

PURPOSE/APPLICATION

To provide guidance to workers, Supervisors and Managers who may be required to work in proximity of overhead power lines, power poles and guy wires to prevent contact with a power line by a worker or equipment. (For underground power lines, refer to the Ground Disturbance COP.)

PPE

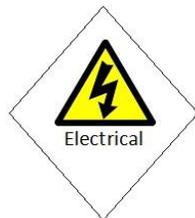
- Canadian Plains Energy Services (CPE) minimum Site-specific requirements

TRAINING

- Power line contact prevention (power companies /utilities provide power line safety awareness training)

HAZARD SOURCES & CONCERNS

- Personal injury
- Property damage
- Equipment damage
- Transformer/Breaker reset
- Arcing
- Public safety
- Economic impact
- Distractions (Communication device, Focus on task)



Approaching any work involving electrical hazards overhead or underground requires the utilization of CPE's Hazard Identification, Assessment and Control (HIAC) process. For work planning and execution this SWP follows the three stage HIAC process; 1) Before Work Starts, 2) Prior to Execution of Work and 3) Execution of Work.

PRECAUTIONS

- **All always maintain a 7 m distance from the line.**
- If you are required to work within 7m, you must contact the owner of the Power line and receive written approval.
- When passing under a power line, you must confirm sufficient clearance.
- When moving loads on public roads you not exceed the provincial maximum height. If the height clearance limit cannot be achieved the appropriate written permissions and steps must be in place prior to passing under.

1. BEFORE WORK STARTS (PRE-JOB PLANNING)

Review job scope, potential hazard sources with owner, client and power utility company.

- Complete job site visit

Pre-job meeting with the client (Internal / External)

The meeting should be held well enough in advance of the work, to allow for the sourcing of the right labour, equipment, material and for proper planning to take place. Determine the following:

- Do construction activities require people and/or equipment to cross under power lines?
- Can the construction activities be completed with people and/or equipment working near power lines without having to cross under them?
- Who has prime contractor responsibility?
- Client: Has the client applied for, or has received a crossing agreement from the power company of the line(s) being crossed?
- CPE as Prime: Apply for and receive a crossing agreement from the power company of the line(s) being crossed.
- Arrange for any required line lifts or crossing supervision. Coordinate with any 3rd party transportation contractors to verify travel routes and timeline.
- Is there ability or a requirement to de-energize the power lines for the period of time that construction activity will take place?

2. PRIOR TO EXECUTION OF WORK

Review site specific hazard assessment

- Review the site-specific hazard assessment to identify all overhead power lines.
- Identify control measures to eliminate or minimize the hazard(s).
- When construction activities are intended to take place within 7 meters (23 feet) of an energized overhead power line, the power company must be notified 48 hours in advance.
- CPE site management when Prime Contractor is responsible for contacting the power company. If CPE is not Prime, then site management is to confirm with the Prime Contractor that the power company has been contacted.
- The power company will provide:
 - Voltage of each line
 - Distance between ground level and the lowest sag point of each line
- Prior to any activity at the job site, obtain a safe work permit from the client.
- The permit must clearly designate and define **the danger zone** parallel to each side of the power line.

Determine heights of equipment, materials, loads, etc.

The possible equipment, material and/or loads to consider are Excavators, Buildings, Sidebooms, Truck Loads, Cranes, Process Equipment (i.e. Vessels, tanks, compressors, modules, etc.).

The safe limit of approach distances apply to a load, equipment or building that is transported under energized overhead power lines when the total height, including truck and equipment exceeds 4.15 meters. These loads require a written permit from the appropriate government body.

If the load exceeds 5.3 meters than the electrical distribution utility must be contacted to oversee the move. If line lifts or supervision is required the utility generally required a minimum of 7 days’ notice.



Safe Limits of Approach Based on Province

The following safe limits of approach charts have been established by provincial regulation for Overhead power lines. These charts are minimum clearances specified by the owner.

