

May 6, 2014

To: All HQ Directors: Operations, Planning & Major Projects
All Regional Directors
All District Managers, Transportation
All Electrical Engineering Staff
All Managers, Electrical Services

Subject: Update to the Ministry of Transportation and Highways Utility Policy Manual (1995)

Purpose:

To clarify the offset requirements for overhead high voltage transmission lines up to and including 287 kV (phase to phase) along highways. This circular supplements the Ministry's Overhead Power and Communications Line policy contained in Chapter 10 of the Ministry's Utility Policy Manual.

Background:

The Ministry's Utility Policy Manual (1995), Chapter 10, defines policy for overhead power and communication lines along highways. Clause 1 of the Policy section states that the Ministry generally does not permit overhead transmission lines of voltages at or above 60 kV phase to phase within highway right-of-way due, in part, to electrical interference caused by high voltage transmission lines. The Ministry has commissioned and accepted two reports: *Review of Overhead Transmission Lines in Highway Right-of-Ways (2001)* which addresses 69 kV and 138 kV and *The Effects of High Voltage Transmission Lines in Proximity of Highways (2005)* which addresses 230 kV and 287 kV. These reports conclude that transmission lines up to and including 287 kV phase to phase could be accommodated within highway right-of-way provided clearance requirements are met.

Discussion:

High voltage transmission lines cause corona discharge, radio interference and audio noise through generation of electric and magnetic fields. The impact of these effects is proportional to the voltage level and the distance to the transmission line. In order to reduce these effects to acceptable levels, transmission lines must be located sufficient distance from the highway.

As the electrical interference is caused by the conductor running between supporting structures, it is the distance from the conductor to the highway that is the main consideration. The conductor will move, or swing, when subjected to wind load and the amount it swings is dependent on the design of the transmission line. Factors determining the amount of conductor swing include span between structures, conductor sag, and conductor type. The design of the supporting structure will also impact the clearance distance. Due to these design variances, it is not possible to specify a clearance distance between a transmission line structure and a highway based upon voltage alone.

Guidelines:

Clearance distances for transmission lines in proximity to highways must be calculated on a case-by-case basis. The Ministry's *Utility Policy Manual* and highway design guidelines shall take precedence when determining the location of any transmission line structure.

High voltage transmission lines in proximity to highways must be in compliance with:

- BC Hydro Transmission Engineering standard ES 41-K 3.3 R2 (2013) *Electric and Magnetic Fields, Section 3.3.*
- BC Hydro Transmission Engineering Standard ES41K1.1 R-2 *Electrical Clearances for Overhead Transmission Lines.*
- BC Hydro Transmission Engineering Standard E41-C *Right of Way Dimensions for New Overhead Transmission Lines.*
- BC Hydro Transmission Engineering Standard ES 41-K, Section 4.1, *Transmission Line Radio Interference.*

Where clearances stated in the Ministry's design standards and BC Hydro's transmission engineering standards differ, the greater clearance shall be used.


Policy:

In addition to fulfilling all other requirements of the Ministry of Transportation & Infrastructure District permitting process, transmission lines with voltages up to and including 287 kV phase to phase may be accommodated within highway right-of-way provided:

1. The transmission line structures are installed with clearance distances based upon the criteria stated in this technical circular.
2. Compliance with the engineering standards listed is confirmed by an Engineer of Record experienced in high voltage transmission line design.
3. The installation has been approved by the Ministry of Transportation & Infrastructure Regional Director in consultation with the Chief Engineer.

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