

National Occupational Standard

Wind Turbine Technician

Electricity Human Resources Canada is a non-profit organization supporting the human resources needs of the Canadian electricity sector.

Our Vision

Keeping the lights on in Canada by preparing and empowering a world-class workforce for the entire electricity industry.

Our Mission

Working to strengthen the ability of the Canadian electricity industry in meeting current and future needs for their workforce—one that is safety-focused, highly skilled, diverse and productive.

Our Values

We are a values-driven organization, committed to the improvement of our sector, the growth of Canada's economy, and the stability of our power grid. Our core values are:

Collaboration

Working with all stakeholders in Canada's electricity sector for our mutual benefit.

Trust

Forging relationships and products built on unwavering integrity.

Innovation

Leading the industry to be future-ready.

National Occupational Standards (NOS)

NOS are voluntary guidelines that have been developed to provide businesses, educators, trainers, and job seekers with practical guidance.

How are NOS used?

Employers, employees, and educational institutions can put NOS to a wide variety of uses supporting effective workforce planning:

- Support personnel certification or accreditation programs.
- Inform curricula for colleges and apprenticeships.
- Assist recruitment by informing job descriptions and providing a benchmark for employee appraisals.
- Identify career paths in order to promote employee retention.
- Help employers evaluate and determine the competencies of potential employees, including Internationally Trained Workers (ITWs).

Electricity Human Resources Canada has developed National Occupational Standards for a range of in-demand occupations.

Visit electricityhr.ca for more information.

Key Terms within the National Occupational Standard:

Major Category	A general functional area within the industry
Competency Area	A specific area of responsibility within a Major Category
Competency Unit	A specific task that contains a description of the knowledge and performance components that are needed for successful, safe and effective completion

Each Competency within the National Occupational Standard is made up of (some or all of) the following elements:

- **Purpose:** A statement that describes what the competency is, and why it is important.
- **Performance:** What a job incumbent must be able to do to perform the competency.
- **Knowledge:** What a job incumbent must know to perform the competency.
- **Glossary:** Definitions for key terms used in the competency.
- **Range of Context:** Specific variables or situations that may impact the way that the competency is performed.
- **Level of Practice:** The level of job incumbent that typically performs the competency.
- **Adapted Bloom's Taxonomy:** The level of cognitive performance required for the competency (of particular interest to trainers/educators).
- **RWATEM:** The Requisite Work Aids, Tools, Equipment and Materials used by job incumbents to perform the competency.

Chart of Competency: Wind Turbine Technician

This Chart outlines the competencies (also known as skills and knowledge) that are performed by Wind Turbine Technicians.

Key: Tasks included in trade national occupational analyses (i.e. Industrial and Construction Electricians) that are also performed or supported by Wind Turbine Technicians

Occupational Definition:

Wind Turbine Technicians perform preventative maintenance and repair work to keep wind turbines in optimal condition for generating electricity. Their work involves maintaining, testing and repairing mechanical, hydraulic and electrical equipment.

Major Category	Competency Area	Competency Unit					
Asset Maintenance	Prepare to Maintain Equipment and Systems	Organize materials and equipment for maintenance	Coordinate maintenance activities with others				
	Conduct Tests for Asset Maintenance	Conduct electrical tests for maintenance	Conduct vibration analysis				
	Maintain Control Systems	Maintain discrete input/output (I/O) devices	Maintain analog input/output (I/O) devices	Maintain automated control systems			
	Maintain Wind Turbine Systems	Perform preventative maintenance on wind turbines	Torque or tension bolts on wind turbines	Repair wind turbine mechanical and hydraulic equipment	Repair wind turbine electrical equipment		
Safety	Maintain a Safe Working Environment	Follow safe work practices	Use Personal Protective Equipment (PPE)	Participate in safety meetings and emergency drills	Isolate component, equipment or system	Perform lock-out tag-out procedures	Handle, transport and store hazardous materials
		Use fall arrest equipment	Work in confined spaces	Climb wind turbine ladders			
	Maintain a Sustainable Environment	Follow sustainable work practices	Contribute to wildlife mitigation practices				
	Respond to Emergencies	Respond to chemical spills and leaks	Respond to non-electrical emergencies	Participate in high-angle rescue			
Security	Follow Security Practices	Follow security practices for physical work environment	Follow cybersecurity procedures				
Organizational Policies and Procedures	Follow Organizational Policies and Procedures	Follow organizational policies and procedures					
Information/Record Management	Complete Information/Record Management Tasks	Maintain technical information and data	Use information/record management system for generation, transmission and distribution operations				
Information and Communication Technology Foundations	Use Digital Technology	Use communication applications	Use common software applications	Use navigation and mapping applications	Use digital mobile radios		
	Use Organization's ICT System	Use organization's ICT system					
Foundation Trade Skills	Perform Routine Trade Tasks	Use hand and power tools	Use electrical measuring and testing equipment	Use access equipment and work platforms	Operate vehicles and motorized equipment	Lubricate equipment and components	Assist with rigging, hoisting/lifting and moving tasks
Personal Competencies	Demonstrate Professionalism	Work as member of a team	Develop professionally	Demonstrate professional and ethical conduct	Mentor/coach others	Manage stress	Manage time
	Communicate Effectively	Use active listening skills	Use speaking skills	Use hand signals	Use writing skills	Exchange information with internal and external stakeholders	

Major Category	Asset Maintenance
Competency Area	Prepare to Maintain Equipment and Systems
Competency Unit	Organize materials and equipment for maintenance

Purpose

Organizing materials and equipment in advance allows practitioners to complete maintenance activities as planned thereby avoiding wasting time and money and causing unnecessary delays.

Performance/Abilities

- P1** Obtain required documentation, e.g. drawings, manufacturers' specifications, maintenance plan, safety standards
- P2** Review maintenance plans and job requirements, for example:
 - maintenance and repair activities
 - sequence of activities
 - location(s)
 - time allocation
 - workplace hazards and risk mitigation strategies
 - environmental considerations, e.g. protecting water supplies, securing areas
 - roles and responsibilities of self and other crew members
- P3** Arrange for materials and equipment required for job, for example:
 - identify materials and equipment required, e.g. safety equipment, hand and power tools, supplies, testing equipment
 - book equipment in advance, if required
 - ensure components are available:
 - ensure any missing components are ordered
 - confirm delivery date
 - store materials in secured area when not in use, as required
- P4** Collect materials and equipment for assignment
- P5** Verify equipment and tools function properly

Knowledge

- K1** Organization's policies and procedures, e.g. material handling, booking equipment, containing spills
- K2** Applicable regulations, e.g. WHMIS, CSA standards, transportation of dangerous goods (TDG)
- K3** Organization's information/record management system
- K4** System being maintained, e.g. electrical, hydraulic, mechanical
- K5** Tools and equipment required for maintenance of assets
- K6** Types of access equipment (e.g. ladders, scaffolding, aerial work platform), their components and procedures for use
- K7** Safe work planning process, e.g. tailboard meeting, set up
- K8** Safety hazards associated with equipment and tools
- K9** Types of safety hazards on sites
- K10** PPE required for different maintenance activities and site hazards
- K11** Electrical measuring and testing equipment and procedures for use
- K12** Calibration procedures for electrical measuring and testing equipment
- K13** Historical information (e.g. past incidents) related to assigned task

Contextual Variables

Range of Context

- The complexity of the maintenance activities, the availability of equipment and materials, the environmental conditions, the assigned level of responsibility, and the role of the practitioner will impact the performance of this competency.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Documentation, e.g. work order, maintenance plan, drawings, manufacturers' specifications, safety standards
- Communication tools, e.g. mobile phone

Major Category	Asset Maintenance
Competency Area	Prepare to Maintain Equipment and Systems
Competency Unit	Coordinate maintenance activities with others

Purpose

Maintenance activities are coordinated with others to ensure they are completed safely, properly and efficiently.

Performance/Abilities

- P1** Confirm participation of other co-workers and trades as defined in maintenance plan:
- confirm scheduling
 - confirm sequence of activities, if necessary
- P2** Ensure required equipment and tools are available
- P3** Confirm planned outages with control center personnel, if required
- P4** Notify supervisor and other relevant parties of unexpected situations:
- revise schedule, as directed
 - inform other affected departments and trades of required changes
 - confirm changes with affected departments and trades
 - re-book equipment and tools, if required

Knowledge

- K1** Organization's policies and procedures, e.g. standard operating procedures (SOPs), safe work plan (SWP)
- K2** Job requirements as specified in documentation, e.g. drawings, manufacturers' specifications, maintenance plans, safety plans
- K3** Organization's information/record management system
- K4** Roles and responsibilities of others involved
- K5** System being maintained, e.g. electrical, hydraulic, mechanical

Contextual Variables

Range of Context

- The complexity of the maintenance activities, the availability of equipment and materials, the environmental conditions, the assigned level of responsibility, and the role of the practitioner will impact the performance of this competency.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Documents, e.g. maintenance records
- Communication tools, e.g. mobile phone

Major Category	Asset Maintenance
Competency Area	Conduct Tests for Maintenance
Competency Unit	Conduct electrical tests for maintenance

Purpose

Electrical tests are conducted to assess the condition of electrical equipment and systems. Testing provides data on the current condition of equipment that may indicate potential issues. Testing may also be conducted to meet regulatory or warranty requirements, to diagnose a problem, or to confirm effectiveness of a repair.

Performance/Abilities

- P1** Determine purpose for testing, e.g. variations in performance, unusual data
- P2** Determine electrical test(s) required for equipment and desired information, e.g. trip test, insulation test, gas test, gas relay test, functional checks
- P3** Plan tests:
- review prints
 - determine testing requirements, e.g. process and tools, testing parameters, testing order
 - determine availability of testing equipment and power sources:
 - testing equipment is charged or has new batteries
 - secondary or auxiliary source of current, e.g. generator
 - ensure all motor rotation is correct in both grid-tied power and generator
 - check power factor for motors and generators
- P4** Prepare to conduct tests:
- review test equipment manuals
 - use required portable testing equipment, (e.g. protective relay test set, multimeter, hi-pot tester), ensure:
 - in good working order
 - calibrated to manufacturer's specifications
 - safety features in place, e.g. sheathed probe tips
 - Category Safety Rating (CAT)
 - wear appropriate PPE, e.g. boots, eye protection, gloves, arc flash protection
 - mark off safe work area
 - cover equipment with material, if required
- P5** Isolate electrical equipment and circuits e.g. disconnect linkages, open breakers, open disconnect switch
- P6** Apply lock-out tags, if required
- P7** Conduct test according to testing protocols, including:
- connect sensing input/outputs, as required
- P8** Analyze test results:
- compare readings to variables and past results
- P9** Document test results
- P10** Determine if corrective action or further testing is required
- P11** Remove lock-out tags
- P12** Re-energize equipment
- P13** Update asset maintenance log in information/record management system

Knowledge

- K1** Organization's policies and procedures, e.g. safety, testing standards
- K2** Jurisdictional requirements, e.g. electrical code
- K3** Applicable regulations, e.g. Canadian Electrical Code (CE code), North American Electric Reliability Corporation (NERC), Worker Protection Code
- K4** Organizational information/record management system
- K5** Principles of electricity, circuits, voltage
- K6** Principles of electrical engineering, e.g. theory (AC and DC), Program Logic Controllers (PLC), breakers and fuses, fiber optics and CANBUS communication, meters and meggers, transformers, generators, motors
- K7** Types of electrical tests, their purpose, parameters and procedures, e.g. contact resistance, insulation resistance, continuity and ground grid test, polarity
- K8** Types of isolation equipment, e.g. CT Links and Flexi Test switches
- K9** Electrical testing equipment characteristics and limitations, e.g. range and capacity
- K10** Structures, electrical pathways, and functions specific to equipment and system, e.g. transformers and regulators, breakers and contactors, cables and busways, switchgear, switchboards, motor control centers, switching devices, fuses, protective relays and metering
- K11** Transmission and distribution systems, e.g. underground (radial, loop, network), overhead and underwater (radial, loop)
- K12** Testing result implications for equipment and/or system
- K13** Factors that could influence testing results, e.g. site conditions, power output, weather conditions
- K14** Software related to equipment and required settings

Glossary

- **Category Safety Rating (CAT):** when selecting voltage testing instruments, an assessment must be performed to determine the proper category (CAT) rating required, based on the hazard exposure
 - CAT I: safety rating typically covering electronic equipment
 - CAT II: safety rating typically covering single-phase receptacle connected loads (residential)
 - CAT III: safety rating typically covering three-phase distribution, including single phase commercial lighting
 - CAT IV: safety rating typically covering three-phase at utility connection, any outdoor conductors or primary supply
- **Electrical failure:** unit that does not meet electrical specifications defined for the device.
- **Gas test:** to check gas quality in SF6 breakers (high voltage), purity and water content in parts per million (PPM).
- **Gas relay test:** check for dissolved gas in transformers, indicator of internal issues with transformer.

