

# Fire Chiefs' Association of B.C. / BC Hydro Task Force

## Mutual Response to Downed Power Lines Report





December 1, 2009

**To: Fire Services in British Columbia**

**Re: Fire Chiefs' Association of B.C. / BC Hydro Task Force:  
Mutual Response to Downed Power Lines Report**

This report provides background and recommendations from the Fire Chiefs' Association of B.C. / BC Hydro Task Force that was formed out of a common interest in improving the response to downed power lines during extreme storm events.

The purpose of the report is to outline actions to improve education, communication, coordination, and operations in order to reduce risk to public safety when the resources of both the Fire Services and BC Hydro are overwhelmed.

This final report includes updates to both information and recommendations that are the result of work that has proceeded in the period since the draft report was first created in 2008. Progress made in addressing some of the recommendations is summarized in a document ('Status of Progress on Recommendations') that accompanies this report.

If you have any questions or concerns, please contact us.

Sincerely yours,



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## Executive Summary

In recent years, major winter storm events have occurred with increasing frequency and impact. In the winter of 2006/2007, more than 500 electrical distribution circuits were impacted, exhausting the capacities of both Fire Service and BC Hydro crews to respond effectively to mitigate hazards to public safety associated with downed power lines. These storms brought to the forefront the need to strengthen the partnership between BC Hydro and the Fire Chiefs' Association of B.C.

In March 2007, a Task Force was formed with representatives from the Fire Chiefs' Association of B.C. and BC Hydro. The ultimate objective was to develop an action plan to further improve each organization's preparedness for and response to severe storm events involving downed power lines. These actions will necessarily also assist preparedness and response to less extreme storm events.

To identify solutions to minimize the interactions between the general public and downed power lines that could lead to serious injury or fatality during a severe storm event, the Task Force developed recommendations in the areas of:

1. Education and awareness;
2. Communications and coordination;
3. Operations; and
4. Finances and Legal.

The recommendations outlined below are discussed in more detail in the body of this report.

### Education and Awareness

1. Firefighters should **NEVER** attempt to move or come within 10 metres (33 feet) of a downed power line until an authorized member of the local power authority has confirmed that the line is safe.
2. Increased messaging to the public by BC Hydro and Fire Departments on the hazards associated with downed power lines, limits of approach, proper generator use, and emergency preparedness, should occur in advance of the storm season. Additional information is available through BC Hydro's Public Safety website (<http://www.bchydro.com/safety/>), and BC Hydro can assist the Fire Service in providing appropriate messaging. BC Hydro should continue to explore opportunities to partner with the Fire Service to provide public safety messaging to communities.
3. All Firefighter Training Officers should take the train-the-trainer workshops on electrical safety that are offered free-of-charge by BC Hydro and delivered by the

Electrical Industry Training Institute (EITI). These workshops will enable them to provide electrical safety training to their departments and better integrate electrical safety messaging in core training programs.

4. Fire departments should continue to explore safe alternatives to traditional response procedures under circumstances where electrical hazards are present. For example, during a motor vehicle accident where it is difficult to determine if a victim is injured inside the vehicle, first responders could use the fire truck's ladder to get a better look inside the vehicle rather than approaching the potentially hazardous area on foot.

### **Communications and Coordination**

5. BC Hydro should continue to improve the call handling capacity (including automatic call handling) of the POWERON call system.
6. BC Hydro should develop and implement a web-based electronic interface for communication of non-critical information (i.e., status reports) accessible by First Responders Dispatchers [Primary Service Answering Points (PSAPs) and Secondary Service Answering Points (SSAPs)].
7. BC Hydro should create an additional 'life or death only' phone line to call in the event that the existing dedicated first responder line is overloaded. Discretion should be applied in use of the high-priority phone lines to avoid overloading. Using faxes to share relevant information with the BC Hydro Restoration Centre is also encouraged.
8. With more experience gained, BC Hydro and Fire Service representatives should conduct a risk-ranking workshop to further refine their understanding of their risk tolerance and ranking methodology during extreme events. This would test and further refine the Task Force's ranking matrix under various scenarios.

### **Operations**

9. BC Hydro should explore having 'Utility Identification Responders' who could assess downed wires when they are not likely to be energized (i.e., telephone or cable lines). These responders could determine whether or not a downed wire is indeed a power line and the appropriate priority could be assigned to the response.
10. Local Governments should explore the possibility of engaging a force of non-traditional responders to maintain limits of approach and provide traffic control at downed power lines to relieve firefighters and BC Hydro crews during extreme storm events. These non-traditional responders should receive training on the appropriate measures required to effectively protect themselves and the public from the electrical hazard.

11. Fire departments should conduct the triage exercise to in order to compare and contrast policies for managing high call volume and for determining how many calls can be managed until traditional fire department resources are depleted (see Appendix A).
12. Fire departments should develop contingency planning for extreme storm events that are likely to tax the capacity and resources of the departments to respond effectively to downed power line hazards.
13. The Task Force should explore using specific 'Stay Out - Electrical Hazard' tape to cordon off lower-priority downed lines areas rather than simply using the existing 'Caution – Keep Out' barrier tape (see Appendix B).
14. Local governments and BC Hydro should continue to discuss means to further improve response during extreme storm events to minimize the risk to the public from downed power lines. In addition, the action plan arising from the Task Force, and any programs developed as a result, should be periodically reviewed and updated to reflect new knowledge, operational changes, and conditions.

### **Finances and Legal**

15. The Task Force should continue to discuss potential options for recovery of specified costs following an extreme storm event that will be mutually acceptable to Fire Services and BC Hydro.
16. If a local government intends to follow the recommendations in the report with respect to downed power lines, the elected body should adopt the recommendations as a corporate policy and the Fire Department should consider adopting and implementing the sample Operational Guidelines (see Appendix C) and associated training programs as their foundation to a safe and effective response. In this regard, the Task Force strongly recommends that each community seek their own legal advice (due diligence) in order to protect the interests of their own community. See Appendix D for a legal opinion to Surrey Fire Services.

# 1 Introduction

In the winter of 2006-2007, British Columbia was faced with one of the most severe storm seasons in recent history. Between October 2006 and January 2007, B.C. was battered by five major storms that presented BC Hydro and local fire services with considerable challenges associated with responding to downed power lines and effectively reducing unnecessary danger to the public, BC Hydro employees, and first responders.

During restoration processes, BC Hydro's first priority is public safety. There is no evidence of anyone from the public being injured by damaged or downed electrical lines during the storms<sup>1</sup>. However, a number of near miss incidents were reported. For example, often when Hydro crews arrive at the scene of a downed power line, the fallen trees have already been cut up, probably for firewood, even though the downed line remains entangled in the branches<sup>2</sup>. The public is taking an extraordinary risk as these lines may still be energized. One particular near-miss incident of note was of a firefighter from the Sooke Fire Department who picked up a downed power line and moved it off the road while waiting for BC Hydro crew to respond. Fortunately the wire was not live.

These storms highlight the need to strengthen partnerships to further improve the response to hazardous situations that can exhaust the capacities and resources of both organizations. This report provides the background to the Fire Chiefs' Association of B.C. and BC Hydro Task Force initiative, activities to date, and recommendations<sup>3</sup>.

## 1.1 Background

In just five storms from October 2006 through to January 2007, thousands of distribution lines were downed and more than 500 electrical distribution circuits were impacted, resulting in power outages to roughly 1.6 million residents with more than 11,000 customers needing to cope without power for more than three days. At the height of the storms, the number of customers without power at any one moment peaked at 240,000.

In many ways, the general public was well served by the BC Hydro crews who cordoned off hazardous areas, removed fallen trees and limbs, made downed wires safe, snow shod through the backwoods to access damaged lines, worked countless hours in the

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<sup>1</sup> Tragically, however, a couple from Burnaby died from carbon monoxide poisoning caused by using a gas-powered generator indoors after the storm on December 15. Prior to and following this incident, BC Hydro issued warnings to customers, asking them to exercise caution when using generators, and to use them only in well-ventilated areas.

<sup>2</sup> BC Hydro Winter Storm Report: October 2006 – January 2007  
(available at: <http://www.bchydro.com/news/2007/may/release52239.html>)

<sup>3</sup> The guidelines and recommendations outlined in this report are intended for Firefighters active in BC Hydro's Service Area. Those in jurisdictions not serviced by BC Hydro should contact their local power utility having authority to identify the most appropriate measures to improve responses to downed wire situations when organisation's capabilities are exhausted.

rain and cold, and ultimately restored power to customers. Only to do it all over again as one storm followed another.

