

## Incident Summary #II-2195416-2021 (#20823) (FINAL)

SUPPORTING INFORMATION	Incident Date	February 13, 2021	
	Location	Castlegar, BC	
	Regulated industry sector	Electrical - Low voltage electrical system (30V to 750V)	
	Impact	Qty injuries	0
		Injury description	None
		Injury rating	None
	Damage	Damage description	Main distribution panelboard and associated branch wiring dwelling sustained fire and heat damages.
		Damage rating	Moderate
	Incident rating	Moderate	
Incident overview	Main distribution 100 amp 120/240 volt panelboard and associated branch wiring in a single family dwelling sustained fire and heat damages when a surge suppressor failed and ignited while providing over-voltage protection.		
INVESTIGATION CONCLUSIONS	Site, system and components	A 120/240 volt surge suppressor was installed in a branch circuit position in a 100 amp 120/240 volt single phase panelboard installed in a basement area of a single family dwelling. The surge suppressor is fitted with components that rupture and create a short-circuit when a voltage value higher than the rated voltage limit is impressed on the equipment it is protecting. The short-circuit trips open an upstream main breaker or fuse thus de-energizing the branch wiring and providing protection from any subsequent over-voltage condition and potential damage.	
	Failure scenario(s)	The local area electric supply authority was informed that multiple dwellings in the incident area reported flickering lighting and appliance failures. The supply authority responded to the reports and discovered that a faulty pole mounted transformer was delivering erratic, random high and low voltages to structures supplied from the transformer. The property owner noted dwelling interior lighting was flickering and appliances were creating popping and crackling noises and then heard a loud 'bang' in the basement. The property owner descended into the basement to investigate the noise and noted smoke and flames in and around the area of the main distribution panelboard installed on basement exterior wall. The property owner called 911, manually opened the main breaker and evacuated the dwelling.	
	Facts and evidence	Information obtained in a statement from the property owner indicated the owner heard a loud 'bang' in the basement prior to noting smoke and flame in the area of the panelboard. When a surge suppressor operates on an over-voltage condition it creates a loud noise when the protection devices rupture to create the intentional short circuit on the system to actuate operation of upstream overcurrent protection.	

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	<p>Examination of the surge suppressor and panelboard revealed that the surge suppressor involved in the incident did not create the intended short circuit when the protection devices ruptured on the over-voltage condition. Instead, the plastic enclosure of the surge suppressor ignited when the protection components ruptured. The burning surge suppressor enclosure ignited adjacent plastic panelboard components, adjacent branch wiring conductor insulation, and adjacent branch wiring cable insulation.</p>
Causes and contributing factors	All evidence indicates that the surge suppressor protection did not operate as designed.



Main dwelling panelboard, installed on basement level



Burnt branch wiring conductor insulation



Burnt branch wiring cable insulation above panelboard



Square D Surgebreaker Suppressor QO2175SB 120/240v 5ka – top view





Square D Surgebreaker Suppressor QO2175SB 120/240v 5ka – side view



Square D Surgebreaker Suppressor QO2175SB 120/240v 5ka – other side view



Square D Surgebreaker Suppressor QO2175SB 120/240v 5ka – back view