Alberta Clearance Distances (OH&S Code: Part 17)

Safe Limit of Approach Distances from Overhead Power Lines for Persons and Equipment	
Operating voltage of overhead power lines between conductors	Safe limit of approach distance for persons and equipment
0 - 750V - Insulated or polyethylene covered conductors (1)	300 mm
Above 750V Insulated Conductors (1) (2)	1.0 m
0 - 40 kV	3.0 m
69 kV, 72 kV	3.5 m
138 kV, 144 kV	4.0 m
230 kV, 240 kV	5.0 m
500 kV	7.0 m

Notes:

1. Conductors must be insulated or covered throughout their entire length to comply with this group.
2. Conductors must be manufactured to rated and tested insulated levels.



British Columbia Clearance Distances (WCB OH&S Regulations: Part 19)

Operating Voltage - Phase to Phase	General limits of approach
0 - 750V to 75 Kilovolts	3.0 m
Over 75 kilovolts to 250 kilovolts	4.5 m
Over 250 kilovolts to 550 kilovolts	6.0 m

Note: In British Columbia, the system owner representative must state in writing whether the electrical system has been de-energized, guarded or rerouted. This document must be available at the work site.

Saskatchewan Clearance Distances (OH&S Regulations Section 465)

Operating Voltage of Overhead Power Lines Voltage to Ground	Minimum Distance from Exposed High Voltage Electrical Conductors
133 Kilovolts or greater	6.1 m
41.6 kilovolts to 138 kilovolts	4.6 m
2.4 kilovolts to 41.6 kilovolts	3.0 m

Manitoba Clearances Distances (Workplace Safety & Health's Manitoba Regulation 108/88R)

Where work is being done or any part of equipment or machinery is capable of coming within 3 metres of an overhead electrical line or using equipment or machinery from a location from which it, or any part of it, is capable of coming within 3 m of an overhead electrical line. The work must be carried out, and equipment or machinery used is operated, in a manner that prevents contact with the overhead electrical line or electricity arcing from the line to the equipment or machinery. Before permitting a worker to work within 3 m of the line or use equipment or machinery from a location from which it is capable of coming within 3 metres of an overhead electrical line, the authority having jurisdiction must be notified.

In situations in which the worksite parallels a power line, induced voltage may be a potential hazard the utility must be consulted to determine the appropriate control measures to be taken.

Special attention needs to be paid to certain activities around power lines. Such activities include concrete pump trucks, scaffold erection, pile driving and tree falling/logging. A hazard assessment prior to the start of such activities should be completed and address hazard mitigation techniques.

Erecting/Placement of Signage/Goal Posts

When working near overhead power lines, personnel are required to install a minimum of two "Danger Overhead Power lines" signs. The signs shall be installed on both sides of the line at a distance of 7m from the line.

