	**6**	**-**	**3**
PC14. identify the environmental impact of operations related to RE chemical plant and take steps to reduce the impact	1	2	-	1
PC15. ensure the productivity of the machine for material/fuel conservation	2	2	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC16. follow the process for collecting, storing, and disposing of the hazardous material and waste (like used oil, lubricant, battery, etc.) in compliance with worksite guidelines and safety guidelines as prescribed by regulatory authorities like Atomic Energy Regulatory Board (AERB), United Nations Development Group (UNDG), etc.	1	2	-	1
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N1705
NOS Name	Follow Health, Safety and Environmental guidelines for Rare Earth (RE) Chemical plant
Sector	Mining
Sub-Sector	Mining Operation
Occupation	HSE Functions
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	30/06/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N3104: Comply with unique requirements for installation and operations and maintenance (O&M) of electrical system in U/G Mines

Description

This unit is about complying with unique requirements for installations, operations and maintenance (O&M) of electrical systems in Underground (U/G) Mines.

Scope

The scope covers the following :

- Comply with unique requirements for U/G Mine working

Elements and Performance Criteria

Comply with unique requirements for U/G Mine working

To be competent, the user/individual on the job must be able to:

PC1. conduct earthing for U/G mines considering all safety precautions

PC2. repair and set earth leakage current and time in earth leakage relay

PC3. locate the right area for installation of sub-station, equipment in U/G mines ensuring safety and ease of maintenance at the selected area

PC4. conduct installation, O&M of signalling and telecom equipment as per intrinsically safe requirements

PC5. prepare the underground electrical plan/layout

PC6. maintain electrical lamp room and ensure that all lamps are cleaned, refitted and refilled in a separate room

PC7. install various safety equipment used in U/G mines

PC8. install electric lighting in gassy mines as per CMR (Coal Mines Regulations)

PC9. follow all safety standards relevant to electrical layout, earthing system, voltage limit, armored cables and flexible cables as per electricity rules and DGMS guidelines

PC10. use portable hand-lamps in U/G mines

PC11. extend the relevant electrical cables as per the face development while considering all relevant safety precautions

PC12. isolate transformer and switch gears and other electrical equipment

PC13. ensure proper lighting is available before commencement of any electrical work

PC14. use circuit for the remote control or electric interlocking of apparatus in U/G mines

PC15. ensure the electrical circuit is locked and tagged before any installation and O&M

PC16. ensure that all power circuits and electrical equipment is deenergized before work is performed, except for troubleshooting or testing

PC17. remove electrical equipment from service in case any potentially dangerous condition is identified

PC18. check safety circuits of mining equipment like drilling machines, locomotives, etc.

PC19. ensure equipment are flameproof while working in gassy mines

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. job-specific documents e.g. daily maintenance checklist and importance of the same
KU2. risk and impact of not following defined procedures/work instructions
KU3. cost of equipment and loss for the company that results from damage of equipment
KU4. implications of delays in the process
KU5. safety guidelines specified by Directorate General of MInes Safety (DGMS) specific to U/G electricity relevant operations
KU6. about tramways and siding, haulage rooms, winding rooms, boilers, electrical gears, etc.
KU7. the outcome of violation of safety procedures
KU8. the proper earthing procedures
KU9. types of cables, used in mines
KU10. precautions to be taken for the gases that exist in U/G mines
KU11. use of flameproof equipment/enclosures
KU12. earthing of neutral points
KU13. setting of earth leakage and overload relays
KU14. permissible voltage level for various applications in the underground as per CEA Regulations 2010
KU15. how to use portable hand lamps in U/G mines
KU16. working principle and use of Neutral Grounding Resistors (NGR) in underground mines
KU17. how to use the circuit for the remote control or electric interlocking of apparatus in U/G mines

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. note down observations (if any)
GS2. read and interpret symbols and readings
GS3. read information documents
GS4. effectively communicate, listen and comprehend the information given by various sources about the site
GS5. make decisions pertaining to the concerned area of work
GS6. plan and organize the work order and tasks
GS7. organize all operation and service manuals so that sorting/ accessing information is easy
GS8. detect problems in day to day tasks
GS9. find solutions to problems and resolve them
GS10. make decisions in emergency conditions
GS11. complete the assigned tasks timely