Contextual Variables

Range of Context

- The increasing complexity of electrical installation locations may impact the performance of this competency.
- Equipment produced by different manufacturers may vary the performance of this competency.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Diagnostics and electrical test equipment, e.g. continuity testers, current leakage meters, digital recording ammeters, digital recording voltmeters, energized insulator testers, fault indicators, hi-pot testers, meggers, multi-meter, ohmmeters, phasing sticks, potential indicators, phase rotation meters, time domain reflectometers TDR, turns test ratio TTR, very low frequency VLF testers, electronic relay meters, single or three phase power measuring devices
- PPE, e.g. safety glasses, face shields, hard hats, safety shoes, insulating rubber gloves with leather protectors, insulating sleeves, flame resistant clothing
- Documentation, e.g. electrical schematics and diagrams, manufacturers specifications and recommendations, maintenance strategy and maintenance plan of equipment

Major Category	Asset Maintenance
Competency Area	Conduct Tests for Maintenance
Competency Unit	Conduct vibration analysis

Refer to the following task within the **Red Seal Occupational Standard (RSOS) for Industrial Mechanic (Millwright)** for more details on how to perform this Competency:

- Block F:** Performs preventative and predictive maintenance, commissioning and decommissioning
- Task 23:** Performs preventative and predictive maintenance
- Skill 2:** Performs vibration analysis procedures

Major Category	Asset Maintenance
Competency Area	Maintain Control Systems
Competency Unit	Maintain discrete input/output (I/O) devices

Refer to the following task with the **Red Seal Occupational Standard (RSOS) for Industrial Electrician** for more details on how to perform this Competency:

- Block F:** INSTALLS AND MAINTAINS PROCESS CONTROL SYSTEMS
- Task 29:** Installs and maintains input/output (I/O) devices
- Skill 2:** Maintains discrete input/output (I/O) devices

Major Category	Asset Maintenance
Competency Area	Maintain Control Systems
Competency Unit	Maintain analog input/output (I/O) devices

Refer to the following task with the **Red Seal Occupational Standard (RSOS) for Industrial Electrician** for more details on how to perform this Competency:

- Block F:** INSTALLS AND MAINTAINS PROCESS CONTROL SYSTEMS
- Task 29:** Installs and maintains input/output (I/O) devices
- Skill 4:** Maintains analog input/output (I/O) devices

Major Category	Asset Maintenance
Competency Area	Maintain Control Systems
Competency Unit	Maintain automated control systems

Refer to the following task with the **Red Seal Occupational Standard (RSOS) for Industrial Electrician** for more details on how to perform this Competency:

- Block F:** INSTALLS AND MAINTAINS PROCESS CONTROL SYSTEMS
- Task 30:** Installs, programs and maintains automated control systems
- Skill 2:** Maintains automated control systems

Major Category	Asset Maintenance
Competency Area	Maintain Wind Turbines Systems
Competency Unit	Perform preventative maintenance on wind turbines

Purpose

Preventative maintenance, also referred to as service, is carried out to meet warranty requirements, to reduce the risk of unexpected system and equipment failures, and to decrease the likelihood of costly unscheduled downtime.

Performance/Abilities

- P1** Follow maintenance schedule
- P2** Verify required maintenance activities according to maintenance plan
- P3** Obtain required documentation, e.g. Job Safety Analysis (JSA), lock-out tag-out (LOTO) procedures, confined space entry permit
- P4** Identify other minor corrective tasks that could be completed at same time, e.g. check punch list
- P5** Wear appropriate PPE, e.g. safety glasses, full body harness, cable sleeve, rescue equipment
- P6** Isolate electrical equipment and circuits, and other energy systems, as required
- P7** Perform required maintenance activities, for example:
 - torque or tension bolts, as required
 - change gear oil, coolants, seals, brake pads, slip ring brushes, contactor-relays and filters
 - grease bearings, refill and test auto lubrication systems
 - adjust sensors and actuator
 - check fluid levels, e.g. oil, hydraulic and cooling fluids
 - take fluid samples
 - check for leaks, e.g. oil, hydraulic and cooling fluids
 - check alignment of gearbox and generator
 - inspect gearbox, e.g. check for leaks, check internal gears, check for metal debris
- P8** Repair or replace components, if issues identified:
 - follow manufacturers' specifications
- P9** Verify functionality of replaced components, if required
- P10** Update asset maintenance log in information/record management system

Knowledge

- K1** Organization's policies and procedures, e.g. standard operating procedures (SOPs), safe work practices, lock-out tag-out procedures, isolation procedures
- K2** Applicable regulations, e.g. confined space regulation, working at heights
- K3** Turbine documentation, e.g. maintenance manual
- K4** Organizational information/record management system
- K5** Principles of electricity, e.g. AC and DC
- K6** Principles of mechanics and hydraulics, e.g. friction, pressure, torque, gravity
- K7** Impact of environmental conditions on wind turbines, e.g. wind speed, icing
- K8** Wind turbine components, equipment and function
- K9** Wind turbine mechanical equipment, their function and characteristics
- K10** Wind turbine hydraulic equipment, their function and characteristics

- K11 Maintenance practices for wind turbines
- K12 Rigging, hoisting/lifting and moving procedures

CONTEXTUAL VARIABLES

Range of Context

- The type of wind turbine and control systems used vary and may impact the way this competency is carried out.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- PPE, e.g. full body harness, cable sleeve, twin leg safety lanyard, helmet, eye protection, positioning lanyard, rescue equipment
- Diagnostic and testing equipment, e.g. multimeter, megger, phase rotation meter, oscilloscope, high voltage tester
- Tools, e.g. hand tools, torqueing equipment, grease guns
- Documentation, e.g. schematics, diagrams, manufacturers' specifications
- Control system, e.g. input/output devices, programmable logic controller (PLC)

Major Category

Asset Maintenance

Competency Area

Maintain Wind Turbines Systems

Competency Unit

Torque or tension bolts on wind turbines

Purpose

Torqueing and tensioning ensure tightness of bolts that secure turbine towers and components.

Performance/Abilities

- P1** Wear appropriate PPE, e.g. helmet, safety boots, safety glasses
- P2** Identify torqueing or tensioning specifications:
 - review instructions from manufacturer and company
- P3** Identify required torque value in torque table:
 - convert torque values, if required, i.e. foot pounds to Newton meters and vice versa, e.g. 1ft-lb= 1.355818Nm
- P4** Torque bolts:
 - select tool with torqueing range that meets specifications:
 - verify calibration of torque tool, e.g. calibration tag, certificate
 - set value on tool to torqueing specifications
 - follow tightening pattern outlined in specifications
- P5** Tension bolts:
 - select appropriate tool depending on application and manufacturer's specification:
 - verify calibration of tensioning tool, e.g. calibration tag, certificate
 - set value on tool to tensioning specifications
 - follow stretching pattern outlined in specifications
- P6** Document torqueing and tensioning as required

Knowledge

- K1** Required PPE, e.g. helmet, safety boots, safety glasses
- K2** Manufacturer's bolt or stud specifications for required torque or tension value
- K3** Manufacturer's specifications and procedures for use, maintenance, and storage of torqueing and tensioning tools
- K4** Size, property class and loading of bolts
- K5** Safety precautions for each tool, e.g. pinch points, hydraulic pressure, dropped tools

Glossary

- Tension:** the stretch and elongation of a bolt that provides the clamping force of a joint.
- Tensioning:** stretching a bolt or stud to a predetermined load through the use of a hydraulic cylinder or tensioning system.
- Torque:** measurement of the twisting force required to rotate the nut up along the threads of a bolt.
- Torqueing:** stretching a bolt or stud to a predetermined load through the use of a torqueing tool.

CONTEXTUAL VARIABLES

Range of Context

- Specifications for torquing and tensioning will differ by manufacturer and wind turbine site.
- Torque and tension tools will differ by manufacturer and wind turbine site.
- Torque and tension tools present hazards that may differ from hand tools.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- PPE, e.g. helmet, safety boots, safety glasses
- Torquing tools
- Tensioning tools
- Conversion tables
- Torquing tables

Major Category

Asset Maintenance

Competency Area

Maintain Wind Turbine Systems

Competency Unit

Repair wind turbine mechanical and hydraulic equipment

Purpose

The proper functioning of the mechanical and hydraulic equipment in wind turbines is critical for optimal wind turbine operation. Repairs must be made in a timely manner to prevent damage to the wind turbine and to limit downtime.

Performance/Abilities

- P1** Review information sources on mechanical and/or hydraulic issue, as required:
 - supervisory control and data acquisition (SCADA) findings
 - maintenance manuals, schematics and manufacturers' specifications for problem turbine
 - past maintenance logs for problem turbine
- P2** Obtain required documentation, e.g. Job Safety Analysis (JSA), lock-out /tag-out (LOTO) tags, permits to work
- P3** Wear appropriate PPE, e.g. full body harness, cable sleeve, safety lanyard, helmet, eye protection, rescue equipment
- P4** Diagnose cause of mechanical and/or hydraulic issue:
 - perform sensory inspection, for example:
 - abnormal wear
 - overheating
 - leaks
 - low oil and water levels
 - loose components
 - vibration
 - abnormal noises, e.g. grinding, buzzing, rattling
 - air leaks
 - cavitation
 - broken mechanical coupling
 - perform diagnostic testing, e.g. vibration measurement, temperature measurement
- P5** Perform lock-out tag-out procedures and de-energize system(s), if required
- P6** Complete required course of action to correct issue:
 - repair or replace malfunctioning component(s)
- P7** Remove locks and tags
- P8** Re-energize system(s)
- P9** Conduct tests to verify repair was successful
- P10** Update asset maintenance log in information/record management system

Knowledge

- K1** Organization's policies and procedures, e.g. standard operating procedures (SOPs), safe work practices, lock-out tag-out procedures
- K2** Applicable regulations, e.g. confined space regulation, working at heights
- K3** Turbine documentation, e.g. maintenance manual

- K4** Organization's information/record management system
- K5** Principles of electricity, e.g. AC and DC
- K6** Principles of mechanics and hydraulics, e.g. friction, pressure, torque, gravity
- K7** Impact of environmental conditions on wind turbines, e.g. wind speed, icing
- K8** Wind turbine components and their functions
- K9** Wind turbine mechanical equipment, their function and characteristics, e.g. gears, bearings, seals, shafts, cooling fans
- K10** Wind turbine hydraulic equipment, their function and characteristics, e.g. gearbox, cylinders
- K11** Maintenance practices for wind turbine mechanical and hydraulic equipment
- K12** Appropriate testing and diagnostic equipment for different types of mechanical and hydraulic equipment

CONTEXTUAL VARIABLES

Range of Context

- Proprietary mechanical and hydraulic systems in a wind turbine may impact the way this competency is performed.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- PPE, e.g. full body harness, cable sleeve, twin leg safety lanyard, helmet, eye protection, positioning lanyard, rescue equipment
- Diagnostic and testing equipment, e.g. manometer, dial gauge
- Tools, e.g. torquing tool, chain hoist, hand tools
- Documentation, e.g. schematics, diagrams, and manufacturers' specifications
- Control system, e.g. input/output devices, programmable logic controller (PLC)

Major Category

Asset Maintenance

Competency Area

Maintain Wind Turbines Systems

Competency Unit

Repair wind turbine electrical equipment

Purpose

Proper functioning of the electrical equipment in wind turbines is critical for optimal wind turbine operation. Repairs must be made in a timely manner to prevent damage to the wind turbine and to limit downtime.

Performance/Abilities

- P1** Review information sources on electrical issue, as required:
 - supervisory control and data acquisition (SCADA) findings
 - manuals, schematics and manufacturer's specifications for turbine model
 - past maintenance logs for problem turbine
- P2** Obtain required documentation, e.g. job safety analysis (JSA), lock-out tag-out (LOTO) tags, permits to work
- P3** Wear appropriate PPE, e.g. full body harness, cable sleeve, twin leg safety lanyard, helmet, eye protection, positioning lanyard, rescue equipment
- P4** Diagnose cause of electrical issue:
 - perform sensory inspection, for example:
 - check conductors and cables, e.g. poor splices, broken strands, corrosion, discoloration, breaks in outer insulation of cables, poor connection in terminal, failed contactor
 - check insulators, e.g. corrosion of metal parts, deterioration of rubberized material, wear of attachment points
 - check motor, e.g. excessive noise, broken fan, tight or frozen shaft, burned lead wires
 - perform diagnostic inspection, for example:
 - measure vibration
 - take temperature
 - measure current and voltage
 - check generator, e.g. short to ground and open windings on stator and rotor
 - check for proper insulation between windings and frame
- P5** Isolate electrical equipment and systems
- P6** Apply locks and tags
- P7** Complete required course of action:
 - repair or replace malfunctioning component(s)
- P8** Remove locks and tags
- P9** Re-energize equipment and systems
- P10** Conduct tests to verify repair was successful, e.g. test operation of circuit or control system
- P11** Update asset maintenance log in information/record management system

Knowledge

- K1** Organization's policies and procedures, e.g. standard operating procedures (SOP), safe work practices, lock-out tag-out procedures, isolation procedures, electrical safety
- K2** Applicable regulations, e.g. confined space regulation, working at heights, Canadian Electrical Code
- K3** Organization's information/record management system

- K4** Turbine documentation, e.g. maintenance manual
- K5** Principles of electricity, e.g. AC and DC
- K6** Impact of environmental conditions on wind turbines, e.g. wind speed, icing
- K7** Wind turbine components and their functions
- K8** Wind turbine electrical equipment, their function and characteristics, e.g. motor starters, motor control devices
- K9** Appropriate testing equipment for different types of electrical components
- K10** Electrical systems, e.g. power system, control system
- K11** Maintenance strategies and plans for wind turbine electrical equipment
- K12** Maintenance practices for wind turbine electrical equipment

CONTEXTUAL VARIABLES

Range of Context

- Proprietary wind turbine electrical system and equipment will impact the performance of this competency.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- | | |
|---|---|
| <input type="checkbox"/> Recall, Remember | <input checked="" type="checkbox"/> Analyze |
| <input type="checkbox"/> Understand | <input type="checkbox"/> Evaluate |
| <input type="checkbox"/> Apply | <input type="checkbox"/> Create/Transform |

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- PPE, e.g. full body harness, cable sleeve, twin leg safety lanyard, helmet, eye protection, positioning lanyard, rescue equipment
- Diagnostic and testing equipment, e.g. multimeter, megger, phase rotation meter, oscilloscope, high voltage tester
- Hand tools
- Documentation, e.g. schematics, diagrams, manufacturers' specifications
- Control system, e.g. input/output devices, programmable logic controller (PLC)

Major Category

Safety

Competency Area

Maintain a Safe Working Environment

Competency Unit

Follow safe work practices

Purpose

Following safe work practices is critical to protect employees, contractors, customers and the general public against injury or death, and to protect the organization and its assets from loss and liability.

