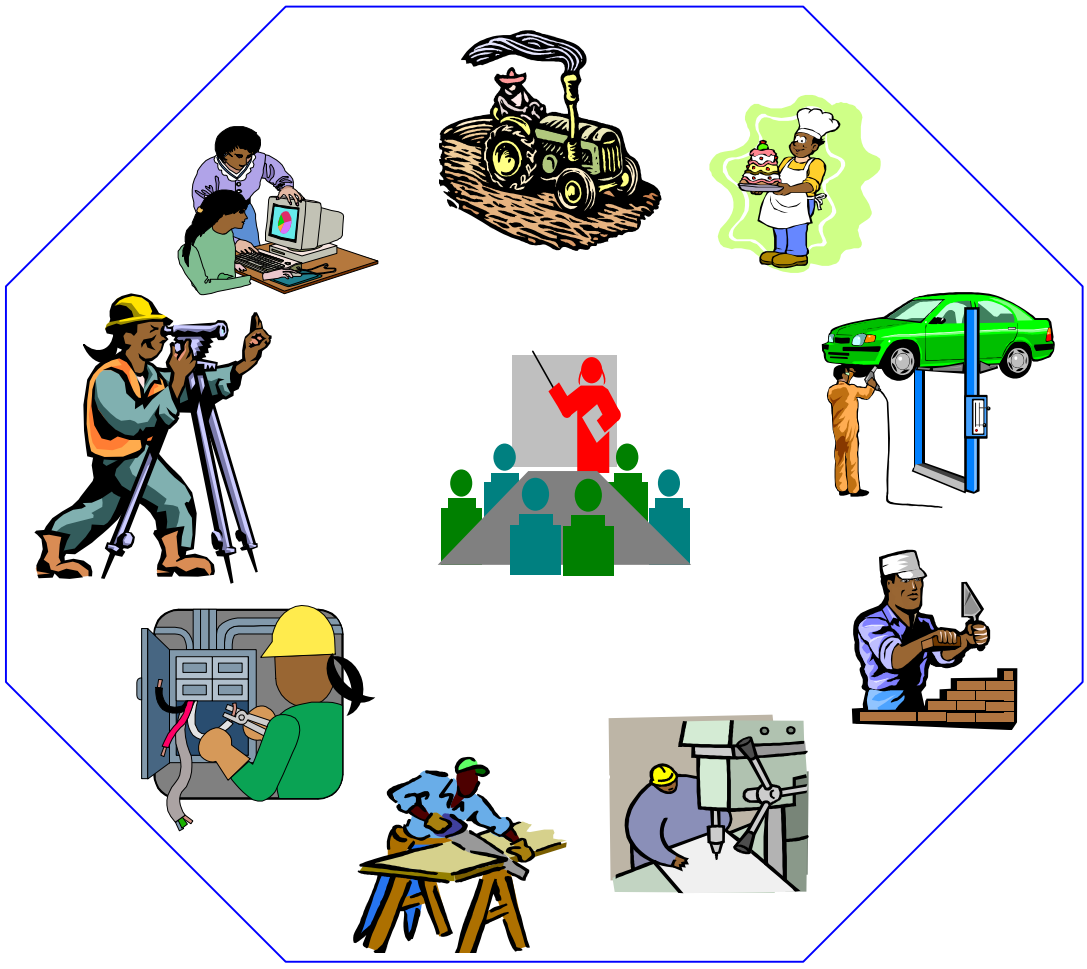
Federal Democratic Republic of Ethiopia
OCCUPATIONAL STANDARD

POWER GENERATION OPERATION AND MAINTENANCE SUPPORT

NTQF Level I



Ministry of Education
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Introduction

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

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

This document details the mandatory format sequencing wording and layout for the Ethiopia Occupational Standard which comprised of Units of Competence.

A Unit of Competence describes a distinct work activity. It is documented in a standard format that comprises:

