

NATIONAL OCCUPATIONAL STANDARD FOR WATER TREATMENT PLANT OPERATOR



**NOS.WTPO.01
FIRST EDITION**

APPROVING AUTHORITY

This National Occupational Standard (NOS) has been prepared and published under the authority of the Zambia Qualifications Authority Board on 16th May, 2024.

ZAMBIA QUALIFICATIONS AUTHORITY

The Zambia Qualifications Authority (ZAQA) Act No. 13 of 2011 was enacted by the Government of the Republic of Zambia to ***“provide for the development and implementation of a national qualifications framework; establish the Zambia Qualifications Authority; provide for the registration and accreditation of qualifications; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing”***. Among other functions, ZAQA is responsible for ***determining national standards for any occupation***, through the various sector specific National Occupational Standards Development Teams (NOSDTs).

REVISION OF NATIONAL OCCUPATIONAL STANDARDS

National Occupational Standards (NOS) shall be revised every 5 years, or whenever it is deemed necessary, by the issuance of either amendments or revised editions. It is important that users of the NOS ascertain that they are in possession of the latest amendments or editions.

NOS DEVELOPMENT TEAM RESPONSIBLE

This National Occupational Standard was prepared by the Water NOSDT, upon which the following organisations were represented:

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2. Natural Resources Development College (NRDC)
3. The Copperbelt University (CBU)
4. Water Resources Management Authority (WARMA)
5. Technical Education Vocational and Entrepreneurship Training Authority (TEVETA) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Thrive Project
6. Zambia Environmental Management Agency (ZEMA)
7. Living Water International (LWI)
8. WaterAid Zambia (WAZ)
9. National Water Supply and Sanitation Council (NWASCO) / Lusaka Water Security Initiative (LuWSI)
10. Habitat for Humanity Zambia (HHZ)
11. Ministry of Water Development and Sanitation (MWDS)

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FOREWORD

The Zambia Qualifications Authority (ZAQA) is a statutory body under the Ministry of Education established by ZAQA Act No. 13 of 2011 to ***“provide for the development and implementation of a national qualifications framework; provide measures to ensure that standards and registered qualifications are internationally comparable; and provide for matters connected with, or incidental to the foregoing”***.

Among other functions, ZAQA is responsible for ***“determining national standards for any occupation”***, through the various sector specific National Occupational Standards Development Teams (NOSDTs) with experts composed of representation from the appropriate authorities, government departments, consumer associations, regulators, industry, academia, and non-governmental organisations, etc.

This National Occupational Standard (NOS) has been developed by the Water National Occupational Standards Development Team in accordance with the laid down procedures and guidelines of ZAQA. All users should ensure that they have the latest edition of this publication as the NOS are revised from time to time.

This NOS shall be used by, among others, industry, employers, quality assurance bodies, awarding and professional bodies, and education and training institutions, as a benchmark to identify training needs, develop job profiles/descriptions, develop curricula, and learning programmes in various sectors where the occupation exists. In the Water sector, demonstration of competence against this NOS may be required in order to run a business or practice a craft or profession.

JUSTIFICATION

Water Treatment Plant Operator is one of the critical occupations in the water sector. The position of is essential for safeguarding public health, protecting the environment, and ensuring regulatory compliance in providing clean and safe drinking water to communities. The significance of the role cannot be overstated in safeguarding the well-being of both public health and the plant.

This NOS highlights the core knowledge, skills, competences, and personal attributes that Water Treatment Plant Operators must possess to be successful in their jobs.

ACRONYMS AND ABBREVIATIONS

CS	Core Skills
K	Knowledge and Understanding
NOS	National Occupational Standard
NOSDT	National Occupational Standards Development Team
OK	Organisational Knowledge
OSHE	Occupational Safety, Health and Environment
PC	Performance Criteria
pH	Hydrogen Potential
PS	Professional Skill
RPL	Recognition of Prior Learning
SCADA	Supervisory Control and Data Acquisition
SOP	Standard Operating Procedure
TK	Technical Knowledge
WTPO	Water Treatment Plant Operator
ZAQA	Zambia Qualifications Authority
ZQF	Zambia Qualifications Framework

GLOSSARY OF TERMS

For the purposes of this NOS, the following terms and definitions shall apply:

Core Skills/Generic Skills: are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the NOS, these include communication related skills that are applicable to most job roles.

Disability: is the physical or mental impairment that substantially limits one or more major life activities.