In recent years, major weather-related events have occurred with increasing frequency and impact. B.C. averaged less than two major events per year during the 10-year period from fiscal years 1992-2001, but averaged five per year in the last five years between fiscal years 2002 and 2006.

As a result of this trend and last year's experiences, the Fire Chiefs' Association of B.C. and BC Hydro set up a Task Force in March 2007 to develop solutions to improve responses during these uncharacteristically severe storms to better serve the public when both of their organization's finite resources are over-extended.

## **1.2 Purpose**

The Task Force's goal is:

*"To develop a partnership between the Fire Chiefs' Association of B.C. and BC Hydro to create communication links, identify issues and to develop a Plan of Action to minimise the potential exposure of the general public during a major event that results in downed power lines that could lead to serious injury or fatality."*

For purposes of this report, a major event is defined as an uncontrollable event (e.g. windstorm, earthquake, forest fire, flood, etc.) that requires a response from both BC Hydro crews and first responders beyond the capacities of these crews. In general, BC Hydro's Regional Emergency Operation Centres will prepare to staff up when a storm event is expected.

The roles and responsibilities of the Task Force included:

- Identify issues and develop potential solutions to improve public safety related to downed-power lines during extreme storm events.
- Discuss possible solutions and gain support for a recommended plan of action.
- Develop recommendations.

## **1.3 Meetings and Participants**

The taskforce was chaired by Surrey Fire Chief Len Garis and John Millard, then Manager of External Safety, Security and Emergency Preparedness at BC Hydro.

On March 27, 2007, the Task Force met to discuss the problem and identify issues and constraints related to a coordinated response to downed power lines. Smaller follow-up working groups and meetings among the Task Force chairs, BC Hydro, the Surrey Fire Department, and WorkSafeBC were also held since the first meeting. The discussions

focused on feedback from Task Force members' organizations and these are considered and summarized in this report.

Participants in this process have included:

- Len Garis, Fire Chief, Surrey Fire
- Jim Bond, Deputy Chief, Surrey Fire
- Karen Fry, Deputy Chief, Surrey Fire – Combined Fire Dispatch
- John Kenyon, Assistant Chief, Port Coquitlam Fire Rescue
- Al Dutton, Deputy Chief, Coquitlam Fire Rescue
- Bob Cook, Deputy Chief, Burnaby Fire Rescue
- Jeff Ulyot, Assistant Chief, Chilliwack Fire
- Jim MacDonald, Assistant Chief, Chilliwack Fire
- Dean Ford, Captain, Central Island 911 Fire Nanaimo Fire
- Russ Cameron, Fire Chief, Colwood Fire
- Peter Grootendorst, Fire Chief, Maple Ridge Fire
- Byron Funnell, Deputy Chief, Delta Fire Rescue
- Gordie McLennan, Deputy Chief, District of West Vancouver Fire Rescue
- Vic Penman, Deputy Chief, District of North Vancouver Fire Rescue
- Ruth Harding, First Nations' Emergency Services Society
- Ananthan Supprah, First Nations' Emergency Services Society
- Richard Simpson, B.C. Fire Commissioners Office
- David Anderson – Richmond Fire Department
- Brad Perrie – Pitt Meadows Fire
  
- Darcy Wilson, Operations Manager, ECOMM
- Glen Miller, ECOMM
  
- Doug Joinson, Fraser Valley Regional District
- Reg Hornsby, Manager Communications, Fraser Valley Regional District
- Dan Derby, Cowichan Valley Regional District
  
- John Millard – BC Hydro
- Kyle Robertson – BC Hydro
- Warren Quan – BC Hydro
- Eric Valois – BC Hydro
- Ryanne Metcalf – BC Hydro

## 2 Approach

### 2.1 Problem Definition, Risks and Constraints

During the March 27, 2007, Task Force meeting, a number of issues associated with emergency response during extreme storm events were brainstormed and are presented in Figure 1.0.

In general, the Task Force identified four areas in which to focus attention to minimize the number of interactions between the general public and downed power lines that could credibly lead to serious injury or fatality during a severe storm event. These included:

- i. Education and Awareness
- ii. Communications and Coordination
- iii. Operations
- iv. Finances

FIGURE 1.0: Chart outlining extreme storm event issues raised at the March 2007 Task Force meeting.

<b>Liability</b>	Duty	Standard of care	Expectations not defined	Relationships not defined	Acceptable measures beyond capabilities					
<b>Education</b>	Public Behaviour	RCMP Education	Public Works Education	Public Moving Wires	BCAS Education	CO Poisoning	Types of Wires	911 Calls (misuse)	Public Communication Coordination	Common Terminology
	Unreliable Public Reports	Home Generators Energizing Wires	Fire Education (policy change)							
<b>Coordination</b>	Accurate ETA	Priority Responses	No priority given for hydro calls	Not answering phones	Hydro understanding of 'big' problems	Hydro vs. Emergency Service Priority	Best Report Format	Duplication of reports	Emergency Service Priority Recognition	Emergency Service understanding of restoration
	Maintenance of communication @ limit	Make safe vs. restoration goals								
<b>Operations</b>	No traffic control	Taxed Resources	Call volume	Road blockage (trees)	Structure fires	Other Hydro related events	Protection of the site	Thresholds for emergency service	Management of other events	Enforcement for public safety
	Emergency service capability limits defined	Different thresholds to capacity	Not enough hydro crews							
<b>Finance</b>	Staffing cost									

## 2.2 Education and Awareness

The following sections outline some of the education and awareness efforts directed towards the public and first responders that have been endorsed by the Task Force.

### Public

Educating the public on the dangers associated with downed power lines is valuable and should continue to a pre-emptive measure to enhance public safety. BC Hydro has included public safety messaging in bill inserts to residential customers and sent out a similar insert to commercial/industrial customers (see Appendix E). These inserts highlight the need to prepare for outages: to use home generators appropriately in order to reduce the risk of carbon monoxide fatalities and back-feeding into the electrical distribution system; to stay clear from downed power lines; and, to use appropriate contact numbers (e.g. BC Hydro's 1-888-POWERON call system described in next section). In addition, newspaper and radio ads have been used in the case of short notice. An example of an ad from 2007 (with old contact numbers) is presented below.

**Figure 1: Example of a newsprint ad for Public Safety**



The hazards of windstorms

BC Hydro is warning the public about two unusual hazards created during windstorms that cause unnecessary danger to the public and to Hydro line crews.

**Stay clear of downed power lines**  
Often when Hydro crews arrive at the scene of a downed power line, the fallen trees have already been cut up, probably for firewood, even though the downed line was still entangled in the branches. People are taking a terrible risk; the line may still be energized. Just touching a branch that's in contact with a live power line can cause electrocution. Anyone spotting a downed line should keep everyone back a minimum of 10 metres (33 feet) and call Hydro or the police immediately.

**Generators can be hazardous during power outages**  
Portable generators that are connected to building wiring can endanger crews working on outside power lines during power outages if the building's main electrical switch is not in the "off" position. Electricity made from the generator can feed back into the main system, activating downed wires without the crew's knowledge.

To avoid this danger, transfer switches for generators must be CSA-approved and acceptable to both BC Hydro and a local electrical inspector. For further information, please call BC Hydro at 1 800-BCHYDRO (1 800 224-9376) or read about power outage safety at [www.bchydro.com/outage](http://www.bchydro.com/outage).

**BC Hydro**   
FOR GENERATIONS

[www.bchydro.com](http://www.bchydro.com)

Ref number

In fall 2007, BC Hydro partnered with St. John Ambulance and B.C. retailers and aligned with Public Safety Canada, Provincial Emergency Preparedness, and regional emergency preparedness organizations to raise awareness of the need for preparation before and during a power outage, and to induce customers to purchase an emergency preparedness kit from their local retailer.

The kits contained emergency supplies for 72 hours including a postcard provided by BC Hydro with power outage and public safety tips as well as luggage tags with the POWER ON telephone number.



*POWERON Luggage Tags on Emergency Response Kits*



BC Hydro also developed public service announcements for television that have aired on Global television since winter 2007 / 2008.

December 2009 update – Based on feedback by stakeholders and subject matter experts, concern has been expressed regarding the use of candles in the existing Public Service Announcements due to associated safety

risks. Based on this feedback and supporting statistics, BC Hydro is reviewing the reference to and depiction of the use of candles in power outage communications.

Increased messaging on these safety precautions from the Fire Department and municipalities is encouraged in advance of future storm seasons. BC Hydro is available to assist others to review outreach material to ensure a common message is distributed.