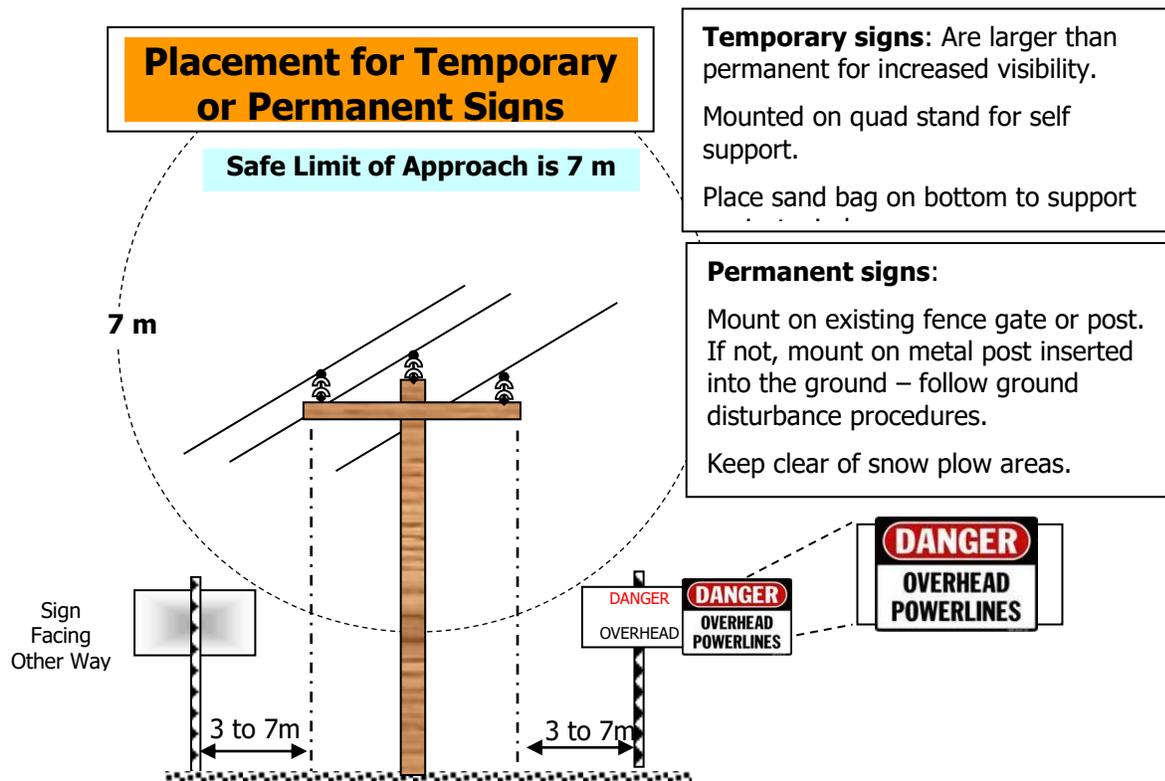
Temporary signs are larger than permanent for increased visibility and are mounted on quad stand for self-support with a sandbag on bottom to support against wind. When placing signage confirm that it is not obscured by vegetation, snowbanks, other equipment, material, etc.

Permanent signs are mounted on existing fence gate or post. If not, mount on metal post inserted into the ground – follow ground disturbance procedures and are offset enough to keep clear of snow plow areas.

Example: Overhead Danger Sign



Example: Placement of Temporary and Permanent Signs



Goal Posts

When crossing under or working in proximity to overhead power lines, goal posts will be installed no closer than 7m. Goal posts will be made of non-conductive materials. Reflective flagging strips shall be tied/attached to cross rope to increase visibility.

3. EXECUTION OF WORK**Complete Pre-Job/Site HIAC**

- Prior to starting work, ensure all hazard sources and hazards have been identified.

Communicate Details Tasks and Hazards

- a) When conducting a tailgate meeting, specifically referring to overhead power line requirements:
 - Define overhead power line locations.
 - Review the specific hazards and appropriate controls (signage, goal posts, voltage, approvals, etc.).
 - Review safe limits of approach.
 - Identify spotter and review responsibilities.
 - Manage Human Factors (mind on task, clear communication between spotter and equipment operators/workers).
 - Review the emergency preparedness and response plan – in detail.
 - Monitor and communicate changing atmospheric conditions (i.e. temperature, humidity, wind, sleet, snow, rain, etc).
- b) Re-assess worksite hazards:
 - When new work is introduced.
 - When planned scope of work for the day changes.
 - When atmospheric conditions present increased risk.

Implement Hazard Control Measures

- Install non-conductive posts and flagging across Right-of-Way at minimum clearances as allowed by the regulations for the line voltage.
 - No equipment higher than the flagged line will be permitted to operate within this area.
- Flag all power pole guy lines in the vicinity of the work area.
- Identify 7-meter (23 ft) Danger Zone(s).
 - No equipment will be allowed to work within this area without a designated spotter.
- Position high visibility signs that clearly identify the “Danger Zones” – “Overhead Power”.
- Appoint a designated spotter equipped with:
 - Reflective vest and/or other reflective wear (i.e. FRC w/ reflective stripes).
 - Air horn to alert others of imminent danger.



- Install warning decals on/in excavators, sidebooms, cranes, or any other lifting device that has the potential to come in contact with an overhead power line.
- Must take into consideration the maximum length or height of equipment, truck loads, etc.
- Must keep in mind the clearance changes resulting from pipeline crossing ramps, ditch spoil piles, etc
- Workers working in or near electrical operating lines need to be trained in safe work procedures.