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

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

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

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

UNIT OF COMPETENCE CHART

Occupational Standard: Power Generation and Operation and Maintenance Support

Occupational Code: EIS OMS

NTQF Level I

EIS OMS1 01 0612 Operate Fuel Supply System (Bagasse/ Furnace Oil /Biogas/Coal)	EIS OMS1 02 0612 Clean Manually and Maintain Housekeeping Standards	EIS OMS1 03 0612 Use Hand Tools
EIS OMS1 04 0612 Collect, Present and Apply Workplace Information	EIS OMS1 05 0612 Operate Ash Separation and Handling System	EIS OMS1 06 0612 Clean Chemically Equipment
EIS OMS1 07 0612 Shift Materials Safely Using Manual Handling Methods	EIS OMS1 08 0612 Shift Load Using Manually-Operated Equipment	EIS OMS1 09 0612 Use Hazardous Substances Safely
EIS OMS1 10 0612 Operate Lifting and Load Shifting Equipment (1)	EIS OMS1 11 0612 Make and Spread Stockpile	EIS OMS1 12 0612 Dispatch Stock
EIS OMS1 13 0612 Operate Forklift	EIS OMS1 14 0612 Handle Dangerous Goods/Hazardous Substances	EIS OMS1 15 0612 Operate Basic Equipment
EIS OMS1 16 0612 Clean Plant and Equipment	EIS OMS1 17 0612 Apply Quality Standards	EIS OMS1 18 0612 Receive and Respond to Workplace Communication
EIS OMS1 19 0612 Demonstrate Work Values	EIS OMS1 20 0612 Work with Others	EIS OMS1 21 0612 Develop Understanding of Entrepreneurship
EIS OMS1 22 1012 Apply 5S Procedures		

Occupational Standard: Power Generation Operation and Maintenance Support Level I	
Unit Title	**Operate Fuel Supply System (Biogases/Furnace Oil/Bio-Mass/Coal)**
Unit Code	**EIS OMS1 01 0612**
Unit Descriptor	It covers the skills, attitudes and knowledge to operate a biogases fuel system and related auxiliary fuel system to supply a boiler.

Element	Performance Criteria
1. Prepare the fuel supply system for operation	1.1 Pre-operational checks are conducted 1.2 Health and safety hazards are identified and controlled 1.3 Maintenance requirements are identified and reported according to workplace reporting procedure 1.4 Primary and ***auxiliary fuel*** is available to meet combustion requirements 1.5 Services are confirmed as available and ready for operation
2. Start and monitor operation of the fuel supply system	2.1 The fuel supply system is operated within limits of manufacturer's specifications to meet workplace requirements 2.2 The fuel supply system is monitored to confirm performance is maintained within manufacturer's specifications to meet workplace requirements 2.3 The ***workplace*** meets housekeeping standards
3. Analyze and respond to abnormal performance	3.1 System operating conditions are monitored to identify causes of abnormal performance 3.2 Corrective action is taken in accordance with workplace procedures in response to hazards and abnormal plant performance 3.3 Emergency procedures are implemented as required according to workplace procedures and manufacturer's recommendations
4. Handover fuel system operations	4.1 Workplace records are maintained in accordance with workplace procedures 4.2 Handover is carried out according to workplace procedure 4.3 Fuel system operators are aware of system and related ***equipment*** status at completion of handover
5. Shutdown the fuel supply system	5.1 The fuel supply system is shut down according to workplace ***procedures*** and manufacturer's recommendations

	5.2 The fuel supply system is prepared for storage in shut down mode 5.3 Maintenance requirements are identified and reported according to workplace reporting procedure 5.4 Fuel is stored to meet fuel requirements and workplace standards

Variable	**Range**
Auxiliary fuel supply system	• typically a heavy oil system
Equipment components and auxiliary equipment	May include • fuel supply storage • conveyor systems • bagacillo separation
Work	Work is carried out in accordance with company policies and procedures, licensing and legislative requirements, manufacturer's recommendations and industry codes of practice and agreements.
Workplace information	can include • Standard Operating Procedures (SOPs) and manufacturer's specifications
Confirming equipment status involves	May include but not limited to: • conducting relevant pre-start checks • confirming that housekeeping standards are met • all safety guards are in place and equipment is operational
Operation and monitoring of equipment and processes	• typically requires the use of control panels and systems
Reclamation procedures	• refers to reclamation of biogases stockpiles

Evidence Guide	
Critical Aspects of Competence	Demonstrate knowledge and skill to: • prepare the fuel supply system for operation • start and monitor operation of the fuel supply system • analyze and respond to abnormal performance • handover fuel system operations • shutdown the fuel supply system
Underpinning Knowledge and	Demonstrate knowledge of: • Relevant OHS legislation standards and codes of practice

Attitudes	relating to work responsibilities: • safe work procedures including awareness of health and safety hazards related to operation of fuel supply system and associated control measures (hazards typically include working with moving equipment working on platforms risk of bagasse forming an explosive dust and related risks of fire associated with hot work and spontaneous combustion) • hierarchy of hazard control measures • purpose and limitations of protective clothing and equipment • properties of bagasse and bagacillo and impact of variation on combustion • impact of bagasse belt levels on system capacity to supply • principles of flame management systems (this includes understanding of when and how to purge boiler before relighting in a flame out situation) • purpose and operation of auxiliary fuel supply • functions and basic operating principles of fuel supply system components and auxiliary equipment • operating requirements and parameters • supply system layout • the effect of fuel quality and supply on boiler operation • relationship between viscosity and temperature for burner operation • purpose of atomizing steam and/or air • purpose of purge cycle for the burner • relationship between fuel supply system and other processes • methods used to render equipment safe to inspect maintain and/or clean including lock-out tag-out and isolation procedures • procedures for responding to emergency situations • This includes emergency shutdown procedure: • handover and long term shut down and storage procedures • fuel storage requirements and fuel reclamation options and procedures as appropriate for the workplace and fuel type • environmental issues and controls • requirements to liaise/advise related work areas • housekeeping standards for the work area • reporting and recording systems • May include knowledge of: • Basic operating principles of process control where relevant • This includes the relationship between control panels and systems and the physical equipment

