

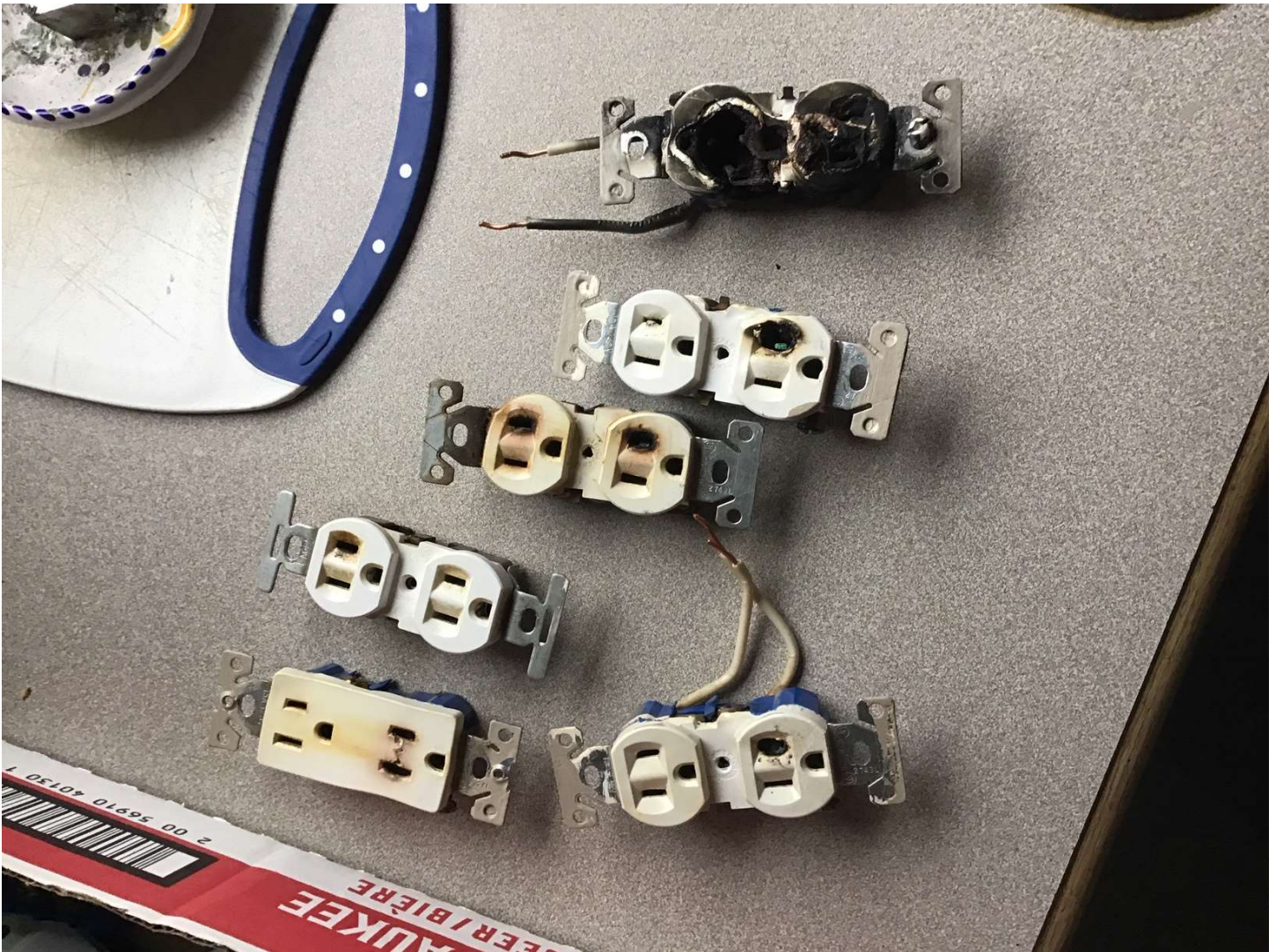
Incident Summary #II-916070-2019 (#15535) (FINAL)

