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LETTER L-35-11

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VIA E-MAIL
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April 27, 2011

Ms. Janet Fraser
Chief Regulatory Officer
British Columbia Hydro and Power Authority
17th Floor, 333 Dunsmuir Street
Vancouver, B.C. V6B 5R3

Dear Ms. Fraser:

Re: British Columbia Utilities Commission (Commission)
Directives to British Columbia Hydro and Power Authority (BC Hydro)
in Letter L-60-10 originating from
Order G-54-09 Mission/Stave Falls Power Surge Event

The Commission began research into power surges after receiving a complaint from the Squamish-Lillooet Regional District (SLRD) regarding a power surge[1] that occurred on November 15, 2007 in the Goldbridge and Gun Lake Areas. [Appendix A]

During its research, the Commission reviewed an IEEE paper[2] (Mansoor & Martzloff, 1998). The paper discusses events that occur when the conductors of the higher voltage distribution system or sub-transmission system come into contact with conductors of the lower voltage distribution system and cause extreme temporary overvoltages (ETOVs) as a result of this commingling scenario. The Commission refers to this condition of commingling of transmission and distribution voltage as ETOVs rather than using BC Hydro's term of temporary overvoltages (TOVs) which is generally used to describe overvoltages produced by lightning discharges and switching surges. As BC Hydro has stated, some of the causes of conductor contact that result in commingling are: vegetation maintenance, snow/ice jump, galloping (wind), motor vehicle collision, tree contact, or 60 kV equipment failures.

Since the SLRD power surge, BC Hydro's customers affected by ETOVs have filed complaints with the Commission regarding customer equipment damage as a result of ETOVs occurring on the distribution system with the most recent incident being in New Denver.[3]

This letter addresses the issue of ETOVs, reviews past directives and BC Hydro's business case for the installation of Station Class surge arresters (SCSAs) on the distribution system, and also provides a background to the evolution of the solutions being discussed. This letter also provides additional directives to BC Hydro to conduct further investigation particularly with respect to the impact of an additional reclose after an ETOV.

BC Hydro's recommendation in the business case is to use SCSAs instead of Distribution Class surge arresters (DCSAs) on the impacted distribution systems. Surge Arresters are protective devices designed primarily for connection between a conductor of an electrical system and ground to limit the magnitude of transient overvoltages on equipment and to divert

1 BC Hydro File No.07-1349
2 Mansoor, A., and Martzloff, F.D. " The Dilemma of Surge Protection vs. Overvoltage Scenarios: Implications for Low-Voltage Surge-Protective Devices " Paper from Proceedings, 8th Annual Conference on Harmonics and Quality of Power, Athens, October 1998.
3 BCUC Log #35612 and other are listed in BC Hydro's business case, page 7.

energy surges into ground. The difference between SCSAs and DCSAs is in the event the energy surge exceeds the rating of the SCSA, the SCSA will sacrifice itself by failing in short circuit mode while DCSAs may disconnect (isolate from ground) from the distribution system when overloaded or be destroyed by the energy surge. Also, SCSAs operate first when compared to DCSAs thereby limiting the energy surge sooner and reducing the damage.

The Commission accepts BC Hydro's business case for alternative 4 which is the installation of SCSAs over five years. This alternative will substantially but not entirely mitigate the damage caused by ETOVs.

Order G-54-09

On January 5, 2009, the Commission received several complaints regarding a power outage and power surge (over-voltage event) in the Stave Falls area that affected 775 customers. Of these customers, approximately 140 customers were severely impacted. As a result, the Commission issued several information requests to BC Hydro. On May 21, 2009 the Commission issued Order G-54-09. Directive 6 of this Order asked BC Hydro to provide a report on the effectiveness of its sacrificial surge arrester program [Business Case, Appendix C], by no later than May 1, 2010. On May 5, 2010, BC Hydro submitted its Surge Arrester Report and on May 28, 2010, BC Hydro submitted its response to the Commission's letter of May 14, 2010 requesting further information with regard to the Surge Arrestor Report filed by BC Hydro on May 5, 2010. In BC Hydro's report on the effectiveness of its sacrificial surge arrester program, BC Hydro recommended the installation of SCSAs on all under-built circuits and making customers aware of the need to fit surge-protected power bars to protect their sensitive electronic devices. [Business Case, Appendix C]

During this investigative and review process, other BC Hydro customers in Lake Cowichan, Nakusp and New Denver experienced similar ETOVs that caused damage to customers equipment, destroying surge protectors and leaving burn marks.