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Comply with unique requirements for U/G Mine working	**30**	**50**	**-**	**20**
PC1. conduct earthing for U/G mines considering all safety precautions	2	4	-	1
PC2. repair and set earth leakage current and time in earth leakage relay	2	4	-	1
PC3. locate the right area for installation of sub-station, equipment in U/G mines ensuring safety and ease of maintenance at the selected area	2	4	-	2
PC4. conduct installation, O&M of signalling and telecom equipment as per intrinsically safe requirements	2	2	-	2
PC5. prepare the underground electrical plan/layout	2	4	-	1
PC6. maintain electrical lamp room and ensure that all lamps are cleaned, refitted and refilled in a separate room	3	3	-	1
PC7. install various safety equipment used in U/G mines	2	2	-	1
PC8. install electric lighting in gassy mines as per CMR (Coal Mines Regulations)	2	3	-	1
PC9. follow all safety standards relevant to electrical layout, earthing system, voltage limit, armored cables and flexible cables as per electricity rules and DGMS guidelines	2	4	-	1
PC10. use portable hand-lamps in U/G mines	-	-	-	-
PC11. extend the relevant electrical cables as per the face development while considering all relevant safety precautions	2	3	-	2
PC12. isolate transformer and switch gears and other electrical equipment	1	3	-	1
PC13. ensure proper lighting is available before commencement of any electrical work	1	3	-	1

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. use circuit for the remote control or electric interlocking of apparatus in U/G mines	-	-	-	-
PC15. ensure the electrical circuit is locked and tagged before any installation and O&M	1	3	-	1
PC16. ensure that all power circuits and electrical equipment is deenergized before work is performed, except for troubleshooting or testing	2	2	-	1
PC17. remove electrical equipment from service in case any potentially dangerous condition is identified	2	2	-	1
PC18. check safety circuits of mining equipment like drilling machines, locomotives, etc.	1	2	-	1
PC19. ensure equipment are flameproof while working in gassy mines	1	2	-	1
NOS Total	**30**	**50**	**-**	**20**

Skill Council For Mining Sector

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Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N3104
NOS Name	Comply with unique requirements for installation and operations and maintenance (O&M) of electrical system in U/G Mines
Sector	Mining
Sub-Sector	Engineering Services
Occupation	Electrical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	27/01/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

MIN/N3105: Comply with unique requirements for Installation and O&M in Rare Earth Chemical Plant

Description

This unit is about installing, operating and maintaining the required electrical systems for substation machinery and electrical equipment as per the required specifications and industry standards in Rare Earth Chemical Plants.

Scope

The scope covers the following :

- Install the electrical supply system and equipment
- Operations and Maintenance procedures

Elements and Performance Criteria

Install the electrical supply system and equipment

To be competent, the user/individual on the job must be able to:

PC1. identify the electrical equipment requirements as per the specifications in the work instructions for installation of electrical substations/ electrical equipment/ electrical wiring or fixtures suitable for chemical plants

PC2. install the electrical supply systems including transformers, generators, circuit breakers, isolators, bus bars, wiring, fuses, earthing, switchboard, control panels, relays etc., by using measuring instruments as per the required working specifications and standards for chemical plants in terms of voltage, current, power, energy, frequency, RPM, etc.