BC Hydro worked with the Township of Langley Fire Department and the Office of the Fire Commissioner to develop a provincial electrical safety curriculum for the fire service, specifically for firefighters who teach public safety in communities. The 'Getting to Know Fire' curriculum contains several Fire Safety lesson plans for all age groups and BC Hydro created an additional section on Electrical Safety (in much the same way Terasen Gas included gas safety a few years ago). This resource was distributed by the Office of the Fire Commissioner of BC to fire departments.

## **First Responders**

As the Task Force solicited ideas for a coordinated response to downed power lines during extreme storm events, there was a suggestion that firefighters could be trained to remove downed power lines themselves. This alternative was unanimously rejected by the Task Force due to a number of concerns related to first responder safety, regulatory and workforce issues, and competency. Specifically, it was recognized that such practice would not meet WorkSafeBC obligations for fire departments nor the Safety Standards Act, and it would not likely receive union approval. Further, equipment maintenance and training issues were concerns raised by the majority of fire departments to take on such a hazardous practice. As such, the Task Force wishes to clearly reiterate that: **FIREFIGHTERS SHOULD NEVER ATTEMPT TO MOVE A DOWNED POWER LINE OR COME WITHIN 10 METRES (33 FEET) UNTIL AN AUTHORIZED MEMBER OF THE LOCAL POWER AUTHORITY HAS CONFIRMED THE LINE IS SAFE.**<sup>4</sup>

Such proposals and the aforementioned near-miss incident at the Sooke Fire Department highlight the critical need for First Responders to be suitably aware of electrical hazards in their work environment. BC Hydro has developed a train-the-trainer program (*Electrical Safety for Fire Fighters*) that enables Firefighter Training Officers to train firefighters in their areas. It is recommended that Fire Fighting Training Officers sign up for the half-day training session at a regional workshop through the Electrical Industry Training Institute (EITI)<sup>5</sup>. The training highlights the need to recognize the limits of approach with respect to downed power lines and the measures required to protect the public from the electrical hazard. In all cases, first responders are advised to stay clear of the electrical line until an on-site representative from the local power authority can ensure the line is no longer energized.

Fire Chiefs and Fire Training Officers should continue to strengthen relationships with the local BC Hydro managers and invite them to their training sessions. If the line manager is available, they could share valuable experiences and become more acquainted with the local fire service, which would likely improve communication and coordination during extreme storm events. Facility tours can be conducted in order for First Responders to get a better understanding of BC Hydro's facilities.

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<sup>4</sup> During severe storm events when there are many downed power lines, non-power lines on BC Hydro poles can still be energized as a result of contact with another power line further away from the identified incident. As such, downed lines (power or otherwise) should always be considered a potential public hazard.

<sup>5</sup> EITI, Electrical Industry Training Institute. Toll Free – 1.866.590.8911, [www.eiti.bc.ca](http://www.eiti.bc.ca)

### **Recommendations – Education**

1. Firefighters should **NEVER** attempt to move or come within 10 metres (33 feet) of a downed power line until an authorized member of the local power authority has confirmed that the line is safe.
2. Increased messaging to the public by BC Hydro and Fire Departments on the hazards associated with downed power lines, violating limits of approach, improper generator use, and the benefits of emergency preparedness, should occur in advance of and during storm season. Additional information is available through BC Hydro's Public Safety website (<http://www.bchydro.com/safety/>) and BC Hydro can assist the Fire Service in providing appropriate messaging. BC Hydro should continue to explore opportunities to partner with the Fire Service to provide public safety messaging to communities.
3. All Firefighter Training Officers should sign up for train-the-trainer workshops to enable them to provide electrical safety training to their departments and better integrate electrical safety messaging in core training programs.
4. Fire departments should continue to explore safe alternatives to traditional response procedures under circumstances where electrical hazards are present. For example, during a motor vehicle accident where it is difficult to determine if a victim is injured inside the vehicle, first responders could use strategic and careful placement of the fire truck's ladder to get a better look inside the vehicle rather than approaching the potentially hazardous area on foot.

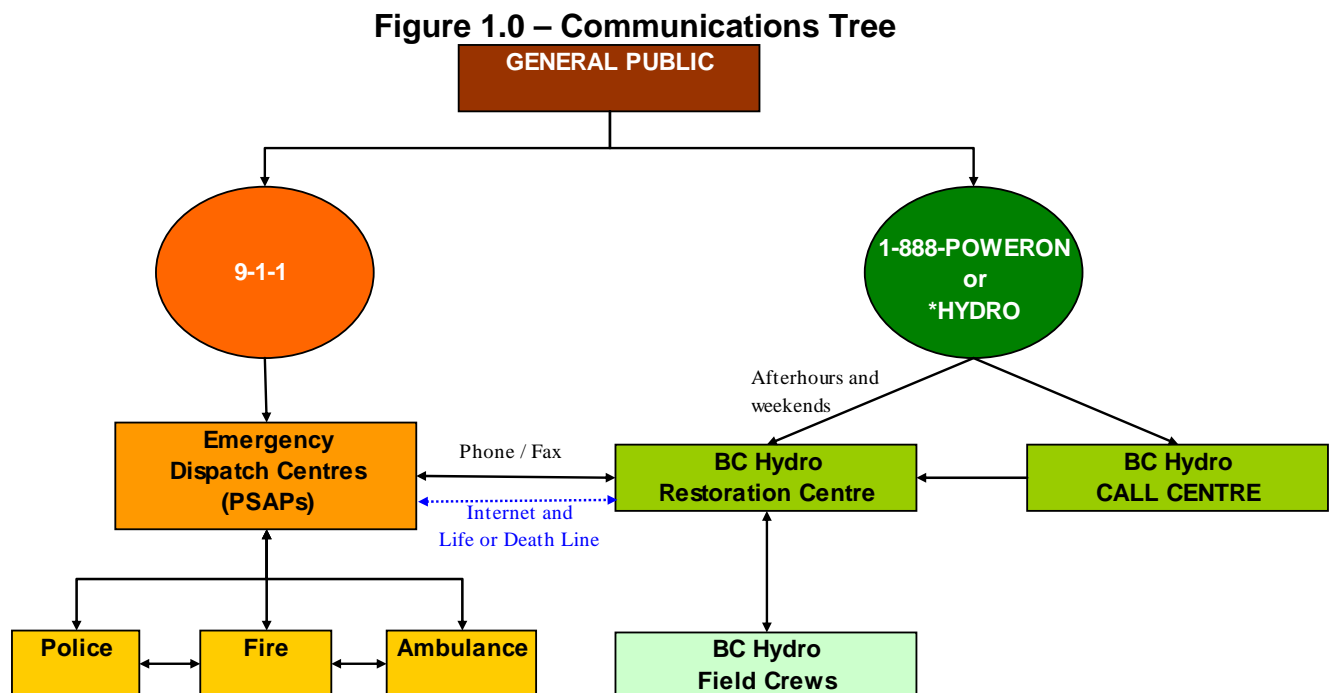
### **2.3 Communications and Coordination**

At the height of the storms, BC Hydro's incoming telephone lines became overloaded, resulting in busy signals, dropped calls and long wait periods. At its peak, BC Hydro's call centre received roughly 37,500 calls per hour, yet its call capacity was just 6,500 calls per hour through a combination of interactive voice response system (IVR) and customer service representatives (CSR). Call agents worked long hours under very stressful situations, often dealing with customers who were angry and frustrated. During the December storm, some agents worked 12-hour shifts for 13 days straight.

## Streamlining Communications

To facilitate incoming calls from the public, BC Hydro uses two groups to receive all calls associated with power outages. The general outage phone number is 1-888-POWERON (1 888 769-3766), or \*HYDRO (\*49376) by cellular phone. During business days from 7 a.m. to 8 p.m., trouble calls are routed through the call centre where an agent enters key information from the trouble calls into the POWERON system. From this information, BC Hydro's Restoration Centre (BCHRC) assesses and dispatches a field crew based on the severity of the damage. After hours and on the weekend, the BCHRC takes the trouble calls from customers directly and dispatches crews from the appropriate headquarters. In addition, dispatchers for first responders (police, fire, ambulance) have a separate emergency trouble call number that is directed to the BCHRC for prioritized response.

The following flowchart (black lines) illustrates the relationship between the public, BC Hydro, and the Emergency Service and Dispatch Centres (rectangles) following calls from the general public (circles). Blue dotted lines refer to planned activities.