Function: is an activity necessary for achieving the key purpose of the sector, occupation or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of the NOS.

Job Title: defines a unique set of functions that together form a unique employment opportunity in an organisation.

Knowledge and Understanding: 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.

National Occupational Standards (NOS): are statements of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding. They are precise descriptions of what an individual is expected to be able to do in his/her work role.

National Occupational Standards (NOS) Code: is a unique reference code that identifies a NOS.

National Occupational Standards Development Team (NOSDT): means an established group of national stakeholders/experts responsible for the development of National Occupational Standards within a specific economic sector or occupation.

Occupation: is a set of job roles, which perform similar/related set of functions in an industry.

Organisational Context: includes the way the organisation is structured and how it operates, including the extent of operative knowledge that managers have in their relevant areas of responsibility.

Performance Criteria: are statements that together specify the standard of performance required when carrying out a task.

Scope: is the 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 the quality of performance required.

Sector: is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy, whose components share similar characteristics and interests.

Sub Sector: is derived from a further breakdown based on the characteristics and interests of its components.

Technical Knowledge: is the specific knowledge needed to accomplish specific designated responsibilities.

Unit Title: gives a clear overall statement about what the incumbent should be able to do.

Elements: set out competences the incumbent should possess to carry out the day-to-day activities.

1. OVERVIEW

This is an introductory section providing a summary and specific information or commentary about the content of the NOS, the targeted sector and occupation to help the user judge whether it is relevant to them.

NOS Code	NOS.WTPO.01
Occupation	Water Treatment Plant Operations
Job Title	Water Treatment Plant Operator
Job Description	A Water Treatment Plant Operator is responsible for monitoring operations of the treatment plant, ensuring all treatment units are functional and in good order. He/she is responsible for determining and ensuring correct dosages/applications of treatment chemicals, and is also responsible for enforcing safety within the plant. He/she ensures the water produced meets the national drinking water standards.
Job Purpose	A Water Treatment Plant Operator is responsible for the production of potable (clean and safe) water in quantities according to the plant design.
ZQF Level	6
Sector	Water
Sub sectors	Water Supply and Sanitation
Other Economic Sector(s) in which the Occupation is Practiced	Manufacturing, Mining.
Other Similar Jobs that can be Performed in the Occupation	Maintenance Officer, Pump Operations & Repair officer, Plant Safety officer, Water Quality Assessment officer, etc.
Minimum Educational Job Entry Qualification(s)	Diploma (Water Engineering, Water Operations, Chemical, Civil and Environmental Engineering, etc.)
Practicing License Requirements (if any)	Membership with the Engineering Institution of Zambia – Technologist
Training/RPL (Suggested)	Experience in operating pumps
Minimum Job Entry Age	20 years
Prior Experience (Recommended)	One year experience or internship as Plant Operator
Performance Criteria	As described in the Units under Section 4

2. SCOPE

This NOS specifies the fundamental knowledge and understanding, skills and competences, and personal attributes that Water Treatment Plant Operators must possess to be successful in their jobs.

3. PERSONAL ATTRIBUTES (VALUES, ETHICS AND ATTITUDES)

This job requires ability to do basic planning and analysis; ability to manage a team; physique to sustain strenuous conditions; high technological exposure to handle various equipment, tools, and materials; sensitivity towards safety for self, others, and water works environment whilst working at the site; be well versed with tasks, functions, standards, specifications, codes of practice, and safety norms applicable to plant operations; be honest and results oriented, etc.

4. UNITS AND ELEMENTS

This National Occupational Standard is divided into 4 Units, representing the tasks that a jobholder should undertake in his/her day-to-day work. Each unit is further broken down into elements depicting the number of activities to be carried out for the successful execution of a particular task.

UNIT 1 [This Unit covers the skills and knowledge required by a Water Treatment Plant Operator in conducting assessment of incoming raw water quality and determine water treatment chemical dosing]