Underpinning Skills	Demonstrates skills of:
	• Access workplace information fuel supply requirements
	• Select fit and use personal protective clothing and/or equipment
	• Confirm status of fuel supply system and related services.
	• This may include confirming availability of auxiliary fuel
	• Conduct pre-start checks
	• Demonstrate set up and start up procedures in both manual and automatic modes and starting for normal operation and after emergency stops
	• Monitor fuel supply system operation.
	• This typically includes monitoring:
	  • fuel levels
	  • bagasse belt height
	  • temperature
	  • fuel oil pressure (on auxiliary system)
	  • speed
	  • vibration
	  • smell
	  • noise
	• Take corrective action in response to abnormal or unacceptable performance
	• Demonstrate procedure for test firing burners
	• Demonstrate procedure for removing inspecting cleaning and replacing oil burners. This involves use of go/no go gauges on atomizing tips
	• Demonstrate procedure for clearing fuel blockages or chokes throughout the system
	• Report and/or record corrective action as required
	• Demonstrate shift handover procedure and confirm that replacement operators are aware of equipment status and operating requirements prior to completing handover
	• Demonstrate procedure to take fuel supply system off-line
	• Demonstrate emergency procedures including operation of auxiliary/emergency fuel supply system
	• Demonstrate fuel storage and/or reclamation procedures as required in the workplace
	• Record operating information
	• Maintain work area to meet housekeeping standard
	May include ability to:
	• Use process control systems

Resources Implication	Access to: • Bagasse fuel supply system and related equipment • Relevant codes and standards • Operating procedures and related advice on equipment

	operation • Personal protective clothing and equipment • Communication systems and equipment • Housekeeping standards and procedures • Workplace information recording systems requirements and procedures
Methods of Assessment	Competence may be accessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Power Generation Operation and Maintenance Support Level I	
Unit Title	**Clean Manually Equipment and Maintain Housekeeping Standards**
Unit Code	**EIS OMS1 02 0612**
Unit Descriptor	This is a core unit for the processing stream. It covers the skills, attitudes and knowledge required to carry out manual cleaning and housekeeping procedures where there is no requirement to use tools to dismantle equipment.

Element	Performance Criteria
1. Prepare cleaning and sanitizing agents tools and equipment for cleaning	1.1 ***Cleaning*** and sanitizing agents ***equipment*** and ***services*** are prepared for use 1.2 Equipment is safe to clean
2. Manually clean equipment	2. 1 Equipment is cleaned to meet requirements 2. 2 Equipment is prepared for operation after cleaning 2. 3 Cleaning data is recorded according to ***workplace*** recording requirements
3. Collect and dispose of waste	3.1 Waste is sorted and collected as required 3.2 Waste is recycled transferred for rework or further treatment or disposal as required
4. Maintain housekeeping standards of the work area	4.1 The ***work*** area is inspected to any non-compliance with ***housekeeping standards*** 4.2 Equipment and the work area meet housekeeping standards

Variable	Range
Cleaning agents	• Cleaning agents include cleaning and sanitizing chemicals
Equipment	• Equipment used to clean and sanitise depends on specific requirements and would normally include brooms cloths scrapers brushes mops spray packs and hoses
Services	• Depend on specific requirements. Examples include high-pressure water or steam
Workplace information	• Workplace information can include Standard Operating Procedures (SOPs) cleaning schedules and Material Safety Data Sheets (MSDS)
Work	• Is carried out in accordance with company policies and

	procedures licensing requirements manufacturer's recommendations legislative requirements codes of practice and industrial awards and agreements. Codes of practice include the Sugar Milling Operations Industry Code of Practice • Work may require the ability to work within a team environment
Housekeeping standards	• may be defined in housekeeping audit criteria