BC Hydro's is continuing to improve the call handling capacity and communications to shorten response times, gain better information of the potential hazards, and minimize the public's anxiety during extreme storm events. As lessons learned from one storm were applied to the next, new strategies were piloted, but were not always successful. At one point, BC Hydro's messaging system advised customers to call 911 to report public safety issues, such as line down situations. This affected the volume of calls to

the 911 call centre and hindered BC Hydro's operations from knowing the location of the downed lines.

### **2.3.1 BC Hydro's Outage Communications Initiative**

As part of an Outage Communications Initiative, BC Hydro has made key improvements to build customer satisfaction and increase the timeliness, accuracy and usefulness of outage information and customer access to outage information. This has included the training of call centre agents on background about the restoration process and factors that impact estimated times of restoration (ETR), enhanced training for power line technicians to provide more timely ETR updates, and an improved call centre staffing model to better assess the number of agents required at each stage of a storm to handle call volume.

BC Hydro has also enhanced its website (<http://www.bchydro.com/outages/>) to share information to the public regarding outages and the expected duration to repair the system. This is in addition to automated messaging with the most recent estimated time of restoration that is available through the 1-888-POWERON line. In addition, BC Hydro's larger business customers or Key Accounts have access to the Outage Notification Service, which will send outage notifications to company identified contacts via text messaging, voicemail or e-mail to allow those businesses to be aware of outages without having to be on-site. Similarly, information can now be accessed through Personal Digital Assistant (PDA) devices such as BlackBerrys.

Update as of November 2009 – BC Hydro has significantly increased incoming phone lines and has introduced several Interactive Voice Response (IVR) system enhancements to handle high call volumes. This includes providing wait times, customer outage reporting via the IVR system, and overflow call handling techniques that will allow customers to be called with the changes to the status of their outage.

### **2.3.2 BC Hydro Restoration Centre (BCHRC)**

BC Hydro's primary outage call handling and dispatching group is the BC Hydro Restoration Centre (BCHRC). BC Hydro's call centre is utilized to gather outage information when it is already open for customer care calls or as requested to open for high call volume events by the BCHRC. To improve the quality and consistency of information provided by customers reporting downed power lines, the BCHRC may contact the customer to acquire additional information. Recent changes have allowed for customers to identify within the trouble IVR that they are calling regarding an emergency event (i.e. downed line, burning equipment, etc.).

The BCHRC requires a facilitated communication to obtain an accurate assessment of the location and extent of trouble in order to:

- Determine what additional crews, vehicles, or materials may be required;
- Establish priorities according the System Operating Orders (See Table 1.0); and

- Advise the call centre of the estimated restoration time via POWERON so it can respond to customers inquiring about the expected outage duration.

The assessment process is a critical part of determining whether a trouble call requires further attention. For example, there are anecdotal references that roughly 40% of the reported downed lines are associated with a telephone or cable line rather than a power line<sup>6</sup>. Asking the appropriate questions to the customers (e.g., where on the pole is the wire located? is there rubber casing? etc.) improves BC Hydro's ability to assess risk during these situations.

In the future, BC Hydro plans to move to a "SMART Grid" system that can provide increased accuracy and information on outages. Such a system might also be able to better characterize the likelihood the downed wire is BC Hydro's or not.

### 2.3.3 Emergency Dispatch and BCHRC Communication

During extreme storm events, Emergency Dispatch Centres will generally have three types of queries for BC Hydro's Restoration Centre (BCHRC):

1. *Notification* - An event requires a response from BC Hydro.
2. *Status* - First Responders on the scene want to know when BC Hydro crews will arrive.
3. *Emergency* - A critical life-or-death emergency that requires immediate attention.

To address the different types of requests, the Task Force recognized that a web-based electronic interface for communication of information (i.e., status reports) was required between the BC Hydro Restoration Centre and first responder dispatch centres. Currently all correspondence flows through a phone/fax line and there is no assurance that an emergency call (life or death) can get through when the system is overloaded. As such, the Task Force also recommends that an additional 'life or death only' number be created by BC Hydro in the event that the first responder line is overloaded and a critical emergency call can't get through (blue dotted line in Figure 1.0).

Update as of November 2009 – BC Hydro has successfully implemented the 'BC Hydro - Emergency Services' web interface with several Fire Dispatch services. The interface allows for Emergency Services Dispatchers to electronically enter in priority electricity related incidents and then view and track BC Hydro's progress in addressing those incidents. As well, a 'life or death' satellite phone line, reserved for Emergency Services Dispatchers to call when the existing BC Hydro lines are filled, has been implemented and communicated to the Emergency Services Dispatch community.

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<sup>6</sup> During severe storm events when there are many downed power lines, Non-power lines on BC Hydro poles can still be energized as a result of contact with another power line further away from the identified incident. As such, downed lines (power or otherwise) should always be considered a potential public hazard.

## **Enhanced Coordination**

During an extreme weather event, BC Hydro's top priorities for response are to (1) minimize the risk to our workers, First Responders and the public, (2) restore control centres and communications, generation and transmission facilities necessary to supply distribution customers, and (3) where possible ensure facilities such as hospitals, fire and police departments, and public utilities are prioritized for restoration. To better inform the restoration process, a Critical Infrastructure Program was initiated through the Provincial Emergency Program (PEP), BC Hydro and other stakeholders to enable local authorities and agencies with critical service delivery requirements to provide information regarding their Critical Infrastructure. BC Hydro will use this information as guidance during restoration activities. For example, while one community may place hospitals and municipal emergency centres at the highest priority for restoration, another may consider a wastewater treatment plant's pump station as a higher priority if their hospitals have standby generation and could withstand a longer power outage. Table 1 provides the typical response priorities during an outage.

**Table 1.0  
Typical Priority for Restoring Power**

### **BC Hydro Priorities for Response**

1. Safety of crews, First Responders and the public
2. Restore control centres and communications
3. Restore Generation
4. Restore major transmission components
5. Restore major circuits
6. Restore government and critical agency priorities
7. Restore residential customers
8. Restore commercial / industrial services

### **Non-Electric Restoration Priorities**

Based on pending provincial methodology and definitions for Critical Infrastructure, municipal and provincial agencies can supply information to BC Hydro regarding their own critical facilities. This information will be used as guidance to inform BC Hydro's plans for restoration. Facilities deemed critical by local authorities or agencies should be adequately supported with stand-by generator capability.

#### *Examples:*

- Fire, Police Public Works yard
- Emergency Operations Centres
- Reception centres, group shelters
- Pumping, lift stations, and repeater sites
- Utilities (gas, water, sewer, telephone, cellular)
- Special needs customers (community care facilities, seniors homes)

In the majority of incidents, public safety and restoration go hand-in-hand as a downed power line typically would result in an outage. The Task Force was interested in developing a risk-based prioritization for various downed power line incidents to enhance coordination when resources to respond were exhausted. For example, in one case during the 2006/2007 storm season, a BC Hydro crew was sent to repair a wire down situation that serviced two or three customers (lower populated area). At the same time, there was an area of more than 500 customers, possibly including traffic and street lights, left without power because the higher trouble repair priority was given to the wire down. Had the crew been aware of the bigger picture, they may have been directed to just make the wire down situation safe and then proceeded to restore power to the subdivision.

The Fire Service does not triage the majority of its calls, and most calls they respond to are received by other agencies. The B.C. Ambulance Service, for example, would receive an initial call for an electrical contact incident and a dispatcher would question the caller to determine if the patient is conscious or if there are other complications. For subsequent calls, perhaps a fall on the street, the dispatcher would determine if the patient's condition was such that the ambulance needed to be sent immediately, or could be sent when one was available. The Police and Ambulance Services routinely question and place priorities and divert resources prior to arriving on scene based on call assessment, either on the initial call or on a call-back.

In contrast, the Fire Service has few call assessment opportunities. A culture has developed whereby fire fighting resources are sent to all calls. This approach is characterized by a 'first come, first served, all are served, zero risk' approach to providing fire and first responder services. Fire crews routinely remain on scene until the issues are resolved or the crews are relieved by other agencies. During extreme storm events, this approach quickly overruns Fire Service resources.

Under the abnormal circumstances of an extreme storm event where all resources are overstretched, it is recognized that a different standard of care applies to public safety. A common understanding of the issues and a risk prioritization of incidents would enable first responders on the scene to use criteria to effectively evaluate the situation, communicate their evaluation to BC Hydro, and deploy an appropriate response relative to the new standard of care the situation demands.

The risk-based prioritization of downed power line incidents in no way suggests that a perceived lower-level risk incident is not a serious threat to public safety. For example, a downed power line that is arcing in a busy street intersection may appear to be more hazardous than a downed power line motionless on a quiet country road, but both can be fatal. The innocuous nature of the motionless power line will not warn the public of the threat of entering the hazard zone as would an arcing line. As such, risk-ranking of hypothetical downed power line incidents is presented herein to illustrate how response might be prioritized during these abnormal situations.