Unit No.	01
Unit Title	Assessment of Incoming Raw Water Quality and Determine Water Treatment Chemical Dosages
Description	This Unit describes the skills, knowledge and competence required by a Water Treatment Plant Officer to assess the quality of incoming raw water into a plant, and make determinations of the dosage rates for water treatment chemicals that need to be added to the water for effective water purification.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Raw water quality analysis. • Determination of appropriate chemical dosages.
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Raw Water Quality Analysis	To be competent, the individual must be able to: PC1. Perform raw water quality analysis. PC2. Read and interpret water quality results.
Determination of Appropriate Chemical Dosages	To be competent, the individual must be able to: PC3. Undertake chemical dosage experiments. PC4. Develop a chemical dosing curve. PC5. Read and Interpret chemical dosing curves.
Knowledge and Understanding (K)	
A. Organisational Context (knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: OK1. Standard operating procedures for raw water quality analysis. OK2. Quality assurance procedures. OK3. Stores management procedures. OK4. Company environmental and safety processes. OK5. Statutory compliance requirements at the workplace. OK6. Procedures of conflict resolution in the workplace.
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: TK1. Correct methods for raw water sample collection. TK2. Performing raw water quality analysis tests. TK3. Assessing and interpreting laboratory water quality results. TK4. Water treatment processes. TK5. Ambient water quality standards.

C. Regulatory Context (knowledge on rules and regulations)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1. Water quality standard and guidelines.</p>	
Skills (S)		
A. Core Skills/ Generic Skills	Writing Skills	
	<p>The individual on the job must be able to:</p> <p>CS1. Write in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site.</p> <p>CS2. Prepare and provide clear and simple instructions, details, and sketches to co-workers.</p>	
	Reading Skills	
	<p>The individual on the job must be able to:</p> <p>CS3. Read English and be able to, or have the means to, give simple instructions in the local language used at the site.</p> <p>CS4. Read and interpret sketches, drawings or instructions provided for the required work.</p> <p>CS5. Read and interpret various safety and general signage, safety rules and tags, etc., provided at the workplace, including directions for exit routes during emergencies</p>	
	Oral Communication (Listening and Speaking skills)	
	<p>The individual on the job must be able to:</p> <p>CS6. Speak in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site.</p> <p>CS7. Listen attentively and interpret communication/ instructions from the supervisor and other co-workers.</p> <p>CS8. Convey information clearly and concisely to co-workers.</p>	
	B. Professional Skills	Decision-Making
		<p>The individual on the job must be able to:</p> <p>PS1. Determine the right chemical dosage for water treatment.</p> <p>PS2. Select appropriate laboratory test procedures.</p> <p>PS3. Make decisions on whether to treat water based on raw water quality or shut down the plant.</p>
Plan and Organise		
<p>The individual on the job should be able to:</p> <p>PS4. Plan work and organise required resources in coordination with team members and superiors.</p> <p>PS5. Plan and organise maintenance schedules.</p>		
Customer Centricity		
<p>The individual on the job should be able to:</p> <p>N/A</p>		

	Problem Solving
	The individual on the job should be able to: PS5. Resolve any conflicts within the team. PS6. Recognise problems and come up with solutions. PS7. Choose best methods to complete assigned tasks.
	Analytical Thinking
	The individual on the job should be able to: PS8. Analyse and convey to the superior and carry out remedial action. PS9. Apply domain knowledge, observations, and data to select course of action to perform tasks related to water treatment.
	Critical Thinking
	The individual on the job should be able to: PS10. Identify and deal with or report violation of any safety norms which may lead to accidents. PS11. Critically evaluate information obtained from supervisors and co-workers to perform day to day activities. PS12. Assess and evaluate the resources needed against the plan of action to complete the assignment with the given timeframe.

UNIT 2 [This Unit covers the skills and knowledge required by a Water Treatment Plant Operator in the operation of a water treatment plant]