Evidence Guide	
Critical Aspects of Competence	Demonstrate knowledge and skills in: • Prepare cleaning and sanitizing agents tools and equipment for cleaning • Manually clean equipment • Collect and dispose of waste • Maintain housekeeping standards of the work area
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: • Basic purpose of cleaning/sanitizing and housekeeping • Safe handling and storage of requirements of cleaning agents and equipment used • Purpose of protective clothing and equipment related to cleaning role • Action required in the event of an accident when handling cleaning chemicals • Methods used to render equipment safe to clean including lock-out tag-out and isolation procedures where relevant • Housekeeping and cleaning standards and methods relevant to equipment and the work area • Procedures for preparing cleaning/sanitizing agents. This includes consequences of mixing incorrectly and combining incompatible chemicals • Procedures for applying cleaning/sanitizing agents • Procedures for safe use of cleaning/sanitizing equipment and chemicals • Types of waste generated by both the production and the cleaning process and related collection treatment and disposal requirements • Spill control procedures and recycling or disposal of spilled materials. This includes environmental responsibilities covered by environmental legislation • Requirements to liaise/advise related work areas
Underpinning Skills	Demonstrates skills of: • Access and apply workplace information to identify cleaning

	requirements • Identify the cleaning and sanitizing agents used • Handle cleaning and sanitation agents safely. This includes following correct handling and preparation procedures and use of appropriate protective clothing and equipment • Prepare cleaning and sanitizing agents as required • Prepare equipment for cleaning. This includes rendering equipment safe to clean and clearing all materials consumables and waste • Advise affected work areas of cleaning schedule and progress • Clean/sanitize equipment as required according to procedures • Return equipment to operating order • Maintain housekeeping standards • Contain spills and dispose of spilled material according to company procedure • Store cleaning agents and equipment as required • Record cleaning and sanitation data in required format
Resources Implication	Candidate will to have access to: • Cleaning schedule and related procedures including OHS advice • Cleaning procedures including safe work procedures • Personal protective clothing and equipment • Material Safety Data Sheets as required • Cleaners sanitizers and related equipment • Equipment to be cleaned • Waste collection and treatment/disposal procedures • Advice on environmental management issues relevant to work responsibilities • Housekeeping standards and procedures • Workplace information recording systems requirements and procedures
Methods of Assessment	Competence may be accessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Power Generation Operation and Maintenance Support Level I	
Unit Title	**Use Hand Tools**
Unit Code	**EIS OMS1 03 0612**
Unit Descriptor	This unit covers the knowledge, skills and attitude required to use hand tools.

Element	**Performance Criteria**
1. Use hand tools	1.1 Appropriate ***hand tools*** selected according to the task requirements. 1.2 Hand tools used to produce desired outcomes to job specifications which may include finish tension size or shape. 1.3 All safety requirements are adhered to before during and after use. 1.4 Unsafe or faulty tools identified and marked for repair according to designated procedures before during and after use. 1.5 ***Routine maintenance*** of tools including hand sharpening undertaken according to standard operational procedures principles and techniques. 1.6 Hand tools are stored safely in appropriate location according to standard operational procedures and manufacturer's recommendations.

Variable	**Range**
Hand tools	• Including but not limited to hacksaws hammers punches screwdrivers sockets wrenches scrapers chisels gouges wood planes and files of all cross-sectional shapes and types.
Routine maintenance tasks	• May include cleaning lubricating tightening simple tool repairs hand sharpening and adjustments using engineering principles tools equipment and procedures.

Evidence Guide	
Critical Aspects of Competence	Demonstrate knowledge and skills in: • This unit could be assessed in conjunction with any other units addressing the safety quality communication materials handling recording and reporting associated with the use of hand tools or other units requiring the exercise of the skills and knowledge covered by this unit. Competence in this unit cannot be claimed until all prerequisites have been satisfied.

Underpinning Knowledge and Attitudes	Demonstrate knowledge to: • demonstrate safe working practices at all times • communicate information about processes events or tasks being undertaken to ensure a safe and efficient working environment • take responsibility for the quality of their own work • plan tasks in all situations and review task requirements as appropriate • perform all tasks in accordance with standard operating procedures • perform all tasks to specification • use accepted engineering techniques practices processes and workplace procedures (tasks involved will be completed within reasonable timeframes relating to typical workplace activities)
Underpinning Skills	Demonstrates skills of: • perform all tasks in accordance with standard operating procedures • perform all tasks to specification • use accepted engineering techniques practices processes and workplace procedures (tasks involved will be completed within reasonable timeframes relating to typical workplace activities)
Resources Implication	The candidate will have access to: • All tools equipment materials and documentation required. The candidate will be permitted to refer to the following documents: • Any relevant workplace procedures. • Any relevant product and manufacturing specifications. • Any relevant codes standards manuals and reference materials.
Methods of Assessment	Competence may be accessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Power Generation Operation and Maintenance Support Level I	
Unit Title	**Collect, Present and Apply Workplace Information**
Unit Code	**EIS OMS1 04 0612**
Unit Descriptor	This is a Core unit for all industry streams. It covers the skills and knowledge required to identify collect and present information to convey meaning to others and to participate in group processes.