Performance/Abilities

- P1** Participate in safety orientations and training
- P2** Complete safety certifications, as required, e.g. confined space
- P3** Identify locations of:
 - first aid kit
 - emergency equipment
 - emergency access routes
- P4** Participate in daily safety meeting/tail-board meetings
- P5** Follow safety policies and procedures on site, e.g. limits of approach
- P6** Respect physical limitations of self and others
- P7** Use protection systems, as required, e.g. lockout/tagout, card system
- P8** Inspect safety systems, as required, e.g. guards, emergency stops
- P9** Perform tests, as required, e.g. test voltage level
- P10** Establish exclusion zones, when required, e.g. around open trench or working heavy equipment:
 - place barriers and/or signage
- P11** Identify hazards on site, e.g. personal safety, work site, environmental:
 - monitor weather conditions, as necessary
- P12** Minimize or remove hazards, as necessary, for example:
 - protect self from weather-related conditions, e.g. wear sunscreen and sunglasses, keep hydrated, wear warm clothing
- P13** Use equipment only as intended/classified:
 - ensure equipment is appropriate for work site conditions
- P14** Maintain clean, orderly work area
- P15** Dispose of waste materials, as required:
 - dispose of hazardous materials (e.g. chemicals, batteries) according to legislation and organizational policies
- P16** Store materials and equipment in designated areas
- P17** Communicate issues to relevant personnel, e.g. co-workers, project manager:
 - document work safety issues, as required

Knowledge

- K1** Relevant legislation, including Occupational Health and Safety (OH&S)
- K2** Safety Management Plan
- K3** Organizational safety policies and procedures, including OH&S
- K4** Workplace Hazardous Materials Information System (WHMIS)

- K5** Required training and certifications for specific work, e.g. confined space
- K6** Required personal protective equipment (PPE)
- K7** Types of safety hazards on site
- K8** Available emergency response services and their contact information
- K9** Available equipment on worksite/in vehicles, e.g. first aid, containment equipment
- K10** Procedures for safe excavation, if required
- K11** Safety reporting procedures

CONTEXTUAL VARIABLES

Range of Context

- Quantity and type of safety hazards varies with type of work and work location.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- | | |
|---|---|
| <input type="checkbox"/> Recall, Remember | <input type="checkbox"/> Analyze |
| <input type="checkbox"/> Understand | <input type="checkbox"/> Evaluate |
| <input checked="" type="checkbox"/> Apply | <input type="checkbox"/> Create/Transform |

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- First aid kits
- Safety equipment, e.g. spill kit, fire extinguisher
- Safety features on equipment
- Personal Protective Equipment (PPE)
- Rated tools, e.g. screwdriver rated for particular voltage

Major Category

Safety

Competency Area

Maintain a Safe Working Environment

Competency Unit

Use Personal Protective Equipment (PPE)

Purpose

Using PPE correctly protects employees against injury or death, and protects the organization and its assets from loss and liability.

Performance/Abilities

- P1** Ensure required training is up to date, e.g. fall arrest equipment training
- P2** Select equipment appropriate to task and work environment
- P3** Inspect/test PPE before use:
 - check expiry dates, if applicable
 - document condition
- P4** Ensure PPE is properly fitted and adjusted
- P5** Use PPE only for intended purpose
- P6** Communicate issues with PPE to relevant personnel, e.g. co-workers, supervisor
- P7** Tag defective equipment:
 - turn in to relevant personnel or department
- P8** Clean PPE after use:
 - store in designated location

Knowledge

- K1** Relevant legislation, including Occupational Health and Safety (OH&S)
- K2** Organizational safety policies and procedures, including OH&S
- K3** Potential safety hazards on site
- K4** PPE required for specific tasks, equipment and environments

CONTEXTUAL VARIABLES

Range of Context

- Quantity and type of PPE varies with type of work and work location.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- | | |
|---|---|
| <input type="checkbox"/> Recall, Remember | <input type="checkbox"/> Analyze |
| <input type="checkbox"/> Understand | <input type="checkbox"/> Evaluate |
| <input checked="" type="checkbox"/> Apply | <input type="checkbox"/> Create/Transform |

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- PPE, e.g. hard hats, safety glasses, safety boots, rubber gloves, fall arrest and restraint equipment, fire-retardant clothing, shock hazard PPE, arc flash hazard PPE, hearing protection, respiratory protection equipment

Major Category

Safety

Competency Area

Maintain a Safe Working Environment

Competency Unit

Participate in safety meetings and emergency drills

Purpose

Participating in safety meetings and emergency drills is important to ensure employees, contractors and customers work in a safe manner and are prepared for unexpected events. This also protects the organization and its assets against loss and liability.

Performance/Abilities

- P1** Attend meetings and drills at scheduled times
- P2** Identify role of self and team members in meetings and drills
- P3** Share knowledge and skills with co-workers
- P4** Communicate work issues to the group
- P5** Participate in emergency drills, e.g. evacuation, fire, environmental, sabotage/terrorist/bomb threat, electrical restoration
- P6** Debrief drills and exercises:
 - provide feedback
- P7** Take notes, if applicable

Knowledge

- K1** Relevant legislation
- K2** Organizational safety policies and procedures, including communication protocols
- K3** Own and others' roles and responsibilities during emergencies
- K4** Contact information for emergency services
- K5** Types of safety hazards on site

CONTEXTUAL VARIABLES

Range of Context

- Types of meetings and emergency drills will vary with organization, type of work and work location.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

Major Category

Safety

Competency Area

Maintain a Safe Working Environment

Competency Unit

Isolate component, equipment or system

Purpose

Isolation procedures must be performed correctly to protect self and others (e.g. other employees, contractors, customers and the public) in preparation for work on powered components, equipment or systems. Performing this task incorrectly can lead to serious injury or death. This task also protects the organization and its assets against loss and liability.

Performance/Abilities

- P1** Identify all sources of hazardous energy that may be encountered when performing work on component, equipment or system
- P2** Disconnect each hazardous energy source in component, equipment or system, e.g. disconnect linkages, open breakers, open disconnect switch
- P3** De-energize component, equipment or system, if required:
- release stored or residual energy, for example:
 - ground electrical devices, e.g. capacitors, batteries/UPS, accumulators
 - release hydraulic liquid
 - vent air pressure
 - brake mechanical movement
- P4** Perform lock-out tag-out procedures
- P5** Verify isolation using one of following methods:
- activate controls to ensure no response:
 - complete visual inspection, ensure electrical connections are open
 - test component, equipment or system to ensure zero potential energy, for example:
 - test circuitry
 - check pressure gauges to ensure energy removed
 - check temperature gauges to ensure thermal energy discharged
- P6** Document, as required
- P7** Return component, equipment or system to normal configuration
- P8** Ensure component, equipment or system can be safely re-energized, e.g. phase testing, Megger testing
- P9** Re-energize component, equipment or system, if no other locks on equipment or system:
- coordinate re-energization with controlling authority
- P10** Test component, equipment or system to ensure operating properly
- P11** Document, as required

Knowledge

- K1** Relevant regulations, e.g. work protection, grounding and bonding code
- K2** Organization's policies and procedures, e.g. electrical safety, arc-flash policies, hazard assessment, lock-out tag-out procedures
- K3** Type and rating of PPE required for isolation
- K4** Testing procedures

- K5** Electrical and mechanical principles, e.g. AC and DC, pressure
- K6** Primary energy sources (i.e. electrical, mechanical, hydraulic, chemical, thermal and gravitational) in components, equipment and systems
- K7** Safety tests to ensure zero energy state
- K8** Electrical and mechanical control systems and components, e.g. SCADA, program logic controllers (PLC), breakers, fuses, disconnects

Glossary

- **De-energize (aka depressurize):** a process used to remove residual or stored energy from isolated component, equipment or system to eliminate the chance that residual or stored energy could accidentally harm workers
- **Isolate:** a process used to disconnect component, equipment or system from a primary source of energy to eliminate the chance that the primary source of energy in component, equipment or system could accidentally harm workers
- **Lock-out tag-out (LOTO):** a safety procedure used to ensure that components, equipment or systems are locked off and not able to be started up again prior to the completion of maintenance or repair work. It requires that hazardous energy sources be isolated and rendered inoperative before work is started on the component, equipment or system in question.
- **Tag-out:** a labelling process that is always used when lock-out is required; the process involves attaching or using an information tag or indicator (typically a standardized label) that includes tag #, name of component, equipment or system that has been isolated or re-configured, why lockout is required, the time of application, and the name of the authorized person who attached lock and tag.

CONTEXTUAL VARIABLES

Range of Context

- A multi-point isolation procedure requires more than one lock and may need more than one worker to execute.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- PPE, e.g. arc flash protection equipment, safety glasses, steel-toed boots, hard hats
- Lock-out tag-out devices, e.g. breaker lock, multi-lock, lock box, tag, hold cards
- Energy testing equipment, e.g. voltmeters, pressure gauges
- Energy removal devices, e.g. ground straps
- Locking devices, e.g. rotor pins

Major Category

Safety

Competency Area

Maintain a Safe Working Environment

Competency Unit

Perform lock-out tag-out procedures

Purpose

Lock-out tag-out procedures are performed for self-protection and as part of work protection procedures. These safety procedures eliminate the chance that equipment or systems could harm people through the unintended release of energy or the unintended start-up or motion of equipment or components. Not following proper lock-out tag-out procedures can lead to serious injury or death. These procedures also protect the organization and its assets against loss and liability.

Performance/Abilities

- P1** Ensure required training is up to date
- P2** Plan lock-out tag-out with relevant personnel:
 - clarify scope of work to be done
 - identify potential energy sources that must be controlled
 - identify equipment and/or system to be locked-out tagged-out:
 - refer to panel schedules, drawings, single-line diagrams, cable and equipment tags
 - confirm details:
 - when lock-out tag-out will begin
 - how long it will continue
 - authorized person responsible for applying locks and tags
 - affected persons to inform of lock-out tag-out
- P3** Inform affected persons of lock-out tag-out
- P4** Select appropriate PPE
- P5** Isolate component, equipment or system:
 - de-energize component, equipment or system, if required
 - coordinate with controlling authority, if required
- P6** Apply locking mechanisms or approved devices (e.g. locking pins, rotor locks), on component, equipment or system, as required
- P7** Apply approved tag with required information, including:
 - tag number
 - name of component, equipment or system that is locked out
 - why lock-out is required
 - time component, equipment or system was locked out
 - name of authorized person who attached tag and lock
- P8** Verify component, equipment or system is locked out and tagged out properly:
 - conduct visual inspection, e.g. tag filled out correctly
- P9** Remove lock-out devices and tags when maintenance or repair activities are completed

Knowledge

- K1** Organizational safety policies and procedures, including lock-out tag-out procedures
- K2** Relevant legislation

- K3** Training renewal requirements for lock-out tag-out
- K4** Hazards associated with lock-out tag-out
- K5** Energy potential in components, equipment and systems
- K6** Procedures for potential energy testing
- K7** Safety checks to ensure zero energy state
- K8** Types of lock-out procedures, e.g. individual, group, and complex
- K9** Types of locking devices and their applications
- K10** Types of tags and their applications

Glossary

- **De-energize (aka depressurize):** a process used to remove residual or stored energy from isolated component, equipment or system to eliminate the chance that residual or stored energy could accidentally harm workers.
- **Isolate:** a process used to disconnect component, equipment or system from a primary source of energy to eliminate the chance that the primary source of energy in component, equipment or system could accidentally harm workers.
- **Lock-out tag-out (LOTO):** a safety procedure used to ensure that components, equipment or systems are locked off and not able to be started up again prior to the completion of maintenance or repair work. It requires that hazardous energy sources be isolated and rendered inoperative before work is started on the component, equipment or system in question.
- **Tag-out:** a labelling process that is always used when lock-out is required; the process involves attaching or using an information tag or indicator (typically a standardized label) that includes tag #, name of component, equipment or system that has been isolated or re-configured, why lock-out is required, the time of application, and the name of the authorized person who attached lock and tag.

CONTEXTUAL VARIABLES

Range of Context

- Types of systems that may be locked out vary, e.g. electrical, mechanical, hydraulic, pneumatic.
- Approved devices used to lock-out equipment/systems vary depending on the types of energy involved.
- Types of approved devices and voltage-rated equipment used to perform this task vary.
- A multi-point isolation procedure requires more than one lock and may need more than one worker to execute.
- The procedures for lock-out and tag-out may vary when provided as part of work protection.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Locking mechanisms or devices, e.g. locking pins, rotor locks, bars, cribbing, chains
- Tag devices, e.g. test and operate cards, hold cards
- Approved safety devices, e.g. arc flash protection equipment, energy removal devices, PPE
- Potential energy testing equipment, e.g. voltmeters, pressure gauges

Major Category	Safety
Competency Area	Maintain a Safe Working Environment
Competency Unit	Handle, transport and store hazardous materials

Purpose

Handling, transporting and storing hazardous materials must be performed correctly to ensure the safety of employees, contractors, customers the public, and the environment. Performing this task incorrectly can lead to serious injury or death. This task also protects the organization and its assets against loss and liability.