Unit No.	02
Unit Title	Operate Water Treatment Plant
Description	This Unit describes the skills and knowledge required by a Water Treatment Plant Operator to operate a water treatment plant.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Operation of a water treatment plant from abstraction to sedimentation/clarification, filtration, disinfection, to conveyance.
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Operation of a Water Treatment Plant from Abstraction to Sedimentation/Clarification, Filtration, Disinfection, to Conveyance	To be competent, the individual must be able to: <p>PC1. Operate pumps and associated equipment.</p> <p>PC2. Operate sedimentation and filtration units.</p> <p>PC3. Flush and maintain the screens.</p> <p>PC4. Operate disinfection equipment.</p> <p>PC5. Operate solar powered water supply systems.</p> <p>PC6. Interpret and troubleshoot control panels.</p> <p>PC7. Complete documentation as required.</p> <p>PC8. Operate different valves.</p> <p>PC9. Operate and read different meter/gadgets associated with water treatment.</p> <p>PC10. Analyse water quality at different phases of treatment.</p> <p>PC11. Monitor water levels in reservoirs.</p> <p>PC12. Participate in the development or updating of standard operating procedures and checklists relating to maintenance.</p>
Knowledge and Understanding (K)	
A. Organisational Context (knowledge of the company/organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: <p>OK1. Standard operating procedures for water treatment and equipment.</p> <p>OK2. Quality policies and procedures.</p> <p>OK3. Stores management procedures.</p> <p>OK4. Company environmental and safety processes.</p> <p>OK5. Statutory compliance requirements at the workplace.</p> <p>OK6. Procedures of conflict resolution in the workplace.</p>
B. Technical Knowledge	The individual on the job must demonstrate knowledge and understanding of: <p>TK1. Science of water.</p> <p>TK2. Assessing and interpreting water quality results.</p> <p>TK3. Water treatment processes.</p> <p>TK4. Ambient water quality standards.</p> <p>TK5. Operation of instrumentation in a water treatment plant.</p> <p>TK6. Importance and need of treating water.</p>

	TK7. Operation of the various water treatment equipment (pumps, motors, blowers, valves, chlorinators, etc.).
C. Regulatory Context (knowledge of rules and regulations)	The individual on the job must demonstrate knowledge and understanding of: RK1. Water quality standard guidelines. RK2. Safety compliances while handling chemicals.
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. Write in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site. CS2. Prepare and provide clear and simple instructions, details, and sketches to co-workers.
	Reading Skills
	The individual on the job must be able to: CS3. Read English and be able to, or have the means to, give simple instructions in the local language used at the site. CS4. Read and interpret sketches, drawings or instructions provided for the required work. CS5. Read and interpret various safety and general signage, safety rules and tags, etc., provided at the workplace, including directions for exit routes during emergencies.
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS6. Speak in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site. CS7. Listen attentively and interpret communication/ instructions from the supervisor and other co-workers. CS8. Convey information clearly and concisely to co-workers.
	C. Professional Skills
	Decision-Making
The individual on the job must be able to: PS1. Follow organisational rule-based decision-making processes with regard to water treatment. PS2. Take decisions with systematic course of actions and/ or responses. PS3. Make decisions on the chemical dosing requirements for water treatment processes.	
Plan and Organise	
The individual on the job should be able to: PS4. Plan work and organise required resources in coordination with team members and superiors. PS5. Plan allocation and utilisation of resources. PS6. Plan operations of the water treatment plant.	

	Customer Centricity
	The individual on the job should be able to: N/A
	Problem Solving
	The individual on the job should be able to: PS7. Resolve any conflicts within the team. PS8. Recognise problems and come up with solutions. PS9. Choose best methods to complete assigned tasks.
	Analytical Thinking
The individual on the job should be able to: PS10. Analyse and convey to the superior, and carry out remedial actions. PS11. Apply domain knowledge, observations, and data to select course of action to perform tasks related to water treatment.	
Critical Thinking	
The individual on the job should be able to: PS12. Identify and deal with or report violation of any safety norms which may lead to accidents. PS13. Critically evaluate information obtained from supervisors and co-workers to perform day to day activities. PS14. Assess and evaluate the resources needed against the plan of action to complete the assignment with the given timeframe.	

UNIT 3 [This Unit covers the skills and knowledge required by a Water Treatment Plant Operator in monitoring and maintaining a water treatment plant]

Unit No.	03
Unit Title	Monitor and Maintain a Water Treatment Plant
Description	This Unit describes the skills and knowledge required by a Water Treatment Plant Operator to monitor and maintain a water treatment plant.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Monitor the functionality of a water treatment plant. • Maintain the water treatment plant.
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Monitor the Functionality of a Water Treatment Plant	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC1. Check all equipment and fill out daily activity log sheets. PC2. Operate the abstraction points correctly. PC3. Monitor the working of the water treatment equipment and record any anomalies. PC4. Take chemical inventory and record the chemical and water usage. PC5. Inspect the inlet chambers periodically at the plant for anomalies. PC6. Monitor and record all meter and gauge readings. PC7. Prepare and maintain the operation records.
Maintain the Water Treatment Plant	To be competent, the individual must be able to: <ul style="list-style-type: none"> PC8. Participate in the development of maintenance schedules. PC9. Perform maintenance on valves, pumps, tanks, and filters. PC10. Perform general maintenance. PC11. Clean the workplace and equipment. PC12. Assist in developing estimates for repair, maintenance, and construction activities in the water treatment plant. PC13. Complete documentation as required. PC14. Adhere to standard operation procedures. PC15. Participate in the development or updating of standard operating procedures and checklists relating to maintenance.
Knowledge and Understanding (K)	
A. Organisational Context (knowledge of the company/ organisation and its processes)	The individual on the job must demonstrate knowledge and understanding of: <ul style="list-style-type: none"> OK1. Company policies on quality and standards, design norms, safety hazards, integrity, codes, compliance, and guidelines. OK2. Maintenance of the water treatment plant. OK3. Company's reporting structure. OK4. Different departments and concerned authorities.