**No downed power lines should be considered safe until an authorized BC Hydro representative has investigated and declared it as such.**

A number of criteria are implicitly considered by BC Hydro's dispatchers when prioritizing responses during an extreme storm event. These include, among other criteria, attributes associated with the hazard and the exposure to the public. Presented below is a matrix outlining levels of priority (with 1 equivalent to the highest priority) based on the probability the public will interact with the hazard and the probability the downed line is energized.

Severity of Hazard				
Line is known to be Energized	1	1	1	1
Higher Likelihood that Line is Energized	2	2	1	1
Lower Likelihood that Line is Energized	3	2	2	1
Not likely to be a Power Line **	3	3	2	1
<b>Proximity to People</b>				
	<b>Minimal</b>	<b>Low</b>	<b>High</b>	<b>Interacting</b>
	Remote location with limited traffic in the area.	Potential for traffic within one hour.	Traffic likely within a 10 minute period.	Public interacting with hazard or critical route (i.e., hospitals, highway) is obstructed.

**Notes:**

"Traffic" refers to both vehicular and pedestrian.

The highest appropriate frequency of interaction should be selected.

The probability of a line being energized must be determined by an authorized BC Hydro personnel or suitable equivalent.

\*\* - During severe storm events when there are many downed power lines, non-power lines on BC Hydro poles can still be energized as a result of contact with another power line further away from the identified incident. As such, downed lines (power or otherwise) should always be considered a potential public hazard.

Some examples of downed power lines situations and the associated 'priority level' are described in Table 2.0.

Level	Table 2.0 - Examples Situations of Downed Power Lines
1	<ul style="list-style-type: none"> <li>• A wire known to be energized (i.e. arcing, on fire) in high traffic areas (i.e. traffic intersections, school yards, etc.).</li> <li>• A line down across a remote road that leads to an essential service (hospitals, etc).</li> <li>• Any line lying atop a car with an occupant inside.</li> <li>• Leaning/damaged power poles with sagging or suspended wires.</li> </ul>
2	<ul style="list-style-type: none"> <li>• A wire down on a grass lawn (low traffic) in an urban neighbourhood.</li> <li>• A downed power line in a less populated area with a high potential for indirect consequences because the line is likely energised (i.e. forest fires, etc.).</li> <li>• A wire is down in an intersection of a highly populated area, no outages are reported, the line appears to be telephone or cable service and determined to not likely to be a power line by authorized BC Hydro personnel or suitable equivalent.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Wire down in quiet residential area, low on the utility pole, no outages reported in the area and unlikely to be a power line.</li> <li>• Wire down on the side of a remote road with little traffic.</li> </ul>

As the priority levels listed above reflect a generalization of potential events, it is recommended that the Fire Services and BC Hydro further explore the ranking proposed, as experience is gained, to better define the potential risks to public safety and further refine their understanding of triaging responses during extreme storm events. This could be done through a risk-ranking workshop exercise in which representatives of BC Hydro's Restoration Centre, First Responder Dispatchers and Fire Services run through a number of different scenarios to test the matrix, discuss reasons for any differences in opinion, and then refine the matrix. This workshop would be most effective if it were held once the electronic interface has been further enhanced (the objective is to enhance it sometime in 2010-2011).

### **Recommendations – Communications and Coordination**

5. BC Hydro should continue to improve the call handling capacity (including automatic call handling) of the POWERON call system.
6. BC Hydro should develop and implement a web-based electronic interface for communication of non-critical information (i.e. status reports) accessible by First Responders Dispatchers (Primary Service Answering Points (PSAPs) and Secondary Service Answering Points (SSAPs).
7. BC Hydro should create an additional 'life or death only' phone line to call in the event that the existing dedicated first responder line is overloaded. Discretion should be applied in use of the high-priority phone lines to avoid overloading. Use of faxes to share relevant information with the BC Hydro Restoration Centre is also encouraged.
8. In the future, with more experience gained, representatives of BC Hydro and the Fire Services should conduct a risk-ranking workshop to further refine their understanding of their risk tolerance and ranking methodology during extreme events. This would test and further refine the Task Force's ranking matrix under various scenarios.

### 2.3.4 Operations

To minimize the number of incidents when BC Hydro crews or firefighters respond to a downed line call to find the line is a telephone or cable line and not a power line, BC Hydro has considered exploring the option to develop and train a number of 'Utility Identification Responders'. They would be responsible for investigating and reporting possible wire down, non-outage trouble calls where it is unlikely the wire is a power line. Through appropriate training in hazard identification, these responders could support the BC Hydro Restoration Centre dispatchers and generate additional information regarding the status of a downed power line without overwhelming BC Hydro crews or firefighters. Any interested people in remote regions susceptible to extreme storm events who are willing to be certified with the appropriate electrical training could respond to these low priority incidents (e.g., retired Hydro employees, traffic flagging crews, taxi drivers, security personal, local government officials, etc.).

Once the hazards are identified and firefighters are dispatched, obstacles remain in providing the appropriate response. When Fire Service resources are over-run as a result of an extreme storm event, the current approved response is to 'guard the scene' by providing a physical presence. Only when the demand for service is beyond the ability of the Fire Service to provide a physical presence at a downed power line and the expected standard of care for the public is reduced due to an extreme storm event, the Task Force recommends the following response relative to the appropriate levels of risk:

Level	Table 3.0 - Possible Response Approaches during Extreme Storm Events
<b>1</b>	Fire personnel and apparatus should remain on the scene to protect the public from the hazard.
<b>2</b>	Provided that all Level 1 resources have been exhausted, non-traditional responders (such as local government staff with specialised training in traffic control, electrical safety, etc.) can be dispatched to the scene to protect the public from the hazard.
<b>3</b>	Provided that all Level 1 and Level 2 resources have been exhausted, First Responders should cordon off and mark the area before leaving to respond to higher priority calls.

Fire departments should conduct a workshop using the triage exercise (see Appendix A) to compare and contrast various policies for managing high call volume and to determine how many calls can be managed until traditional Fire Department resources are depleted during extreme events. Fire departments should then develop contingency planning for extreme storm events that are likely to out-stretch the capacity and resources of the departments to respond effectively to downed power line hazards.

BC Hydro can assist local authorities in developing content for a training program for non-traditional responders to provide traffic control and protect the public from the hazard during these unique downed power line situations. In addition, it is recommended that first responders develop guidelines and 'make-safe' procedures to effectively cordon off downed power lines when all of their resources are overwhelmed

and they cannot remain on the scene. For example, the Task Force should explore the value added to using specific 'Stay Out – Electrical Hazard' tape to cordon off lower-priority downed lines areas rather than simply using the existing 'Caution – Keep Out' barrier tape (see Appendix B).

Local governments and BC Hydro should continue to discuss means to further improve responses during extreme storm events to minimize the risk to the public from downed power lines. In addition, this plan (and any programs developed as a result) should be periodically reviewed and updated to reflect new knowledge, operational changes, and conditions.

### **Recommendations – Operations**

9. BC Hydro should explore having 'Utility Identification Responders' who could assess downed wires when they are not likely to be energized (i.e. telephone or cable line). These responders could determine whether or not a downed wire was indeed a power line and the appropriate priority could be assigned to the response.
10. Local Governments should explore the possibility of engaging non-traditional responders to maintain limits of approach and provide traffic control at downed power lines to relieve firefighters and BC Hydro crews during extreme storm events. These non-traditional responders should receive training on the appropriate measures required to effectively protect themselves and the public from the electrical hazard.
11. Fire departments should conduct a workshop using the triage exercise (see Appendix A) to compare and contrast various policies for managing high call volume and to determine how many calls can be managed until traditional Fire Department resources are depleted during extreme events.
12. Fire departments should develop contingency planning for extreme storm events that are likely to tax the capacity and resources of the departments to respond effectively to downed power line hazards.
13. The Task Force should explore using specific 'Stay Out – Electrical Hazard' tape to cordon off lower-priority downed lines areas rather than simply using the existing 'Caution – Keep Out' barrier tape (see Appendix B).
14. Local governments and BC Hydro should continue to discuss means to further improve responses during extreme storm events to minimise the risk to the public from downed power lines. In addition, this plan (and any programs developed as a result) should be periodically reviewed and updated to reflect new knowledge, operational changes, and conditions.

