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 Standard
Wind Turbine Technician

This project is funded by the Government of Canada’s Sectoral Initiatives Program.
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 determined 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:

<table>
<thead>
<tr>
<th>Major Category</th>
<th>A general functional area within the industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Competency Area</td>
<td>A specific area of responsibility within a Major Category</td>
</tr>
<tr>
<td>Competency Unit</td>
<td>A specific task that contains a description of the knowledge and performance components that are needed for successful, safe and effective completion</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Major Category</th>
<th>Competency Area</th>
<th>Competency Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Asset Maintenance</strong></td>
<td>Prepare to Maintain Equipment and Systems</td>
<td>Organize materials and equipment for maintenance</td>
</tr>
<tr>
<td></td>
<td>Conduct Tests for Asset Maintenance</td>
<td>Conduct electrical tests for maintenance</td>
</tr>
<tr>
<td></td>
<td>Maintain Control Systems</td>
<td>Maintain discrete input/output (I/O) devices</td>
</tr>
<tr>
<td></td>
<td>Maintain Wind Turbine Systems</td>
<td>Perform preventative maintenance on wind turbines</td>
</tr>
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<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Safety</strong></td>
<td>Maintain a Safe Working Environment</td>
<td>Follow safe work practices</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Use fall arrest equipment</td>
</tr>
<tr>
<td></td>
<td>Maintain a Sustainable Environment</td>
<td>Follow sustainable work practices</td>
</tr>
<tr>
<td></td>
<td>Respond to Emergencies</td>
<td>Respond to chemical spills and leaks</td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>Follow Security Practices</td>
<td>Follow security practices for physical work environment</td>
</tr>
<tr>
<td><strong>Organizational Policies and Procedures</strong></td>
<td>Follow Organizational Policies and Procedures</td>
<td>Follow organizational policies and procedures</td>
</tr>
<tr>
<td><strong>Information/Record Management</strong></td>
<td>Complete Information/Record Management Tasks</td>
<td>Maintain technical information and data</td>
</tr>
<tr>
<td><strong>Information and Communication Technology Foundations</strong></td>
<td>Use Digital Technology</td>
<td>Use communication applications</td>
</tr>
<tr>
<td></td>
<td>Use Organization's ICT System</td>
<td>Use organization's ICT system</td>
</tr>
<tr>
<td><strong>Foundation Trade Skills</strong></td>
<td>Perform Routine Trade Tasks</td>
<td>Use hand and power tools</td>
</tr>
<tr>
<td><strong>Personal Competencies</strong></td>
<td>Demonstrate Professionalism</td>
<td>Work as member of a team</td>
</tr>
<tr>
<td></td>
<td>Communicate Effectively</td>
<td>Use active listening skills</td>
</tr>
</tbody>
</table>
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
Wind Turbine Technician

National Occupational Standard

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
- 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  □ Recall, Remember  □ Analyze
Supervisor  □ Understand  □ Evaluate
Manager/Executive  □ Apply  □ Create/Transform

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

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

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
- evaluate 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 | Adapted Bloom's Taxonomy
--- | ---
Frontline | Recall, Remember
Supervisor | Understand
Manager/Executive | Apply

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, turn 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
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<tr>
<td>Competency Area</td>
<td>Conduct Tests for Maintenance</td>
</tr>
<tr>
<td>Competency Unit</td>
<td>Conduct vibration analysis</td>
</tr>
</tbody>
</table>

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

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<td>Competency Area</td>
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<td>Competency Unit</td>
<td>Maintain discrete input/output (I/O) devices</td>
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Refer to the following task within 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

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<td>Competency Area</td>
<td>Maintain Control Systems</td>
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<tr>
<td>Competency Unit</td>
<td>Maintain analog input/output (I/O) devices</td>
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Refer to the following task within 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

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<tr>
<td>Competency Area</td>
<td>Maintain Control Systems</td>
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<tr>
<td>Competency Unit</td>
<td>Maintain automated control systems</td>
</tr>
</tbody>
</table>