	OK5. The purpose and scope of the work to be carried out and its importance.
B. Technical Knowledge	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. Working principles of different components in a water treatment plant.</p> <p>TK2. Classifications of different types of filters, valves, tanks, pumps, screens, and how they are cleaned or replaced when required.</p> <p>TK3. Maintenance of components of water treatment plants.</p> <p>TK4. Importance of maintenance management systems.</p> <p>TK5. SCADA based control systems.</p>
C. Regulatory Context (knowledge of rules and regulations)	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1. Guidelines and standard operating procedures relating to maintenance.</p> <p>RK2. Safety compliance while handling chemicals.</p>
Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	<p>The individual on the job must be able to:</p> <p>CS1. Write in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site.</p> <p>CS2. Prepare and provide clear and simple instructions, details, and sketches to co-workers.</p>
	Reading Skills
	<p>The individual on the job must be able to:</p> <p>CS3. Read English and be able to, or have the means to, give simple instructions in the local language used at the site.</p> <p>CS4. Read and interpret sketches, drawings or instructions provided for the required work.</p> <p>CS5. Read and interpret various safety and general signage, safety rules and tags, etc., provided at the workplace, including directions for exit routes during emergencies.</p>
B. Professional Skills	Oral Communication (Listening and Speaking skills)
	<p>The individual on the job must be able to:</p> <p>CS6. Speak in English (at least working level), and be able to, or have the means to, give simple instructions in the local language used at the site.</p> <p>CS7. Listen attentively and interpret communication/ instructions from the supervisor and other co-workers.</p> <p>CS8. Convey information clearly and concisely to co-workers.</p>
	Decision-Making
	<p>The individual on the job must be able to:</p> <p>PS1. Determine and report to the superior whether the working space is safe for operating.</p>

	Plan and Organise
	The individual on the job should be able to: PS2. Plan work and organise required resources in coordination with team members and superiors.
	Customer Centricity
	The individual on the job should be able to: PS3. Manage relationships with customers with intent to satisfying their project requirements.
	Problem Solving
	The individual on the job should be able to: PS4. Resolve any conflicts within the team.
	Analytical Thinking
	The individual on the job should be able to: PS5. Analyse and convey to the superior and carry out remedial actions.
Critical Thinking	
The individual on the job should be able to: PS6. Identify and deal with or report violation of any safety norms which may lead to accidents.	

UNIT 4 [This Unit covers the skills and knowledge required by a Water Treatment Plant Operator in maintaining health and safety at the workplace]

Unit No.	04
Unit Title	Health and Safety in a Water Treatment Plant
Description	This Unit describes the skills and knowledge required by a Water Treatment Plant Operator in maintaining, health, safety, and environmental protection for individuals and the environment around water treatment plants.
Scope	This Unit covers the following: <ul style="list-style-type: none"> • Healthy and safety in a water treatment plant. • Emergency procedures.
Performance Criteria (PC) with respect to the Scope	
Element	Performance Criteria (PC)
Healthy and Safety in a Treatment Plant	<p>To be competent, the individual must be able to:</p> <p>PC1. Train staff and enforce safety measures in the plant.</p> <p>PC2. Undertake basic safety checks before operation of all machinery and vehicles, and report potential hazards to the supervisor.</p> <p>PC3. Identify work for which protective clothing or equipment is required, and perform duties in accordance with workplace policies.</p> <p>PC4. Read and understand the hazards of contamination and use mentioned on the labels of chemicals and reagents.</p> <p>PC5. Assess risks prior to performing manual handling jobs, and work according to current recommended safe practices.</p> <p>PC6. Use equipment and materials safely and correctly, and return the same to designated storage when not in use.</p> <p>PC7. Dispose of waste safely and correctly in the designated areas.</p> <p>PC8. Recognise risks to bystanders and take action to reduce risk associated with jobs in the workplace.</p> <p>PC9. Perform work in a manner that minimises environmental damage for all procedures, and ensure work instructions for controlling risks are followed accurately.</p> <p>PC10. Report all accidents, incidents or problems without delay to an appropriate person, and take necessary immediate action to reduce further danger.</p> <p>PC11. Develop or update standard operating procedures and checklists relating to safety and health.</p>

