



Electrical Power Systems Operator Occupational Standards





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About the Electricity Sector Council

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The Electricity Sector Council provides support to this dedicated team by working with industry employers and other stakeholders to research and resolve human resource and workplace development issues.

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Electrical Power Systems Operator Occupational Analysis Profile

Disclaimer: Please note that some of the tasks detailed in this document will require the services of a registered tradesperson depending upon the province of work. Provincial regulations change from time to time, employers and employees should consult your provincial appropriate licensing authority for clarification regarding which tasks may be affected. It is the responsibility of the individual employer/employee to ensure they act within the regulation for their jurisdiction.

A Operate Safely	A.1	A.2	A.3	A.4	A.5	A.6
	Commit to a safety culture	Recognize workplace hazards	Maintain safety certifications	Apply Occupational Health and Safety Act	Report safety-related incidents	Support field procedures
	A.7	A.8				
	Maintain public and environmental safety	Administer standard protection code				
B Manage Personal Development	B.1	B.2	B.3	B.4	B.5	B.6
	Follow policies and procedures	Provide and take direction	Show leadership	Problem-solve	Multi-task	Perform under stress
	B.7	B.8	B.9	B.10	B.11	B.12
	Demonstrate professionalism	Maintain physical and mental well-being	Participate in continuous learning	Mentor others	Work as a member of a team	Work independently

B.13	B.14
Build working relationships	Adapt to a 24/7 working environment

C Communicate

C.1	C.2	C.3	C.4	C.5	C.6
Speak clearly and concisely	Apply industry terminology	Use communication tools	Read for direction	Write clearly and concisely	Listen
C.7	C.8	C.9	C.10	C.11	C.12
Use three-way communication	Maintain logs	Communicate shift conditions and equipment status for shift change	Train staff	Draft technical documentation	Communicate with stakeholders

D Plan, Co-ordinate and Dispatch

D.1	D.2	D.3	D.4	D.5	D.6
Plan equipment outages	Participate in scheduled job planning	Set and co-ordinate daily operations	Perform contingency analysis	Observe and respond to weather information	Manage and track inadvertent energy (transmission)
D.7	D.8	D.9	D.10	D.11	
Dispatch generation (transmission)	Manage electrical energy transactions (transmission)	File equipment work requests	Support equipment maintenance process	Commission new or modified equipment	

E	Respond to Emergencies and Abnormal Conditions	E.1	E.2	E.3	E.4		
		Respond to electrical emergencies	Respond to non-electrical emergencies	Practice emergency drills	Participate in cause of event analysis		
F	Operate Energy Management Systems (EMS) and Electronic Tools	F.1	F.2	F.3	F.4		
		Operate SCADA (Supervisory Control and Data Acquisition)	Use PC based programs	Use EMS tools	Use e-tagging tools (transmission)		
G	Operate Transmission/Sub-transmission System	G.1	G.2	G.3	G.4	G.5	G.6
		Operate transmission/sub-transmission system components	Operate transmission/sub-transmission system	Maintain reliability of transmission/sub-transmission system	Balance load generation and interconnection	Co-ordinate and implement scheduled outages	Perform transmission switching
		G.7	Monitor and respond to unplanned transmission outages				

H Operate Distribution/Sub-transmission System

H.1	H.2	H.3	H.4	H.5	H.6
Operate distribution/sub-transmission system components	Operate distribution/sub-transmission system	Maintain reliability of distribution/sub-transmission system	Co-ordinate and implement scheduled distribution system outages	Perform distribution switching	Monitor and respond to unplanned distribution outages

H.7
Co-ordinate system operations with connecting distribution/sub-transmission systems

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Area of Competence A: Operate Safely

Task A.1: Commit to a safety culture

Sub-task:	Supporting Knowledge and Abilities:
a) Incorporate safety in all work activities	<ul style="list-style-type: none"> • Participate in safety training • Consider safety in pre- and post-job briefings • Incorporate safety into written and recorded procedures • Participate in safe work planning • Always use safety procedures • Apply applicable safety programs; for example, Stop, Think, Act, Review (STAR) and SafeStart
b) Use safe operating practices and procedures	<ul style="list-style-type: none"> • Adhere to procedural compliance standards • Follow step-by-step and reference procedures
c) Facilitate/ participate in regular safety meetings	<ul style="list-style-type: none"> • Follow safety reporting policies (i.e., always report observations of unsafe conditions)

Task A.2: Recognize workplace hazards

Sub-task:	Supporting Knowledge and Abilities:
a) Deal with hazards and potentially hazardous conditions	<ul style="list-style-type: none"> • Types of hazards may include mechanical, electrical, thermal, chemical, tripping, confined spaces, and others • Take immediate corrective action as appropriate; for example, erect barriers and warning signs
b) Select and use appropriate personal protective equipment	<ul style="list-style-type: none"> • Personal protective equipment may include hard hats, gloves, fire retardant clothing, electrical, safety boots, glasses, respirators, fall arrest systems, face shields (for flash protection and chemical protection), and others
c) Select and use appropriate procedures	<ul style="list-style-type: none"> • e.g., use confined space procedures, safe physical switching procedures, and others
d) Select and use equipment and tools	<ul style="list-style-type: none"> • Read and obey signage, instructions and directions, corporate safety manuals, procedures and rules • Apply proper use, functions and limits of tools and equipment • Apply Occupational Health and Safety Act and regulations
e) Recognize and remove distractions	<ul style="list-style-type: none"> • e.g., non-essential personnel, excessive noise, spurious alarms
f) Report hazards and potentially hazardous conditions	<ul style="list-style-type: none"> • Log and report hazardous conditions and any corrective actions