Performance/Abilities

- P1** Ensure WHMIS training is up to date
- P2** Ensure transportation of dangerous goods (TDG) training is up to date, if applicable
- P3** Review information provided on Safety Data Sheets (SDS) for each material to be handled
- P4** Review manufacturer's instructions for each material to be handled, if applicable
- P5** Follow handling and disposal guidelines for hazardous materials, for example:
 - do not combine chemical products, as some combinations can be hazardous
 - use designated containers when transferring chemical products
 - label all chemical products/hazardous materials
- P6** Store chemicals in designated, ventilated area away from danger, e.g. heat source
- P7** Transport hazardous materials according to guidelines and legislation
- P8** Document activities, as required

Knowledge

- K1** Relevant legislation
- K2** WHMIS, including hazard symbols, Safety Data Sheets (SDS)
- K3** Organizational safety policies and procedures
- K4** Location of first aid stations and procedures
- K5** Location of safety equipment, e.g. eye-wash stations, spill containment

Glossary

- **Workplace Hazardous Material Information System (WHMIS):** a federal government mandated program that provides information on the safe use, storage, handling, and disposal of hazardous materials that may be in the workplace.

CONTEXTUAL VARIABLES

Range of Context

- Types of hazardous materials stored and handled varies depending upon type of work and work location.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Safety Data Sheets (SDS)
- Approved containers for chemicals/hazardous materials
- Safety equipment, e.g. chemical aprons, goggles, spill containment

Major Category	Safety
Competency Area	Maintain a Safe Working Environment
Competency Unit	Use fall arrest equipment

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Fall arrest equipment, e.g. harness, lanyard
- Anchors

Purpose

Fall arrest equipment must be used correctly to ensure the safety of employees and contractors. Performing this task incorrectly can lead to serious injury or death. This task also protects the organization against loss and liability.

Performance/Abilities

- P1** Ensure fall arrest training is up to date
- P2** Use fall arrest equipment only for intended purpose
- P3** Ensure ladders, scaffolding and lift equipment are appropriate for task
- P4** Select appropriate personal protective equipment (PPE)
- P5** Inspect fall arrest equipment before use:
 - check expiry dates, if applicable
 - document condition
 - tag and remove defective equipment from service
- P6** Ensure fall arrest equipment is properly fitted and adjusted
- P7** Ensure safety harnesses are attached to rated anchor points
- P8** Communicate issues to relevant personnel, e.g. co-workers, supervisor
- P9** Clean fall arrest equipment after use:
 - store in designated location

Knowledge

- K1** Relevant legislation, including Occupational Health and Safety (OH&S)
- K2** Organizational safety policies and procedures, including OH&S
- K3** Manufacturer's specifications and recommendations for use and care
- K4** Types of safety hazards on site that impact fall arrest
- K5** PPE required for specific environments
- K6** Use of anchor points

CONTEXTUAL VARIABLES

Range of Context

- Types of fall arrest equipment and anchors may vary depending on job and environment.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

Major Category	Safety
Competency Area	Maintain a Safe Working Environment
Competency Unit	Work in confined spaces

Purpose

Working in confined spaces must be performed correctly to ensure the safety of employees and contractors. Performing this task incorrectly can lead to serious injury or death. This task also protects the organization against loss and liability.

Performance/Abilities

- P1** Ensure confined space training is up to date
- P2** Preplan entry:
 - identify hazards, e.g. gases, multiple power sources
 - discuss with team members
 - review rescue procedures
- P3** Select appropriate personal protective equipment (PPE)
- P4** Erect barriers and warning signs, as necessary
- P5** Gather tools and equipment before entering space
- P6** Use confined space equipment according to manufacturer's instructions
- P7** Verify entry permit
- P8** Monitor and document atmospheric conditions:
 - evacuate space, as necessary
- P9** Maintain constant communication with team members outside of confined space
- P10** Secure confined space during inactivity

Knowledge

- K1** Relevant legislation, including Occupational Health & Safety (OH&S)
- K2** Organizational safety policies and procedures
- K3** Manufacturer's instructions and recommendations
- K4** Location of first aid stations and procedures
- K5** Definition of confined space, e.g. locations that require care and monitoring
- K6** Types of confined space monitoring equipment and their operation
- K7** Hazards associated with confined spaces
- K8** Types of gasses and their properties
- K9** Rescue procedures for confined spaces

CONTEXTUAL VARIABLES

Range of Context

- Types of confined spaces vary, e.g. trenches, tanks, stacks.
- Types of hazards vary, e.g. lack of ventilation, inert gas, oxygen deficiency, exceeding explosive limits.
- Types of gasses encountered in confined spaces vary, e.g. chlorine, carbon monoxide.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Equipment for communication, e.g. two-way radios, air horns, closed circuit video
- Equipment for securing confined spaces, e.g. signage, tape, barricades, barriers, locks, hole covers
- Personal protective equipment, e.g. safety harness, respirator
- Space conditioning equipment, e.g. fans, inert gas, pressurized air, sump pump
- Monitoring equipment
- Rescue equipment

Major Category

Safety

Competency Area

Maintain a Safe Working Environment

Competency Unit

Climb wind turbine ladders

Purpose

Following safe work practices when climbing wind turbine ladders allows practitioners to ascend and descend the tower with less effort and without injury to self and others.

Performance/Abilities

- P1** Ensure conditions are safe before climbing tower, including:
 - turbine is not operating, unless trained and authorized to climb when operating
 - other workers are not near base of ladder
 - weather hazards are within safe range, e.g. winds below specified speed, no lightning in area, no ice on turbine
- P2** Wear appropriate PPE, e.g. full body harness, fall arrest lanyard, helmet, gloves:
 - check condition of equipment before each climb looking for wear, tears, cuts, burns or mold
 - ensure designed for industrial climbing purposes
- P3** Use safety climb system, e.g. cable and/or rail systems, cable grab or rail slider with built-in shock absorber
- P4** Empty non-sealed pockets prior to climbing
- P5** Secure tools and other items, for example:
 - secure to body with lanyard
 - store in closeable pocket
 - carry in closeable bag or bucket
- P6** Ensure hands, gloves and boots are free of mud, grease or other slippery substances
- P7** Use 100% tie-off at all times using fall arrest device
- P8** Maintain three points of contact
- P9** Keep body close to ladder
- P10** Use legs to do most of work instead of arms
- P11** Take regular breaks while climbing:
 - monitor fatigue level
 - rest at platforms or use positioning lanyard
- P12** Close platform doors after passing through them
- P13** Transition safely from ladder to platform and from platform to ladder
- P14** Remove any loose parts, grease or oil from ladder, for climbers that will follow
- P15** Monitor condition of fellow climbers
- P16** Stay outside of fall distance of climber above
- P17** If turbine is equipped with climb assist or man lift, follow manufacturer’s and organization’s specifications for safe use and maintenance

Knowledge

- K1** Applicable regulations, e.g. working at heights
- K2** Applicable organization policies and procedures, e.g. required training, climb assist and/or man lift use, number of people allowed on ladder at same time

- K3** Personal fall arrest systems (PFAS) including:
 - their limitations
 - how to use, inspect, and maintain them
- K4** Components of safety climb system, e.g. e.g. fall arrest lanyards, cable and rail systems, cable grabs, rail sliders, shock absorbers
- K5** Tie-off techniques, locations and anchor points
- K6** Rescue procedures and equipment, e.g. controlled rate descent devices
- K7** Safe environmental conditions required for climbing

CONTEXTUAL VARIABLES

Range of Context

- If using a turbine elevator or climbing assistance devices, practitioners will need to follow safe operating procedures as recommended by equipment manufacturers and organization.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom’s Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Personal fall arrest systems (PFAS), e.g. safety climb system, fall arrest lanyards, cable and rail systems, cable grabs, rail sliders, shock absorbers, full body harness
- Personal protective equipment, e.g. safety harness, helmet, safety glasses, gloves, safety boots
- Climbing devices

Major Category

Safety

Competency Area

Maintain a Sustainable Environment

Competency Unit

Follow sustainable work practices

Purpose

Following sustainable work practices is critical to protect the environment and to protect employees, contractors and the general public against personal injury. It creates a positive public impression of the organization and its commitment to social responsibility, and protects the organization from loss and liability.

Performance/Abilities

- P1** Ensure required training is up to date, e.g. WHMIS
- P2** Identify potential environmental hazards, including:
 - contaminants of water, air and soil
 - hazardous materials
- P3** Identify locations of:
 - first aid kit
 - spill kits
 - emergency access routes and personnel
 - Safety Data Sheets (SDS)
- P4** Monitor weather conditions, as necessary, e.g. consider direction of chemical drift
- P5** Follow waste management practices:
 - sort waste by type
 - place waste in correct disposal container or area
- P6** Use recycled products and materials when possible
- P7** Store hazardous materials and equipment in designated areas
- P8** Dispose of hazardous materials (e.g. chemicals, batteries) according to legislation and organizational policies
- P9** Communicate issues to relevant personnel, e.g. co-workers, supervisor:
 - document issues, as required

Knowledge

- K1** Relevant legislation, including Occupational Health and Safety (OH&S)
- K2** Organizational safety policies and procedures, including OH&S
- K3** Sustainability plan and practices, e.g. energy and water conservation, commitment to low-carbon energy
- K4** Importance of sustainable practices, e.g. controlled use of ozone depleting substances
- K5** Safety Management Plan
- K6** Workplace Hazardous Materials Information System (WHMIS)
- K7** Types of hazardous materials associated with specific work activities
- K8** Available emergency response services and their contact information
- K9** Available equipment on site or in vehicles, e.g. first aid, containment equipment
- K10** Procedures for safe evacuation, if required
- K11** Procedures for containment, if required
- K12** Safety reporting procedures

CONTEXTUAL VARIABLES

Range of Context

- Quantity and type of hazards vary with type of work and work location.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- First aid kits
- Spill kit
- Personal protective equipment
- Safety Data Sheets (SDS)

Major Category	Safety
Competency Area	Maintain a Sustainable Environment
Competency Unit	Contribute to wildlife mitigation practices

Purpose

Practitioners are encouraged to respect wildlife and minimize their negative impact on them. They are also encouraged to contribute to the efforts of their organization and other parties to improve environmental sustainability.

Performance/Abilities

- P1** Respect wildlife, for example:
 - observe wildlife from a distance
 - never feed wildlife
 - avoid wildlife habitat during sensitive times, e.g. mating, nesting, raising young
 - avoid disturbing sediment in streams and rivers
- P2** Monitor wildlife as directed by supervisor, for example:
 - count wildlife observed in area
 - report dead and injured animals to appropriate authority, e.g. wildlife officer, supervisor
 - take measurements of dead animals
- P3** Monitor organization's wildlife mitigation efforts at work site, for example:
 - observe indicators of how well mitigation efforts are working
 - note recommendations for improvements
- P4** Record data:
 - note own observations and those shared by co-workers and local residents, trappers, hunters, and fishers as appropriate
- P5** Share data with appropriate individuals, e.g. supervisor, wildlife officer, researcher, environmental monitor

Knowledge

- K1** Organization's commitments to wildlife protection, e.g. environmental standards, permits,
- K2** Organization's policies, procedures and plans, e.g. environmental protection plan, collaborative studies with wildlife officers and researchers
- K3** Information/record management system
- K4** Organization's structures and activities that impact wildlife, for example:
 - air or water pollutants
 - electrocution
 - changes in water level and temperature in lakes, rivers and streams
 - improper waste disposal
 - decreases in quantity and quality of soils
 - destruction of wildlife habitat
 - impedance of wildlife travel and reproduction patterns
 - noise, vibration, illumination and vehicular movement
 - use of land for fuel production, power generation, and transmission and distribution lines
 - bird incineration and blinding from solar technology

- K5** Organization's impact mitigation activities, for example:
 - building temporary bridges over streams
 - stabilizing and revegetating banks after crossing is complete
 - leaving low growing plants undisturbed
 - reducing noise generated by equipment
 - avoiding calving and nesting areas
 - creating buffer zones around sensitive habitat
 - providing nesting platforms on transmission line towers
 - washing and refueling equipment away from bodies of water
 - installing markers and flight diverters
 - altering wind turbine cut-in speeds
 - separating energized lines from grounded objects by distance greater than span of birds
 - scheduling activities at times when they will have least impact on wildlife
 - building fences around structures to minimize accidental electrocution of wildlife
- K6** Importance of contributing to organization's and other parties' efforts to understand and reduce negative impacts on wildlife

CONTEXTUAL VARIABLES

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Paper or digital document for recording data
- Camera for taking photos
- Tape measure or ruler for measurements

Major Category	Safety
Competency Area	Respond to Emergencies
Competency Unit	Respond to chemical spills and leaks

Purpose

Responding quickly and correctly to chemical spills and leaks reduces the chance of injury to employees, contractors, customers and the public, and protects the environment.