<p>Emergency Procedures</p>	<p>To be competent, the individual must be able to:</p> <p>PC12. Follow procedures for dealing with accidents, fires, and emergencies, including issuing instructions and directions for emergency evacuation.</p> <p>PC13. Follow emergency procedures to company standards/ workplace requirements.</p> <p>PC14. Use emergency equipment in accordance with manufacturers' specifications and workplace requirements.</p> <p>PC15. Provide treatment appropriate to patients' injuries in accordance with recognised First Aid techniques.</p> <p>PC16. Recover (if practical), clean, inspect/test, refurbish, replace and store First Aid equipment as appropriate.</p> <p>PC17. Report details of First Aid administered in accordance with workplace procedures.</p>
<p>Knowledge and Understanding (K)</p>	
<p>A. Organisational Context (knowledge of the company/ organisation and its processes)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>OK1. Company safety, health, and environmental policies and procedures.</p> <p>OK2. General duties under the relevant health and safety legislation.</p> <p>OK3. Personal protective equipment to be worn and how it is cared for; correct and safe way to use materials and equipment required for the work.</p> <p>OK4. The correct and safe way to use materials and equipment required for work.</p> <p>OK5. Importance of good housekeeping in the workplace.</p> <p>OK6. Safe disposal methods for waste.</p> <p>OK7. Methods for minimising environmental damage during work.</p>
<p>B. Technical Knowledge</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>TK1. Risks to health and safety, and measures to be taken to control them in the workplace.</p> <p>TK2. Basic emergency First Aid procedures.</p> <p>TK3. Local emergency services.</p> <p>TK4. Importance of reporting accidents, incidents, and problems, and the appropriate action to be taken.</p>
<p>C. Regulatory Context (knowledge of rules and regulations)</p>	<p>The individual on the job must demonstrate knowledge and understanding of:</p> <p>RK1. Government regulatory agency requirements for health and safety.</p>

Skills (S)	
A. Core Skills/ Generic Skills	Writing Skills
	The individual on the job must be able to: CS1. Mention data which is required for record keeping purposes. CS2. Report problems to appropriate personnel timely. CS3. Write descriptions and details about incidents in reports
	Reading Skills
	The individual on the job must be able to: CS4. Read instruction manuals on hand tools and equipment
	Oral Communication (Listening and Speaking skills)
	The individual on the job must be able to: CS5. Communicate clearly and effectively with others, like farmers and team members; concerned officers and stakeholders CS6. Comprehend information shared by senior staff/experts.
B. Professional Skills	Decision-Making
	The individual on the job must be able to: PS1. Make decisions pertaining to types of tools to be used. PS2. Identify need of First Aid and render it accordingly.
	Plan and Organise
	The individual on the job must be able to: PS3. Plan and organise work to meet deadlines. PS4. Work constructively and collaboratively with others.
	Customer Centricity
	The individual on the job must be able to: PS5. Follow code of conduct. PS6. Manage relationships with customers with intent on satisfying their requirements for service delivery.
	Problem Solving
	The individual on the job must be able to: PS7. Recognise problems and search for solutions. PS8. Choose best methods to complete assigned tasks. PS9. Approach relevant authorities when required. PS10. Judiciously use common sense in day-to-day activities.
	Analytical Thinking
	The individual on the job must be able to: PS11. Apply domain knowledge, observations, and data to select course of action to perform tasks.
	Critical Thinking
	The individual on the job must be able to: PS12. Critically evaluate information obtained from customers, supervisor, and co-workers to perform day to day activities. PS13. Ask relevant questions for better understanding.

5. EQUIPMENT, TOOLS AND CONSUMABLE MATERIALS

Equipment, tools and consumable materials used by the job holder include, but are not limited to the following:

Hand Tools: Wrenches, spanners, hammers, pliers, shifting spanners, screw driver, sampling bottles, etc.

Measuring Instruments: pH meter, flow meter, conductivity meter, chlorine residue devices, power analysers, vibration analysers, current meter, etc.