Task A.3: Maintain safety certifications

Sub-task:	Supporting Knowledge and Abilities:
a) Participate in ongoing safety training	<ul style="list-style-type: none"> • Ongoing safety training may include electrical awareness training, self-contained breathing apparatus and respirators, work protection certification, lock out procedures, WHMIS, CPR and First Aid, AED (automatic electronic defibrillator training, forklift training, dam safety training, and others • Observe mandatory safety training requirements
b) Establish levels of responsibility and authority	<ul style="list-style-type: none"> • Perform work to the level allowed by your level of qualification • Obtain and maintain certifications as required

Task A.4: Apply Occupational Health and Safety Act

Sub-task:	Supporting Knowledge and Abilities:
a) Comply with occupational health and safety rules and regulations	

Task A.5: Report safety-related incidents

Sub-task:	Supporting Knowledge and Abilities:
a) Recognize incident has occurred	
b) Initiate incident reporting procedures	<ul style="list-style-type: none"> • Initiate and coordinate reports as required (e.g., spill reports)

Task A.6: Support field procedures

Sub-task:	Supporting Knowledge and Abilities:
a) Monitor activities and maintain contact protocols	<ul style="list-style-type: none"> • e.g., location of line and maintenance crews, personnel working alone
b) Respond to personnel safety situations	
c) Support and/or coordinate safety response and protocols	

Task A.7: Maintain public and environmental safety

Sub-task:	Supporting Knowledge and Abilities:
a) Comply with corporate and regulatory requirements	<ul style="list-style-type: none"> • e.g., apply regulations for power quality, water, and air management • Apply applicable regulations, for example the Occupational Health and Safety Act and regulations, municipal, provincial and federal environmental legislation
b) Adhere to standards	<ul style="list-style-type: none"> • e.g., ISO standards like International Standards Organization (ISO) 14000, etc.
c) Control and monitor releases	<ul style="list-style-type: none"> • Control releases of air, water, and emissions
d) Participate in co-ordinated drills with public agencies	<ul style="list-style-type: none"> • Flooding, fire, grid disturbances, restoration plans
e) Participate in public relations initiatives	<ul style="list-style-type: none"> • Seminars, safety, school presentations • Special interest groups, associations • Communicate information via notification process

Task A.8: Administer standard protection code

Sub-task:	Supporting Knowledge and Abilities:
a) Follow lockout and tag procedures	<ul style="list-style-type: none"> • Ensure equipment is isolated and de-energized for worker safety • Provide verification of isolation • Complete lockout/tag-out interruptions to facilitate testing of equipment
b) Direct and/or perform work protection protocols	<ul style="list-style-type: none"> • e.g., work permits, condition guarantees, apply hold-offs, information tags • Follow specified documentation protocols • Recognize role of Controlling Authority

Area of Competence B: Manage Personal Development

Task B.1: Follow policies and procedures

Sub-task:	Supporting Knowledge and Abilities:
a) Review and interpret policies and procedures	
b) Clarify policies and procedures	<ul style="list-style-type: none"> • Ensure content is understood
c) Apply policies and procedures to work	<ul style="list-style-type: none"> • Apply to daily routine • Apply to emergency situations • Follow instructions pertaining to operation of equipment • Adhere to documented processes
d) Provide feedback to appropriate authorities	<ul style="list-style-type: none"> • e.g., for improvements

Task B.2: Provide and take direction

Sub-task:	Supporting Knowledge and Abilities:
a) Listen to or read directions	<ul style="list-style-type: none"> • Seek clarification, if required • Recognize organizational structure and chain of command
b) Take appropriate action	
c) Review results of action taken	
d) Provide direction	<ul style="list-style-type: none"> • e.g., understand and apply controlling authority responsibilities • Delegate and coordinate tasks
e) Supervise staff and activities	

Task B.3: Show leadership

Sub-task:	Supporting Knowledge and Abilities:
a) Exert leadership skills when necessary	<ul style="list-style-type: none"> • Understand the difference between leadership and support • Select appropriate response
b) Develop leadership style	<ul style="list-style-type: none"> • Pick style that best fits personality
c) Establish leadership role models	
d) Mentor others with leadership potential	
e) Apply positional authority	<ul style="list-style-type: none"> • e.g., Controlling authority

Task B.4: Problem-solve

Sub-task:	Supporting Knowledge and Abilities:
a) Identify the problem	<ul style="list-style-type: none"> • Use advice of knowledgeable, competent people/co-workers • Ask manufacturer or supplier for help • Maintain a history of equipment • Don't jump to conclusions and avoid preconceptions • Use your senses: <ul style="list-style-type: none"> ○ Listen ○ Smell ○ See ○ Touch • Take steps to investigate problems: <ul style="list-style-type: none"> ○ Who ○ What ○ When ○ Where ○ Why ○ How
b) Prioritize	<ul style="list-style-type: none"> • Recognize levels of severity/importance and order of task completion
c) Coordinate solution for problem	<ul style="list-style-type: none"> • Based on results of observations
d) Solve the problem	<ul style="list-style-type: none"> • Use a systematic (or step-by-step) approach to problem solving

Task B.5: Multi-task

Sub-task:	Supporting Knowledge and Abilities:
a) Identify tasks that need to be completed	<ul style="list-style-type: none"> • Prioritize tasks
b) Identify time available to complete tasks	<ul style="list-style-type: none"> • Use time management skills • Delegate tasks, when possible/required
c) Prioritize tasks according to degree of importance and urgency	<ul style="list-style-type: none"> • Do not try to complete too many tasks at once to avoid mistakes and confusion
d) Organize a task schedule	<ul style="list-style-type: none"> • If time is afforded • Track status of task completion
e) Complete each task in phases	<ul style="list-style-type: none"> • Complete tasks in a sequential and logical order
f) Recognize limits and abilities of self and others	<ul style="list-style-type: none"> • Set realistic expectations