Performance/Abilities

- P1** Initiate Emergency Response Plan, if required, e.g. notify internal and external authorities
- P2** Assess level of hazard, e.g. potential for fire or explosion:
 - do not touch spilled materials
 - identify chemical, if possible
 - remove or extinguish ignition sources, if possible
- P3** Contain spills and leaks, if possible:
 - use tools and equipment appropriate to chemical, e.g. corrosion-resistant
 - prevent chemicals from reaching sewers, drains and confined spaces
 - increase ventilation to spill area, if possible
 - contain with earth, sand or absorbent material that does not react with spilled material
 - soak up spilled liquid with absorbent material
 - scoop/shovel spilled material into suitable, covered, labeled containers
- P4** Perform clean-up, as required:
 - wear personal protective equipment (PPE) appropriate to the chemicals being handled
 - flush spill area with water, if safe
 - contain runoff for disposal
 - handle contaminated absorbent material same as hazardous materials
 - ensure clothing, equipment and tools are decontaminated
- P5** Communicate spills and leaks to appropriate personnel, e.g. co-workers, supervisor:
 - document issues, as required, e.g. note in logbook
 - estimate quantity of unrecovered chemicals

Knowledge

- K1** Relevant legislation
- K2** Emergency Response Plan
- K3** Organizational safety policies and procedures, including Occupational Health & Safety (OH&S)
- K4** Workplace Hazardous Materials Information System (WHMIS)
- K5** Transportation of Dangerous Goods (TDG)
- K6** Types of chemicals that may be encountered
- K7** Importance of handling chemical spills and leaks correctly and in timely manner
- K8** Available emergency response services and their contact information
- K9** Procedures for safe evacuation, if required
- K10** Safety reporting procedures

CONTEXTUAL VARIABLES

Range of Context

- Type of chemicals encountered will vary, e.g. chlorine, oil.
- Size of spill/amount of chemicals spilled may vary the approach to handling the spill/leak.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- PPE, e.g. gloves, masks, eye protection
- Materials for containment, e.g. sand, earth
- Tools for containment, e.g. corrosion resistant shovel, disposal container
- Legal forms related to chemical spills and leaks

Major Category

Safety

Competency Area

Respond to Emergencies

Competency Unit

Respond to non-electrical emergencies

Purpose

Responding quickly and correctly to non-electrical emergencies reduces the chance of injury or death to employees, contractors, customers and the public as well as minimizes damage to the environment. It also protects the organization and its assets against loss and liability.

Performance/Abilities

- P1** Remain calm
- P2** Initiate Emergency Response Plan for type of risk, if required, for example:
 - notify internal and external authorities
 - evacuate
 - follow direction of emergency authority
 - assist emergency authorities
 - secure area
- P3** Assess level of hazard:
 - determine what is exposed to risk, e.g. facilities, service to customers, workers, public
 - provide first aid to injured parties within scope of first aid training
- P4** Record details of emergency, for example:
 - date and time
 - nature of emergency
 - time authorities were contacted
 - time authorities arrived
 - action taken
 - names and contact information for witnesses
- P5** Follow up, as required, for example:
 - take action to prevent recurrence

Knowledge

- K1** Relevant legislation
- K2** Emergency Response Plan
- K3** Organizational safety policies and procedures, including Occupational Health & Safety (OH&S)
- K4** Workplace Hazardous Materials Information System (WHMIS)
- K5** Available emergency response services and their contact information
- K6** Procedures for safe evacuation, if required
- K7** Emergency reporting procedures

CONTEXTUAL VARIABLES

Range of Context

- Type of emergencies encountered will vary, e.g. bomb threat, sabotage threat, natural disaster.
- Severity of emergency situation will vary.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Communication equipment
- Emergency response equipment, e.g. first aid kits, fire extinguishers
- Notebook

Major Category	Safety
Competency Area	Respond to Emergencies
Competency Unit	Participate in high-angle rescue

Purpose

Responding quickly and correctly to a situation in which individual(s) are in danger at height reduces the chance of injury and death to employees, contractors, customers and the public. It also protects the organization and its assets against loss and liability.

Performance/Abilities

- P1** Maintain certification for high-angle rescue
- P2** Participate in high-angle rescue training exercises
- P3** Prepare for potential rescue:
 - inspect equipment on regular basis
 - replace equipment, as necessary
 - store rescue kit in designated location
- P4** Assess level of hazard
- P5** Initiate Emergency Response Plan, if required, for example:
 - notify internal and external authorities
 - secure area
- P6** Follow legislated procedures for high-angle rescue
- P7** Communicate issues to appropriate personnel, e.g. co-workers, supervisor:
 - document actions, as required

Knowledge

- K1** Relevant legislation
- K2** Emergency Response Plan
- K3** Organizational safety policies and procedures, including Occupational Health & Safety (OH&S)
- K4** Certification/training needed for high-angle rescue
- K5** Inspection requirements for equipment
- K6** Available emergency response services and their contact information
- K7** First aid training
- K8** Procedures for safe evacuation, if required
- K9** Emergency reporting procedures

CONTEXTUAL VARIABLES

Range of Context

- Environmental conditions will vary, e.g. wind direction/speed.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- High-angle rescue kit
- High-angle rescue equipment, e.g. elevated work platform, ladder
- First aid kit

Major Category	Security
Competency Area	Follow Security Practices
Competency Unit	Follow security practices for physical work environment

Purpose

Following practices to protect the physical work environment is critical to protect project/organizational assets, employees, contractors, customers and the general public.

Performance/Abilities

- P1** Adhere to security procedures, including:
 - participate in NERC training, as required
 - use tools and equipment, e.g. access cards
 - identify situations that may cause security issues, e.g. door propped open, gate access point unmanned
- P2** Update procedures/tools on regular basis, as required, e.g. use new codes
- P3** Report unsafe or suspicious activity, e.g. unauthorized visitors, equipment being removed from site unexpectedly
- P4** Document work security issues

Knowledge

- K1** Relevant legislation
- K2** NERC Standards
- K3** Organizational/project security policies and procedures
- K4** Types of security hazards on site
- K5** Authorized access systems and their use

CONTEXTUAL VARIABLES

Range of Context

- Quantity and type of security hazards varies with type of work and work location.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- | | |
|---|---|
| <input type="checkbox"/> Recall, Remember | <input checked="" type="checkbox"/> Analyze |
| <input type="checkbox"/> Understand | <input type="checkbox"/> Evaluate |
| <input type="checkbox"/> Apply | <input type="checkbox"/> Create/Transform |

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Access tools and equipment, e.g. key cards, identification cards

Major Category	Security
Competency Area	Follow Security Practices
Competency Unit	Follow cybersecurity procedures

Purpose

Along with Information and Communication Technology (ICT) security functions that are built into an organization's computer system, it is essential for users to follow cybersecurity protocols to prevent intentional damage to an organization through cyberattacks. Users following security protocols are another layer of protection from external threats.

Performance/Abilities

- P1** Follow system log-in/out protocols:
 - log out of system when work is completed
- P2** Participate in organization's cybersecurity training
- P3** Use passwords:
 - change passwords when requested or required by organization's ICT procedures
 - do not share passwords with others
 - do not write passwords down in a visible place
 - use a mix of characters, letters and numbers for passwords
- P4** Operate organization's computer system in a secure manner, for example:
 - use computers and smart mobile devices approved by organization
 - do not leave computer equipment unattended, e.g. computer, smart phone, tablet, flash drives, hard drives
 - do not plug unauthorized flash drives or smart phones into computer
 - use organization's sites and applications for field devices
 - comply with assigned permissions and access limits
 - upload security updates as directed, and use newest versions of application software
- P5** Carry out work on organization's computer system securely, for example:
 - use approved web browsers and search engines
 - check all URLs for indications of a phishing site, e.g. spelling errors, complete "https://" on secure sites
 - avoid using links, when possible, even on secure websites
 - do not download from unknown websites
 - do not work using unsecured internet connections or public computers
- P6** Use communication applications in a secure manner:
 - do not accept or open mail or attachments from unknown senders
 - use approved communication channels and protocols, especially when communicating with other organizations
 - do not provide confidential work information to an unknown email source/caller:
- P7** Do not upload personal applications or access personal websites on organization's devices
- P8** Do not post unauthorized work information on social networks
- P9** Back up files to specified drives and at specified times, as directed
- P10** Contact ICT immediately when:
 - computer device is unresponsive or is operating in odd manner
 - windows or communications open with unusual messages, demands, or instructions, especially when system will not respond
 - there are frequent information or data disruptions, misconfigurations, and gaps or unexplained changes

Knowledge

- K1** Organization's cybersecurity protocols
- K2** Approved applications
- K3** Personal password for access to system
- K4** Access permissions and restrictions
- K5** Indicators of data corruption
- K6** Potential risks to system, e.g. viruses, malware, ransomware
- K7** Normal application operations
- K8** Indicators of unsecured or fraudulent websites

Glossary

- **Cybersecurity:** the practice of protecting systems, networks, and programs from digital attacks that interrupt normal business operations. Digital or cyberattacks try to:
 - access confidential and/or sensitive information to use for illegal purposes, e.g. identity theft;
 - destroy or change confidential and/or sensitive information to disrupt business operations; or,
 - extort money from users by holding their systems hostage until some form of payment is received.
- **Malware:** software that is specifically designed to access and/or damage a computer without owner of the computer being aware of what is happening, e.g. viruses, worms, spyware.
- **Ransomware:** software that prevents users from accessing their own data until the user pays a ransom.
- **Phishing:** a scam to obtain personal information to commit fraud, often involving social engineering, e.g. email or phone calls from distant relative requesting money, phony websites with sign up forms, message from bank requiring confirmation of account information.
- **Social engineering:** attempts to obtain personal or confidential information or to get the user to perform certain tasks by what appears to be a legitimate source or person; a component of phishing.

CONTEXTUAL VARIABLES

Range of Context

- While many cybersecurity safeguards are built into the design of the system software, users working from home, working remotely in the field, or on personal devices, e.g. smart phones, may change the performance of this skill.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Passwords
- Computers, mobile devices
- Cybersecurity software
- Key fob, e.g. RSA SecurID token

Major Category

Organizational Policies and Procedures

Competency Area

Follow Organizational Policies and Procedures

Competency Unit

Follow organizational policies and procedures

Purpose

Following policies and procedures is important to create a consistent work environment for employees and to provide consistent service delivery to internal/external customers.

Performance/Abilities

- P1** Review organizational policies and procedures
- P2** Participate in orientation and on-the-job training
- P3** Complete all work-related tasks according to organizational policies and procedures
- P4** Identify opportunities for improvement to policies and procedures:
 - communicate to team members and supervisors, as appropriate
- P5** Keep up to date with changes to policies and procedures, e.g. access online library for updates

Knowledge

- K1** Organization policies, procedures and plans, e.g. occupational health and safety, workplace health and wellness
- K2** Organization/project goals, vision and status
- K3** Organizational document management system, e.g. where to find latest policies and communication documents

CONTEXTUAL VARIABLES

Range of Context

- Number of policies and procedures to be followed will vary.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Organizational policies and procedures manual
- Documents associated with organizational policies and procedures, including forms, checklists

Major Category

Information/Record Management

Competency Area

Complete Information/Record Management Tasks

Competency Unit

Maintain technical information and data

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- CAD software
- Mobile workforce technology

Purpose

Maintaining technical information and data is important so that critical and up to date information is available. This data is the basis for setting goals and objectives for the short-, medium- and long-term. It also ensures that legislative requirements are met.

Performance/Abilities

- P1** Identify types of information/records that are required, for example:
 - operations and maintenance manual
 - bill of material parts
 - asset related information, e.g. type of equipment, location
 - event and call logs
 - drawings
 - test results
- P2** Provide information as required, e.g. fill out online or paper forms:
 - ensure information is provided/records are completed within required timelines, e.g. daily, weekly, monthly
- P3** Ensure information recorded is accurate and complete
- P4** Complete field mark-ups, as required
- P5** Verify that drawing revisions match field wiring, as required
- P6** Update drawings or ensure drawings are sent for update, as required
- P7** File revised drawings according to information/record management protocols

Knowledge

- K1** Legislation, e.g. NERC Standards
- K2** Organization policies, procedures and plans
- K3** Organization/project goals, vision and status
- K4** Organizational document management system
- K5** Use of relevant software, e.g. CAD, GIS

CONTEXTUAL VARIABLES

Range of Context

- Work environment can make this skill challenging to perform, e.g. outdoors.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom’s Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

Major Category	Information/Record Management
Competency Area	Complete Information/Record Management Tasks
Competency Unit	Use information/record management system for generation, transmission and distribution operations

Purpose

Using the information/record management system keeps oneself and others up to date on the condition of equipment, systems and auxiliaries. The information/record management system provides information for operating decisions, compliance requirements, and allows for smooth shift changes. It also serves as an organizational record of information and instructions for managing protection, energy storage, generation, transmission, distribution and dispatch. In addition, the reporting system provides a history of operating events for post-fault analysis and reflects the long-term efficiency of power generation, transmission and distribution systems.

Performance/Abilities

- P1** Review information recorded during previous shift(s):
- analyze information relevant to shift tasks, e.g. outstanding authorizations, unresolved faults, generation status, abnormal circuit or plant configurations, imposed load constraints, shift-transfer sheets, customer outage information
 - determine action required, e.g. how to resolve faults depending on type and frequency, follow-up with engineering groups
- P2** Record information during shift in required format and timeframe:
- record status of systems including abnormalities and corrections made
 - record information immediately upon receipt
 - note information source, e.g. other operators, SCADA, contractors, members of public, operating forms, industry codes
 - use abbreviations and terminology according to industry and organizational practice
 - use 24-hour clock when recording times
 - consider time zones for reporting energy transactions, if required
 - keep operating log up to date throughout shift
 - sign or initial log entries at beginning and end of shift
 - ensure regulatory logging requirements are met
- P3** Keep uncompleted actions in view for supervision:
- communicate status updates and other important information (verbally and/or in documents) to co-workers at shift change

Knowledge

- K1** Applicable regulations, e.g. reporting requirements, privacy, security
- K2** Reliability criteria and standards of local, regional and continental bodies, e.g. North American Electric Reliability Corporation (NERC)
- K3** Reporting system procedures, e.g. access, use, filing, distribution, turnover, information security
- K4** Types of information documented in information/record management, for example:
- operating events
 - relevant non-operating events, e.g. lightning, bird strikes, accidents, unauthorized entries into restricted areas
 - changes in status and abnormal conditions
 - corrective actions

- exact time of sending or receiving operational instructions and messages
- energy storage, generation, transmission, distribution and dispatch
- asset management activities
- switching instructions
- operation of circuit breakers and disconnectors
- auto-reclose operations
- work orders
- relay flaggings
- protection limitations
- incidents reported to the control centre
- switching schedules, shift handover information, operational constraints

K5 Shift change procedures, e.g. report abnormal situations, complete shift change report

K6 Types of reporting documents and their purpose, e.g. fault logs, status reports, shift change reports, asset management

K7 Industry terminology and abbreviations

K8 24-hour clock

K9 Time zones

Glossary

- Information/record management system:** collection of manual or electronic logs, sheets, completed authorization forms and other records, which together form a complete record of operating events in a station or operating area.