Refer to the following task within 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

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**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**

1. **P1** Follow maintenance schedule
2. **P2** Verify required maintenance activities according to maintenance plan
3. **P3** Obtain required documentation, e.g. Job Safety Analysis (JSA), lock-out tag-out (LOTO) procedures, confined space entry permit
4. **P4** Identify other minor corrective tasks that could be completed at same time, e.g. check punch list
5. **P5** Wear appropriate PPE, e.g. safety glasses, full body harness, cable sleeve, rescue equipment
6. **P6** Isolate electrical equipment and circuits, and other energy systems, as required
7. **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
8. **P8** Repair or replace components, if issues identified:
   - follow manufacturers’ specifications
9. **P9** Verify functionality of replaced components, if required
10. **P10** Update asset maintenance log in information/record management system

**Knowledge**

1. **K1** Organization’s policies and procedures, e.g. standard operating procedures (SOPs), safe work practices, lock-out tag-out procedures, isolation procedures
2. **K2** Applicable regulations, e.g. confined space regulation, working at heights
3. **K3** Turbine documentation, e.g. maintenance manual
4. **K4** Organizational information/record management system
5. **K5** Principles of electricity, e.g. AC and DC
6. **K6** Principles of mechanics and hydraulics, e.g. friction, pressure, torque, gravity
7. **K7** Impact of environmental conditions on wind turbines, e.g. wind speed, icing
8. **K8** Wind turbine components, equipment and function
9. **K9** Wind turbine mechanical equipment, their function and characteristics
10. **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
- 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. 1 ft-lb = 1.355818 Nm
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.
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
- Manager/Executive

Adapted Bloom’s Taxonomy
- Recall, Remember
- Understand
- Analyze
- Evaluate
- Apply
- 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

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
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  Adapted Bloom’s Taxonomy
☐  Frontline  ☐  Recall, Remember  ☐  Analyze
☐  Supervisor  ☐  Understand  ☐  Evaluate
☐  Manager/Executive  ☐  Apply  ☐  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)

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)
**CONTEXTUAL VARIABLES**

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

**Level of Practice** | **Adapted Bloom's Taxonomy**
---|---
Frontline | Recall, Remember | Analyze
Supervisor | Understand | Evaluate
Manager/Executive | Apply | 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

**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** | **Adapted Bloom's Taxonomy**
---|---
Frontline | Recall, Remember | Analyze
Supervisor | Understand | Evaluate
Manager/Executive | Apply | 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
Wind Turbine Technician

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

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:** Recall, Remember
- **Supervisor:** Understand
- **Manager/Executive:** Apply

Adapted Bloom’s Taxonomy

- **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
Safety

Supervisor

Apply

affected persons to inform of lock-out tag-out

Frontline

Manager/Executive

Understand

Adapted Bloom’s Taxonomy

refer to panel schedules, drawings, single-line diagrams, cable and equipment tags

Evaluate

Create/Transform

Maintain a Safe Working Environment

Recall, Remember

date when lock-out tag-out will begin

Analyze

when lock-out tag-out will begin

Isolate

Identify equipment and/or system to be isolated:

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.

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.

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:

- 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

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

Recall, Remember

Superior

Understand

Manager/Executive

Apply

Adapted Bloom’s Taxonomy

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
**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.
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

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
• Fall arrest equipment, e.g. harness, lanyard
• Anchors
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.
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 lightening 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. 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

- Recall, Remember
- Understand
- Apply
- 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

National Occupational Standard
Wind Turbine Technician
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

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

Level of Practice
- Frontline: Recall, Remember
- Supervisor: Understand
- Manager/Executive: Analyze

Adapted Bloom’s Taxonomy
- Frontline: Analyze
- Supervisor: Evaluate
- Manager/Executive: Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- First aid kits
- Spill kit
- Personal protective equipment
- Safety Data Sheets (SDS)
Wind Turbine Technician

National Occupational Standard

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
- Analyze
- Understand
- Evaluate
- Apply
- 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
Respond to Emergencies
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