Task B.6: Perform under stress

Sub-task:	Supporting Knowledge and Abilities:
a) Recognize and respond to planned and unplanned disturbances on the power system	<ul style="list-style-type: none"> • Focus and make appropriate decisions • Rely on your training and experience • Eliminate distractions • Follow processes and procedures
b) Manage work load and priorities	<ul style="list-style-type: none"> • Coordinate work • Prioritize and re-evaluate priorities • Consult with others
c) Recognize limits and abilities of self and others	<ul style="list-style-type: none"> • Set realistic expectations • Assign and delegate tasks

Task B.7: Demonstrate professionalism

Sub-task:	Supporting Knowledge and Abilities:
a) Recognize, follow and promote company policies and procedures	<ul style="list-style-type: none"> • Follow codes of conduct
b) Dress appropriately for the job	<ul style="list-style-type: none"> • e.g., wear proper personal protection equipment when needed, wear approved uniforms
c) Use diplomacy	<ul style="list-style-type: none"> • e.g., when communicating with other work groups • Be respectful of others
d) Think critically and act when necessary	
e) Obtain and maintain appropriate and/or required certification, training and development	<ul style="list-style-type: none"> • Participate in training and certification programs offered by the company

Task B.8: Maintain physical and mental well-being

Sub-task:	Supporting Knowledge and Abilities:
a) Do not work under the influence of drugs or alcohol	<ul style="list-style-type: none"> • Follow company policies and procedures
b) Prepare for work	<ul style="list-style-type: none"> • Follow company policies and procedures • Plan meals for shifts
c) Maintain a proper level of physical fitness for the job	<ul style="list-style-type: none"> • Utilize company wellness program, if available
d) Attend the job properly attired, well-rested, and adequately prepared for work	<ul style="list-style-type: none"> • Enlist family support • Get proper amount of sleep
e) Utilize company wellness program, if available	

Task B.9: Participate in continuous learning

Sub-task:	Supporting Knowledge and Abilities:
a) Identify areas requiring further learning and training	<ul style="list-style-type: none"> • As per personal development plan (e.g., develop areas of recommended improvement based on Performance Appraisals)
b) Choose appropriate courses based on needs	<ul style="list-style-type: none"> • Participate in training that is mandated by company/regulatory bodies
c) Complete in-house and off-site training	
d) Participate in training and development as dictated by corporate and industry requirements	<ul style="list-style-type: none"> • Complete mandatory safety training • Maintain certifications and training (e.g., NERC certification continuous education hour (CEH) requirements)

Task B.10: Mentor others

Sub-task:	Supporting Knowledge and Abilities:
a) Exhibit patience	<ul style="list-style-type: none"> • Understand limitations of trainees and inexperienced staff
b) Utilize good communication skills	
c) Have confidence in own abilities	
d) Learn how to mentor	<ul style="list-style-type: none"> • e.g., company training, if available
e) Complete appropriate documentation, if required	<ul style="list-style-type: none"> • e.g., skills measurement methods

Task B.11: Work as a member of a team

Sub-task:	Supporting Knowledge and Abilities:
a) Be accountable	<ul style="list-style-type: none"> • Report unexpected conditions • Be on time • Take pride in self (e.g., appearance and hygiene) • Follow company codes of business conduct • Know and follow your schedule
b) Be adaptable	<ul style="list-style-type: none"> • Demonstrate willingness to be trained and retrained • Be open to change • Compromise to make a decision
c) Be aware of diversities in the workplace	<ul style="list-style-type: none"> • Foster cultural diversity and non-traditional roles • Understand differences
d) Be responsible	<ul style="list-style-type: none"> • For safety of self and others
e) Be respectful	<ul style="list-style-type: none"> • Elicit the opinion of others, recognize their ability to contribute and leverage the expertise of team members

Task B.12: Work independently

Sub-task:	Supporting Knowledge and Abilities:
a) Be self-aware	<ul style="list-style-type: none"> • Monitor work and correct actions as necessary • Recognize personal skills limits
b) Recognize what tasks need to be accomplished	<ul style="list-style-type: none"> • Foresee and mitigate issues
c) Take initiative	<ul style="list-style-type: none"> • Self-start (provide and/or seek information) • Recognize the need to address issues
d) Work to the best of personal abilities	<ul style="list-style-type: none"> • Continue until task is completed
e) Work at a sustainable pace	<ul style="list-style-type: none"> • Eliminate distractions in order to focus on task at hand
f) Take ownership and responsibility for work	<ul style="list-style-type: none"> • Apply knowledge and training to make appropriate decisions
g) Communicate information as required	<ul style="list-style-type: none"> • e.g., keep supervisor informed of work activities

Task B.13: Build working relationships

Sub-task:	Supporting Knowledge and Abilities:
a) Work positively with stakeholders and peers	<ul style="list-style-type: none"> • e.g., reliability co-ordinators, ISO, interconnected system operators, customers, marketing, control center, generation operators, work crews, internal and external stakeholders, etc. • Convey respect for the people with which you work • Listen to their concerns • Provide constructive advice • Identify issues and provide solutions

Task B.14: Adapt to a 24/7 working environment

Sub-task:	Supporting Knowledge and Abilities:
a) Work shifts	<ul style="list-style-type: none"> • Function adequately no matter when you work • Engage spousal, child and social network for support • Possess shift work awareness (e.g., need for rest periods, special eating habits, etc.)
b) Adjust personal time to work shifts and meet work demands	<ul style="list-style-type: none"> • Prepare yourself for shifts • Get plenty of rest • Ensure proper nutrition • Focus properly on tasks at hand

Area of Competence C: Communicate

Task C.1: Speak clearly and concisely

Sub-task:	Supporting Knowledge and Abilities:
a) Organize your thoughts before speaking	<ul style="list-style-type: none"> • Take your time to gather all pertinent information before reporting
b) Keep message clear and focused	<ul style="list-style-type: none"> • Maintain consistency in your message
c) Use appropriate body language	
d) Use appropriate volume and tone of voice	<ul style="list-style-type: none"> • Speak slowly • Repeat your conversation if required
e) Use appropriate terminology and language	<ul style="list-style-type: none"> • Follow appropriate legislation and company standards, policies, and procedures • Use designated language of site
f) Confirm understanding	<ul style="list-style-type: none"> • Use active listening skills • Ask questions • Re-state to confirm understanding