### **2.3.5 Finances and Legal**

BC Hydro has occasionally received requests to pay local governments for the time their Fire Service has been deployed to respond to downed power lines. In accordance with the Hydro and Power Authority Act, BC Hydro is not obliged to comply with requests. Further, the Task Force agreed that the issue of cost recovery would not solve the underlying problem that fire departments and BC Hydro are, and will continue to be, resource constrained in major storm situations. Even with cost recovery, fire departments would not staff to levels to allow them to deploy resources to every downed power line.

While base operating costs for fire departments are planned for and recovered through property taxes, it is recognized that overtime and contractor costs associated with maintaining public safety in emergency situations such as severe storms can create extraordinary costs for local governments. To address this issue, discussions were held with representatives from the Emergency Management BC and the Provincial Emergency Program (PEP) to explore whether local governments might be able to apply for PEP funding in these circumstances, since arguably the storm and downed lines would have exceeded the local government's ability to respond to the emergency. The outcome was that PEP does not have the capacity to provide cost-recovery for local governments for all high wind events.

Recognizing that the issue of extraordinary costs incurred by fire departments in standing by downed power lines remains an issue, the Task Force will continue to discuss potential options for recovery of specified costs that will be mutually acceptable to Fire Services and BC Hydro.

If a local government intends to follow the recommendations in this report with respect to downed power lines, the elected body should adopt the recommendations as a corporate policy and the Fire Department should consider adopting and implementing the sample Operational Guidelines (see Appendix C) and associated training programs as their foundation to a safe and effective response. In this regard, the Task Force strongly recommends that each community seek their own legal advice (due diligence) in order to protect the interests of their own community. See Appendix D for a legal opinion to Surrey Fire Services.

#### **Recommendations – Finances and Legal**

15. The Task Force should continue to discuss potential options for recovery of specified costs that will be mutually acceptable to Fire Services and BC Hydro.

16. If a local government intends to follow the recommendations in this report, the elected body should adopt the recommendations as a corporate policy and the Fire Department should consider adopting and implementing the sample Operational Guidelines (see Appendix C) and associated training programs. Each community should seek their own legal advice in order to protect the interests of their own community. See Appendix D for a legal opinion to Surrey Fire Services.

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**\*\* BE SAFE – DON'T BECOME THE SECOND VICTIM \*\***

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# APPENDIX A - RESOURCE TRIAGE SIMULATION EXERCISE

## **DISCOVERY OF CALL CAPACITY AND TRIAGE RULES FOR ELECTRICAL EMERGENCIES, WIND STORMS AND OTHER HIGH CALL VOLUME EVENTS**

**PURPOSE:** The purpose of this exercise is to compare and contrast four policies for managing high call volume and determining how many calls can be managed until traditional Fire Department resources are depleted.

**Policy 1:** Maintain the existing number of Engines and Staff to manage high call volume.

**Policy 2:** Authorize the addition of two Engine Companies to supplement the existing fleet as a strategy to manage high call volume. This policy requires staff overtime and placing older spare apparatus into service.

**Policy 3:** No additional staff or apparatus are added at this time. However, Fire Officers are authorized to leave the current electrical emergency scene to attend the next emergency call if certain conditions are met. First, the Fire personnel have placed visual and other barriers on all sides of the incident and the public is warned of the possible electrical danger. Second, the electrical emergency has been assessed as having a lower probability of danger to the public. Third, an emergency call of higher priority (risk to life safety) is received. Fire Officers are not authorized to leave an electrical emergency where a wire is known to be energized (i.e. Arcing, on fire) in high traffic areas (e.g. traffic intersections, schoolyards, etc.), a wire is down across a remote road that leads to an essential service (e.g. hospitals, etc.) or any line lying atop a car with an occupant inside.

**Policy 4:** The fourth and last policy examines a combination of the first and second policies whereby additional Fire Department resources are added and Fire Officers are authorized to leave the scene for the next emergency once the scene is protected and the risk has been assessed as a lower priority. While another policy might be developed for the deployment of non-traditional responders like Bylaws Officers or Public Works Staff, this option is similar to Policy 2. For now, however, this exercise looks at the deployment of traditional Fire Department resources only.

**RESOURCE CARDS:** Resources cards may be found in this package and represent the apparatus and personnel available to respond to emergencies. These are printed in RED to identify them as Fire Department resources. Cut the cards out and set them aside.

**CALL CARDS:** Call cards are printed in WHITE and represent all kinds of calls that a department might experience during a high wind event. Cut the cards out, shuffle them and randomly display one card at a time. Imagine that this is the random sequence that calls begin to arrive during a major storm event and the information is the best “at-that-time information” from callers and other emergency services. Arrange the call cards so that you will not be able to see the nature of the next call until each card is revealed.

**ASSIGN FIRE DEPARTMENT RESOURCES:** Given the nature of the call, assign the appropriate Fire Department resource(s) to the call cards until there are no more resources to assign. Under this policy (Policy 1), Fire Department resources are assigned as the calls are received and the apparatus are committed “On Scene” and are not available for re-assignment. Count the number of calls that the Fire Department was able to manage and record this number in the space provided on the Policy Chart under Policy 1.

Now, test the effect of adding additional resources. Add Resource Cards Engine 1-2 and Engine 2-2 to the deck. Re-shuffle the call cards and begin assigning resources as before. Under this policy (Policy 2), Fire Department resources are assigned as the calls are received and the apparatus are committed “On Scene” and are not available for re-assignment. Count the number of calls that the Fire Department was able to manage given two additional engines and record the number of calls attended in the space provided on the Policy Chart under Policy 2.

For Policy 3, Fire Officers are permitted to leave the scene if the scene has been given a lower priority, the scene has been protected with warning devices/barrier tape and a call of greater priority is received. Under this policy, Fire Department resources must remain on scene for any Priority 1 call where there is a higher risk and threat to life. Remove the additional resource cards Engine 1-2 and Engine 2-2. Re-shuffle the call cards and begin assigning resources as before. Assigned resources may leave any Priority 2 or 3 call for a higher priority call. Structural fires and life threatening medical emergencies will be considered Priority 1 calls. Consult the chart below for guidance in assigning priorities to electrical emergencies. Count the number of calls that the Fire Department was able to manage given this change in policy and record the number of calls attended in the space provided on the Policy Chart under Policy 3.

## PRIORITY CHART

PRIORITY	DESCRIPTION
1	<ul style="list-style-type: none"> <li>• A wire known to be energized (i.e. arcing, on fire) in high traffic areas (e.g. traffic intersections, school yards, etc.)</li> <li>• A wire down across a remote road that leads to an essential service (e.g. hospitals, etc.)</li> <li>• Any line lying atop a car with an occupant inside.</li> </ul>
2	<ul style="list-style-type: none"> <li>• A wire down on a grass lawn (low traffic) in an urban neighbourhood</li> <li>• A downed power line in a less populated area with a high potential for indirect consequences because the line is likely energized (e.g. it may initiate a forest fire, etc.)</li> <li>• A wire down in an intersection of a highly populated area, no outages are reported, the line appears to be telephone or cable service and determined to not likely be a power line by authorized B.C. Hydro personnel or suitable equivalent.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Wire down in a quiet residential area, low on the utility pole, no outages reported in the area and not likely to be a power line.</li> <li>• Wire down on the side of a remote road with little traffic.</li> </ul>

Policy 4 is similar to Policy 3. However, additional resources have been added. Place the additional resource cards for Engine 1-2 and Engine 2-2 into the resource card deck. Re-shuffle the call cards and begin assigning resources as before. Assigned resources may leave any Priority 2 or 3 call for a higher priority call. Structural fires and life threatening medical emergencies will be considered Priority 1 calls. Count the number of calls that the Fire Department was able to manage given this change in policy and record the number of calls attended in the space provided on the Policy Chart under Policy 4.

## COMPLETE THE POLICY CHART

<b>POLICY CHART</b>	<b>NUMBER OF CALLS ATTENDED BEFORE RESOURCES ARE DEPLETED UNDER THE EXISTING POLICY</b>
1. Maintain the existing number of Engines and Staff	→ Number of Attended Calls before resources depleted _____.
2. Add two additional Engines and Staff to the existing fleet to manage high call volume.	→ Number of Attended Calls before resources depleted _____.
3. Maintain the existing number of Engines and Staff <b>BUT</b> change the policy to allow Fire Officers to protect the scene and leave current Priority 2 and 3 calls if the next emergency is of higher priority.	→ Number of Attended Calls before resources depleted _____.
4. Add two additional Engines and Staff to the existing fleet <b>AND</b> change the policy to allow Fire Officers to protect the scene and leave current Priority 2 and 3 calls if the next emergency is of higher priority.	→ Number of Attended Calls before resources depleted _____.