Letter L-60-10

On August 17, 2010, by letter L-60-10, the Commission directed BC Hydro to submit a mitigation plan dealing with the risk to its customers from future incidents involving transmission lines with distribution underbuild and addressing the following four areas:

1. The use of recloser pulse-closing technology on distribution underbuild to further mitigate the impact of power surges.

2. The separation of the primary distribution neutral and customers' secondary neutral in multi-neutral grounded electrical systems as permitted by the National Electrical Safety Code (NESC) to further mitigate the impact of power surges as a result of recloser operation onto a shorted station class surge arrester.

3. The resolution with British Columbia Safety Authority (BCSA), Underwriters Laboratories of Canada (ULC) and Canadian Standards Association (CSA) of the safe application of the impending CSA standard for whole-house residential surge suppressors (similar to UL 1449, 3rd edition) and a plan of how it intends to communicate this information to its customers.

4. The resolution with the BCSA and the Office of the Fire Commissioner for British Columbia of the issue of the hard-wired residential smoke alarm functionally after a power surge of this type.

On November 16, 2010, BC Hydro filed its response to Letter L-60-10 and included a business case.

The Commission will now address:

- **BC Hydro's response to letter L-60-10.**
- **The letter from BC Hydro and FortisBC to the other regulatory bodies mentioned in directives 3 and 4.**
- **The CSA response to the letters from BC Hydro and FortisBC.**
- **The mitigation plan (BC Hydro's Business Case) submitted by BC Hydro.**

L-60-10, DIRECTIVE 1 – RECLOSER TECHNOLOGY AND OPERATING ORDERS

In response to directive 1, BC Hydro stated "At this point, to the best of BC Hydro's knowledge, the technology is only available at distribution voltage classes, up to 27kV. BC Hydro is not aware of similar pulse-closing technologies for application on the transmission system." The Commission acknowledges the technology has not progressed to the transmission voltage level but still has concerns regarding the potential for additional damage to be caused if BC Hydro attempts to reclose the circuit at the transmission level. The reclose issue will be discussed further under Directive 2.

The Commission has reviewed and accepts BC Hydro's response on the availability of pulse-closing technologies for application on the transmission system with the caveat on reclosing as further discussed in BC Hydro's response to directive 2.

L-60-10, DIRECTIVE 2 – NEUTRAL SEPARATION AND RECLOSING

In response to the directive 2, BC Hydro stated that the BC Hydro distribution standards and British Columbia's adoption of the Canadian Electrical Code call for the interconnection of the BC Hydro's system neutral and the customer's neutral. BC Hydro stated separation of the customer neutral would not mitigate the damage due to recloser operation onto a shorted station class arrester. Moreover, BC Hydro stated the ground potential rise (GPR) due to transmission recloser operation into a shorted arrester is not significant while acknowledging that the GPR issue has not been studied in detail.

As BC Hydro stated the separation of the customers' neutral from the BC Hydro system neutral is not a generally accepted practice and the Commission finds that no further action in regard to the separation of the neutrals is required at this time.

On the subject of automatic reclose, BC Hydro stated "Reclosing 60 kV lines (automatic or supervisory) can introduce a second and potentially third [temporary] overvoltage [or ETOV] into distribution lines in cases where a permanent contact between transmission and distribution lines exists" and as "BC Hydro is studying the matter to see if the situations in which reclose attempts should be limited can be more closely defined. BC Hydro expects that revising its 60kV reclosing procedures will achieve some measure of enhanced mitigation in power surge situations to complement its other mitigation programs." Also, BC Hydro filed operating order 1T-29A relating to the transmission system governing automatic, supervisory, and manual reclose procedures and is considering amending 1T-29A to limit reclosing to only one reclose attempt for those circuits having 60 kV circuits with poles containing distribution underbuild. Because BC Hydro may be attempting to reclose into a fault, the Commission has serious concerns in permitting a reclose attempt without the knowledge that the cause of the fault has been removed thereby permitting a second power surge or ETOV to occur.