PC3. follow all safety standards relevant to electric layout, earthing system, voltage limit, armored cables and flexible cables as per electricity rules applicable for chemical plants

PC4. install required electrical equipment like motors, fans, lighting, ACs, heaters, compressors, pumps, etc. associated with the chemical plant

PC5. install and commission required electrical components of equipment like Grinding equipment, Digesters, Precipitation & Crystallization setups, Filters, Mixer Settlers, etc. associated with the chemical plant

PC6. conduct a test to ensure the performance of installed electrical equipment as per the defined specifications

PC7. make modifications in the parameters of electrical equipment (by selecting the right program from the machine control system), if required and ensure alignment with the prescribed standards

Operations and Maintenance procedures

To be competent, the user/individual on the job must be able to:

PC8. carry out predictive, preventive and break down maintenance for generators, transformers, circuit breakers, isolators, bus bars, control panels, switchboards, wiring, protective relays etc. as per the frequency suitable to the chemical plants

PC9. inspect and test electrical systems for continuity of circuits for proper functioning in electrical wiring, equipment, or fixtures, using testing devices such as ohmmeters, voltmeters, ammeters, energy meters, to ensure compatibility & safety of the system, identify electrical risks, hazards, defects or the need for adjustment or repair, and to ensure compliance with relevant statutes

PC10. diagnose malfunctioning systems, apparatus, or components, using test equipment and hand tools to locate the cause of a breakdown and correct the problem

PC11. operate and maintain the electrical equipment as required in chemical plants

PC12. maintain the records as required in Rare Earth (RE) chemical plant

Knowledge and Understanding (KU)

The individual on the job needs to know and understand:

KU1. different types of chemical factories and detail of the plant

KU2. plant organisation, time keeping, need for discipline and punctuality

KU3. fencing, guarding, spillage control, etc.

KU4. risk and impact of not following defined procedures/ daily maintenance checklist

KU5. types of cables, electrical enclosures, accessories etc used in chemical plants

KU6. precaution against corrosive liquids, gases that exist in the chemical plant

KU7. use of flameproof equipment/enclosures

KU8. various types of chemical processes carried out in the plant

KU9. general operation of Grinding equipment, Digesters, Precipitation & Crystallization set ups, Filters, Mixer Settlers, associated with the chemical plant

KU10. Rare Earth (RE) chemical plant safety procedures

KU11. processes like procurement, store management, inventory management, quality management, etc.

KU12. key contact points for query resolution

KU13. quality norms prescribed by the organization

KU14. importance of sensitization towards different genders and persons with disabilities (PWD)

Generic Skills (GS)

User/individual on the job needs to know how to:

GS1. note down observations (if any)

GS2. read and interpret symbols, readings and information documents

GS3. read equipment manuals and process documents

GS4. read internal information documents sent by internal sources

GS5. write information documents to internal departments/ teams or enter the information in online Enterprise Resource Planning (ERP) systems under the guidance of the supervisor

GS6. effectively communicate, listen and comprehend the information given by various sources about the site

GS7. make decisions pertaining to the concerned area of work and in emergency conditions

GS8. plan and organize the work order and tasks

GS9. detect problems in day to day tasks

GS10. support supervisor in using specific problem-solving techniques and detailing out the problems

GS11. complete the job defined by the supervisor within the timelines and quality norms

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
Install the electrical supply system and equipment	**18**	**29**	**-**	**13**
PC1. identify the electrical equipment requirements as per the specifications in the work instructions for installation of electrical substations/ electrical equipment/ electrical wiring or fixtures suitable for chemical plants	3	3	-	1
PC2. install the electrical supply systems including transformers, generators, circuit breakers, isolators, bus bars, wiring, fuses, earthing, switchboard, control panels, relays etc., by using measuring instruments as per the required working specifications and standards for chemical plants in terms of voltage, current, power, energy, frequency, RPM, etc.	2	4	-	2
PC3. follow all safety standards relevant to electric layout, earthing system, voltage limit, armored cables and flexible cables as per electricity rules applicable for chemical plants	2	4	-	3
PC4. install required electrical equipment like motors, fans, lighting, ACs, heaters, compressors, pumps, etc. associated with the chemical plant	3	5	-	2
PC5. install and commission required electrical components of equipment like Grinding equipment, Digesters, Precipitation & Crystallization setups, Filters, Mixer Settlers, etc. associated with the chemical plant	3	5	-	2
PC6. conduct a test to ensure the performance of installed electrical equipment as per the defined specifications	2	4	-	2
PC7. make modifications in the parameters of electrical equipment (by selecting the right program from the machine control system), if required and ensure alignment with the prescribed standards	3	4	-	1
Operations and Maintenance procedures	**12**	**21**	**-**	**7**

