

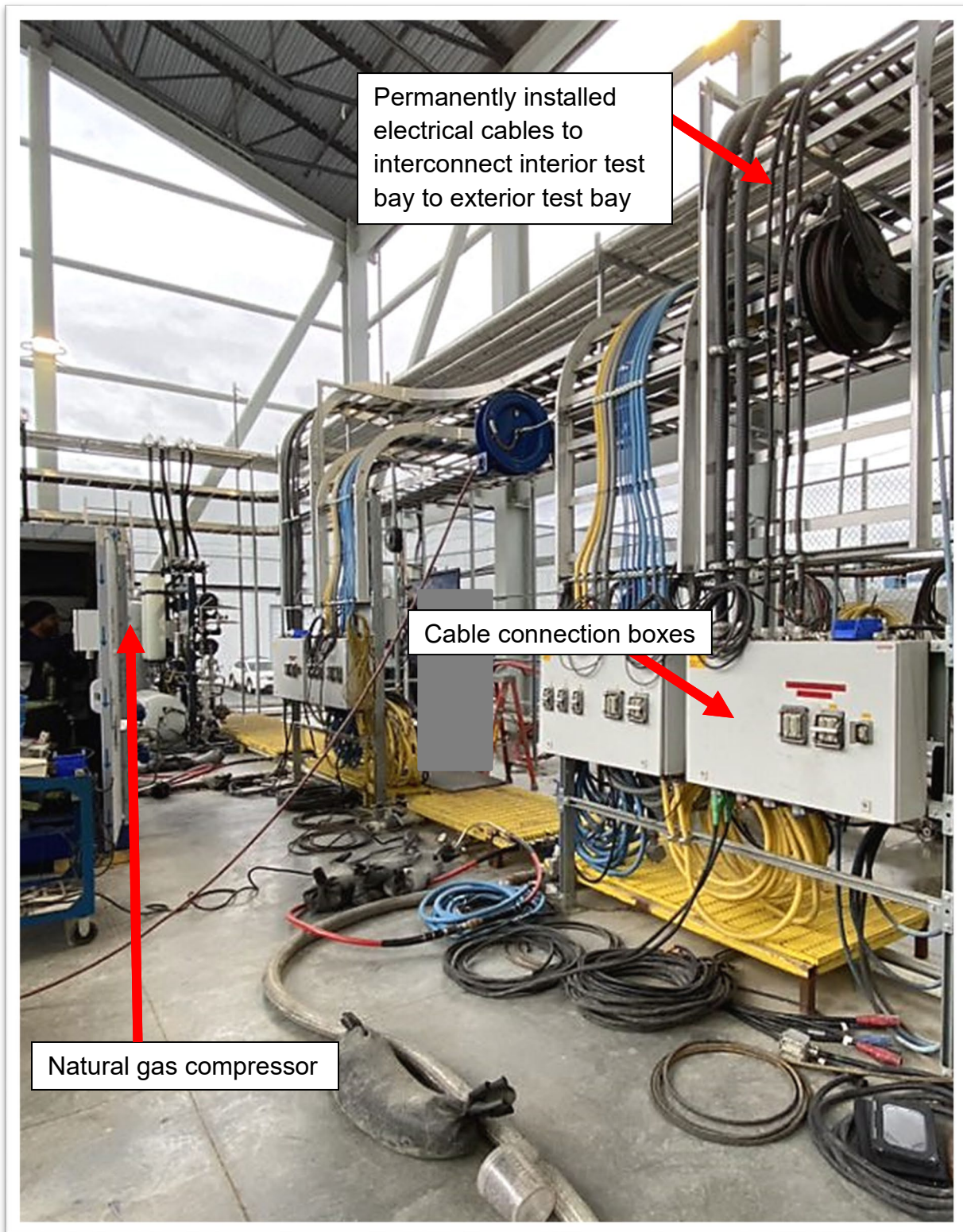
## Incident Summary #II-1268495-2021 (#24429) (FINAL)

SUPPORTING INFORMATION	Incident Date	October 13, 2021	
	Location	Chilliwack	
	Regulated industry sector	Electrical - Low voltage electrical system (30V to 750V)	
	Injury	Qty injuries	1
		Injury description	Damage to the individual's safety glasses and work gloves. No burns or injury to the body.
		Injury rating	Insignificant
	Impact Damage	Damage description	<ul style="list-style-type: none"> <li>• Damage to the Bay 2 power connection boxes in the interior and exterior of test bay.</li> <li>• Damage to the heavy-duty cable connectors that are used to connect test power from the test bay power connection boxes to the natural gas compressor.</li> <li>• Damage to the vent fan contactor on the inside of the motor control centre (MCC).</li> <li>• Damage to the individuals work gloves and safety glasses.</li> </ul>
		Damage rating	Minor
		Incident rating	Minor
	Incident overview	Heavy-duty cable connector connected under electrical load resulted in an arc flash that caused damage to electrical equipment and personal protective equipment. The incident occurred in a facility that manufactures compressed natural gas (CNG) and compressors that are shipped to North America and International customers.	
INVESTIGATION CONCLUSIONS	Site, system and components	<p>Before each compressor is shipped to the customer, it is tested to ensure that all the components are functioning properly. The electrical system for testing consists of a distribution system that is designed to test the compressors at either 600-volts or 480-volts depending on the customers requirements.</p> <p>Test Bay:</p> <ul style="list-style-type: none"> <li>• A typical test bay has a section on the exterior of the building where the compressor is located, and a section on the interior of the building where a motor control centre (MCC) that controls all the electrical components of the compressor, is located.</li> <li>• The interior section and the exterior section are interconnected with permanently installed electrical cables that terminate into power connection boxes at either end. This is essentially a large jumper to transfer all the power and controls between the two sections of the test bay.</li> <li>• The power connection boxes as well as each piece of electrical equipment used for testing are equipped with either cam lock style cable connectors, or large heavy-duty cable connectors that allow the power and control wiring, required to run the compressor for testing, to be easily connected or disconnected in a timely manner (See <a href="#">Photo 1</a>).</li> </ul>	