Task C.2: Apply industry terminology

Sub-task:	Supporting Knowledge and Abilities:
a) Use workplace-specific vocabulary and gestures	
b) Identify and use the common language of usage for the job site	<ul style="list-style-type: none"> • e.g., use terminology as per documented agreements

Task C.3: Use communication tools

Sub-task:	Supporting Knowledge and Abilities:
a) Use primary voice communication system	<ul style="list-style-type: none"> • e.g., telephone systems, cell phones, two-way radios, etc.
b) Use back up voice communication systems	<ul style="list-style-type: none"> • e.g., satellite phones
c) Use electronic communication tools	<ul style="list-style-type: none"> • e.g., e-mail, fax, websites, RCIS (reliability coordinated information system)
d) Use proper communication etiquette	<ul style="list-style-type: none"> • Limit unnecessary chatter • Use proper radio settings • Speak professionally
e) Follow federal (CRTC) guidelines	

Task C.4: Read for direction

Sub-task:	Supporting Knowledge and Abilities:
a) Review past and revised operating instructions, procedures and policies	<ul style="list-style-type: none"> • Filter and retain relevant material that applies directly to the operator position
b) Confirm understanding	

Task C.5: Write clearly and concisely

Sub-task:	Supporting Knowledge and Abilities:
a) Follow reporting and documentation procedures	<ul style="list-style-type: none"> • Use reporting formats and templates
b) Compile information	<ul style="list-style-type: none"> • Gather and assemble facts, reference and support information
c) Write understandable documentation	<ul style="list-style-type: none"> • Use proper grammar and spelling • Employ technical writing skills as required • Employ industry approved terminology as required
d) Forward documentation to appropriate individuals	
e) File documentation according to guidelines	

Task C.6: Listen

Sub-task:	Supporting Knowledge and Abilities:
a) Give speaker undivided attention	<ul style="list-style-type: none"> • Eliminate all non pertinent distractions; e.g., alarms, phone calls, other conversations
b) Clarify and repeat information	<ul style="list-style-type: none"> • Do not assume • Repeat your understanding of any instructions you are given • Ask to repeat directions if not clear

Task C.7: Use three-way communication

Sub-task:	Supporting Knowledge and Abilities:
a) Convey message to listener	<ul style="list-style-type: none"> • Use proper protocols when using communication equipment
b) Listen for receiver to repeat message	<ul style="list-style-type: none"> • Focus on task at hand.
c) Confirm response and outcome of action	<ul style="list-style-type: none"> • Acknowledge responses, for example: “yes, that is correct”
d) Proceed with action	<ul style="list-style-type: none"> • Implement directed responses in a timely manner

Task C.8: Maintain logs

Sub-task:	Supporting Knowledge and Abilities:
a) Record all pertinent shift activities in written/electronic log books	<ul style="list-style-type: none"> • Be aware that log books and electronic logs are a legal documents • Follow company policies and procedures • Write and type legibly • Ensure accuracy and completeness of information (include who, what, why, when, where and how) • Include time, intent, and reporting details

Task C.9: Communicate shift conditions and equipment status for shift change

Sub-task:	Supporting Knowledge and Abilities:
a) Record and review shift change activities in log book	<ul style="list-style-type: none"> • Provide accurate and complete information • Ensure all critical information is passed on
b) Share verbal information	<ul style="list-style-type: none"> • Convey information about work in progress, current status of system equipment, crews, permits, etc.
c) Share information through technology	<ul style="list-style-type: none"> • For example, using e-mail

Task C.10: Train staff

Sub-task:	Supporting Knowledge and Abilities:
a) Consider knowledge and experience of trainer and trainees	<ul style="list-style-type: none"> • Ensure trainer has adequate level of competency to instruct others
b) Demonstrate proper technique	<ul style="list-style-type: none"> • Mentor new operators in operational procedures; i.e., shift change
c) Follow proper procedures	
d) Check for understanding	<ul style="list-style-type: none"> • Perform assessments as required
e) Observe trainees	<ul style="list-style-type: none"> • Mentor trainees
f) Provide training and development as required	<ul style="list-style-type: none"> • e.g., facilitate and/or lead business or safety meetings/presentations • Contribute to the design, development and implementation as an SME (subject matter expert)
g) Provide assistance as required	<ul style="list-style-type: none"> • Employ team concepts

Task C.11: Draft technical documentation

Sub-task:	Supporting Knowledge and Abilities:
a) Participate in job task analysis (JTA)	<ul style="list-style-type: none"> • Follow manufacturer's recommendations • Contribute to annual JTA requirements as required by NERC standards
b) Identify the need for new guidelines and procedures	
c) Create short-term and long-term operating instructions	
d) Create procedures for commissioning of new equipment	<ul style="list-style-type: none"> • Follow template for creating a procedure
e) Create drawings and schematics	<ul style="list-style-type: none"> • Submit for final revision
f) Develop operating agreements	
g) Initiate, review and/or provide input for technical documents	<ul style="list-style-type: none"> • For example: update and correct operating policies and procedures, modify manufacturer's technical material for training purposes
h) Review procedures for accuracy	
i) Provide feedback on new procedures	

Task C.12: Communicate with stakeholders

Sub-task:	Supporting Knowledge and Abilities:
a) Communicate with management personnel	• e.g., supervisors, managers, CEO, etc.
b) Communicate with control centre operators	
c) Communicate with field personnel/contractors	
d) Communicate with customers	
e) Communicate with union/labour personnel	
f) Communicate with service organizations	• e.g., EMS, police, fire, municipal works department, etc.
g) Communicate with call network	• e.g., call centres, crew dispatch centres, etc.
h) Communicate with reliability coordination offices	• e.g., Independent System Operator (ISO)