Element	Performance Criteria
1. Select and present verbal information	1.1 ***Information*** requirements are identified 1.2 Information is collected assessed and structured to convey meaning to others 1.3 Interactive skills are used to ***communicate*** effectively with others
2. Use and maintain workplace information	2. 1 Routine ***workplace*** texts are used to obtain information required to operate in the workplace 2. 2 ***Information*** is recorded in standard formats according to workplace recording requirements

Variable	Range
Typical workplace information may include:	• Work instructions check-sheets tally sheets labels and codes • Materials Safety Data Sheets (MSDSs) standard forms production schedules and manufacturer's specifications
Work	• Work is carried out in accordance with company policies and procedures licensing requirements, manufacturer's recommendations, legislative requirements, codes of practice and industrial awards and agreements. • Codes of practice include the Sugar Milling Operations Industry Code of Practice
Typical subjects for communication may include	• work roles rights and responsibilities employment conditions and entitlements company policies labor agreement and codes of practice
Interactive communication processes	• Interactive communication processes include active listening turn taking questioning and tolerating the views of others
Every day workplace language	This may include • commonly used technical terms
Information	• may be conveyed in verbal written and screen-based forms appropriate to the audience and the purpose of information

Evidence Guide	
Critical Aspects of Competence	Demonstrate knowledge and skills in: • Select and present verbal information • Use and maintain workplace information
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: • Common colloquial and technical language • Sources of information and advice relating to work responsibilities • Methods of accessing recording and storing workplace information including print and screen based systems • Formal and informal communication systems • Group processes. This may include basic facilitation negotiation and conflict resolution
Underpinning Skills	Demonstrates skills of: • Access workplace information relating to work responsibilities • Select appropriate methods to communicate with people from diverse backgrounds • Structure information in a logical sequence • Ascertain or clarify information by asking questions • Present information appropriate to audience and information purpose • Participate in group discussions and processes as required • Demonstrate interactive communication processes • Interact with others to achieve agreed outcomes • Respect and where appropriate represent the views of • Others • Record information in required format/s
Resources Implication	The candidate will have access to: • Opportunities to interact with others using typical workplace communication processes • Typical group forums which can include work groups and committees • Typical workplace information • Information systems and procedures • Standard forms and equipment (as required) for recording workplace information
Methods of Assessment	Competence may be accessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Power Generation Operation and Maintenance Support Level I	
Unit Title	**Operate Ash Separation and Handling System**
Unit Code	**EIS OMS1 05 0612**
Unit Descriptor	This is a Specialist Unit. It covers the skills and knowledge required to operate a system to separate ash solids from boiler sluice water by use of clarifiers and filters.

Element	Performance Criteria
1. Prepare the ash separation system for operation	1.1 Materials are confirmed and available to meet requirements 1.2 ***Services*** are confirmed as available and ready for operation 1.3 ***Equipment*** is checked to confirm readiness for use 1.4 The ***ash separation*** process is set to meet production requirements 1.5 Health and safety hazards / maintenance requirements are identified and reported to appropriate personnel according to ***workplace*** reporting procedures
2. Operate the ash separation process	2. 1 The ash separation system is operated within limits of manufacturer's specifications to meet workplace requirements 2. 2 The ash separation system is monitored to confirm performance is maintained within manufacturer's specifications to meet workplace requirements 2. 3 The workplace meets housekeeping standards
3. Analyze and respond to abnormal performance	3.1 System operating conditions are monitored to identify causes of abnormal performance 3.2 Corrective action is taken in accordance with workplace procedures in response to hazards and abnormal plant performance 3.3 Emergency procedures are implemented as required according to workplace procedures and manufacturer's recommendations
4. Handover ash separation operations	4.1 Operating log is maintained in accordance with workplace procedures 4.2 Handover is carried out according to workplace procedure 4.3 System operators are aware of system and related equipment status at completion of handover

5. Complete ash separation operations	5.1 Ash is collected and disposed according to company procedures 5.2 Maintenance requirements are identified and reported according to workplace reporting procedure 5.3 Workplace ***information*** is recorded according to workplace recording ***requirements***

Variable	**Range**
Services	• may include general mill water supply power and mill and instrumentation air
Equipment	• may include grate cleaning system ash and soot blowing equipment ash removal system pumps weirs tanks belt conveyors rotary filters chemical addition systems and clarifier
Confirming equipment status	• may involves conducting relevant pre-start checks confirming that housekeeping standards are met all safety guards are in place and equipment is operational
Operation and monitoring of equipment and processes	• may require the use of control panels and systems
Ash separation	• Ash separation may involve use of clarifiers followed by a filter use of screens or by filter only
Workplace information	• Workplace information can include Standard Operating Procedures (SOPs) and manufacturer's specifications
Work	• Work is carried out in accordance with company policies and procedures licensing requirements manufacturer's recommendations legislative requirements codes of practice and industrial awards and agreements. Codes of practice include the Sugar Milling Operations Industry Code of Practice
Information system	• may be print or screen based
Typical test requirements	• Typical test requirements include pH settling tests clarity or turbidity