As SCSAs will not completely eliminate the risk of ETOVs, the Commission reviewed the following statements by BC Hydro and still has concerns related to the continued use of an automatic reclose since BC Hydro is considering amending 1T-29A to limit reclosing to only one reclose attempt for those circuits having 60 kV circuits with poles containing distribution underbuild because of the impact of risk of an additional ETOV on the customers. For example, in the business case BC Hydro stated:

> "For temporary type faults between transmission and distribution conductors (e.g., galloping conductors, falling branches) customers would experience only one TOV event for the original contact. For permanent type faults, (i.e. tree on lines) customers will usually be exposed to more than one TOV as they will experience a TOV from the original contact, an automatic reclose as programmed into the protection device, and often a supervisory reclose as given by an operator at the Control Centre. BC Hydro is reviewing and revising its practice regarding reclosing on 60 kV circuits with distribution underbuild to limit the number of reclosing operations and thereby reduce the impacts of TOV." [BC Hydro January 14, 2011 Business Case, p. 4], and
>
> "Station Class surge arresters do not have this self-disconnect mechanism [found in Distribution Class surge arresters]; therefore a [Station Class] failed [surge] arrester will continue to provide a low-impedance path to ground and protect the circuit from further [E]TOV events. Reclose attempts will not be successful until the arrester is manually disconnected from the line." [BC Hydro January 14, 2011 Business Case, p. 5]

Because of the risk of further damage to both the customers' and BC Hydro's equipment, the Commission directs BC Hydro perform a risk analysis and cost-benefit analysis to show the benefit of allowing one reclose operation versus no reclose operation for those circuits having 60 kV circuits with utility power poles containing distribution underbuild before the Commission accepts the one reclose operation attempt.

L-60-10, DIRECTIVES 3 AND 4

On November 1, 2010 BC Hydro and FortisBC issued letters to British Columbia Safety Authority, Underwriters Laboratories of Canada, Canadian Standards Association (CSA) and Office of the Fire Commissioner for British Columbia, with copies to the Commission, advising these other regulatory bodies that even though the Commission directed them to participate in the resolution of these matters, BC Hydro and FortisBC are unable to participate as such a resolution would involve equipment installed past the Point of Delivery. However, both FortisBC and BC Hydro advised that they encouraged communication and development of surge suppressors and appropriate standards for both surge suppressors and hard-wired smoke alarm functionality and were willing to provide any aggregate data or statistics that may be required to assist in the development and implementation.

CSA Response

On November 22, 2010 the Commission received a copy of letter addressed to BC Hydro and FortisBC from the CSA stating "it would be particularly helpful if data was provided by BC Hydro and FortisBC regarding the magnitude of surge originating from transmission lines with underbuilt distribution circuits that can reasonably be expected at the customer service entrance" and that "Such data would be helpful in the development of guidance regarding the safe application of whole house surge protection devices."[4]

Extreme temporary overvoltages (ETOVs) originate on the BC Hydro's side of the Point of Delivery. The Commission determines that the safety, convenience or service of the public is impacted by the safe application of surge protection devices and functional operation of smoke alarms, both during and after an ETOV.[5] The Commission views the request by CSA as reasonable and directs BC Hydro to supply the information (data only), to the extent it is available, as may be requested by CSA and other regulatory authorities to address these concerns.

