

Incident Summary #II-1401534-2022 (#28632) (FINAL)

SUPPORTING INFORMATION	Incident Date	June 30, 2022	
	Location	Quesnel BC	
	Regulated industry sector	Electrical - Low voltage electrical system (30V to 750V)	
	Impact	Qty injuries	1
		Injury description	Electrical shock of worker.
		Injury rating	Minor
	Damage	Damage description	N/A
		Damage rating	None
Incident rating	Minor		
Incident overview	<p>In an industrial facility, an electrician was troubleshooting variable frequency drive (VFD) faults and was checking a brake resistor on the top of VFD cabinet. There was a 2nd brake resistor in the enclosure, which is fed from another VFD. The 2nd VFD was energized, and the electrician contacted the live terminals in the brake resistor enclosure and received an electric shock.</p>		
INVESTIGATION CONCLUSIONS	Site, system and components	<p>Motors run various parts of the industrial facility. To have better control and efficiency, VFD's are very frequently utilized. A VFD changes the incoming voltage and outputs variable voltage and/or frequency to give motors certain characteristics (greater starting torque, precise speed control etc.).</p> <p>Break resistors are quite often used with VFDs to aid the motor in slowing down (when a motor is used for braking, it acts as a generator and the excess power is used up in the braking resistor. It is the same process as regenerating braking in an EV, just in this application there is no battery to store the energy).</p> <p>The brake resistor is large to dissipate the heat and is commonly housed in a ventilated enclosure at the top of the VFD cabinet.</p> <p>In this instance, 2 separate brake resistors were in the same enclosure.</p>	
	Failure scenario(s)	<p>The electrician de-energized and locked out the VFD they were working on and confirmed it was de-energized with a multimeter. The brake resistor enclosure did not have labeling or drawing identifying that there were two electrical feeds inside the same enclosure. The electrician did not test for the presence of electricity at the brake resistors inside the brake resistor enclosure after disconnecting and locking out the electrical source to the first VFD. They were unaware that the 2nd VFD was energized and fed into the brake resistors in the brake resistor enclosure as well. When the worker came in contact with the energized terminals, they received an electric shock.</p>	

Incident Summary #II-1401534-2022 (#28632) (FINAL)

Facts and evidence	<p>Photos of the brake resistor cabinet were shown to not have labeling.</p> <p>Drawings provided from the facility did not show the brake resistors (or subsequently showing multiple feeds into the same enclosure)</p>
Causes and contributing factors	<p>Failure probably resulted from poor operating procedures and signage.</p> <p>The drawings for the VFD did not show the brake resistor.</p> <p>The enclosure did not have signage to show multiple sources of energy were included.</p>