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
Recall, Remember
Supervisor
Understand
Manager/Executive
Apply
Evaluate
Manager/Executive
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
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: Recall, Remember
- Supervisor: Understand
- Manager/Executive: Analyze

Adapted Bloom's Taxonomy
- Recall
- Remember
- Understand
- Analyze
- Evaluate
- Apply
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Communication equipment
- Emergency response equipment, e.g. first aid kits, fire extinguishers
- Notebook
Wind Turbine Technician

National Occupational Standard

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
☐ Evaluate
☐ Analyze
☐ 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 Adapted Bloom’s Taxonomy
☐ Frontline ☐ Recall, Remember ☐ Analyze
☐ Supervisor ☐ Understand ☐ Evaluate
☐ Manager/Executive ☐ Apply ☐ Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
• Access tools and equipment, e.g. key cards, identification cards

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

National Occupational Standard
Wind Turbine Technician
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

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<td>Evaluate</td>
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<tr>
<td>Create/Transform</td>
</tr>
</tbody>
</table>

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

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

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

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<td>Create/Transform</td>
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</table>

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

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

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

- CAD software
- Mobile workforce technology
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
Analyze
Evaluate
Apply
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
<table>
<thead>
<tr>
<th><strong>Major Category</strong></th>
<th>Information and Communication Technology Foundations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Competency Area</strong></td>
<td>Use Digital Technology</td>
</tr>
<tr>
<td><strong>Competency Unit</strong></td>
<td>Use communication applications</td>
</tr>
</tbody>
</table>

**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**

**Adapted Bloom’s Taxonomy**

- Frontline
  - Recall, Remember
  - Analyze
- Supervisor
  - Understand
  - Evaluate
- Manager/Executive
  - Apply
  - Create/Transform

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

- Computer
- Tablet
- Cell phone
- Communication software applications
- Headsets
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 Adapted Bloom’s Taxonomy

Frontline Recall, Remember
Supervisor Understand
Manager/Executive Apply

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Computer
- Tablet
- Cell phone
- Common software 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.
**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**

- Frontline
- Supervisor
- Manager/Executive

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

- Digital mobile radio
Major Category: Information and Communication Technology Foundations

Competency Area: Use Organization’s ICT System

Competency Unit: Use organization’s ICT system

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 Adapted Bloom’s Taxonomy

- **Frontline**: Recall, Remember
- **Supervisor**: Understand, Evaluate
- **Manager/Executive**: Apply, Create/Transform

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

- Computer or mobile device
- Software programs
**Purpose**
Correctly using hand and power tools protects employees against injury or death and protects the organization from loss and liability.

**Performance/Abilities**

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

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<tr>
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</tr>
<tr>
<td>K2 Organizational safety policies and procedures, e.g. OH&amp;S</td>
</tr>
<tr>
<td>K3 Types of safety hazards on site and mitigation methods, e.g. limits of approach, barriers</td>
</tr>
<tr>
<td>K4 Types of safety hazards associated with hand and power tools</td>
</tr>
<tr>
<td>K5 PPE required for specific tasks</td>
</tr>
<tr>
<td>K6 Types of hand and power tools, their components and procedures for use</td>
</tr>
<tr>
<td>K7 Manufacturer's instructions and recommendations, including ratings</td>
</tr>
</tbody>
</table>

**CONTEXTUAL VARIABLES**

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

**Level of Practice**

| Level of Practice | | Adapted Bloom’s Taxonomy | |
|-------------------|---|---------------------------|
| ☒ Frontline       | ☒ Recall, Remember | ☒ Analyze |
| ☒ Supervisor      | ☒ Understand      | ☒ Evaluate |
| ☐ Manager/Executive | ☐ Apply            | ☐ Create/Transform |
## 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 |
| Recall, Remember | Understand | Apply |
| Analyze | Evaluate | Create/Transform |
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.
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