BC HYDRO BUSINESS CASE

On January 14, 2011 BC Hydro, in response to the directives contained in BCUC Letter L-60-10 dated August 17, 2010, filed its business case with respect to overvoltage mitigation for events [or ETOVs] caused by contact between transmission and distribution conductors. BC Hydro states the practice of installing distribution underbuild on 60 kV transmission lines is common within the BC Hydro service area and this construction method carries with it the possibility that the two circuits can contact each other during events such as a motor vehicle accident, a tree falling on the line, conductor sag caused by thermal loading, or an accumulation of snow and ice on the wires. BC Hydro describes these events as introducing temporary overvoltages (TOVs) on the distribution system that may impact BC Hydro's customers.

The Commission accepts that most of the conditions that may lead to ETOVs are weather related and beyond the control of BC Hydro but the Commission requests BC Hydro to review its Edge Tree Program [6] in respect to vegetation management and how transmission lines with underbuilt distribution lines are dealt with in this program.

In the business case on page 5, BC Hydro discussed the safety risks that occur during an ETOV. These safety risks not only involve potential damage to customer equipment but present a safety hazard to distribution line crews since the level of protection provided by distribution voltage rated tools may be exceeded. This statement by BC Hydro substantiates the Commission's efforts to resolve the safety risks presented by these ETOVs.

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4 A repository of Surge Protection information can be found at website http://www.eeel.nist.gov/817/pubs/spd-anthology/index.html.

5 Section 23 of the Act addresses customer safety.

6 This program proactively identifies and removes hazard trees growing near the rights-of-way that are at risk for falling into the lines or entering into a line's limits of approach.

Based on the evaluation of the alternatives, the BC Hydro business case recommended that SCSAs be installed on distribution circuits that are underbuilt on transmission lines in coordination with planned transmission line refurbishment and maintenance over the next five years (Alternative 4). This coordination of the installation of SCSAs with planned transmission refurbishment is expected to result in a 20 per cent reduction in program costs when compared to the installation of SCSAs in isolation.

In the Summary of the Analysis of the alternatives in the business case, BC Hydro presented the following table:

Objective	Criteria	Measures (unit)	Alt. 1 – Do Nothing	Alt. 2 – Station-Class surge arresters	Alt. 3 – Distribution-Class surge arresters	Alt. 4 – Station class arrester & other work	Alt. 5 – Exclusive Pole Lines
Cost	Total Capital and OMA	PV ($)	$2.20 M	$2.91 M	$3.45 M	$2.24 M	$133.6 M
Safety	Public – potential injury due to failed equipment	1-6 scale, 1 is best, based on BCH risk matrix	4	2	3	2	1
Reputation	BCH loss of reputation for managing responsibilities well	1-6 scale, 1 is best, based on BCH risk matrix	5	2	2	2	3
Environment	Disturbed Land	Relative	Low	Low	Low	Low	High
	GHG emissions from vehicles	Relative	Low	Low	Moderate - Low	Low	High

Legend:

- Relatively EQUAL to recommended alternative
- Relatively BETTER than recommended alternative
- Relatively WORSE than recommended alternative

BC Hydro recommended that Alternative 4, installation of Station Class surge arresters over five years coordinated with other planned transmission capital and maintenance work, be adopted. Specifically, the planned maintenance and upgrade programs would be reprioritized so that lines with potential transmission to distribution line contacts are upgraded first thereby correcting any clearance issues and at the same time installing surge arresters where deemed to still be required.

In the business case, BC Hydro provided discussion pertaining to each alternative. BC Hydro discussed each of the following alternates using major benefits, major drawbacks, risks (project, safety, and reputation), and financial costs as a basis for the comparison:

Alternative 1: Do nothing and maintain the status quo

"Safety Risk: In the event that a TOV occurs while a worker is in contact with the distribution line or a customer is in contact with an impacted piece of equipment, injuries with a consequence severity of S5 [fatality] could occur. However, it is judged that the frequency of such an occurrence is low at an L4 level [at least once every thousand years], resulting in a safety risk of four (moderate-high) using the BC Hydro Corporate Risk Matrix (see Appendix B)."

Alternative 2: Install Station Class surge arresters over next two years

"Safety Risk: The installation of Station Class surge arresters would reduce the consequence severity from S5 [fatality for a worker to permanent disability for the public] to S3 [temporary disability for a worker to treatment by a medical professional for the public] reducing the residual inherent safety risk to two (low) as compared to four in Alternative 1."

