

## Incident Summary (5608515)

SUPPORTING INFORMATION	Incident Date		October 15, 2016	
	Location		Whistler	
	Regulated industry sector		Low voltage electrical system (30V to 750V)	
	Impact	Injury	Qty injuries	1
			Injury description	One person was reported to have minor smoke inhalation.
			Injury rating	Minor
	Damage		Damage description	Fire and smoke damage occurred to the baseboard heater, internal wiring and surface damage to the drywall directly behind the heater.
			Damage rating	Moderate
	Incident rating		Moderate	
	Incident overview		A baseboard heater caught fire explosively with fire damage to the baseboard heater and minor fire damage to the wall directly behind the baseboard heater. The fire was mostly contained within the baseboard heater and did not spread from there.	
INVESTIGATION CONCLUSIONS	Site, system and components	<p>Site location: Family room of a residential home.</p> <p>Wire terminations must be tight to avoid loose, high resistance electrical connections. The metal plate must be installed on the back of the heater to prevent damage to the electrical components within the heater and to contain thermal energy should a wiring or component failure occur.</p> <p>240V to 24V transformer/relay components installed for electric heating thermostat controls are required to have the 240 volt wiring in a separate enclosure then the 24 volt wiring. The circuit breaker should trip under the high current electrical fire condition.</p> <p>Only qualified persons may install electrical equipment.</p> <p>Manufacturers installation instructions must be followed when installing electrical equipment.</p> <p>The circuit and components were adequately sized for the load.</p>		
	Failure scenario(s)	<p>1) It is plausible that a loose 240 volt wire connection created a condition of excessive heat to a conductor and its wire insulation. The wire insulation started to melt and caught fire, which spread to other wiring and the side of the plastic relay enclosure was partially melted.</p> <p>2) It is also plausible that a loose internal wire connection inside the relay created a condition of excessive heat to a wiring lead and its insulation. The wire insulation started to melt and caught fire, which spread to other wiring and the side of the plastic relay enclosure was partially melted.</p>		

## Incident Summary (5608515)

<p>Facts and evidence</p>	<p>The monitored smoke alarm was set off by the fire and alerted the fire department. One person was in the room sleeping and attempted to suppress the fire.</p> <p>Interview with firefighter: The firefighter stated that the circuit breaker did not trip during the incident but they turned it off when they attended the site.</p> <p>Interview with the homeowner: The homeowner stated that the baseboard heaters were installed a few years ago and was unable to determine whether the person who installed them was qualified or not. The homeowner also stated that the damaged components were removed from the site and discarded. This was done prior to the BCSA investigation.</p> <p>Figure #1 – Video home security footage of the incident confirming the baseboard heater as the point of origin for the fire.</p> <p>Figure #2 – Photo of the side of the relay enclosure melted and the 240 volt and 24 volt wiring in the same compartment against the manufacturer’s instructions.</p> <p>Figure #3 – Photo of replacement components installed similarly showing the circuit loaded at 8 amps on a 22 amp relay within tolerable levels.</p> <p>Figure #4 – Photo showing the baseboard heater missing the back plate.</p> <p>Figure #5 – Photo showing that the relay was not securely mounted as per the manufacturer’s instructions.</p> <p>Figure #6 – Relay manufacturer’s installation instruction diagram for reference.</p>
<p>Causes and contributing factors</p>	<p>This incident was very likely caused by an electrical fault that occurred within the electrical connection box in the baseboard heater. The fault likely occurred as a result of a loose wiring connection associated with the electrical heater installation or a faulty thermostat relay internal connection. A contributing factor was that the work was likely done by unqualified person(s).</p>

Figure #1 - Video home security footage of the incident confirming the baseboard heater as the point of origin for the fire.



Clicking the image above will open the video in a new browser.

Figure #2 - Photo of relay with the side of the enclosure melted. Also showing the 240 volt and 24 volt wiring were not in separate compartments as per the manufacturer's instructions.



Figure #3 - Photo showing the circuit loaded at 8 amps on a 22 amp relay within tolerable levels.  
(Circuit and components rewired similar to during the incident)



Figure #4 – Photo showing baseboard heater missing back plate.



Figure #5 - Photo showing that the relay was not securely mounted as per the manufacturer's instructions.



Figure #6 – Relay manufacturer’s installation instruction diagram for reference.