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC8. carry out predictive, preventive and break down maintenance for generators, transformers, circuit breakers, isolators, bus bars, control panels, switchboards, wiring, protective relays etc. as per the frequency suitable to the chemical plants	2	6	-	2
PC9. inspect and test electrical systems for continuity of circuits for proper functioning in electrical wiring, equipment, or fixtures, using testing devices such as ohmmeters, voltmeters, ammeters, energy meters, to ensure compatibility & safety of the system, identify electrical risks, hazards, defects or the need for adjustment or repair, and to ensure compliance with relevant statutes	4	6	-	1
PC10. diagnose malfunctioning systems, apparatus, or components, using test equipment and hand tools to locate the cause of a breakdown and correct the problem	2	3	-	2
PC11. operate and maintain the electrical equipment as required in chemical plants	2	2	-	1
PC12. maintain the records as required in Rare Earth (RE) chemical plant	2	4	-	1
NOS Total	**30**	**50**	**-**	**20**

National Occupational Standards (NOS) Parameters

NOS Code	MIN/N3105
NOS Name	Comply with unique requirements for Installation and O&M in Rare Earth Chemical Plant
Sector	Mining
Sub-Sector	Mining Operation
Occupation	Electrical Services
NSQF Level	4
Credits	TBD
Version	1.0
Last Reviewed Date	27/01/2022
Next Review Date	17/11/2025
NSQC Clearance Date	17/11/2022

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Element/ Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SCMS will also lay down proportion of marks for Theory and Skills Practical for each Element/ PC.

2. The assessment for the theory part will be based on knowledge bank of questions created by the SCMS.

3. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

4. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).

5. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.

6. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Minimum Aggregate Passing % at QP Level : 70

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N3101.Recognise work requirements and related Processes	40	60	-	-	100	20
MIN/N3102.Install the electrical supply/ sub-station and equipment	40	60	-	-	100	30
MIN/N3103.O&M for electrical supply/substation and equipment	40	60	-	-	100	20
DGT/VSQ/N0102.Employability Skills (60 Hours)	20	30	-	-	50	10
Total	**140**	**210**	**-**	**-**	**350**	**80**

Elective: 1 U/G Metal

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N1702.Follow Health, Safety and Environmental guidelines for Underground Metalliferous Mines (UMM) (Including Mine Vocational Training Rule and Mine Rescue Rule)	30	50	-	20	100	20
Total	**30**	**50**	**-**	**20**	**100**	**20**

Elective: 2 Opencast

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N1703.Follow Health, Safety, and Environmental Guidelines for opencast mines (Including Mine Vocational Training Rule)	30	50	-	20	100	20
Total	**30**	**50**	**-**	**20**	**100**	**20**

Elective: 3 U/G Coal

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N1704.Follow Health, Safety, and Environmental guidelines for underground coal mines (Including Mine Vocational Training Rule and Mine Rescue Rule)	30	50	-	20	100	20
Total	**30**	**50**	**-**	**20**	**100**	**20**

Elective: 4 Rare Earth Plant

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N1705.Follow Health, Safety and Environmental guidelines for Rare Earth (RE) Chemical plant	30	50	-	20	100	20
Total	**30**	**50**	**-**	**20**	**100**	**20**

Optional: 1 U/G Installation

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N3104.Comply with unique requirements for installation and operations and maintenance (O&M) of electrical system in U/G Mines	30	50	-	20	100	30
Total	**30**	**50**	**-**	**20**	**100**	**30**

Optional: 2 Rare Earth Installation

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MIN/N3105.Comply with unique requirements for Installation and O&M in Rare Earth Chemical Plant	30	50	-	20	100	30
Total	**30**	**50**	**-**	**20**	**100**	**30**

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training

Glossary

Sector	Sector is a conglomeration of different business operations having similar business 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.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications 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.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.

Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation 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/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment 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.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.