Area of Competence D: Plan, Co-ordinate and Dispatch

Task D.1: Plan equipment outages

Sub-task:	Supporting Knowledge and Abilities:
a) Receive maintenance/equipment outage requests	<ul style="list-style-type: none"> • Submit equipment outage request to proper authorities • Receive requests from work authorities
b) Determine what work needs to be deferred to an equipment outage	<ul style="list-style-type: none"> • Scheduled or forced outages • Determine scope of the work with other work groups (contingency analysis) • Prioritize activities • Assess the work and develop workplans • Stagger outage times sequentially to effectively coordinate
c) Forecast business obligations during equipment outages	<ul style="list-style-type: none"> • Make real-time decisions as to the best time to complete maintenance
d) Communicate equipment outages to internal and external stakeholders	<ul style="list-style-type: none"> • Follow reporting procedures • Encourage and coordinate additional work from authorities (e.g., maintenance protection and control, construction, lines, sites, utilities)

Task D.2: Participate in scheduled job planning

Sub-task:	Supporting Knowledge and Abilities:
a) Receive and review job requests	<ul style="list-style-type: none"> • Ensure maintenance/electrical personnel are available for the work • Complete preparation work • Perform contingency analysis
b) Forecast and ensure system reliability for job request	<ul style="list-style-type: none"> • Ensure redundant systems are available and capable prior to maintenance • Ensure outage contingency plan
c) Provide/receive approvals for job request	
d) Communicate job plan with all stakeholders	<ul style="list-style-type: none"> • Mechanics, electricians, instrumentation technicians, electrical technicians, power protection and control technicians
e) Schedule and carry out testing	<ul style="list-style-type: none"> • Coordinate and execute testing of isolated, de-energized, and locked-out equipment • Coordinate and execute testing of live and hazardous equipment

Task D.3: Set and co-ordinate daily operations

Sub-task:	Supporting Knowledge and Abilities:
a) Review daily work plan	<ul style="list-style-type: none"> • Ensure resources are available (i.e., mechanics, electricians, instrumentation technicians, electrical technicians, power protection and control technicians) • Ensure equipment is available • Perform contingency analysis
b) Set work priorities	<ul style="list-style-type: none"> • Evaluate impact of decisions
c) Co-ordinate activities	<ul style="list-style-type: none"> • Consider resource requirements and availability (e.g., staff skills and expertise) • Consider timing and logical order in execution of activities

Task D.4: Perform contingency analysis

Sub-task:	Supporting Knowledge and Abilities:
a) Review state of the system	<ul style="list-style-type: none"> • Understand system configuration • Prepare for first contingency
b) Forecast expected load and generation profiles	<ul style="list-style-type: none"> • Based on historical data, current conditions, etc.
c) Use specific tools	<ul style="list-style-type: none"> • Use Energy, Network and Distribution Management Systems (EMS, NMS, DMS) to analyse systems for computer software
d) Make considerations for current and anticipated system conditions	<ul style="list-style-type: none"> • Use information with consideration to factors affecting operation of electrical networks • Implement operational strategies with consideration for reliability, customers, weather, etc.
e) Respect limitations of equipment	<ul style="list-style-type: none"> • Plan with consideration for safety and economical operations
f) Complete appropriate documentation	<ul style="list-style-type: none"> • e.g., switching orders

Task D.5: Observe and respond to weather information

Sub-task:	Supporting Knowledge and Abilities:
a) Monitor information	<ul style="list-style-type: none"> • e.g., use radar
b) Evaluate conditions	<ul style="list-style-type: none"> • Consider impacts of extreme conditions (e.g., temperature, wind, rain, ice and snow)
c) Predict effects of impending weather conditions	
d) Take action based on conditions	<ul style="list-style-type: none"> • e.g., cancel work, recall hold-offs, restrict automatic operations • Coordinate and deploy staff to respond to system conditions • Operate equipment in accordance with weather conditions • Consider equipment limits and processes (e.g., severe weather alerts, quiet mode of operation)

Task D.6: Manage and track inadvertent energy (transmission)

Sub-task:	Supporting Knowledge and Abilities:
a) Monitor deviation from interchange schedule	
b) Document running tally of accumulated inadvertent energy	<ul style="list-style-type: none"> • e.g., on-peak, off-peak tallies
c) Implement inadvertent energy transfer payback methods	

Task D.7: Dispatch generation (transmission)

Sub-task:	Supporting Knowledge and Abilities:
a) Determine generation resource requirements	<ul style="list-style-type: none"> • Know load forecast, weather conditions, power system constraints, etc.
b) Obtain market generation dispatch plan	<ul style="list-style-type: none"> • Know generation constraints, de-rating, etc.
c) Make system configuration changes to accommodate plan	
d) Make best economic decisions	<ul style="list-style-type: none"> • Consideration for contracts, reliability, costs, etc.
e) Maintain adequate electricity generating capacity reserves	

Task D.8: Manage electrical energy transactions (transmission)

Sub-task:	Supporting Knowledge and Abilities:
a) Monitor transmission reservations	
b) Approve, deny or make e-tags and energy schedules	
c) Perform constrained economic dispatch	<ul style="list-style-type: none"> • Secure emergency energy
d) Implement energy reserves in emergencies	
e) Ensure replacement of implemented reserve energy	<ul style="list-style-type: none"> • Understand reserve requirements

Task D.9: File equipment work requests

Sub-task:	Supporting Knowledge and Abilities:
a) Complete request for maintenance	<ul style="list-style-type: none"> • Use appropriate forms to initiate maintenance processes • Describe deficiencies clearly and completely

Task D.10: Support equipment maintenance process

Sub-task:	Supporting Knowledge and Abilities:
a) Isolate components for safe work and apply work protection	<ul style="list-style-type: none"> • Use isolation and switching procedures (e.g., lockout/tagout procedures for steam, water, electrical and pressurized gases) • Ensure venting and grounding for de-energization • Prepare, check, verify, order, approve, apply and issue work protection permits • Follow policies and procedures
b) Place in service	<ul style="list-style-type: none"> • Test components as appropriate