SUPPORTING INFORMATION	Incident Date		October 2, 2019	
	Location		Castlegar, BC	
	Regulated industry sector		Electrical - Low voltage electrical system (30V to 750V)	
	Impact	Injury	Qty injuries	0
			Injury description	Not applicable
			Injury rating	None
	Damage	Damage	Damage description	Damage is isolated to six wall-mounted 15A 120V style duplex receptacles, interior wall surfaces and adjacent features about the receptacle at the incident origin area.
			Damage rating	Minor
	Incident rating		Minor	
Incident overview		A single family dwelling sustained minor damages resulting from a failed 15A 120v style duplex receptacle. The receptacle failure resulted from a breakdown, melting of receptacle structure plastics by high temperatures created from overuse of a high wattage appliance.		
INVESTIGATION CONCLUSIONS	Site, system and components		Single family dwelling structure is serviced by an overhead 100A 240V electric service. A 100A combination style main service panelboard is installed in the main living space of the dwelling. Branch wiring is supplied from the main service panelboard, routed through the wood framed structure to end use devices: receptacles, switching controls, luminaires and baseboard style heating.	
	Failure scenario(s)		A deteriorated wall mounted 15A 120V duplex sustained an internal short circuit. The corresponding arcing resulted in heat and smoke damage to living space features and interior wall surfaces.	
	Facts and evidence		<p>Examinations of 15A 120V style duplex receptacles installed in main living and dining areas display overheating conditions and varying degrees damage as evidenced by melted plastics and discolored current carrying metal components of the receptacles.</p> <p>Extensive use of two portable/mobile, high wattage heating appliances to provide dwelling space heating created a high temperature condition at each receptacle supplying the heating appliance when the appliance was in use .</p> <p>The high temperatures were a result of the high current flowing through the receptacle contact elements and the conductor terminations at each receptacle. Two mobile heating appliances were in use, each appliance requires a 120V volt supply and is rated at 1500 watt output. The 1500 watt rating requires a minimum of 12.5 amperes current flow when in operation. 12.5 amperes of current passing through the receptacle mating contacts would be considered the maximum ampere rating of the receptacle and would result in elevated temperatures at the receptacle. The damaged receptacles were terminated to the supply conductors</p>	

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	<p>using the 'quick connect', pressure style termination feature of the receptacle; the receptacle screw type terminations were not utilized. This 'quick connect' style of termination does not have the termination integrity of the screw type with respect to termination ampacity: the surface contact areas and contact pressure of the 'quick connect' termination is less than the screw type termination which results in higher termination temperatures at maximum current flow ratings. The 1500W output rating of the heating appliance results in current flow values that reach the maximum ratings of the equipment supplying the appliance. Over time, the high current and high temperatures resulted in damage to each receptacle at the conductor 'quick connect' termination area as displayed by the breakdown and melting of the receptacle structure and insulating plastics.</p>
Causes and contributing factors	<p>Two high wattage (1500 W) heating appliances created a high temperature condition at each 120 V supply receptacle due to the high current flowing through the receptacle contact elements and the conductor terminations at each receptacle. The two heating appliances resulted in current flow values that reached the maximum ratings of the equipment. Over time, the high temperatures resulted in damage to each receptacle at the conductor 'quick connect' termination area as displayed by the breakdown and melting of the receptacle structure and insulating plastics.</p>

Photos or diagrams (if necessary)



15A 120V duplex receptacles display deterioration and damage from elevated temperatures at each receptacle contact point



Receptacle removed from incident origin area.



Receptacle removed from incident origin area.



Portable heating appliances, each rated at 120 volt, 1500 watt. The following four photographs show the manufacturer equipment label, valid approval certification and overtemperature discoloration at each respective appliance cordset.