CONTEXTUAL VARIABLES

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Required documents, e.g. fault logs, status reports, shift change reports
- Shift reporting software and applications
- Electronic job order system
- Voice logs

Purpose

Communication applications allow efficiencies when sending and receiving messages. This includes combinations of visual and audio communication and document sharing over distance which in turn allow for virtual meetings, educational webinars, and other communication formats that can save time and money.

Performance/Abilities

- P1** Open desired communication application on system, online, or on cell phone e.g. email, text messaging
- P2** Verify message before sending
- P3** Select communication recipients:
- verify who will receive message, e.g. only include relevant parties
- P4** Use email:
- follow email etiquette, e.g. do not use all uppercase, keep message professional in tone
 - include purpose of message in subject line
 - create concise and clear message
 - add attachments following email application protocols, e.g. drop and click, select file using paperclip icon:
 - follow application instructions to make attachment smaller or use alternative document sharing applications if attachment is too large
 - close message with appropriate salutation and sign-off, e.g. organization logo and contact information
 - proofread message before sending
 - manage mailboxes:
 - use settings to designate type of mail, if appropriate, e.g. check junk mail regularly, check auto rules to ensure up to date and correct
 - delete messages in trash and junk mail periodically
- P5** Use text messaging:
- keep messages brief
 - do not use texting abbreviations, e.g. lol, btw
 - do not use emojis and animated images, e.g. GIFs
- P6** Use conferencing applications authorized by organization:
- ensure appropriate documents are open and screen background is appropriate when screen sharing
 - ensure quiet environment when using audio
 - mute microphone when not speaking
 - consider lag time when speaking and sharing documents
 - announce name when entering conference and before speaking, if appropriate

Knowledge

- K1** Organization's policies and procedures, e.g. cybersecurity, logging into applications
- K2** Application functions and icons, e.g. trash can, flags, reply
- K3** Purpose of communication
- K4** Audience
- K5** Writing protocols for email and text messages
- K6** Communication considerations, e.g. background noise, time lag, pitch of voice

Glossary

- **Cybersecurity:** the practice of protecting systems, networks, and programs from digital attacks that interrupt normal business operations. Digital or cyberattacks try to:
 - access confidential and/or sensitive information to use for illegal purposes, e.g. identity theft;
 - destroy or change confidential and/or sensitive information to disrupt business operations; or,
 - extort money from users by holding their systems hostage until some form of payment is received.
- **Emoji:** a small digital icon used to express a feeling or idea.
- **GIF:** series of images encoded to automatically replay back as an animated sequence.

CONTEXTUAL VARIABLES

Range of Context

- Communication applications on mobile devices may differ from desktop system and clarity of communication may vary.
- Communication applications differ depending on system and device being used.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Computer
- Tablet
- Cell phone
- Communication software applications
- Headsets

Major Category	Information and Communication Technology Foundations
Competency Area	Use Digital Technology
Competency Unit	Use common software applications

Purpose

Common computer software applications for word processing, data spreadsheets, and presentations help to increase the productivity and efficiency of the organization.

Performance/Abilities

- P1 Select appropriate application for task, e.g. word processing, presentation, spreadsheets
- P2 Use application's tools to create, enhance or customize content
- P3 Save document to appropriate folder and drive

Knowledge

- K1 Organizational policies and procedures, e.g. file naming, file sharing, cybersecurity
- K2 Purpose and features of common applications
- K3 Links between applications, e.g. cell phone camera photos are saved automatically in photo application

Glossary

- **Cybersecurity:** the practice of protecting systems, networks, and programs from digital attacks that interrupt normal business operations. Digital or cyberattacks try to:
 - access confidential and/or sensitive information to use for illegal purposes, e.g. identity theft;
 - destroy or change confidential and/or sensitive information to disrupt business operations; or,
 - extort money from users by holding their systems hostage until some form of payment is received.

CONTEXTUAL VARIABLES

Range of Context

- Applications will differ depending on device and operating systems.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

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|---|---|
| <input type="checkbox"/> Recall, Remember | <input type="checkbox"/> Analyze |
| <input type="checkbox"/> Understand | <input type="checkbox"/> Evaluate |
| <input checked="" type="checkbox"/> Apply | <input type="checkbox"/> Create/Transform |

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Computer
- Tablet
- Cell phone
- Common software applications

Major Category	Information and Communication Technology Foundations
Competency Area	Use Digital Technology
Competency Unit	Use navigation and mapping applications

Purpose

Navigation and mapping applications are used to ensure accurate identification and documentation of asset and work locations, as well as ensure the safety of personnel in the field and the efficient use of resources.

Performance/Abilities

- P1 Use global positioning system (GPS) and geographical information system (GIS) device required for tasks e.g. GPS receiver, truck tracker, cell phone
- P2 Follow manufacturer's instructions
- P3 Ensure correct types of maps of field work area are uploaded or correct views selected, for example:
 - street maps
 - topographical maps
 - satellite view
- P4 Comply with GPS features in vehicles and personal tracking fob requirements when working in field

Knowledge

- K1 Manufacturer's instructions
- K2 Organization's policies and procedures, e.g. safety
- K3 Capabilities and limitations of different types of devices and applications
- K4 Types of maps
- K5 Geographical coordinates
- K6 Functions of navigation and mapping applications

Glossary

- **Geographic information system (GIS):** a computer application that captures, stores, checks and displays data related to positions on Earth's surface; may include cartographic data, photographic data, digital data, or data in spreadsheets.
- **Geographic coordinates:** a grid system consisting of lines of latitude (north-south) and lines of longitude (east-west) that allow users to define a precise location on the earth's surface. Expressed in degrees and minutes.
- **Global Positioning System (GPS):** a computer program that uses triangulation to determine a user's location on the earth by feedback received from at least three satellites orbiting the earth.
- **Waypoint:** is the marking of a location by obtaining the geographic coordinates with a GPS unit.

CONTEXTUAL VARIABLES

Range of Context

- Locating assets may require both GIS and GPS.
- There is generally no cellular or wireless service in remote destinations which may impact the type of GPS device that can be used.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- | | |
|---|---|
| <input type="checkbox"/> Recall, Remember | <input type="checkbox"/> Analyze |
| <input type="checkbox"/> Understand | <input type="checkbox"/> Evaluate |
| <input checked="" type="checkbox"/> Apply | <input type="checkbox"/> Create/Transform |

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- GPS receiver
- Cell phone
- Computer

Major Category

Information and Communication Technology Foundations

Competency Area

Use Digital Technology

Competency Unit

Use digital mobile radios

Purpose

Digital mobile radios (DMRs) are used for internal communications between departments and work groups for the purposes of primary and emergency backup communication.

Performance/Abilities

- P1** Use digital mobile radios as required, for example:
- from field to office
 - between work groups
 - within own work group
 - for emergency communications
- P2** Follow manufacturer's instructions
- P3** Comply with organization's policies and guidelines
- P4** Comply with Industry Canada's radio communication regulations, e.g. licensing requirements

Knowledge

- K1** Applicable legislation, e.g. Industry Canada's radio communication regulations
- K2** Manufacturer's instructions and recommendations
- K3** Organization's policies and procedures, e.g. safety, communication protocols
- K4** Capabilities and limitations of different types of devices

CONTEXTUAL VARIABLES

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- | | |
|---|---|
| <input type="checkbox"/> Recall, Remember | <input type="checkbox"/> Analyze |
| <input type="checkbox"/> Understand | <input type="checkbox"/> Evaluate |
| <input checked="" type="checkbox"/> Apply | <input type="checkbox"/> Create/Transform |

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Digital mobile radio

Purpose

Following the organization's protocols to enter and retrieve information in the computer system is essential to ensure the organized, accurate, and secure documentation of an organization's activities across various types of computerized equipment.

Performance/Abilities

- P1** Follow organization's policies and procedures, e.g. data entry, cybersecurity
- P2** Retrieve required information from saved files or databases, for example:
- access information from saved files or databases as permitted from:
 - computer hard drive
 - organization's shared drive(s)
 - use appropriate search terms to find required information, e.g. file name, subject matter, customer name
- P3** Enter/update information, for example:
- complete all data fields accurately
 - check accuracy of manual data entry
 - do not enter same data more than once
 - do not edit or change data without appropriate permissions
- P4** Upload information, e.g. files, photograph, prints, data:
- ensure information sources are secure
- P5** Save work:
- use file naming protocol
 - save in appropriate drive(s) and folder

Knowledge

- K1** Organization's protocols, for example:
- cybersecurity
 - access permissions
 - file naming
 - organization of shared drives
 - printing
 - file sharing
- K2** Applications purposes and functions
- K3** Consequences of inaccurate or incomplete data
- K4** Different uses of data
- K5** Allowable data requests
- K6** Organization of shared drive(s)
- K7** Uploading and downloading of documents, files, drawings and photos

Glossary

- Computer Aided Design (CAD):** a computer application that is used to produce 2- and 3-dimensional drawings of an engineered design that details the physical components and layout.
- Cybersecurity:** the practice of protecting systems, networks, and programs from digital attacks that interrupt normal business operations. Digital or cyberattacks try to:
 - access confidential and/or sensitive information to use for illegal purposes, e.g. identity theft;
 - destroy or change confidential and/or sensitive information to disrupt business operations; or,
 - extort money from users by holding their systems hostage until some form of payment is received.
- Geographic Information Systems (GIS):** a computer application that manages geographic information, which can be manipulated to display aspects of geographical information in a map format.

CONTEXTUAL VARIABLES

Range of Context

- Organizations will have different levels of permissions and access to different applications and shared drives based on occupational requirements and responsibilities.
- Organizations may use proprietary closed computer systems and networks.
- Access to system and applications may differ if using a mobile device.
- Cybersecurity protocols may differ in levels of automation and auto-surveillance, e.g. audit trails.
- Organizations may use different purchased applications.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Computer or mobile device
- Software programs

Major Category	Foundational Trades Skills
Competency Area	Perform Routine Trade Tasks
Competency Unit	Use hand and power tools

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Personal protective equipment, e.g. safety glasses, gloves, safety boots, hearing protection
- Hand and power tools, e.g. standard hand tools, drill press, pneumatic wrenches

Purpose

Correctly using hand and power tools protects employees against injury or death and protects the organization from loss and liability.

Performance/Abilities

- P1** Follow organization’s policies and procedures, e.g. ensure required training is completed
- P2** Follow manufacturer’s instructions, e.g. inspection, preparation, cleaning
- P3** Wear appropriate PPE, e.g. safety glasses
- P4** Inspect hand and power tools before use
- P5** Ensure hand or power tool is appropriate and rated for task
- P6** Use tools for intended purpose only
- P7** Communicate issues with tools to relevant personnel, e.g. co-workers, supervisor
- P8** Tag defective tools:
 - turn in to relevant personnel or department
- P9** Clean tools after use:
 - store in designated location

Knowledge

- K1** Relevant legislation, e.g. Occupational Health and Safety (OH&S)
- K2** Organizational safety policies and procedures, e.g. OH&S
- K3** Types of safety hazards on site and mitigation methods, e.g. limits of approach, barriers
- K4** Types of safety hazards associated with hand and power tools
- K5** PPE required for specific tasks
- K6** Types of hand and power tools, their components and procedures for use
- K7** Manufacturer’s instructions and recommendations, including ratings

CONTEXTUAL VARIABLES

Range of Context

- Types of hand and power tools vary with type of work and work location.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom’s Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

Major Category	Foundational Trades Skills
Competency Area	Perform Routine Trade Tasks
Competency Unit	Use electrical measuring and testing equipment

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Personal protective equipment, e.g. gloves, safety glasses
- Electrical measuring and testing equipment, e.g. multi-meters, power level meters, frequency selective meters, hi-pot tester, non-contact tester, diagnostic test equipment

Purpose

Correctly using electrical measuring and testing equipment protects employees and contractors against injury or death and protects the organization from loss and liability. It also helps to ensure that data being analyzed is accurate.

Performance/Abilities

- P1** Follow relevant legislation, e.g. Occupational Health & Safety
- P2** Follow organization’s policies and procedures, e.g. ensure required training is completed
- P3** Follow manufacturer’s instructions, e.g. inspection, preparation, calibration, grounding
- P4** Wear appropriate personal protective equipment (PPE), e.g. safety glasses, gloves
- P5** Inspect equipment before use
- P6** Ensure equipment is appropriate and rated for task
- P7** Use equipment for intended purpose only
- P8** Communicate issues with equipment to relevant personnel, e.g. co-workers, supervisor
- P9** Tag defective equipment:
 - turn in to relevant personnel or department
- P10** Clean equipment after use:
 - store in designated location

Knowledge

- K1** Relevant legislation, including Occupational Health and Safety (OH&S)
- K2** Organizational safety policies and procedures, e.g. OH&S and training requirements
- K3** Types of safety hazards on site and mitigation methods, e.g. limits of approach, barriers
- K4** Types of safety hazards associated with electrical measuring and testing equipment
- K5** PPE required for specific tasks
- K6** Types of electrical measuring and testing equipment, their components and procedures for use
- K7** Inspection procedures for electrical measuring and testing equipment
- K8** Calibration procedures for electrical measuring and testing equipment

CONTEXTUAL VARIABLES

Range of Context

- Types of equipment will vary with type of work and work location.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom’s Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

Major Category	Foundational Trades Skills
Competency Area	Perform Routine Trade Tasks
Competency Unit	Use access equipment and work platforms

Purpose

Correctly using access equipment and work platforms protects employees against injury or death and protects the organization from loss and liability.