Task D.11: Commission new or modified equipment

Sub-task:	Supporting Knowledge and Abilities:
a) Review supporting documentation	<ul style="list-style-type: none"> • For example, owner and operating manuals, flow sheets and load verifications
b) Complete supporting documentation	<ul style="list-style-type: none"> • For example, transfer of control documents, in-service reports, and acceptance reports, update prints, instructions, alarm cards, and operating procedures • Includes planned and scheduled maintenance • Conduct routine surveillance • Review training materials to understand and implement effective operation of equipment and systems
c) Liaise with technical support as required	<ul style="list-style-type: none"> • For example, with engineering and maintenance departments
d) Conduct field verification	<ul style="list-style-type: none"> • For example, tagging and flow sheet review
e) Place in service	<ul style="list-style-type: none"> • Test new or modified equipment as appropriate • Ensure equipment monitoring systems are in service (e.g., alarms)

Area of Competence E: Respond to Emergencies and Abnormal Conditions

Task E.1: Respond to electrical emergencies

Sub-task:	Supporting Knowledge and Abilities:
a) Apply operating capacity shortfall procedures	<ul style="list-style-type: none"> • Apply voltage reduction procedures • Apply load shedding and restoration operations
b) Identify and respond to system instability	<ul style="list-style-type: none"> • Apply under-frequency load shedding and restoration operations
c) Apply solar magnetic disturbance guidelines	
d) Apply contingency/system restoration procedures	<ul style="list-style-type: none"> • Apply 'black start' procedures • Evaluate extent of outage or disturbance • Implement contingency plans • Allocate manpower and equipment for restoration • Return system to reliable state • Operate equipment safely and economically • Respond to minimize damage and extend the life of equipment and assets
e) Operate under islanded systems	<ul style="list-style-type: none"> • Operate equipment and implement processes to accommodate requirements of reliability, power quality and system stability
f) Synchronize islanded systems	<ul style="list-style-type: none"> • Operate and adjust the load generation balance • Adjust frequency, voltage and phase angles • Use approved synchronizing, facilities, tools and breakers
g) Respond to unplanned contingencies	<ul style="list-style-type: none"> • Interpret and apply relay target reporting • Access/interpret SER, alarms and fault recorder information • Apply line restoration procedures (all voltage levels) • Apply sectionalizing techniques
h) Report electrical system outages and malfunctions	

Task E.2: Respond to non-electrical emergencies

Sub-task:	Supporting Knowledge and Abilities:
a) Apply control centre evacuation procedures	<ul style="list-style-type: none"> • Operate backup control centre • Coordinate activities of staff to enable operation of backup facilities
b) Respond to environmental emergencies	<ul style="list-style-type: none"> • e.g., oil spills, hydro emergencies, fires, • Pandemics • Apply EMO procedures, as required
c) Apply bomb threat and sabotage response procedures	
d) Respond to emergency calls	<ul style="list-style-type: none"> • e.g., two-way radio, cell phones, Mayday, etc.

Task E.3: Practice emergency drills

Sub-task:	Supporting Knowledge and Abilities:
a) Participate in annual restoration drills	<ul style="list-style-type: none"> • For your own utility and other utilities as required
b) Participate in sabotage/ terrorist/bomb threat drills	<ul style="list-style-type: none"> • Liaise with police and safety organizations, i.e., Emergency Measures Organization • Follow workplace procedures for public notification
c) Participate in emergency drills	<ul style="list-style-type: none"> • Follow workplace procedures for public notification • Examples include: evacuation, fire, major medical, environmental, • For example: move to backup control centre • Liaison with police and safety organizations, i.e., Emergency Measures Organization
d) Document outcomes of drills	<ul style="list-style-type: none"> • Complete logs and other reporting

Task E.4: Participate in cause of event analysis

Sub-task:	Supporting Knowledge and Abilities:
a) Meet with interest and stakeholder groups	• Includes internal and external groups
b) Compare feedback	
c) Determine causes	
d) Implement corrective plans and procedures	• Provide input to recommendations

Area of Competence F: Operate Energy Management Systems (EMS) and Electronic Tools

Task F.1: Operate SCADA (Supervisory Control and Data Acquisition)

Sub-task:	Supporting Knowledge and Abilities:
a) Interpret SCADA system configuration	
b) Navigate functions and displays	
c) Operate equipment and stations	
d) Interpret and respond to alarms	<ul style="list-style-type: none"> • Prioritize alarms
e) Interpret and analyze data	
f) Perform tagging functions	
g) Respond to SCADA fail over and RTU (remote terminal unit failure)	
h) Operate AGC (Automatic Generation Control)	<ul style="list-style-type: none"> • For transmission operations

Task F.2: Use PC based programs

Sub-task:	Supporting Knowledge and Abilities:
a) Use electronic logs, if required	
b) Use Microsoft Office Suite	<ul style="list-style-type: none"> • e.g., word processing, e-mail, presentation software
c) Use Internet	
d) Use custom programs	<ul style="list-style-type: none"> • e.g., SAP, GIS
e) Use outage management programs	
f) Use electronic analysis tools	

Task F.3: Use EMS tools

Sub-task:	Supporting Knowledge and Abilities:
a) Use contingency analysis applications	
b) Use thermal limit monitor/calculator	
c) Use rehearsal/study operating modes	
d) Use short circuit analysis	
e) Use load flow application	
f) Use information storage and retrieval (ISR) modes	
g) Use information support tools	

Task F.4: Use e-tagging tools (transmission)

Sub-task:	Supporting Knowledge and Abilities:
a) Use OATI (Open Access System International)	
b) Use in-house programs	

Area of Competence G: Operate Transmission/Sub-transmission System

Task G.1: Operate transmission/sub-transmission system components

Sub-task:	Supporting Knowledge and Abilities:
a) Apply system nomenclature	<ul style="list-style-type: none"> • Understand nomenclature
b) Apply system operating diagrams	<ul style="list-style-type: none"> • Understand one-line diagrams, schematics, symbols, etc.
c) Operate system equipment	<ul style="list-style-type: none"> • e.g., circuit breakers, circuit switchers, reclosers, switches, transmission lines, transformers, capacitor banks, static VAR compensator (SVC) • Direct/control transmission switching
d) Interpret and respond to metering quantities	<ul style="list-style-type: none"> • e.g., voltage, amps, megawatts, frequency, megavars, etc.

