Incident Summary #II-1748998-2024 (#50512) (FINAL)

SUPPORTING INFORMATION	Incident Date		August 16, 2024
	Location		Hope, BC
	Regulated industry sector		Electrical - Low voltage electrical system (30V to 1000V)
	Impact – Injury	Qty injuries	1
		Injury description	Minor scrapes and abrasions.
		Injury rating	Insignificant
	Impact – Damage	Damage description	Arc flash burn marks to the vehicle, complete destruction of the electric vehicle charger adaptor. Damage to the charging cable and internal components of the commercial electrical vehicle charger.
		Damage rating	Major
	Incident rating		Major
	Incident overview		While charging a Tesla EV at a non-Tesla commercial electric vehicle charger, a short circuit between the charging cable of the charger and an after-market charging adaptor resulted in an arc-flash.
INVESTIGATION CONCLUSIONS	Site, system and components		Commercial electric vehicle (EV) charging stations are available for public use at select locations such as gas stations, shopping malls and in other locations. In North America there are three primary styles of charging plugs and sockets depending on vehicle manufacture and charging station output. AC charging stations typically use a SAE J1772 – Type 1 connector good for up to 19 kilowatts (KW) while DC fast charging stations typically use a CCS – type 1 connector good for up to 360 KW. Tesla vehicles have a NACS proprietary plug style that is good for both AC and DC charging up to 250KWs. To charge a Tesla vehicle at a non-Tesla charging station, an adapter is needed to connect the charging plugs into the Tesla port. Telsa provides adaptors to allow for the charging of their vehicles at charging stations with non-Tesla charging connections. Tesla has a policy that only allows the use of adapters sold or provided by Tesla and prohibits the use any other device that plugs in between a vehicle and the charging cable such as third-party adapters, extension cords, and breakaway devices. The policy states that prohibited devices that are advertised by third parties as compatible with Tesla charging equipment are dangerous and therefore remain prohibited, even if sold under such advertising. Aftermarket charging cable adaptors are available on the market for the use of different brands of EVs with different charging ports at commercial charging stations. The charging adaptor is installed at the end of the electrical vehicle EV charger cable and then plugged into the EV. Under section 21(1) of the Electrical Safety Regulation, electrical equipment in BC must bear evidence of either a mark or a label of a certification agency accredited by the Standards Council of Canada. Certification marks are trusted stamps for product conformity Canadian National codes and standards. At the time of the incident there was no standard for adapters for use with electric vehicle couplers. All adapters other

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	that those manufactured by automakers for use with the vehicles chargers could not have a certification mark recognised for sale or use in Canada, including BC, and are not allowable to be used under the regulation. The First Edition of ANSI/CAN/UL 2252, Standard for Adapters for Use with Electric Vehicle Couplers, was issued, dated March 19, 2025, as a new joint US/Canada Standard. Several of the major charging networks in North America including Electrify Canada only permits the use, of adapters manufactured by automakers with its chargers. The use of any other adapter with the network is prohibited.
Failure scenario(s)	The owner of the Tesla vehicle had a third-party adaptor manufactured and sold by A2Z EV that allowed the use of a CCS DC fast charging connector to be used to charge the Tesla. The adaptor did not have an approved certification mark for Canada and was not an adapter approved for use by Tesla or most charging networks. They had used the adapter to charge the vehicle several times in the past without any previous issues. They stopped at a non-Tesla 200kW max DC fast charging station and connected the charger to their vehicle with the adapter. Using an application on their phone, they initiated the charger. The owner was standing next to the charging port, and a passenger was inside the vehicle. During initial startup of the charger a DC arc-fault occurred in the adapter creating a large arc-flash which knocked the owner to the ground, blew apart the adapter, and caused heat and burning damage to the vehicle, charging cable, connector and internal components of the commercial electrical vehicle charger. Video: Uncertified EV Adapter Use with Tesla Causes Explosion
Facts and evidence	**Vehicle owner statement:** • They had used the adaptor was approximately 50 times without incident. • They plugged in the charger to the car with the adapter and initiated the charger from their phone. • As they were walking away from the charging port, they saw a bright flash and heard a loud bang and were knocked to the ground. • Their spouse was in the passage seat of the car at the time. **Technician Statement:** • The failure occurred between the adaptor and the EV charger charging cable. • The adaptor was blown in half, significantly melted and damaged. • A short circuit appears to be between terminals and communication cable in the adaptor. • Multiple components in the EV charger were observed to have electrical burn damage.