Alternative 3: Install Additional Distribution Class surge arresters

"Safety Risk: The installation of Distribution Class arresters will mitigate impacts of some TOV events, but the disconnect feature of the arresters may also leave some circuits unprotected. This makes this alternative better than Alternative 1, but

not as good as Alternative 2. The consequence severity is judged to be S4 [permanent disability for the worker to temporary disability for the public] resulting in a residual safety risk of three (moderate) when compared with Alternative 1 (see Appendix B)."

Alternative 4: Install Station Class surge arresters coordinated with other planned work

"Safety Risk: The residual safety risk of this option would be similar to Alternative 2."

Alternative 5: Relocate the underbuild to new distribution pole lines

"Safety Risk: Separation of the lines would all but eliminate the potential of line contact reducing the frequency of occurrence to L0 [less than once every 1,000,000 years] with a corresponding reduction of the safety risk to one (low) [first aid for a worker to a near miss for the public] from four [permanent disability for the worker to temporary disability for the public] when compared with Alternative 1 (see Appendix B)."

As alternative 5 involves physically separating the transmission and distribution lines by building exclusive pole lines for the distribution line, and as occasional underbuild on transmission poles would still be required for line crossings in order to serve customers.

FINDINGS ON ALTERNATIVES

As the Commission's initial interest is safety, the Commission evaluated the five alternatives initially for safety before considering the other benefits, drawbacks, risks, and cost.

As alternative 1 has a consequence severity of S5 the Commission eliminated alternative 1 since the safety aspect is unsatisfactory.

In alternative 5, while the likelihood of contact is extremely low, it still exists at the crossings. The Commission concludes that without the SCSAs installed in alternative 5, the consequence severity risk is still S5 and the safety aspect is unsatisfactory. As consequence, the severity risk is still S5 [fatality for a worker to permanent disability for the public] and the Commission eliminated this alternative because of the consequence severity risk and its high cost; the Commission suggests that BC Hydro further examine the treatment of crossing of transmission lines and distribution lines.

Alternative 3 involves the installation of self-disconnecting Distribution Class surge arresters at strategic points along the circuit. This alternative requires every affected district having underbuilt to perform regularly planned inspections on all Distribution Class surge arresters to check for failures caused by ETOVs so that protection is maintained. Distribution Class arresters are not designed to mitigate transmission induced ETOVs and will be subject to failures. As protection would be needed against the initial contact, the automatic reclose and any supervisory reclose on the 60 kV circuits, there is still a possibility of ETOVs under this option. The Commission concludes alternative 3 does not provide the safety level required and permits an inferior safety outcome when compared to alternatives 2 and 4.

Alternatives 2 and 4 have the same safety risk and the consequence severity is identified as S3 [temporary disability for a worker to treatment by a medical professional for the public]. Because of this, the Commission finds alternatives 2 and 4 provide the greatest level of satisfactory safety but remains concerned about allowing BC Hydro to initiate a reclose attempt that could increase the frequency of occurrence, may raise the consequence severity risk level and may cause even more equipment damage. The Commission notes that the Business Case discussion of safety risks did not involve damage to the equipment of either BC Hydro or its customers.

FURTHER INFORMATION ON ALTERNATIVES 2 AND 4

In the business case, under alternative 4, BC Hydro stated:

- This alternative would take up to five years to implement, however the work will be prioritized so that all lines that have experienced recent incidents or are otherwise considered to be higher risk will be addressed over the next

two years.

- The non-self disconnecting characteristic of a Station Class arrester would result in more permanent outages as a result of temporary overvoltage (TOV) incidents, with a slightly smaller impact on reliability since fewer arresters would be installed.
- The upgrade work will also consider design innovations such as the installation of phase spacers where appropriate to maintain line separation.
- This alternative will help to mitigate the impact of TOVs, but will not completely eliminate the risk of transmission to distribution line contacts.