## ASSESSMENT OF RESULTS

Re-shuffle the “Call Cards” and assign “Resource Cards” several times. Record your “Number of Attended Calls” each time. What is your assessment of Policy 1, Policy 2, Policy 3 and Policy 4 in terms of effectiveness (Getting the job done) and efficiency (Cost)? Which Policy seems to be most Cost Effective (Getting the job done at the least cost)?

Try this experiment several times. Why does the number of managed calls change each time? The number of calls that can be managed changes because the outcome under each policy is strongly influenced by the type of call received and the order in which it is received.

## ASSESSMENT OF RESULTS FOR YOUR FIRE DEPARTMENT

Re-shuffle the “Call Cards”. This time, use “Resource cards” that are representative of your Fire Department. Under each policy, how many calls can be attended before your resources are depleted?

### CALL CARDS ✂

Wire arcing and flashing in a tree	Sound of a very loud explosion – lights went out in the house
Kiosk is smoking	Car is on top of an electrical kiosk – persons inside
Electrical transformer on the power pole is on fire	Tree is leaning on the power lines – wires look like they are going to come down
Hedges and Tree right next to my house are on fire	A Tree has collapsed on the house and my husband is trapped in the kitchen

<p>A Tree has come down on the Jones' house – not known if they are home</p>	<p>A tree is across the road to the hospital</p>
<p>Tree is on top of a car – occupants inside</p>	<p>Tree is on top of a car – occupants unknown</p>
<p>Wire is lying across the road</p>	<p>Tree fell in the back yard and pulled the wires out of the house – power is out</p>
<p>Wires down on grass and smoking</p>	<p>Vehicle and occupants are caught between two wires on a roadway</p>

<p>Vehicle into power pole – occupants inside – Fire Reports primary wire is off the insulator and resting on the cross bar</p>	<p>Wires down and across a chain link fence</p>
<p>Brush fire under a ROW (Right of Way)</p>	<p>Person is down and unresponsive in proximity to wires</p>
<p>2 car MVA – injuries – rescue</p>	<p>Intersection Lights are Out</p>
<p>People trapped in an Elevator</p>	<p>Roof has blown off a 3 storey apartment</p>

Alarms Ringing at a Care Facility	Residential Alarms Ringing
Medical Assist for laceration/bleeding	Medical assist for a cardiac arrest
Three different families have arrived at the Fire Station for shelter	Engine X cannot refuel – no power
Smell of electrical Wires burning in the house	Fire in a residence

Infant Not Breathing	Alarms ringing Condo Complex
First Responder Call: Sick Person	Car stalled on a Flooded Road: Person on Roof
The caller's basement is filling up with water	

RESOURCE CARDS ✂

ENGINE 1	RESCUE 1
ENGINE 2	ENGINE 3
ENGINE 4	CHIEF 1
ADDITIONAL ENGINE 1-2	ADDITIONAL ENGINE 2-2

## **APPENDIX B - BARRIER TAPE SAMPLE**

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# **APPENDIX C - SAMPLE FIRE DEPARTMENT OPERATIONAL GUIDELINES**

## **Electrical Emergencies Involving Downed Lines**

**and**

## **Managing High Demand For Emergency Services With Downed Lines**

**FIRE SERVICE  
OPERATIONAL GUIDELINE**

<b>Electrical Emergencies Involving Downed Lines</b>	<b>O.G. #</b>	<b>Page x of y</b>
	<b>Eff. DRAFT</b>	<b>Init. of FC</b>

**PURPOSE:** To identify safe distances and procedures for responders to secure the scene of electrical emergencies involving downed wires.

**SCOPE:** All Fire Department Personnel.

**POLICY:** Fire Service personnel shall not approach a scene closer than the specified distance (minimum 10 m (33 ft) or one span) where it is suspected that the area is energized until it is confirmed face-to-face by a qualified utility representative that the downed wire is de-energized and safe to approach.

**PROCEDURE:**

**WIRES DOWN, FELLING TREES, AND CARS INTO DISTRIBUTION POLES**

Wires down, the felling of trees (wind storms or human activity), natural tree growth into power lines or motor vehicle accidents involving distribution poles may result in the flow of electricity to the ground creating serious step and touch potential hazards. Emergency Responders must take the necessary steps to prevent themselves or others from becoming part of the circuit. Live wires may not spark or give any indication that they are live. Always assume the lines are live until confirmed as de-energized and safe to approach by a utility representative.

Park well clear and block traffic. Maintain safe distances (as measured from the point of contact of the downed wire) and based on the number of insulators (bells) or the pole/structure design. The majority of incidents will likely involving voltages below 60 kV (distribution voltage) and 10m (33 ft) is the distance that is appropriate. However, if pole/structures such as those below, or the number of insulator ‘bells’ are above 4, then transmission voltage is present and greater distance is required to ensure safety.

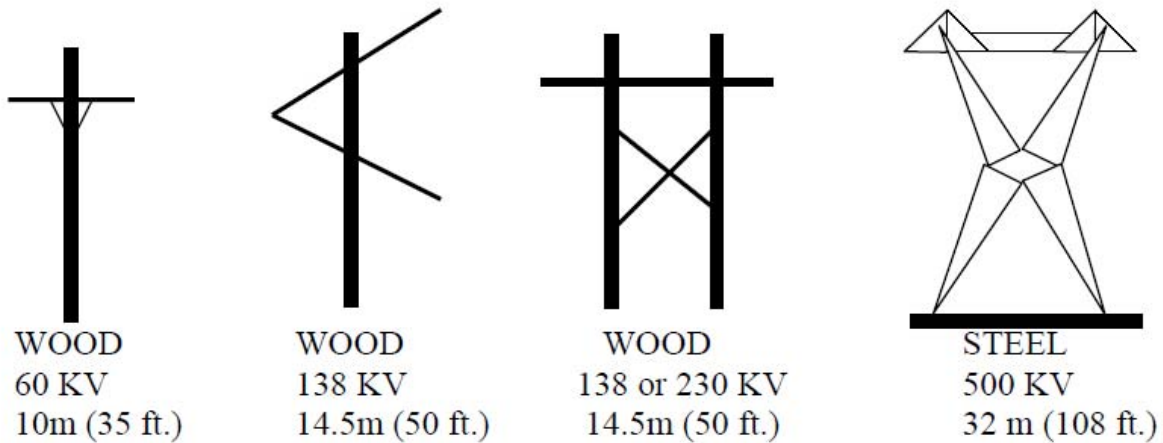
At night, use illumination to ensure that the apparatus is not near downed wires or under

suspended wires before stepping out of the apparatus. Determine if wires have fallen from insulators onto cross arms or to the ground. If wires are in contact with a fence, consider the entire fence and area energized. Be aware of leaning or broken poles or line sag.

To determine safe distances, count the number of insulators ('bells'), and use this guideline:

INSULATORS	VOLTAGE	APPROPRIATE DISTANCE
1-4 insulators (4 bells)	4-60kv	10m (33ft)
7 insulators 7(bells)	138kv	10m (33ft)
12-14 insulators(bells)	230kv	15m (50ft)
15 insulators (bells)	287kv	15m (50ft)
18 insulators (bells)	360kv	22m (72ft)
21-23 insulators(bells)	500kv	32m (108ft)

If the Responder's vision is impaired by darkness or distance and the insulators (bells) cannot be counted, the design of the structure can be used as a guideline for determining safe distances.



Conduct size-up from a safe distance to determine the nature of the problem, locations of bystanders or victims (if any). If there is arcing, do not look directly at the arc flash as the ultraviolet radiation may cause serious, permanent eye damage. An outer circle check is conducted. This includes an upward visualization of power pole insulators and cross arms to determine if power lines have come in direct contact with the power pole. An inner circle check is conducted to eliminate the possibility of energy from an in-ground kiosk.

Warn and keep all persons away. Do not attempt to aid injured persons who may be in contact

with an energized source. Initiate measures to warn and prevent the public from entering a potentially energized area by deploying available resources, such as electrical warning barrier tape, traffic cones, and light sources, at the safe recommended distances on all sides of the incident as soon as is practical.

Request/confirm the attendance of a qualified utility representative, the Police (for traffic control as required), and the Ambulance Service (if victims are present).