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	A2Z EV Adapter manufacturer statements • The factory they are in partnered with in China has a facility of testing equipment where every single adapter is tested in accordance with available standards. • Up until the incident there has been no proper certification for EV charging adapters, the appropriate certification will be UL2252 based on the J3400/1 standard. • They are aware the product does not have a certification mark for approval in Canada. • The product was sold to the customer approximately two years prior to the incident. • Analysis of the damaged components lead them to believe that when the charger started the isolation test, the contactors on the vehicle were closed and the station was open for the isolation test. Even with the low power flowing through it was able to start to generate enough heat via resistance in the DC pins on the CCS adapter to allow them to start to deform. This could have led to the buss bars beginning to deform and become closer together. When the station ramped up to pack voltage for the isolation test (which we don't have the data for but know that it must have got there) the short occurred to ground and was able to transfer full pack isolation voltage via the GND pin back to the station. **Safety Officer observations:** • Significant scorching was observed at the charging port of the EV**.** • The terminal of the EV charger cable and the adaptor show signs of melting. • The circuit board in the EV charger is severely burned. • There were multiple burned components inside the EV charging station. • Photos of the adaptor show severe damage. • Security footage showed a large flash, knocking the EV owner to the ground. • There were no signs of damage to vehicle terminals. • The adaptor was not approved for use in Canada.
Causes and contributing factors	A short circuit in the caused an arc-fault and arc-flash in the adapter damaging electrical components and injuring the owner. It could not be determined if the initial short circuit originated in the charger or the adapter due to damage from the incident. Additional considerations: • The charging adapter used to charge the vehicle was not approved in Canada and had not been subject to the testing requirements of a Canadian approved standard. • The manufactures did not have the ability to test and approve charging adapters for use in Canada due to there being no finalized approval standard at the time.

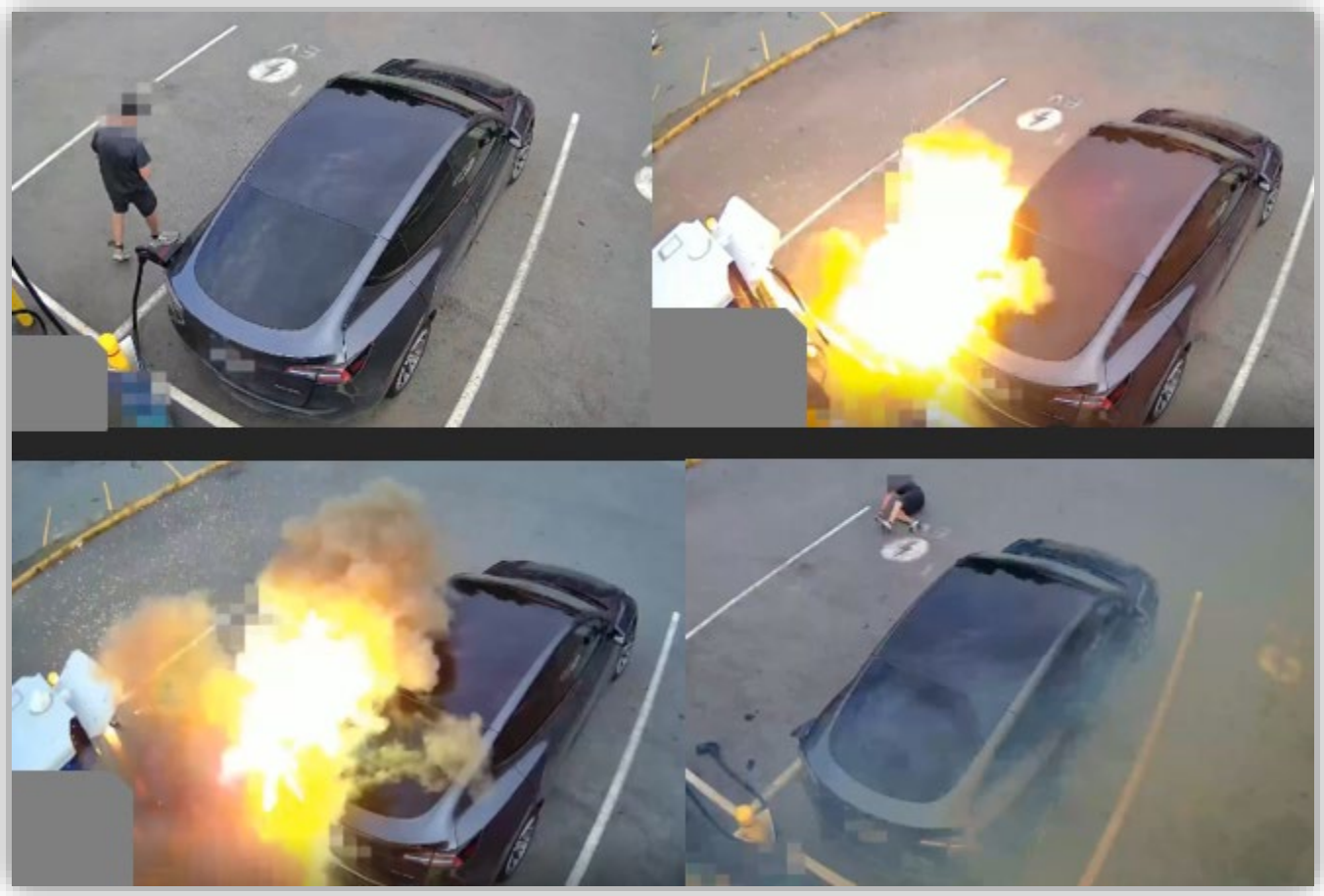

Image 1 – Stills take from security camera footage of the incident.

Image 2 - Adaptor blown in half with terminals showing signs of extreme heat.

Image 3 - The ground terminal on the charging cable melted away.

Image 4 - Electrical burn marks on the vehicle but charging terminals show little sign of damage.

Image 5 – Data tag for the charging station showing 200kW maw power output.