Power Tools: Power drive, welding machine, drilling machine, grinder, etc.

Consumables and General Requirements: Chlorine (gas or granular), coagulants, flocculants, testing reagents (DPD tablets, Phenol red, Methylated spirit), etc.

Personal Protective Equipment: Safety boots, gloves, work suit, helmet, gas mask, goggles, welding shields, lab coats, aprons, etc.

Others: Scaffolds, ladders, computers, fire extinguishers, etc.

6. DILEMMAS/CHALLENGES AND COMPLEXITIES FOR A JOBHOLDER

Dilemmas associated with the job of Water Treatment Plant Operator include: exposure to flames and electrical power supply; working around and with machinery with moving parts; working in dangerous areas with likelihood of sharp or falling materials and objects; working in confined spaces and at heights with likelihood of falls; working in extreme weather, such as hot and cold conditions; working in noisy, wet, and dusty environments; exposure to welding fumes and odours; lifting/pulling/pushing heavy materials; long working hours; pressure from supervisors and colleagues; pressure from government regulators, etc.

6.1 Alternative Choices (Solutions) to Dilemmas and Complexities

Solutions to dilemmas include: wearing protective clothing, and ensuring their availability and use by other employees; exercising regularly to maintain physical fitness; exercising proper work ergonomics; participating in workplace safety sensitisation and awareness meetings/training sessions; adhering to company's safety and standard operating procedures at all times; consulting extensively within and outside one's department/team on water safety issues; planning and prioritising work, etc.

7. WORKING CONDITIONS/ENVIRONMENT

Working conditions include: indoor and outdoor water sites, as well as workshops and factories; may also work in commercial buildings or private homes; confined spaces; handling machines with moving parts; working at heights; working in conditions that may be dirty and noisy; exposure to seasonal heat and cold, or

adverse weather conditions; emergency call-outs; standing or squatting for long hours, and lifting relatively heavy objects. In most cases, the job involves working normal hours, but in some instances, shift work and regular overtime may be required. The job also requires wearing suitable protective clothing, such as works suits, ear protectors, safety visors or goggles, gloves, hardhats, safety harnesses, etc.

8. PARTIES INVOLVED/INTERACTING WITH THE JOB HOLDER OR TRAINEE

8.1 Internal – Within the Organisation

Parties involved or interacting with the jobholder, who are internal to the organisation include: supervisors/superiors, trainers, occupational health and safety teams, other colleagues, etc.

8.2 External – Outside the Organisation

Parties involved or interacting with the jobholder, who are external to the organisation include: government regulators, trainers, clients, suppliers of equipment/tools/consumables, fellow Water Treatment Plant Operators from other companies, labour unions, occupational health and safety associations, etc.

9. PHYSICAL DEMANDS ON THE BODY

- Ability to sustain strenuous conditions such as climbing heights;
- Walk and stand for long periods of time;
- Bend, stretch, twist, or reach out;
- Lift, carry, push and pull heavy objects;
- Use fingers, hands and feet with ease to complete the assigned task (dexterity);
- Strenuous works that may cause musculoskeletal disorders;
- Etc.

ANNEX A

Criteria for Assessments based on this NOS

A.1 Guidelines for Assessment

A.1.1 Criteria for assessment for curricula and learning programmes based on this NOS will be created by curricula and programme developers, and each Performance Criteria (PC) will be assigned marks proportional to its importance in the NOS. Curricula and programme developers will also lay down proportion of marks for theory and practical skills for each performance criteria, giving more weight to practical skills.

There shall be allocated 'Total Marks', which will be the sum of all marks in each Unit, distributed across the number of PCs in that particular Unit. The 'Out of' mark will be the mark allocated to each PC, which will be shared between theory and skills practical assessments.

A.1.2 Individual awarding/assessment bodies, or institutions and other users of the NOS, will create unique question papers for the theory part and evaluations for the skill practical part for their respective candidates.

ANNEX B NOS Version Control

This Annex gives details necessary for the tracking of the NOS versions based on the number of revisions.

NOS Code	NOS.WTPO.01		
ZQF Level	6	Version Number	01
Sector	Water	Date of Approval	May 2024
Sub Sectors	Water Supply and Sanitation	Date of Last Review	N/A
Occupation	Water Treatment Plant Operations	Date of Next Review	May 2029

*“You learn,
We Standardise”*

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