

FACTS ABOUT ELECTRICAL EFFECTS FROM DIRECT CURRENT TRANSMISSION LINES

In addition to static electric and magnetic fields (EMF), the electric voltage and current present in a Direct Current (DC) transmission line can produce other electrical effects. This information sheet addresses the potential electrical effects of DC transmission lines on farming operations and communications. For more information on EMF and DC transmission lines, please refer to ATCO Electric's information sheet entitled "Facts About Direct Current Electric and Magnetic Fields".

Corona

Under certain conditions, the electric field very close to an energized conductor can be sufficiently concentrated to produce a tiny electric discharge that can ionize air close to the conductors. This partial discharge of energy is called corona.

Because corona contributes to energy losses, transmission lines are designed so that, normally, they do not initiate corona. However, surface irregularities on the conductor i.e. scratches, water droplets, dust and other contaminants, create the conditions that initiate corona. When corona is present on a transmission line, it produces audible noise in the form of a buzzing sound, electromagnetic interference (EMI), sometimes referred to as radio interference, and an increase in the static electric field under the line.

Audible Noise

Transmission facility owners must meet noise limits set by the Alberta Utilities Commission (AUC). These limits must be met when measured at night during fair weather, at the nearest dwelling. If there are no dwellings nearby, the noise limit cannot be exceeded when measured at a distance of 1,500 metres from the transmission facility. In a rural setting, the limit is typically 40 decibels, which is only slightly higher than the typical background level you would expect to find in a rural area.

ATCO Electric's DC transmission line will be designed so that it meets the AUC noise limit at the edge of the right-of-way, about 30 metres from the center of the line structures. Because existing residences will be at least 150 metres from the right-of-way, this should provide added insurance that audible noise from the line will not be a nuisance to local residents.

Communications Interference

The EMI that results from corona has been known to interfere with AM radio and analog television reception, but usually only if you are directly beneath or very close to the transmission line. Modern communication media such as satellite television, FM radio, cellular telephones, wireless internet, and two way radios operate at much higher frequencies (100 to 1000 times higher) and rarely experience interference from EMI.

ATCO Electric observes all Canadian and Alberta electrical codes with respect to communication interference. Industry Canada stipulates that within six months of the line being energized, radio noise levels are to be measured, and that they must fall within set limits. In the rare event that reception problems occur due to our facilities, ATCO Electric works with Industry Canada to make every reasonable effort to correct the interference.

GPS

The GPS used for navigation by farm equipment also operates at high frequencies and should not experience interference from EMI. The fact that GPS service is provided from numerous satellites in operation at any time also makes signal loss very unlikely.

Livestock/Domesticated Animals and Wildlife

The low static electric and magnetic fields produced by DC transmission lines are similar to the naturally occurring static fields in our environment and are not viewed as a health concern for animals.

Bees

Effects on bees have been shown for alternating current (AC) fields but only for field levels higher than those typically found under AC lines. No research appears to have been conducted on the effects on bees from the static fields found under DC lines but there is no reason to believe that such a study would reach a different conclusion.

However, it would be prudent to relocate hives away from the transmission line so they are not impacted by construction activity. ATCO Electric would assist in the relocation.

Continued on page 2

OTHER COMMON QUESTIONS

Is there a height restriction on farm equipment operating under or near a DC transmission line?

The Eastern Alberta DC Transmission Line will be designed so the conductors at their lowest point will allow equipment up to 6.1 metres (about 20 feet) in height to pass safely underneath. If the equipment being operated is equipped with a boom or other moving extremity, the operator must maintain a minimum clearance of 7 metres (about 23 feet) between the energized conductors and the moving extremity of the equipment, at all times.

This clearance applies exclusively to the Eastern Alberta DC Transmission Line. If you are planning to drive or operate equipment under other power lines, please contact your local electric utility office for further information.

If I can hear a buzzing sound while walking underneath the DC line, should I be concerned?

No. The audible noise simply means that corona is present near the conductors. You may perceive a feeling of static build up on your skin or clothing under the line when corona is present. This is no different than what you may experience after walking across a carpet. Normally, the static charge dissipates through your contact with the ground but it is possible that, if you touched a grounded metal object, you might experience a slightly annoying, but harmless, “carpet shock”. The potential to acquire a static charge from a DC line quickly diminishes as you move away from the line and is negligible by the time you reach the edge of the right-of-way.

Do I need to ground metal objects under the DC line?

Unlike AC lines, DC lines do not induce small electric currents in metal objects like granaries, fences and watering systems. However, it is still prudent to ground large or long parallel metal objects if they are under or very close to DC lines. This will prevent a harmless but potentially annoying build up of static charge, particularly during a long dry spell. ATCO Electric can assist you with installing appropriate grounds.

Is it safe to drive or park a vehicle near a line?

Most vehicles today are well grounded because their tires are made of semi-conducting carbon black. A mild static charge can build up on a vehicle with old rubber tires because they generally do not allow the static to discharge to the ground. Such charges can be annoying, but are harmless. If your vehicle tends to develop such a charge, it can be grounded by attaching a chain that is long enough to touch the ground.

Is it safe to refuel a vehicle under a transmission line?

The chance of ignition by a static spark induced by a transmission line while refuelling is remote. However, the risk can increase under certain conditions (including hot, still weather, a well insulated vehicle and the right mixture and concentration of fuel and air). As a precaution, avoid refuelling your vehicle under a transmission line. If you have no choice, we recommend using a plastic gasoline container.

Can the magnetic field under the DC line affect cardiac pacemakers or other implanted medical devices?

The International Committee on Non-Ionizing Radiation Protection (ICNIRP) recommends that those who rely on such devices avoid static magnetic field levels greater than 5,000 milligauss. This is more than five times the value of the DC line’s magnetic field under the line (approximately 350 milligauss) and the Earth’s natural magnetic field (570 milligauss) combined.

Will my property be endangered in a lightning storm?

Transmission lines do not attract electrical storms or change their pattern. In rural areas, the overhead shield wires of a transmission line are often struck by lightning from passing storms because they are the highest objects around. In this case, the line actually acts as a shield for nearby trees and buildings. The shield wires and the structures are well grounded and designed to direct the lightning energy safely to the earth in the same way a lightning rod on a house does.

How far from the DC line do electrical effects persist?

Like static electric and magnetic field levels, the electrical effects from corona (audible noise, EMI) drop off rapidly as you move away from the line and are almost negligible outside the right-of-way.



Contact Us

Your comments and concerns are important to us. Please contact us at:

HVDC Project

ATCO Electric
10035-105 Street
Edmonton, AB T5J 2V6

Telephone toll-free: 1-866-650-2463

Fax: 780-420-3666

Email: HVDC@atcoelectric.com

Website: www.atcoelectric.com