In evaluating alternatives 2 and 4, the Commission sought additional information from BC Hydro. On March 3, 2011 BC Hydro responded to the Commission's request. BC Hydro's response identified several issues:

1. BC Hydro believes that alternative 2 is not a thorough and robust solution to the problem and hence is not recommending this option:
2. Some of the work on transmission infrastructure such as increasing the clearances between distribution and transmission lines would eliminate temporary overvoltages caused by galloping conductors and thus avoid customer outages that could occur with the installation of SCSAs only; and
3. Installation of SCSAs on some transmission structures may not be feasible without analysis of physical clearances, maintainability and structure asset health to ensure mobilization costs are optimized.

FURTHER FINDINGS ON ALTERNATES 2 AND 4

The Commission carefully considered the responses by BC Hydro and believes that there may be important lessons learned during implementation which could easily be adapted into the alternative 4 solution and not so easily learned or adapted into the alternative 2 solution. The Commission is aware that alternatives 2 and 4 (the installation of SCSAs) represent only a partial solution to ETOVs and the ultimate solution has not been achieved under either.

The Commission recognizes that Alternative 4 - Installation of Station-Class surge arresters coordinated with transmission line refurbishment and maintenance over the next 5 years had a PV cost (over 30 years) of $2.24 million and that installation of SCSAs may only the first step in addressing the ETOV issue but as the incremental PV cost is only $40,000 over doing nothing, the Commission accepts that this cost is acceptable. The Commission considered the two year alternative 2 and the five year alternative 4 and finds alternative 4 to be more acceptable. As BC Hydro stated, it is "a more thorough and robust solution to the problem" and the Commission recognizes the longer term approach will allow for lessons learned to be implemented. Considering the necessity for lessons learned during the implementation of alternative 4, the Commission concludes BC Hydro's recommendation that Alternative 4 - installation of Station Class surge arresters be adopted.

SUMMARY OF COMMISSION'S FINDINGS

The Commission has reviewed the BC Hydro responses and business cases and finds:

- the business case – alternative 4 is accepted;
- BC Hydro is directed to provide information to other regulatory agencies and standards associations as required;
- BC Hydro is directed to review its edge tree program and advise the Commission if any changes are required;
- BC Hydro is directed to perform a cost benefit and risk analysis allowing one-reclose attempt as opposed to a no-reclose attempt, and
- BC Hydro is directed provide annual status program reports, ETOV reports on converted lines, and on-going reports on system ETOVs.

- BC Hydro is to further examine the treatment of crossing of transmission lines and distribution lines; and

- No further action is required by BC Hydro on separation of the primary distribution neutral and customers' secondary neutral at this time.

COMMISSION DIRECTIVES

Now, the Commission directs BC Hydro to:

1. Perform a risk analysis and cost-benefit analysis to show the benefit of allowing one reclose operation versus no reclose operation for those circuits having 60 kV circuits with poles containing distribution underbuild before the Commission accepts the one reclose operation and file an analysis report with the Commission within 45 days of the date of this letter. The analysis shall include worker safety, public safety, damage to BC Hydro equipment and damage to customers' equipment.
2. Review Edge Tree Program (ETP) for any changes that could be implemented in the ETP for those circuits having 60 kV circuits with poles containing distribution underbuild that would reduce the number of these power surges and file a report on any changes made to the ETP with the Commission within 30 days of the date of this letter.
3. Examine the treatment of crossing of transmission lines and distribution lines and file a report recommending any corrective action with the Commission within 90 days of the date of this letter.
4. Provide information (data) that may be requested by CSA as well as any information that may be requested by the other regulatory authorities for the safe application of the impending CSA standard for whole-house residential surge suppressors (similar to UL 1449, 3rd edition) and file copies of the information supplied with the Commission. The information should be supplied within 30 days of the date of the request.
5. Report annually on how many kilometers of transmission line have been completed with SCSAs installed since the last report and how many more kilometers of transmission line remain.
6. Report on:
    a. ETOVs on lines that have been remediated under Business Case - alternative 4 to be reported immediately upon occurrence.
    b. ETOVs on lines that have not been remediated under Business Case - alternative 4 to be included in the annual report.
    c. ETOVs as presently being reported.
7. Notify customers affected by ETOVs in the business case as well as those in the recent New Denver ETOV of the intended corrective actions within 30 days of the date of this letter and place the business case and letter on its website.