Performance/Abilities

- P1** Follow organization's policies and procedures, e.g. ensure required training is up to date
- P2** Wear appropriate personal protective equipment (PPE), e.g. fall arrest
- P3** Identify traffic areas and potential site hazards
- P4** Select access equipment according to site and task requirements
- P5** inspect access equipment and installation location as per manufacturer's guidelines
- P6** Use equipment only for intended purpose
- P7** Secure access equipment, as required
- P8** Use confined space monitoring equipment, as required
- P9** Communicate issues with equipment to relevant personnel, e.g. co-workers, supervisor
- P10** Tag defective equipment:
 - turn in to relevant personnel or department
- P11** Clean equipment after use:
 - store in designated location

Knowledge

- K1** Relevant legislation, e.g. Occupational Health and Safety (OH&S), required training
- K2** Organizational safety policies and procedures, including OH&S
- K3** Types of safety hazards on site
- K4** Types of safety hazards associated with access equipment, e.g. ladder footing, trenches, confined spaces
- K5** PPE required for specific tasks
- K6** Types of access equipment, their components and procedures for use, e.g. ladders, scaffolding, aerial work platform
- K7** Inspection procedures for access equipment

Glossary

- **Access equipment:** any equipment that is specially designed to help user to work safe in locations not readily accessible, e.g. above ground, below ground, confined space, at height.

CONTEXTUAL VARIABLES

Range of Context

- Types of equipment will vary with type of work and work location.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Personal protective equipment, e.g. fall arrest equipment, hard hat, shepherd hooks
- Occupational Health & Safety documents, e.g. safe work procedures
- Access equipment and work platforms, e.g. portable and permanent ladders, diving boards, scissor-lifts, scaffolding, articulating boom

Major Category	Foundational Trades Skills
Competency Area	Perform Routine Trade Tasks
Competency Unit	Operate vehicles and motorized equipment

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Personal protective equipment, e.g. personal flotation device, helmet
- Vehicles and motorized equipment, e.g. trucks, quads, side-by-sides, boats, snowmobiles, bucket trucks

Purpose

Correctly operate vehicles and motorized equipment protects employees, contractors and members of the public against injury or death, and protects the organization from loss and liability.

Performance/Abilities

- P1** Obtain correct training and licenses for vehicles and motorized equipment, as required
- P2** Identify traffic areas and potential site hazards
- P3** Select vehicles and motorized equipment according to site and task requirements
- P4** Inspect vehicles and motorized equipment before use:
 - ensure fluid levels are acceptable
 - adjust controls and safety features, as required
 - document condition of equipment, as required
- P5** Operate vehicles and motorized equipment according to legal requirements and organizational policies and procedures
- P6** Communicate issues with vehicles and motorized equipment to relevant personnel, e.g. co-workers, supervisor
- P7** Inform relevant personnel or department if vehicles and motorized equipment are defective or require maintenance
- P8** Store vehicles and motorized equipment in designated location

Knowledge

- K1** Relevant legislation, e.g. regulations for off-road equipment, highway traffic act
- K2** Organizational safety policies and procedures, including Occupational Health & Safety
- K3** Types of safety hazards on site
- K4** Types of safety hazards associated with vehicles and motorized equipment
- K5** Types of vehicles and motorized equipment, their components and procedures for use
- K6** Inspection procedures for vehicles and motorized equipment

CONTEXTUAL VARIABLES

Range of Context

- Types of vehicles and motorized equipment will vary with type of work and work location.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom’s Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

Major Category	Foundational Trades Skills
Competency Area	Perform Routine Trade Tasks
Competency Unit	Lubricate equipment and components

Purpose

Lubricating equipment and components protects assets against damage and extends the lifespan of equipment and components. Completing this task effectively protects the environment and may also protect employees and contractors against injury.

Performance/Abilities

- P1** Wear appropriate personal protective equipment (PPE), e.g. safety glasses, gloves, masks
- P2** Determine lubricant requirements:
 - refer to manufacturer's specifications for lubricant and equipment
 - comply with applicable regulations
- P3** Select appropriate lubricant, e.g. oil, grease, dry solid, water
- P4** Select appropriate application tools and equipment, e.g. grease gun, hand tool
- P5** Identify points requiring lubricants according to manufacturer's specifications and engineered drawings
- P6** Maintain lubricant levels, as required
- P7** Remove lubricants, as required:
 - follow procedures for recycling or disposal
 - replace lubricants, as required
- P8** Respond to spills and leaks, as required:
 - report spills to supervisor
- P9** Communicate issues to relevant personnel, e.g. co-workers, supervisor
- P10** Clean tools after use, as required
- P11** Store tools and remaining lubricants in designated approved location

Knowledge

- K1** Relevant legislation and documents, e.g. WHMIS
- K2** Manufacturer's specifications and engineered drawings of equipment
- K3** Organizational safety policies and procedures, including Occupational Health & Safety
- K4** Manufacturer's Safety Data Sheets (SDS) and other lubricant specifications, e.g. PPE, first aid measures, characteristics
- K5** Types of safety hazards on site and associated with lubrication, e.g. pinch points
- K6** PPE required for specific tasks
- K7** Consequences of using incorrect lubricant or not following application instructions

CONTEXTUAL VARIABLES

Range of Context

- Types of lubricants vary with types of equipment and components, nature of the work and work location.
- Tools used to lubricate equipment and components will vary with the type of lubricant, equipment and components.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Personal protective equipment, e.g. safety glasses, goggles, masks, gloves
- Hand tools, e.g. grease guns
- Lubricants, e.g. oil, grease, dry solid, water

Purpose

Assisting with rigging, hoisting/lifting and moving equipment and materials protects employees, contractors and members of the general public against injury or death, and equipment from damage. It also protects the organization against loss and liability.

Performance/Abilities

- P1** Wear appropriate personal protective equipment (PPE), e.g. high visibility equipment, hard hat, gloves, safety boots, safety glasses
- P2** Determine equipment needs based on:
- characteristics of rigging, hoisting/lifting or moving task, e.g. headroom, environment, stability
 - process to be used for rigging, hoisting/lifting or moving
 - number of items being lifted/moved at one time
 - weight of load
 - location of taglines
- P3** Identify load ratings for sling arrangements, as required
- P4** Inspect equipment for damage and wear
- P5** Secure area, as required:
- assess site, ground, environmental conditions
 - assist with route planning
 - remove hazards, obstructions and other anomalies
 - secure area of lift radius
 - confirm location of personnel
- P6** Determine scheduling of activities based on environmental conditions, e.g. weather
- P7** Communicate issues to relevant personnel, e.g. co-workers, supervisor
- P8** Communicate clearly before, during and after hoist/lift/move:
- ensure direct communication between operator and signal person, i.e. direct line of sight or radio communication
 - use hand signals and verbal communication

Knowledge

- K1** Relevant legislated requirements, e.g. Occupational Health & Safety (OH&S)
- K2** Organizational safety policies and procedures, e.g. OH&S
- K3** Types of safety hazards on site
- K4** Types of safety hazards associated with rigging, hoisting/lifting and moving
- K5** Terminology, hand signals and flagging associated with rigging, hoisting/lifting and moving
- K6** PPE required for specific tasks
- K7** Types of hoisting and lifting equipment, their components, accessories, applications, ratings, limitations and procedures for use, including:
- sling angles for hoisting/lifting

K8 Types of moving equipment and their applications, e.g. crane, boom or forklift

K9 Procedures to ensure work area is safe for lifting

CONTEXTUAL VARIABLES

Range of Context

- Types of equipment and tools vary with type of work and work location.
- Environment and weather conditions can alter the way this task is performed.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Personal protective equipment, e.g. high visibility clothing, hard hat, gloves, safety glasses, safety footwear
- Rigging, hoisting/lifting and moving equipment and tools, e.g. chain hoists, rope blocks, cable winches, web hoists, levers, slings, ropes, cables, taglines, crane, forklift

Major Category	Personal Competencies
Competency Area	Demonstrate Professionalism
Competency Unit	Work as member of a team

Purpose

Working as a member of a team helps to ensure that operations run smoothly, and allows project managers, supervisors, employees and contractors to be proactive before small issues become large problems.

Performance/Abilities

- P1** Demonstrate respect and empathy towards others:
- respect diversity
 - respect differing perspectives
 - promote an inclusive work environment
 - recognize changes in team members' behaviours, e.g. mental health strain
- P2** Be accountable:
- report unexpected conditions
 - be punctual
 - comply with schedule
 - take action when issues arise
- P3** Initiate contact with other team members on regular basis:
- ask questions
- P4** Share knowledge and skills
- P5** Recognize others' contributions and success
- P6** Accept and provide constructive feedback
- P7** Ask for help, when needed
- P8** Offer help to team members
- P9** Respond to requests in a timely manner
- P10** Be open to change
- P11** Participate actively in team meetings

Knowledge

- K1** Organization policies, procedures and plans
- K2** Organization/project goals, vision and status
- K3** Roles and responsibilities of team members, including own role
- K4** Team members' contact information
- K5** Sector and project terminology and common abbreviations
- K6** Symptoms of psychological strain, e.g. decreased quality of work, withdrawal

CONTEXTUAL VARIABLES

Range of Context

- Team members will vary, for instance, there may be a range of small, temporary working groups and more permanent, long-term working groups.
- Physical locations may change the way this skill is performed, e.g. communication may have to occur via distance means.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. email, telephone

Major Category	Personal Competencies
Competency Area	Demonstrate Professionalism
Competency Unit	Develop professionally

Purpose

Developing professionally is important to keep current with sector trends, products and services. It improves an individual's attitude, knowledge, self-confidence and skills.

Performance/Abilities

- P1** Maintain qualifications and certifications, as required, e.g. trade license, professional designation, First Aid, CPR
- P2** Assess own skills, knowledge and abilities:
 - reflect on feedback from peers and supervisor
 - identify areas for improvement
- P3** Identify areas of interest where new skill and knowledge development might be useful, e.g. new methods/products used in the sector
- P4** Upgrade skills and knowledge, for example:
 - attend courses offered by equipment manufacturers
 - read sector-specific publications
 - conduct research
 - enroll in educational and professional development courses and programs
 - participate in mentorship programs
 - ask for assistance or instruction
- P5** Participate in local trade and business organizations, as applicable
- P6** Network with professional peers, e.g. attend conferences or trade shows
- P7** Join and participate in associations, as applicable
- P8** Ensure professional development is documented in organization's record management system, as required

Knowledge

- K1** Organization policies, procedures and plans
- K2** Organization/project goals, vision and status
- K3** Own skills, knowledge and abilities
- K4** Roles and responsibilities of team members, including own role
- K5** Where to find up-to-date and accurate information on the sector
- K6** Relevant training providers and their offerings

CONTEXTUAL VARIABLES

Range of Context

- Access to resources may affect the way this skill is performed, e.g. organization's professional development budget, individuals may only attend provided professional development sessions during work time.
- Physical location may change the way this skill is performed, e.g. all professional development may have to be pursued via distance means.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Computer access
- Mentoring/coaching program
- Education grant program, if available
- Collective agreement

Major Category

Personal Competencies

Competency Area

Demonstrate Professionalism

Competency Unit

Demonstrate professional and ethical conduct

Purpose

Demonstrating professional and ethical conduct is important to build trust and respect in relationships with others. It also helps to promote a positive image of the organization and the sector.

Performance/Abilities

- P1** Participate in relevant training, e.g. conflict of interest, code of conduct, ethics
- P2** Support high standards and practices that protect public and bring credibility to organization, sector, and community, for example:
 - follow professional code of ethics/code of conduct, as applicable
 - implement responsible policies
 - avoid degrading or malicious discussion
 - recognize potential conflict of interest
- P3** Demonstrate professional attributes, including:
 - approachability, e.g. be available to coworkers and clients
 - composure, e.g. remain calm in emergency
 - empathy, e.g. show concern for others' problems
 - emotional intelligence, e.g. awareness of own and others' emotional states
 - fairness, e.g. treat all equally
 - flexibility, e.g. be open to new situations and approaches
 - being proactive, e.g. address issues before they become large problems
 - initiative
 - QA/QC principles in relation to work, e.g. catching potential errors prior to issues
 - trustworthiness, e.g. honour commitments
 - social responsibility, e.g. report injured wildlife to appropriate authorities
- P4** Ensure appearance is professional, e.g. wear uniform or organizational id/tag, ensure attire is in good repair
- P5** Comply with legal requirements, e.g. high visibility clothing, NERC requirements, conflict of interest
- P6** Maintain confidentiality of information, as required
- P7** Maintain accurate records
- P8** Show respect for organization's assets, e.g. take proper care of tools and equipment

Knowledge

- K1** Relevant legislation, e.g. Freedom of Information and Protection of Privacy (FOIP), NERC Standards
- K2** Organization policies, procedures and plans
- K3** Organization/project goals, vision and status
- K4** Code of conduct/Code of ethics
- K5** Own skills, knowledge and abilities
- K6** Roles and responsibilities of team members, including own role
- K7** Where to find up-to-date and accurate information on standards and practices

CONTEXTUAL VARIABLES

Range of Context

- Formal codes of ethics may exist in some subsectors and not others.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

Major Category	Personal Competencies
Competency Area	Demonstrate Professionalism
Competency Unit	Mentor/coach others

Purpose

Mentoring/coaching others is important to help create an environment of continuous learning within the organization. It helps to ensure consistency in the work being completed, and assists with building positive workplace relationships. It contributes to an improvement of both individual and team performance.