Additional instructions:

- Ensure the site hazards are identified assessed and controlled.
- Ensure the safety of all workers.
- Confirm if there are any injuries; provide first aid and or transport for medical assistance.
- Secure the scene.
- Notify authorities
 - Customer
 - Power/utilities
 - Occupational Health and Safety

POWER LINE CROSSING REQUIREMENTS

Crossing locations used by mobile equipment will be protected with a height restricting, non-conductive warning barricades (goal posts) and high visibility signage clearly identifying the height of the Utility. In some instances, the Utility may have to be raised or re-routed to allow for access of over height loads.

All designated crossings shall be marked with CSA approved warning signs for high voltage.

When cranes, shovels, aerial man lifts, pile drivers and similar equipment are being moved, mark out the route to be travelled. Uneven terrain could cause the boom or other structure to weave or bob, increasing the likelihood of power line contact. Special attention shall be given to auxiliary equipment such as radio antennas and jibs. Spotters are to be used to escort equipment underneath power lines. Also, aerial man lifts, over height loads and cranes are not to be parked under Power Lines

USE OF SPOTTER

- Spotters shall be used to assist Equipment Operators with maintaining a safe limit of approach to over head power lines.
- The spotter shall always be in direct view of the Equipment Operator.
- The spotter shall also be responsible for keeping other workers or the general public at least 30 meters (100 ft.) away from the equipment working near the power lines.
- The spotter is not to touch the heavy equipment during working activities.
- Spotters shall wear a high visibility vest or armband and carry an air horn. Where signals cannot be transmitted properly, or the view is impaired, a radio or additional spotters shall be utilized.

- Except in emergencies and for critical tasks, work near power lines shall be performed during daylight hours only.
- Work shall not be conducted in close proximity to overhead power lines during windy, rainy or stormy weather.

CONTACT WITH OVERHEAD POWER LINE

If a line contact occurs, the priority is to ensure the safety of the individuals involved. If contact is made between equipment and an overhead power line and there is no danger of fire:

- If safe to do so, and possible, move equipment away from overhead power lines, thus breaking contact with energy source.
- If unable to break the contact the operator will stay inside the cab of the equipment and contact the emergency response team for assistance.
- Site supervision will make arrangements to have the power line de-energized, isolated and grounded.
- Once the power line has been de-energized, the operator may leave the cab of the equipment.
- Work shall not resume, or equipment moved, until an investigation and damage assessment has been completed and all electrical safeguards are in place.
- For internal notification and reporting, CPE considers an arcing incident with an overhead power line as a line contact.

If contact is made between equipment and an overhead power line and there is a danger of fire:

- The operator shall shut off the equipment and jump off as far away as possible and land with both feet together.
- The operator shall hop away to a safe distance of 30 m (100 ft.) or more from the equipment, at right angles to the power line, keeping both feet together when hopping away from the equipment.
- When in a safe location, the operator shall contact the emergency response team and site supervision who will have the power line de-energized, isolated and grounded.

OTHER CONSIDERATIONS

- Where overhead power lines or other exposed parts of electrical systems are to be de-energized before the start of work, those lines or other exposed parts shall be visibly grounded at the location of the work.
- Equipment and materials shall not be stored within a 7 m radius of power line poles.
- Grounding trailers and/or any other equipment in the area of the power line is not a safe practice.
- When using taglines to control an elevated load, the taglines shall be made of a non-conducting material.



REFERENCES / ADDITIONAL INFORMATION

- Atco Electric
- Fortis Alberta
- www.wherestheline.ca

REGULATIONS

- Canadian Electrical Code
- Provincial Regulations; British Columbia, Alberta, Saskatchewan, Manitoba

Developed by:	1. <u>Marty Fulkerth</u>	2. _____	Date: <u>Oct. 22, 2009</u>
Last Revised by:	1. <u>HSE Team</u>	2. <u>Scott Desautels</u>	Date: <u>August 12, 2013</u>
	3. <u>Ryan Obleman</u>		<u>April 18, 2018</u>