Yours truly,

Erica M. Hamilton

DJF/cms

Enclosures:

1. Order G-54-09 BC Hydro Mission Power Outage

Microsoft Office Word
97 - 2003 Document

2. Order G-62-09

Microsoft Office Word
97 - 2003 Document

3. Letter L-60-10 BC Hydro 2010 Mission-Stave Falls Power Surge

Microsoft Office Word
97 - 2003 Document

4. 2010_11_01 BC Hydro & FortisBC Letter to BCSA re: D_4

Adobe Acrobat
Document

5. 2010_11_01 BC Hydro & FortisBC Letter to BCSA re: D_5

Adobe Acrobat
Document

6. 2010_11_22 CSA Letter to BC Hydro & FortisBC

Adobe Acrobat
Document

7. 2010_11-16 BCH response to BCUC L-60-10

Adobe Acrobat
Document

8. 2011_01-14_BCH Reporting Forced Outage January 2009 Power Surge Report

Adobe Acrobat
Document

9. Article on New Denver ETOV, page 6, BC Hydro denies fault in power surge, provides some compensation by Jan McMurray

ValleyVoice11032
3.pdf

cc: BC Safety Authority,
Attention: Stephen Hinde,
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THE SLRD COMPLAINT

In the complaint, the SLRD stated "It is clear that this overvoltage incident gave rise to an extremely dangerous situation and it is fortunate that there were no fires and no one was injured as a result. BC Hydro could not determine the cause and make no assurance whatsoever that it won't happen again. Pursuant to section 25 of the Act, we submit that the service of this public utility- was and is unreasonable, unsafe, and inadequate and that the Commission must therefore:

(a) Determine what is reasonable, safe, adequate and fair service, and

(b) Order the utility to provide it."

The SLRD stated:

- the ETOVs damaged or destroyed virtually any electrical appliance connected to the system at the time;
- A residential electrical panel was observed to be smoking and surge protectors [7] were rendered useless, leaving a burn on carpeting in at least one instance;
- This overvoltage (ETOV) incident gave rise to an extremely dangerous situation and it is fortunate that there were no fires and no one was injured as a result.

Also the SLRD stated "While the Fault Analysis Report and other readily available information, such as the operational policies found on the BCTC website, is highly technical in nature and beyond a layman's ability to thoroughly understand, there are indications in the materials that suggest non-compliance with operational policies in the re-energizing of power in Goldbridge and Gun Lake on the subject date." and requested "… that the Commission appoint, at the expense of BC Hydro, an independent expert to undertake a thorough analysis of this overvoltage incident and to report his or her findings to the Commission for dissemination to the Complainant and all affected parties."

On May 22, 2009 BC Hydro responded to further requests by the SLRD and Commission stating "The BC Hydro report from that incident [Mission/Stave Falls overvoltage] recommended the installation of sacrificial surge arrestors on under-built circuits as an option to provide over-voltage protection, and BC Hydro is reviewing this recommendation."

Order G-62-09

On May 28, 2009, the Commission, in Order G-62-09, advised the SLRD that it could not issue an order directing BC Hydro to compensate either the SLRD or the affected BC Hydro customers in Goldbridge and Gun Lake for their damages. The Commission determined the probable cause of the ETOV in Goldbridge and Gun Lake was conductors experiencing wind slap or BC Hydro reclosing operations on the system. Nevertheless, considering the overlapping ETOV events involving Stave Falls, and Goldbridge and Gun Lake, the Commission continued the ETOV investigation and its review under Order G-54-09 for the Stave Falls area ETOV.

[7] A repository of Surge Protection information can be found at website: http://www.eeel.nist.gov/817/pubs/spd-anthology/index.html.