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1. Purpose

This program has been developed with reference to Part 17 of the Alberta Occupational Health and Safety (OH&S) Code to establish guidelines to aid in reducing and eliminating accidental electrical equipment contacts and to assist workers who work in close physical proximity to electrical lines and equipment to work safely.

2. Scope

This Overhead Power Lines (OPL) Program aims to:

- reduce the number of power outages;
- reduce the cost of damaged equipment;
- reduce the number of construction delays; and
- reduce and eliminate accidental contact with electrical equipment and devices.

3. Responsibilities

Supervisors are responsible for:

- being familiar with the OPL Program;
- ensuring workers are familiar with and follow this Program;
- liaising with the Electrical Utility when required;
- completing a Hazard Assessment and Control Form (HACF) and Standard Operating Procedure (SOP) prior to any work being undertaken;
- reviewing and updating the HACF and SOP post-incident or when changes to the operation are implemented (e.g. new equipment or a process is introduced);
- ensuring that all employees who may be required to work adjacent to overhead power lines have been trained and are competent to work near sources of electricity;
- ensuring workers complete a Field Level Hazard Assessment (FLHA) prior to work activities;
- maintaining training records in personnel files; and
- ensuring that workers are adequately trained in the SOP, including emergency response.

Workers are responsible for:

- being familiar with and following this Program;
- participating in required training, following the SOP, and reviewing the HACF;
- following all health and safety standards, rules and responsibilities, and reporting all hazardous conditions to their Supervisor immediately; and
- completing a FLHA prior to work activities.

Contractors are responsible for:

- following the University's OPL Program where the requirements exceed a Contractor's Program and/or the OH&S Code;
- honouring the University's contractual requirements;
- employing competent and qualified workers; and
- having documentation available to indicate appropriate training has been received.

Environment, Health and Safety is responsible for:

- periodically auditing recordkeeping to verify the documents meet or exceed the requirements listed in Part 17 of the OH&S Code;
- providing support to supervisors and workers; and
- reviewing and updating the OPL program as necessary.

4. Training

Overhead power line safety training is essential to ensure safety. The local Electrical Utility can be contacted for overhead power line information and training. The University's Electrical Utilities Division (EUD) can also be contacted for overhead power line and safety information.

5. Hazard Assessment

The HACF should be completed by the supervisor with participation from workers as necessary prior to any work activities. All workers should review the completed HACF. A FLHA should also be completed by workers prior to work activities.

Common hazards associated with overhead power lines include:

- unsafe equipment or installation;
- unsafe environment;
- unsafe work practices;
- faulty insulation;
- improper grounding;
- loose connections;
- defective parts;
- ground faults in equipment;
- unguarded live parts;
- failure to de-energize electrical equipment when it is being repaired or inspected;
- intentional use of obviously defective and unsafe tools; and
- use of tools or equipment too close to energized parts.

General guidelines for working in proximity to overhead power lines:

- Safe limits of approach distances must be respected.
- If a signaller is required by legislation, a competent signaller must be used to ensure equipment does not get closer than the safe limit of approach distance.
- No one can touch the load or any part of the equipment until the signaller indicates that it's safe to do so.
- Workers on site who are not involved in the work being done near overhead power lines must stay away from equipment when it's being used near overhead power lines. If equipment contacts an energized line, the electricity will travel to the ground and could impact workers.
- Equipment operators must always be aware of the position of their equipment in relation to the overhead lines. They should not depend on safety devices.
- When calculating safe limits of approach, equipment operators should be aware that a long span of power line can rise and fall as temperature changes and that wind-induced swing can also affect safe limits of approach.
- Equipment should not be grounded in the area of a power line.
- The route that a crane or other piece of equipment will follow should be marked out before it is moved.
- When using a tag line to control an elevated load, the tag line should be made of a non-conducting material such as dry rope.
- **10 Metres to Safety:** Stay back at least 10 metres or 33 feet from any downed power line or where there is contact with an overhead power line. Depending on voltage, this distance may increase up to 32 metres or 105 feet.
- **Shuffle or Hop, Do Not Step:** If the machinery you are operating contacts an energized line, move it away from the line to break contact. If this cannot be done, remain on the machine. If there is an uncontrollable fire, jump off the machine keeping your feet together. Never contact the machine and the ground at the same time. Once clear of the machine, shuffle away, never

allowing the heel of one foot to move beyond the toe of the other, or, hop with both feet together to a minimum distance of 10 metres or 33 feet.

- **Do Not Become a Victim:** Always call your local emergency services when someone is injured in an electrical accident. If they are still in contact with the electrical source and you touch them, you could be seriously injured or killed. Keep everyone back, a minimum distance of 10 metres or 33 feet and have someone call for help immediately.