If fire control is necessary:

- Ensure a water pressure of no less than 100 psi (at the nozzle)
- Ensure a fog pattern of no less than 30 degrees
- Maintain the recommended distance (10 m (33ft) or higher for transmission lines)
- Do not stand in pools of water/avoid wet ground
- Do not use foam (this is an excellent conductor)

Persons in energized vehicles are told to remain inside their vehicles and if possible (person is capable and vehicle is roadworthy) to drive ahead or back out of the area. If emergency personnel suspect that they have become vulnerable to “step potential” (part of the electrical circuit – tingling in limbs, hair standing up), they are not to touch anyone or anything. Personnel should put both feet together and shuffle (ensuring one foot does not get ahead of the other) out of the area without falling forward or backward.

**Also See:** ‘Electrical Safety for Fire Fighters 2009’ – B.C. Hydro and Power Authority  
Op Guide Sample – Managing High Demand for Emergency Services with  
Downed Lines

_____ Signature of Fire Chief	This O.G. Replaces  Issued:
----------------------------------	-----------------------------------

**FIRE DEPARTMENT  
OPERATIONAL GUIDELINE**

<b>Managing High Demand for Emergency Services with Downed Lines</b>	<b>O.G. #XXXXXX</b>	<b>Page x of y</b>
	<b>Eff. DRAFT</b>	<b>Init. of FC</b>

**PURPOSE:** Damage to the electrical distribution system caused by high winds, falling trees, and/or motor vehicle accidents, may result in the flow of electricity to the ground. First Responders must take steps to warn the public of this potential hazard and reduce the possibility of human contact with electrical sources.

The purpose of this guideline is to identify a standard of care for alerting the public to a potential electrical hazard. Also, in cases when multiple downed wire events occur, to identify the procedures for determining how and when First Responders may leave the scene to attend an emergency of higher priority. The goal is improve the availability of responders, when possible, during times of high demand for emergency service.

**SCOPE:** Fire Department Operations, Fire Dispatch.

**POLICY:** When First Responders can manage the volume of other incoming emergency calls, personnel will remain on scene of the electrical incident to warn and divert the public until the power authority representative arrives.

First Responders will remain on the scene when a wire is known to be or is likely energized and this hazard is in a high pedestrian or high vehicle traffic area where human contact is likely to occur or has occurred.

First Responders may leave the scene to attend another priority incident when:

- the wire is identified as non-electrical;
- the wire is in a low traffic area with low potential for human contact AND warning devices have been deployed on all sides of the incident to alert, stop and divert pedestrian and vehicle traffic;  
AND

- Emergencies of a higher priority are underway and there are no additional emergency resources to deploy to those emergencies.

**PROCEDURE:**

1. Park well clear of the potential electrical emergency and block pedestrian and road traffic.
2. Warn and keep all persons away (at least 10 m (33ft)).
3. Conduct Size-up. Place a priority on the electrical incident by assessing the severity of the hazard using the priority and description chart as a guide. Provide an initial report. Report any immediate life-threatening situation to Fire Dispatch. Fire Dispatch is to notify the power authority of immediate life-threatening emergencies on the dedicated phone line for this purpose (e.g. electrical wires across an occupied vehicle).

PRIORITY	DESCRIPTION
1	<ul style="list-style-type: none"> <li>• A wire known to be energized (i.e. arcing, on fire) in high traffic areas (e.g. traffic intersections, school yards, etc.).</li> <li>• A wire down across a remote road that leads to an essential service (e.g. hospitals, etc.).</li> <li>• Any line lying atop a car with an occupant inside.</li> <li>• Leaning/damaged power poles with sagging or suspended wires.</li> </ul>
2	<ul style="list-style-type: none"> <li>• A wire down on a grass lawn (low traffic) in an urban neighbourhood.</li> <li>• A downed power line in a less populated area with a high potential for indirect consequences because the line is likely energized (e.g. it may initiate a forest fire, etc.).</li> <li>• A wire down in an intersection of a highly populated area, no outages are reported, the line appears to be telephone or cable service and is determined to not likely be a power line by authorized Power Authority personnel or suitable equivalent.</li> </ul>
3	<ul style="list-style-type: none"> <li>• Wire down in a quiet residential area, low on the utility pole, no outages reported in the area and not likely to be a power line.</li> <li>• Wire down on the side of a remote road with little traffic.</li> </ul>

4. Request/confirm the attendance of the Power Authority representative and determine ETA.
5. Initiate measures to warn and prevent the public from entering a potentially energized area by deploying electrical warning barrier tape, traffic cones and light emitting devices for night time operations (if available) at the safe recommended distances on all sides of the incident

as soon as is practical. Subject to the priority of this incident and the policy conditions for leaving a scene, notify Fire Dispatch of availability in the event that another emergency occurs in the response area.

**Also See:** 'Electrical Safety for Fire Fighters 2009' – B.C. Hydro and Power Authority  
Op Guide Sample – Electrical Emergencies Involving Downed Lines

<hr/> <p>Signature of Fire Chief</p>	<p>This Replaces O.G.: NEW Issued on: DRAFT</p>
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## **APPENDIX D - LEGAL OPINION TO SURREY FIRE SERVICES**



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*Email Transmission*

April 8, 2008

File No.: 860 002

**Email Address:** LWGaris@surrey.ca

Chief Len W. Garis  
Fire Chiefs' Association of British Columbia  
Surrey Fire Services  
City of Surrey  
14245 - 56th Avenue  
Surrey, B.C.  
V3X 3A2

Dear Chief Garis:

**RE: Draft FCABC / BC Hydro Task Force Report on Downed Power Lines**

You asked for my opinion on the legal liability issues, if any, arising out of the above report. In my opinion, each local government that intends to follow the recommendations in the report with respect to responding to downed power lines should ensure that before doing so, the elected body adopts the recommendations as a corporate policy.

By doing so, a local government will be able to argue, in defence of a lawsuit for damages, that the course of action followed was pursued in the context of a "pure policy" decision made in for the purpose of the allocation of corporate resources in the circumstances contained in the policy.

Of course, each local government should obtain their own independent legal advice in this matter. Their legal advisors will recognize the term "pure policy" as enunciated by the Supreme Court of Canada in the leading case of *Neilsen v Kamloops* and subsequent judgments and will guide their clients accordingly.

Local government legal advisors will also recognize that, for local governments whose inhabitants may be affected by downed power lines, to do nothing about these events is in itself a form of policy. A "do nothing" policy is not likely to insulate the local government from judgments to pay damages because such a policy would likely be considered to be negligent by the courts.

It may not be sufficient insulation from lawsuits for the policy to be instituted by fire departments without the benefit of council or regional board approval. However, if the elected officials decline to adopt the policy, some measure of protection may be

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Chief Len W. Garis  
April 8, 2008  
Page 2

acquired if it is merely a departmental policy or standard operating practice. An operational policy is more open to a finding of negligence than a "pure policy" but at least if it is reasonable and put into practice competently in each event, lawsuits for damages may fail. Of course, independent legal advice regarding this aspect is also recommended.

The report is compiled by reliable and authoritative sources and contains thoughtful analyses and recommendations. Therefore, it is reasonable for a local government council or board to adopt it, provided their legal advisors and fire professionals recommend it.

As we discussed, the report provides a model for local governments to adapt to their particular circumstances for the purposes of adopting it and putting its recommendations into practice. As long as the recommendations are carried out consistently and competently, it will provide a needed service to the public and become an important part of the risk management strategy for local governments in this Province.

Yours truly,

**STAPLES McDANNOLD STEWART**

Per:

  
Lorena Staples, Q.C.

LS/sc

## **APPENDIX E - OUTAGE COMMUNICATION**

### **SAMPLE RESIDENTIAL BILL INSERT**

OKAY

HOW DO YOU STAY  
IN TOUCH IF THE  
POWER GOES OUT?

SOUNDS  
GOOD

AS LONG AS WE  
ALL STICK TOGETHER  
WE'LL BE FINE.

OKAY

**BC hydro**   
FOR GENERATIONS

SURE

IN A POWER OUTAGE, KNOWLEDGE IS POWER.  
GET OUTAGE UPDATES:

Phone: 1 888 POWERON  
(1 888 769 3766)

Cell phone: \*HYDRO (\*49376)

Web-enabled  
cell phone or PDA: bchydro.com/mobile

Internet: bchydro.com/outages

#### SAFETY FIRST

Use candles with caution, in proper holders.  
Consider using flashlights instead.

Never use a barbeque or portable generator  
indoors, including inside a garage or other  
enclosed or partially-enclosed area.

Never approach a fallen power line. Stay back at  
least 10 metres (33 feet) from wires or anything  
in contact with them.

If you see a fallen power line, report the exact  
location to 1 888 POWERON.

**BC hydro** 

FOR GENERATIONS



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