Task G.2: Operate transmission/sub-transmission system

Sub-task:	Supporting Knowledge and Abilities:
a) Operate at various voltage levels	<ul style="list-style-type: none"> • Understand operating limitations and concerns at various voltage levels • Apply voltage standards and guidelines
b) Apply Special Protection Systems (SPS)	<ul style="list-style-type: none"> • Understand load and generation rejection schemes
c) Identify factors affecting system voltage	<ul style="list-style-type: none"> • Manage reactive power • e.g., capacitor banks, SVC's • Maintain acceptable voltage profile
d) Identify and respond to factors affecting power quality	<ul style="list-style-type: none"> • Understand acceptable limits for delivery point voltage and frequency
e) Maintain line flows within limits	<ul style="list-style-type: none"> • e.g., ratings, stability limits, contractual limits, voltage limits, interchange plans
f) Operate inter- and intra-area interconnections	<ul style="list-style-type: none"> • Understand interconnection operations and obligations
g) Operate according to NERC criteria, regional and local reliability criteria	<ul style="list-style-type: none"> • Understand applicable NERC standards • e.g., NPCC, MRO, IESO
h) Operate IPP (independent power producers) and major customer interfaces	

Task G.3: Maintain reliability of transmission/sub-transmission system

Sub-task:	Supporting Knowledge and Abilities:
a) Monitor bulk electric system	<ul style="list-style-type: none"> • Includes the co-ordination of all events of a 24-hour, 7 days-a-week station
b) Monitor reactive reserve levels	
c) Run contingency analysis	<ul style="list-style-type: none"> • Understand the situations • Understand system operating limits (SOLs) and interchange reliability operating limits (IROLs) • Respond to situations with appropriate actions
d) Direct appropriate authority to respond	<ul style="list-style-type: none"> • e.g., notify NERC via control room hotlines
e) Respond to capacity deficiency	
f) Initiate transmission loading relief (TLR) procedures	<ul style="list-style-type: none"> • e.g., parallel flows

Task G.4: Balance load generation and interconnection

Sub-task:	Supporting Knowledge and Abilities:
a) Monitor and operate bulk electric system within design capabilities	<ul style="list-style-type: none"> • Includes controlling system frequency, voltage and loading, and others
b) Dispatch generators as required	
c) Conduct electronic tagging	<ul style="list-style-type: none"> • Maintain system integrity • Ensure capacity for transfer
d) Select automatic generation control (AGC)	<ul style="list-style-type: none"> • Select bandwidth
e) Monitor area control error (ACE)	<ul style="list-style-type: none"> • Know control performance standards (i.e., CPS 1 and 2)
f) Perform load forecasting	<ul style="list-style-type: none"> • Prepare generation schedules based on load forecast • Perform generation re-dispatch

Task G.5: Co-ordinate and implement scheduled outages

Sub-task:	Supporting Knowledge and Abilities:
a) Adjust configuration to implement proposed transmission system outage plan	
b) Build contingency case for scheduled outages	<ul style="list-style-type: none"> • Have short term operating procedure in place
c) Report all planned outages to reliability coordinator and other affected utilities	<ul style="list-style-type: none"> • Notify major industries or facilities that rely on a constant supply of electricity
d) Coordinate and communicate any planned outages with other transmission systems, maintenance planning authority and other stakeholders	<ul style="list-style-type: none"> • Ensure other transmission systems have made other arrangements during planned outages • Be aware of plans and progress of maintenance • Notify others of progress
e) Perform switching	<ul style="list-style-type: none"> • Follow operating procedures
f) Initiate cancellation of scheduled transmission outages and work when system conditions require	
g) Perform reliability analysis to determine impact of planned transmission outages	

Task G.6: Perform transmission switching

Sub-task:	Supporting Knowledge and Abilities:
a) Develop/follow switching plan	
b) Review switching plan to ensure understanding	
c) Obtain permissions and approvals	
d) Coordinate and communicate intent/effects with stakeholders	<ul style="list-style-type: none"> • Post effects of outages on OASIS (Open Access Same-time Information System)
e) Posture system	<ul style="list-style-type: none"> • e.g., switch capacitor banks, adjust generation, etc.
f) Execute switching procedure	<ul style="list-style-type: none"> • Operate equipment, field tags • Use three-way communication
g) Log, tag and pin	<ul style="list-style-type: none"> • Administer applicable work protection code (WPC)

Task G.7: Monitor and respond to unplanned transmission outages

Sub-task:	Supporting Knowledge and Abilities:
a) Assess impact of outage	<ul style="list-style-type: none"> • e.g., violation of operating limits, disruption to customers, etc. • Interpret relay targets and alarms • Comply with NERC or regulatory requirements
b) Notify and coordinate any unplanned outages with all stakeholders	<ul style="list-style-type: none"> • Mitigate further unplanned outages • Gather all pertinent information before reporting to appropriate authorities • Report clearly and concisely • Ensure compliance with external and internal requirements for example NERC
c) Gather and interpret all available data to determine proper restoration methods during unplanned outages	<ul style="list-style-type: none"> • e.g., relay targets, fault location data, breaker operations, sequence of events
d) Perform reliability analysis to determine impact of unplanned transmission outages	
e) Restore/re-prepare system	<ul style="list-style-type: none"> • Switch element back into service • Recall other outages • Re-dispatch generation • Notify stakeholders

Area of Competence H: Operate Distribution/Sub-transmission System

Task H.1: Operate distribution/sub-transmission system components

Sub-task:	Supporting Knowledge and Abilities:
a) Apply system nomenclature	<ul style="list-style-type: none"> • Understand nomenclature
b) Apply system operating diagrams	<ul style="list-style-type: none"> • Understand one-line diagrams, schematics, symbols, etc.
c) Operate system equipment	<ul style="list-style-type: none"> • e.g., circuit breakers, reclosers, sectionalizers, regulators, switches, transformers, capacitor banks • Direct/control distribution switching
a) Interpret and respond to metering quantities	<ul style="list-style-type: none"> • e.g., voltage, amps, megawatts, megavars, etc.