Evidence Guide	
Critical Aspects of Competence	Demonstrate knowledge and skills to: • Operate the ash separation process • Analyze and respond to abnormal performance • Handover ash separation operations • Complete ash separation operations
Underpinning Knowledge and	Demonstrate knowledge of: • Relevant OHS legislation standards and codes of practice

Attitudes	relating to work responsibilities • Safe work procedures including awareness of health and safety hazards related to operation of the ash removal system and associated control measures. Hazards typically include working with airborne particulates containing silica chemical handling and use of hot water • Purpose and limitations of protective clothing and equipment • Methods used to render equipment safe to inspect maintain and/or clean including lock-out tag-out and isolation procedures • Properties of ash or soot and the impact on filter operation • Functions and operating principles of ash separation system and related equipment • Relationship between vacuum filter speed and cake permeability • Operating requirements and parameters • Test methods • Common causes of variation and corrective action required • Procedures for responding to emergency situations. This includes safe shutdown procedure • Handover and long term shut down and storage procedures • Environmental issues and controls • Procedures for containing and managing ash spills • Housekeeping standards for the work area • Reporting and recording systems • Basic operating principles of process control where relevant. This includes the relationship between control panels and systems and the physical equipment

Underpinning Skills	Demonstrates skills of:
	• Access workplace information ash separation requirements
	• Select fit and use personal protective clothing and/or equipment
	• Confirm status of equipment and that services are available
	• Conduct pre-start checks
	• Demonstrate start up procedures for preparing and operating each equipment component in the system
	• Demonstrate safe chemical preparation and handling
	• Monitor the ash separation system. This typically includes visual inspection and conducting tests to monitor characteristics such as:
	  • moisture content of ash going out of the system
	  • available storage capacity of ash holding area
	  • filter performance and condition
	• Take corrective action in response to abnormal or

	unacceptable performance • Report and/or record corrective action as required • Demonstrate shift handover procedure and confirm that replacement operators are aware of equipment status and operating requirements prior to completing handover • Record operating information • Maintain work area to meet housekeeping standards • May include ability to: • Use process control systems
Resources Implication	The candidate will have access to: • Ash separation system and related equipment • Relevant codes and standards • Operating procedures and related advice on equipment operation • Personal protective clothing and equipment • Communication systems and equipment • Housekeeping standards and procedures • Workplace information recording systems requirements and procedures
Methods of Assessment	Competence may be accessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Power Generation Operation and Maintenance Support Level I	
Unit Title	**Clean Chemically Equipment**
Unit Code	**EIS OMS1 06 0612**
Unit Descriptor	It covers the skills and knowledge required to use chemical agents to clean in-line plant and equipment. This can include evaporator's pans heaters filters and boilers.

Element	Performance Criteria
1. Prepare for cleaning	1.1 Chemical stocks are available to meet cleaning and sanitation requirements 1.2 ***Services*** are confirmed as available and ready for operation 1.3 ***Equipment*** is checked to confirm readiness for use 1.4 Equipment shutdown is planned and equipment is taken off line for cleaning 1.5 The plant is set for the cleaning cycle
2. Operate and monitor the cleaning process	2. 1 The cleaning cycle is undertaken according to company procedures 2. 2 The cleaning process is ***monitored*** to confirm cleaning meets company requirements 2. 3 Cleaning data is recorded according to ***workplace*** recording requirements 2. 4 Out-of-specification process and equipment performance is identified rectified and/or reported according to workplace reporting procedure
3. Dispose of waste and return plant to operating condition	3.1 Cleaning chemicals are flushed from plant and disposed of according to company procedures 3.2 Plant is set up to meet operational requirements

Variable	Range
Services	• may include power water steam compressed and instrumentation air
Equipment cleaned	• may include evaporators pans boilers heaters filters chemical mixing and storage equipment plus pumps and pipes
Monitoring	It may include monitoring: • Condensate quality (evaporators heaters pans and boilers) vacuum and brix (evaporators) time storage tank levels

	chemical strength cycle time temperatures
Workplace information	• can include Standard Operating Procedures (SOPs) specifications production schedules and manufacturer's specifications
Work	• Work is carried out in accordance with company policies and procedures manufacturer's recommendations legislative requirements codes of practice and industrial awards and agreements.