Performance/Abilities

- P1** Initiate contact with other team members/learners on regular basis:
 - ask questions
- P2** Use positive approach to help team members/learners solve problems:
 - ask questions to help focus on problem
 - guide resolution/performance
 - demonstrate patience
- P3** Demonstrate tasks for others, as required:
 - explain importance of and reasons for process/tasks
 - link learning to other tasks and overall job
- P4** Set up environment for learner to practice skills, as required:
 - ensure safety of learning environment
- P5** Recognize success, e.g. praise team member/learner
- P6** Assess learners' progress, as appropriate
- P7** Provide supportive and corrective feedback
- P8** Ask for feedback on own performance as coach/mentor

Knowledge

- K1** Organization policies, procedures and plans
- K2** Organization/project goals, vision and status
- K3** Roles and responsibilities of team members/learners, including own role
- K4** Role of workplace mentor/coach
- K5** Sector and project terminology and common abbreviations
- K6** Different ways of learning/learning needs and strategies to address them, e.g. language proficiency, learning preference
- K7** How to adjust to different learning styles
- K8** Importance of, and techniques for, providing effective feedback

CONTEXTUAL VARIABLES

Range of Context

- Mentoring/coaching may be a formalized or informal process, which will affect how this skill is performed.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. email, telephone

Major Category	Personal Competencies
Competency Area	Demonstrate Professionalism
Competency Unit	Manage stress

Purpose

Managing stress is important to improve one's own ability to balance personal and professional demands, perform one's job competently, and contribute to a harmonious workplace.

Performance/Abilities

- P1** Attend to own physical, emotional, spiritual, family and financial needs:
 - ask for help, if needed
- P2** Recognize own limitations and those of others, e.g. know when to say no
- P3** Recognize how your stress affects others
- P4** Manage time effectively:
 - prioritize tasks to be done
 - ensure schedule is realistic
 - negotiate or discuss with team members/supervisor, as required
- P5** Delegate responsibilities, when appropriate
- P6** Adapt to shift work, as required, for example:
 - prepare self for shifts
 - ensure proper rest/sleep
 - ensure proper nutrition
- P7** Maintain open communication with others
- P8** Identify coping strategies, e.g. maintain a sense of humour

Knowledge

- K1** Organization policies, procedures and plans
- K2** Organization/project goals, vision and status
- K3** Organization's wellness program, e.g. available gym memberships, counselling programs
- K4** Own skills, knowledge and abilities
- K5** Roles and responsibilities of team members, including own role
- K6** Symptoms of psychological strain, e.g. fatigue, irritability, difficulty concentrating, isolation

CONTEXTUAL VARIABLES

Range of Context

- Availability of an organization wellness program, and its associated offerings, may alter the way this skill is performed.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Psychological health and wellness program

Major Category	Personal Competencies
Competency Area	Demonstrate Professionalism
Competency Unit	Manage time

Purpose

Managing time is important to support efficiency and productivity by allowing the required time to be spent on the areas/tasks of most importance, and ensures that all tasks can be completed according to schedule.

Performance/Abilities

- P1** Set goals:
 - ensure goals are realistic and relevant
 - outline objectives to be achieved for each goal
- P2** Identify tasks that need to be achieved for each objective:
 - prioritize based on importance and urgency
- P3** Determine amount of time each task will take, considering:
 - previous experience
 - available resources
 - competing priorities
 - possible delays
- P4** Use time management system, e.g. electronic calendar, daytimer:
 - record appointments, meetings and critical dates
- P5** Create action plan:
 - identify timelines and critical dates
- P6** Schedule tasks:
 - delegate tasks, as required
- P7** Monitor progress of tasks and action plan:
 - review/update timelines regularly
- P8** Identify incomplete tasks:
 - develop plan for completion
- P9** Review goals and objectives periodically:
 - review time management system
 - evaluate own tasks
 - evaluate progress toward goals
 - make adjustments, as required

Knowledge

- K1** Organization policies, procedures and plans
- K2** Organization/project goals, vision and status
- K3** Own skills, knowledge and abilities
- K4** Roles and responsibilities of team members, including own role

CONTEXTUAL VARIABLES

Range of Context

- Complexity of time management will vary with job role and current tasks.
- Goals, objectives and action plans may be provided, depending upon job role and organization.
- Unplanned situations, including emergencies, can make it difficult to perform this skill.
- Collaboration may or may not be required, e.g. some activities need to be coordinated with others/other work teams.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Time management systems, e.g. electronic calendar, daytimer
- Software, e.g. project management software

Major Category	Personal Competencies
Competency Area	Communicate Effectively
Competency Unit	Use active listening skills

Purpose

Using active listening skills helps to ensure that all parties understand each other. This promotes effective teamwork, improves productivity and reduces stress.

Performance/Abilities

- P1** Choose appropriate time and place to listen, if possible:
- remove distractions, as required
- P2** Listen carefully to message:
- be open-minded
 - use attentive body language, e.g. face speaker
 - listen until message is complete, i.e. do not interrupt
 - give speaker undivided attention
- P3** Watch for nonverbal indicators that reinforce or contradict message, e.g. nod, rolling eyes
- P4** Respond to message, for example:
- use nonverbal indicators, e.g. nod, smile
 - offer comments
 - use questions to seek additional information or clarify details
 - paraphrase to confirm understanding

Knowledge

- K1** Relevant legislation, e.g. Freedom of Information and Protection of Privacy
- K2** Organization policies, procedures and plans
- K3** Organization/project goals, vision and status
- K4** Effective communication practices, e.g. verbal versus non-verbal, characteristics of respectful communication
- K5** Sector, trade and project terminology and common abbreviations
- K6** Question types, e.g. open-ended, closed, probing, mirror
- K7** Communication that constitutes harassment and discrimination

CONTEXTUAL VARIABLES

Range of Context

- Physical location may change the way this skill is performed, e.g. all listening may have to occur via distance means.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. telephone

Major Category

Personal Competencies

Competency Area

Communicate Effectively

Competency Unit

Use speaking skills

Purpose

Using speaking skills helps to ensure that all parties understand each other, and reduces errors due to misinterpretation. This promotes effective teamwork, improves productivity and reduces stress.

Performance/Abilities

- P1** Identify purpose of message
- P2** Consider needs and limitations of listeners
- P3** Organize ideas before speaking
- P4** Determine appropriate time and place to deliver message
- P5** Determine appropriate format, e.g. formal/informal, group/individual
- P6** Make final revisions to message
- P7** Communicate message:
 - be concise
 - speak clearly
 - use proper grammar
 - vary tone, volume, inflection and rate of speech
 - make eye contact
 - use positive language whenever possible
 - ensure that verbal and non-verbal communication convey same message
- P8** Adjust message to listener, if appropriate, for example:
 - simplify technical information
 - use different question types to determine listener’s needs
 - avoid using slang, jargon, profanity or sarcasm
 - consider impact of message on listener, e.g. time restrictions, emotional impact
- P9** Confirm understanding:
 - ask for questions and feedback
 - review what was explained
- P10** Encourage additional questions at later date, if appropriate
- P11** Answer questions or know where to find answer:
 - follow up with listener who asked question

Knowledge

- K1** Relevant legislation, e.g. Freedom of Information and Protection of Privacy
- K2** Organization policies, procedures and plans
- K3** Organization/project goals, vision and status
- K4** Organizational communication protocols, e.g. who needs what information, speaking to media
- K5** Effective communication practices, e.g. verbal versus non-verbal, characteristics of respectful communication
- K6** Sector, trade and project terminology and common abbreviations
- K7** Question types, e.g. open-ended, closed, probing, mirror
- K8** Communication that constitutes harassment and discrimination

CONTEXTUAL VARIABLES

Range of Context

- Physical location may change the way this skill is performed, e.g. speaking may have to occur via distance means.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom’s Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. telephone

Major Category	Personal Competencies
Competency Area	Communicate Effectively
Competency Unit	Use hand signals

Purpose

Using hand signals helps to ensure that all parties understand each other, and reduces errors due to misinterpretation, especially in noisy environments or situations in which verbal communication is difficult. Using hand signals helps to reduce the risk of accidents and injury.

Performance/Abilities

- P1** Communicate with team members prior to activity requiring hand signals, when possible:
 - confirm signals with team members prior to beginning the activity
 - identify procedures to be followed
 - identify roles of each individual, including self
 - discuss any potential hazards
- P2** Ensure own visibility to operator/team members, e.g. wear high visibility vest:
 - maintain eye contact, if possible
 - never position self in a compromised location, e.g. behind moving vehicle or equipment, in a drop zone
 - maintain situational awareness
- P3** Use appropriate hand signals, e.g. emergency stop, distance to stopping point
- P4** Finish task with planned stop signal

Knowledge

- K1** Relevant legislation, e.g. Occupational Health and Safety
- K2** Organization policies, procedures and plans
- K3** Hand signals for different actions, e.g. proceed slowly, distance to stopping point, stop, turn

CONTEXTUAL VARIABLES

Range of Context

- Environmental conditions may alter the way this skill is performed.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- Recall, Remember
- Understand
- Apply
- Analyze
- Evaluate
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Hand signal cards

Major Category	Personal Competencies
Competency Area	Communicate Effectively
Competency Unit	Use writing skills

Purpose

Using writing skills helps to ensure that all parties understand each other, and reduces errors due to misinterpretation. This promotes effective teamwork, improves productivity and reduces stress.

Performance/Abilities

- P1** Determine purpose of message
- P2** Identify target audience
- P3** Provide accurate, complete and concise information
- P4** Use format, tone, and style suited to purpose, e.g. email, business letter, report
- P5** Consider reader's:
 - perceptions
 - reading ability
 - needs
 - technical understanding
- P6** Write first draft, if required:
 - arrange ideas logically
 - be clear and concise
- P7** Proofread message:
 - correct errors
- P8** Produce final copy:
 - send to reader(s)/recipient(s)
- P9** File copy according to organizational/project protocol
- P10** Follow up, as required, e.g. ensure message was received

Knowledge

- K1** Relevant legislation, e.g. Freedom of Information and Protection of Privacy
- K2** Organization policies, procedures and plans
- K3** Organization/project goals, vision and status
- K4** Organizational document management system
- K5** Organizational communication protocols, e.g. who needs what information
- K6** Basic spelling and grammar
- K7** Sector, trade and project terminology and common abbreviations
- K8** Communication that constitutes harassment and discrimination

CONTEXTUAL VARIABLES

Range of Context

- Depending upon the message and audience, process may be formal or informal.

Level of Practice

- Frontline
- Supervisor
- Manager/Executive

Adapted Bloom's Taxonomy

- | | |
|---|---|
| <input type="checkbox"/> Recall, Remember | <input checked="" type="checkbox"/> Analyze |
| <input type="checkbox"/> Understand | <input type="checkbox"/> Evaluate |
| <input type="checkbox"/> Apply | <input type="checkbox"/> Create/Transform |

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)

- Software, e.g. Microsoft Word
- Communication tools, e.g. email

Major Category

Personal Competencies

Competency Area

Communicate Effectively

Competency Unit

Exchange information with internal and external stakeholders

Purpose

Interacting effectively and appropriately with internal and external stakeholders helps to ensure that operations run smoothly and allows managers, supervisors, co-workers, customers and other stakeholders to be proactive before small issues become large problems. Exchanging relevant and accurate information in a timely manner is essential for good performance and relations between individuals and stakeholder groups.

Performance/Abilities

- P1** Determine what information needs to be shared and within what timeframe:
 - respect confidentiality of sensitive information
 - tailor message to audience
 - collect information from stakeholders to make decisions or take action, e.g. communicate with host of co-generation station to meet their needs
- P2** Determine who needs information, e.g. department head, team members, customers, government agency
- P3** Determine best method for communicating information, e.g. conduct meeting, hold conference call, send email, share data analysis via SCADA
- P4** Share information through best method, including:
 - conduct or participate in face-to-face meetings
 - communicate over distance, e.g. call department of environment about a log jam in dam, share video or photos of equipment and systems with maintenance team
 - email information and updates to have permanent record of exchanges
 - use specialized communication/reporting software, e.g. OASIS, Reliability Coordinator information System
 - use three-way communication to confirm understanding and ensure safety
- P5** Monitor own communication devices frequently, e.g. smartphone, email
- P6** Document communication, as necessary:
 - file according to organization's information/record management system

Knowledge

- K1** Relevant legislation, e.g. NERC Standards of Conduct, Freedom of Information and Protection of Privacy
- K2** Organization policies, procedures and plans
- K3** Organizational goals, vision and status
- K4** Organizational information/record management system
- K5** Effective communication practices, e.g. verbal versus non-verbal, characteristics of respectful communication, three-way communication
- K6** Relevant stakeholders, e.g. team members, other departments, contractors, customers, government agencies,
- K7** Information needs of stakeholders
- K8** Industry terminology and common abbreviations
- K9** Basics of how overall electricity system works and how components impact each other, e.g. how distribution and transmission affect generation

Notes

Notes

Electricity Human Resources Canada would like to acknowledge all of the industry subject matter experts from across Canada who were involved in drafting, reviewing and validating this National Occupational Standard.