Task H.2: Operate distribution/sub-transmission system

Sub-task:	Supporting Knowledge and Abilities:
a) Operate at various voltage levels	<ul style="list-style-type: none"> • Understand operating limitations and concerns at various voltage levels • Apply voltage standards and guidelines
b) Apply protection systems	<ul style="list-style-type: none"> • Understand load rejection schemes • e.g., fuse coordination, relay reach, etc.
c) Identify factors affecting system voltage	<ul style="list-style-type: none"> • e.g., capacitor banks, SVC's • Maintain acceptable voltage profile
d) Identify and respond to factors affecting power quality	<ul style="list-style-type: none"> • Understand acceptable limits for delivery point voltage and frequency
e) Maintain line flows within limits	<ul style="list-style-type: none"> • e.g., ratings, stability limits, contractual limits, voltage limits, interchange plans
f) Conduct load balancing	<ul style="list-style-type: none"> • Balance buses, phases, transformers, etc.
g) Operate feeder transfers	<ul style="list-style-type: none"> • Understand interconnection operations and obligations • e.g., between own company and neighbouring utilities
h) Operate according to regional and local reliability criteria	<ul style="list-style-type: none"> • Understand applicable standards
i) Coordinate IPP (independent power producers) and major customer interfaces	<ul style="list-style-type: none"> • e.g., customer-owned distributed generation
j) Direct and dispatch crews	<ul style="list-style-type: none"> • e.g., line crews, trouble trucks, forestry, etc.
k) Communicate with customers	<ul style="list-style-type: none"> • e.g., no power calls, police and fire calls, billing, etc.

Task H.3: Maintain reliability of distribution/sub-transmission system

Sub-task:	Supporting Knowledge and Abilities:
a) Monitor distribution system	<ul style="list-style-type: none">• Includes the co-ordination of all events of a 24-hour, 7 days-a-week station
b) Perform contingency analysis	<ul style="list-style-type: none">• Understand the situations• Understand operating limits• Respond to situations with appropriate actions
c) Direct appropriate authority to respond	<ul style="list-style-type: none">• e.g., line crews

Task H.4: Co-ordinate and implement scheduled distribution system outages

Sub-task:	Supporting Knowledge and Abilities:
a) Adjust configuration to implement proposed distribution system outage plan	
b) Build contingency case for scheduled outages	<ul style="list-style-type: none"> • Have short term operating procedure in place
c) Report all planned outages to stakeholders and other affected utilities	<ul style="list-style-type: none"> • Notify major industries or facilities that rely on a constant supply of electricity
d) Coordinate and communicate any planned outages with other distribution/transmission systems, maintenance planning authority and other stakeholders	<ul style="list-style-type: none"> • Ensure other transmission systems have made other arrangements during planned outages • Be aware of plans and progress of maintenance • Notify others of progress
e) Perform switching	<ul style="list-style-type: none"> • Follow operating procedures
f) Cancel scheduled outages and work when system conditions require	
g) Perform reliability analysis to determine impact of planned outages	

Task H.5: Perform distribution switching

Sub-task:	Supporting Knowledge and Abilities:
a) Develop/follow switching plan	
b) Review switching plan to ensure understanding	
c) Obtain permissions and approvals	
d) Coordinate and communicate intent/effects with stakeholders	
e) Posture system	<ul style="list-style-type: none"> • e.g., transfer loads, make tap adjustments, etc.
f) Execute switching procedure	<ul style="list-style-type: none"> • Operate equipment, field tags • Use three-way communication
g) Log, tag and pin	<ul style="list-style-type: none"> • Administer applicable work protection code (WPC)

Task H.6: Monitor and respond to unplanned distribution outages

Sub-task:	Supporting Knowledge and Abilities:
a) Assess impact of outage	<ul style="list-style-type: none"> • e.g., violation of operating limits, disruption to customers, etc. • Interpret relay targets and alarms
b) Notify and coordinate any unplanned outages with all stakeholders	<ul style="list-style-type: none"> • Mitigate further unplanned outages • Gather all pertinent information before reporting to appropriate authorities • Report clearly and concisely • Ensure compliance with external and internal requirements
c) Gather and interpret all available data to determine proper restoration methods during unplanned outages	<ul style="list-style-type: none"> • For example: relay targets, fault location data, breaker operations, sequence of events
d) Perform reliability analysis to determine impact of unplanned transmission outages	
e) Restore/re-prepare system	<ul style="list-style-type: none"> • Switch element back into service • Recall other outages • Re-dispatch generation • Notify stakeholders

Task H.7: Co-ordinate system operations with connecting distribution/sub-transmission systems

Sub-task:	Supporting Knowledge and Abilities:
a) Co-ordinate restoration efforts with all stakeholders and/or the appropriate system operating authorities	<ul style="list-style-type: none"> • With, for example: appropriate system operating authorities, reliability co-ordinators, interconnections, customers, generation operators, etc. • Follow approved company practices and procedures
b) Co-ordinate normal operations	<ul style="list-style-type: none"> • Follow approved company practices and procedures