Evidence Guide	
Critical Aspects of Competence	Demonstrate knowledge and skills in: • Prepare for cleaning • Operate and monitor the cleaning processes • Dispose of waste and return plant to operating condition
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: • Purpose and basic principles of cleaning in place (in-line). • This includes the use and functions of caustic and acid solutions and cleaning sequence and stages as required in the workplace • Terminology relating to the chemicals solutions used • Safe work procedures including appropriate signage of • cleaning activities and safe handling and storage of cleaners and sanitizers used • Purpose and limitations of protective clothing and equipment • Cleaning and sanitation requirements for work area. This includes different levels of cleaning requirements depending on the reason for cleaning • Methods used to render equipment safe to clean including lock-out tag-out and isolation procedures • Equipment settings required for cleaning and for operating respectively • Basic operating principles of process control where relevant. This includes the relationship between control panels and systems and the physical equipment • Inspection points for cleaning and sanitation • Consequences of contamination of process flows by cleaning solutions • Types of waste generated by both the production and the cleaning process and related collection treatment and disposal requirements • Environmental consequences of incorrect waste disposal procedures • Requirements to liaise/advise related work areas • Reporting and recording systems

	May include knowledge of: • Sampling and testing
Underpinning Skills	Demonstrates skills of: • Access workplace information such as the cleaning schedule to identify cleaning requirements • Select fit and use personal protective clothing and/or equipment • Confirm supply of necessary materials and services • Handle cleaning and sanitation agents safely. This includes following correct handling and preparation procedures and use of appropriate protective clothing and equipment • Prepare cleaners and sanitizers as required • Pace production and/or liaise with related work areas to take equipment off-line with minimal disruption to production • Prepare equipment for cleaning. This can include rendering equipment safe to clean correctly positioning equipment such as valves pipes vents and taps selecting appropriate cleaning cycle (CIP) removing waste and or dismantling equipment • Clean equipment according to cleaning process cycle and procedures. This can include starting up and operating the CIP process in both automatic and manual modes • Monitor the process and equipment operation to maintain the cleaning process within the required parameters • Return plant to operating order • Take corrective action in response to out-of-specification results • Advise affected work areas of cleaning schedule and progress • Maintain and store chemicals and related equipment as required • Carry out relevant checks and inspections to confirm effectiveness of cleaning • Sort collect treat recycle or dispose of waste • Record cleaning information • Maintain work area to meet housekeeping standards • May include the ability to: • Take samples and conduct tests
Resources Implication	The candidate have the access to: • Cleaning procedures and related advice on equipment operation including advice on safe work practices and environmental requirements • Personal protective clothing and equipment • Equipment to be cleaned and related cleaning system • Cleaning schedule or advice and related Standard Operating Procedures

	• Chemicals and/or automated chemical addition system • Services as required • Material Safety Data Sheets where appropriate • Housekeeping standards and procedures • Advice on environmental management issues relevant to work responsibilities • Workplace information recording systems requirements and procedures They may also require access to: • Sampling and testing schedules and procedures
Methods of Assessment	Competence may be accessed through: • Interview / Written Test • Observation / Demonstration with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Power Generation Operation and Maintenance Support Level I	
Unit Title	**Shift Materials Safely Using Manual Handling Methods**
Unit Code	**EIS OMS1 07 0612**
Unit Descriptor	This unit involves the skills and knowledge required to shift loads using manual handling methods including assessing the risks associated with relocating the load planning the relocation process and carrying out the relocation in accordance with the plan. Persons achieving competence in this unit will need to fulfill all of the relevant OHS regulatory requirements concerning the safe lifting and handling of a load using manual handling techniques.

Element	Performance Criteria
1. Assess risks arising from the relocation of the load	1.1 Products goods or ***materials*** to be relocated are identified 1.2 Locations for storage are determined and potential routes to be followed are identified 1.3 Effect of load relocation on original load base is predicted 1.4 Points of balance are estimated 1.5 Required clearances are compared to available space and adjustments made 1.6 Effects of moving contents which may be loose liquid dangerous or ***hazardous*** are considered 1.7 Potential risks in route(s) which may be followed are considered 1.8 Risks to self are identified arising from the required lifting ***load*** carrying set down or movement of the goods 1.9 Manual handling procedures for lifting lowering and carrying pushing and pulling are identified 1.10 Team lifting processes are considered for application 1.11 Appropriate ***personal protective equipment*** is worn
2. Plan load relocation	2. 1 Relocation of the load is planned consistent with the code of practice for manual handling 2. 2 Process for relocating load is proposed including predicting and planning for potential difficulties 2. 2 Proposed process is checked against code of practice and ***workplace procedures*** for compliance

3. Relocate load	3.1 Actions for lifting lowering and carrying pulling and pushing a load are in accordance with workplace procedures and OHS requirements 3.2 ***Applications*** appropriate for team relocation of load are identified 3.3 Team lifting tasks are coordinated 3.4 Planned process and route are followed 3.5 Relocated materials are set down without damage to goods ***personnel*** or equipment and checked for stability 3.6 Relocation is checked to see that it meets ***work*** requirements with any variance(s) reported