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
The Wind Turbine Technician National Occupational Standard focuses on the competency area of performing routine trade tasks, specifically lubricating equipment and components. The purpose of lubricating equipment and components is to protect assets against damage and extend the lifespan of equipment and components. This task also effectively protects the environment and may 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: Recall, Remember
- Supervisor: Understand
- Manager/Executive: Apply

**Adapted Bloom’s Taxonomy**

- Frontline: Analyze
- Supervisor: Evaluate
- Manager/Executive: 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

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
Revisit, Remember
Analyze

Supervisor
Understand
Evaluate

Manager/Executive
Apply
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

K8 Types of moving equipment and their applications, e.g. crane, boom or forklift
K9 Procedures to ensure work area is safe for lifting
## Personal Competencies

### Demonstrate Professionalism

#### Competency Area

- 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

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### 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 | Recall, Remember | Analyze |
| Supervisor | Understand | Evaluate |
| Manager/Executive | Apply | Create/Transform |

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

- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. email, telephone
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
- Evaluate
- Analyze
- Apply
- Create/Transform

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

- Computer access
- Mentoring/coaching program
- Education grant program, if available
- Collective agreement
**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
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
- Analyze
- Understand
- Evaluate
- Apply
- Create/Transform

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

- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. email, telephone
**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: Recall, Remember
- Supervisor: Understand
- Manager/Executive: Apply

**Adapted Bloom’s Taxonomy**

- Frontline: Recall, Remember
- Supervisor: Understand
- Manager/Executive: Apply

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

- Psychological health and wellness program
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

Adapted Bloom’s Taxonomy

Frontline
- Recall, Remember
- Analyze

Supervisor
- Understand
- Evaluate

Manager/Executive
- Apply
- Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Time management systems, e.g. electronic calendar, daytimer
- Software, e.g. project management software
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.
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

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: Recall, Remember
- Supervisor: Understand
- Manager/Executive: Analyze, Evaluate
- Apply, Create/Transform

RWATEM (Requisite Work Aids, Tools, Equipment or Materials)
- Software, e.g. video chat, virtual meeting
- Communication tools, e.g. telephone
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 Recall, Remember
Supervisor Understand, Analyze
Manager/Executive Apply, Create/Transform

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

- Hand signal cards

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 | Adapted Bloom’s Taxonomy
--- | ---
Frontline | Recall, Remember
Supervisor | Understand
Manager/Executive | Apply

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

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

**Major Category**

**Competency Area**

**Competency Unit**

**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
Glossary

- **Stakeholders**: individuals and groups who are impacted by the activities or decisions of others; the individuals and groups could be within (internal) or outside (external) of the organization or project, e.g. co-workers, supervisors, contractors, customers, the public, government, union, shareholders.
- **Three-way communication**: sharing a message in three steps: 1. sender states message, 2. receiver repeats message, 3. sender confirms that receiver has repeated message correctly or corrects any misunderstandings.

CONTEXTUAL VARIABLES

Range of Context

- Stakeholders involved in interactions will vary, e.g. tradespeople, team members, managers, agency representatives, and this may affect the tone of the communication, i.e. formal or informal.
- Physical location may change the way this skill is performed, e.g. all communication may have to occur via distance means.
- Continuous training for proper communication, and monitoring of practice, is commonplace for many occupations within the industry.

Level of Practice

<table>
<thead>
<tr>
<th>Level of Practice</th>
<th>Adapted Bloom’s Taxonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Frontline</td>
<td>□ Recall, Remember</td>
</tr>
<tr>
<td>□ Supervisor</td>
<td>□ Understand</td>
</tr>
<tr>
<td>□ Manager/Executive</td>
<td>□ Apply</td>
</tr>
<tr>
<td></td>
<td>□ Analyze</td>
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<tr>
<td></td>
<td>□ Evaluate</td>
</tr>
<tr>
<td></td>
<td>□ Create/Transform</td>
</tr>
</tbody>
</table>

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

- Software, e.g. video chat, virtual meeting, OASIS, RCIS
- Communication devices, e.g. email, telephone
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.