Safe Limit of Approach Distances

If work is done or equipment operated within 7 metres of an energized overhead power line, the employer must contact the Electrical Utility to determine the voltage. The voltage of the line will then determine the safe approach distance for people and equipment. Once safe limits have been set they must be respected. The following limits must be maintained by both people and equipment:

Operating Voltage Between Conductors of Overhead Power Line	Safe Limit of Approach Distance for People and Equipment
0-750 volts (Insulated or polyethylene covered conductors) ⁽¹⁾	300 millimetres
0-750 volts (Bare, uninsulated)	1.0 metre
Above 750 volts (Insulated conductors) ⁽¹⁾⁽²⁾	1.0 metre
750 volts – 40 kilovolts	3.0 metres
69 kilovolts – 72 kilovolts	3.5 metres
138 kilovolts – 144 kilovolts	4.0 metres
230 kilovolts – 260 kilovolts	5.0 metres
500 kilovolts	7.0 metres

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 insulation levels.

If a situation arises where work must be performed at distances less than the safe distance, the employer must notify the Electrical Utility and gain permission and assistance to do the work. In cases like this, power lines might be de-energized, relocated, or isolated.

These safe limits do not apply to loads, buildings, or equipment less than 4.15 metres in height while being transported beneath energized overhead power lines.

Since power lines and wires are the most often contacted types of electrical equipment, very specific clearances have been developed to allow for safe movement underneath them. Contact the Electrical Utility to measure line to ground clearance, to confirm line voltage, and to assist in setting safe limits of approach.

The Electrical Utility may also be helpful when developing the SOP. When developing a SOP, it is very important to determine that these clearances have not been altered over time by new buildings or creative landscaping.

Signallers

The most important consideration in signalling is that the signaller and operator understand each other completely. The signaller as described in Section 191 of the OH&S Code must also:

- wear a bright traffic vest or cuff;
- know all crane and hoist hand signals;
- know the limit of approach distances to overhead power lines;
- be the only person directing the equipment; and
- be totally focused on signalling and not be assigned any other duties when the equipment is near the power lines.

6. Standard Operating Procedure

Electrical utilities must always be considered to be live, with the potential of causing serious injury or death. Contact with electrical equipment such as overhead power lines must be avoided. All University employees must review or complete a SOP prior to any and all activities associated with overhead power lines.

Items to consider in the development of a SOP include:

- step-by-step instructions for the task;
- hazards associated with the task;
- safe work positioning;
- emergency procedures; and
- PPE.

Factors to consider in developing a SOP include:

- scope of work;
- type of hoisting or other equipment that will be required;
- height and reach of the equipment;
- equipment placement;
- equipment and material loading or unloading;
- worker competency;
- soil condition;
- interruptions to electrical services;
- hazard to the public;
- use of ladders, pipe, and other conducting materials;
- need to notify electric utility owner;
- need to communicate all hazards to all workers;
- changing conditions;
- all other hazards present including gases and chemicals;
- emergency response;
- marking the locations of all overhead power lines on drawings and plans;
- posting warning signs;
- using a designated signaller;
- marking the limits of approach on the ground with bright ribbons or ropes.

Emergency Response Plan

The Supervisor is required to complete the Emergency Procedures section of the SOP, including reviewing and updating the SOP post-incident of when changes to the operation are implemented (e.g. new equipment or process is introduced).

7. Definitions

Conductor	A wire, cable or other form of metal capable of conveying electric current from one piece of electrical equipment to another or to the ground.
Electrical Equipment	Overhead electrical lines or buried underground electrical cable.
Electrical Utility	An owner or operator of electrical equipment.
Power Line	Electrical wire or wires.

8. Related Documents

- [Field Level Hazard Assessment \(FLHA\)](#)
- [Hazard Assessment and Control Form \(HACF\)](#)
- [Standard Operating Procedure \(SOP\)](#) (Template in Laboratory Safety Manual)
- [University's Hazard Assessment and Control Procedure](#)

9. References and Additional Resources

- Alberta Occupational Health and Safety Act, Regulation and Code
<http://work.alberta.ca/occupational-health-safety/307.html>
- Alberta Occupational Health and Safety Code Explanation Guide
[OHS Code Explanation Guide 2009 - Alberta Human Services - Government of Alberta](#)
- University of Calgary Occupational Health and Safety Policy
<http://www.ucalgary.ca/policies/files/policies/Occupational%20Health%20and%20Safety%20Policy.pdf>
- EH&S Website
www.ucalgary.ca/safety
- to contact the University's Electrical Utilities Division call Customer Care
[403.220.7555](tel:403.220.7555)

Legislation and Standards

Part 17 of the Alberta OH&S Code outlines safety requirements for work done in proximity to electrical lines. Standards pertaining to overhead power lines referenced in the OH&S Code include:

- Alberta's *Electrical and Communication Utility Code* (ECUC), 2nd Edition, 2002.
- *Commercial Vehicle Dimension and Weight Regulation* (AR 315/2002), Traffic Safety Act.