Variable	**Range**
Materials to be shifted	May include: • goods • equipment and tools • cleaning materials • components and parts of vehicles and equipment such as tires batteries lifting gear etc. • materials used in the course of work such as drums of fuel raw materials packaging etc.
Hazards in the work area	May include exposure to: • chemicals • dangerous or hazardous substances • movements of equipment goods and materials
Loads to be shifted	May be: • irregularly shaped • packaged or unpackaged • labeled or unlabelled
Personal protection equipment	May include: • gloves • safety headwear and footwear • safety glasses • two-way radios • high visibility clothing
Workplace procedures	Depending on the type of organization concerned and the local terminology used workplace procedures may include: • company procedures • enterprise procedures • organizational procedures • established procedures

Workplaces	• may comprise large medium or small worksites
Personnel in the work area	May include: • workplace personnel • site visitors • contractors • official representatives
Applicable regulations and legislation	May include: • relevant OHS legislation • relevant environmental protection legislation • workplace relations regulations • workers compensation regulations • license patent or copyright arrangements • dangerous goods and air freight regulations • export/import/quarantine/bond requirements • marine orders
Communication in the work area	May include: • phone • electronic data interchange • fax • e-mail • Internet • radio • oral aural or signed communications
Work may be conducted in:	• restricted spaces • exposed conditions • controlled or open environments
Work	• Work must be carried out in compliance with the relevant OHS regulations concerning the manual lifting and movement of loads • Work is performed under some supervision generally within a team environment • Work involves the application of the basic principles for the safe lifting and movement of loads when shifting materials using manual handling methods as part of day-to-day work

Evidence Guide	
Critical Aspects of Competence	Assessment must confirm appropriate knowledge and skills to: • locate interpret and apply relevant information • provide customer/client service and work effectively with others • convey information in written and oral form • maintain workplace records • select and use appropriate workplace colloquial and technical

	language and communication technologies in the workplace context • follow the designated work plan for the job • use appropriate techniques and body positioning when lifting lowering and carrying pulling and pushing and team lifting
Underpinning Knowledge and Attitudes	Demonstrate knowledge of: • relevant OHS and procedures and guidelines concerning the manual lifting and movement of loads • risks when manually lifting and handling materials and goods and related precautions to control the risk including: • the load on the spine during lifting • controlled actions on a movement during lifting • rotation and side movement of the spine during lifting • postures and positions during lifting • work layout • weight of the load, load type and position • frequency of shifting operations • distance over which load is to be shifted • time allowed for the shifting of the load • workplace procedures and policies for the shifting of goods and materials • housekeeping standards procedures in the workplace • site layout and obstacles
Underpinning Skills	Demonstrates skills of: • ability to modify activities depending on differing workplace contexts risk situations and environments • ability to read and comprehend simple statements in English including material data safety sheets (where applicable) • ability to identify containers and goods coding IMDG markings and where applicable emergency information panels • ability to estimate the size shape and special requirements of loads
Resources Implication	Access is required to opportunities to: • participate in a range of exercises case studies and other simulated practical and knowledge assessments that demonstrate the skills and knowledge to shift materials safely using manual handling methods and/or • shift materials safely using manual handling methods in an appropriate range of operational situations
Methods of Assessment	Competence may be accessed through: • Interview / Written Test • Observation / Demonstration/ with Oral Questioning
Context of Assessment	Competence may be assessed in the work place or in a simulated work place setting

Occupational Standard: Power Generation Operation and Maintenance Support Level I	
Unit Title	**Shift Load Using Manually-Operated Equipment**
Unit Code	**EISOMS1 08 0612**
Unit Descriptor	This unit involves the skills and knowledge required to shift loads using manually-operated mechanical equipment including assessing the risks associated with relocating the load planning the relocation process and carrying out the relocation with the aid of the equipment in accordance with the plan.

Element	Performance Criteria
1. Assess risks arising from the relocation of the load	1.1 Products goods or materials to be relocated are identified 1.2 Location for storage is determined 1.3 Routes to be followed are identified 1.4 Points of balance are estimated 1.5 Effect of moving contents which may be loose liquid dangerous or ***hazardous*** are considered 1.6 Potential risks in route(s) which may be followed are considered 1.7 Lifting equipment to minimize potential risks is identified 1.8 Appropriate personal protective equipment is worn
2. Plan load relocation	2. 1 ***Load*** shifting equipment is selected in accordance with workplace procedures 2. 2 Safe procedures for using lifting equipment are identified including the calculation of Safe Working Load (SWL) and/or Working Load Limit (WLL) for weight of goods to be moved 2. 3 Process for relocating load is proposed including predicting and planning for potential difficulties 2. 4 Proposed process is checked against relevant code of practice and workplace procedures for compliance 2. 5 Lifting equipment and accessories are checked for safe operation in accordance with manufacturer's instructions and workplace procedures
3. Relocate load	3.1 Any unsafe equipment is reported to appropriate ***personnel*** in accordance with workplace procedures 3.2 Planned process and route are followed using equipment within necessary range of limitations