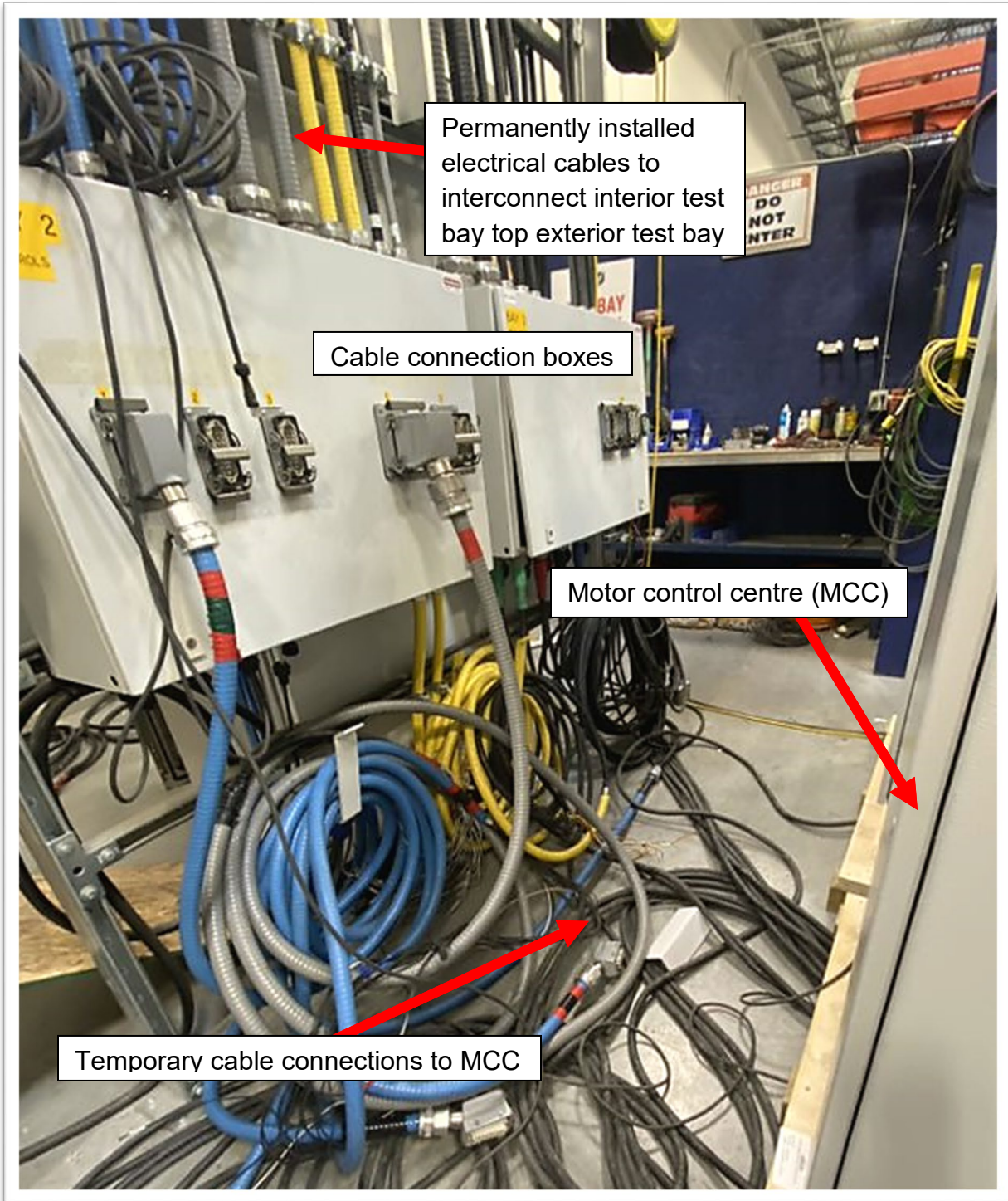
## Incident Summary #II-1268495-2021 (#24429) (FINAL)

<p>Failure scenario(s)</p>	<p>An individual was connecting test cables from the power connection box to the natural gas compressor in the exterior section of test bay 2. The individual was not aware that the power was turned on to the MCC on the inside section of the test bay.</p> <p>There is a detector on the inside of the compressor that senses a natural gas build up and will automatically turn ventilation fans on through the MCC control wiring.</p> <p>At the time the individual was connecting the test cable for the ventilation fan power, the detector had sent a signal to the MCC for the ventilation fans to turn on. When the individual tried to connect the test cable for the compressor ventilation fans, there was an arc flash due to connecting the test cable under an electrical load.</p>
<p>Facts and evidence</p>	<p>Onsite interview and tour with head electrician for the facility and test bay foreman:</p> <ul style="list-style-type: none"> <li>• Voltage selected for the compressor test was 480-volts and confirmed the power to the MCC was on.</li> <li>• The individual was not aware that the MCC was powered on.</li> <li>• The control test cables were already connected from the MCC to the compressor.</li> <li>• The gas detector inside the compressor was reading a gas level of 17% lower explosive limit (LEL) which is a percentage of natural gas in the atmosphere where it is ignitable. The gas detector would be sending a signal to turn the compressor ventilation fans on.</li> <li>• The heavy-duty connector that arc flashed has 32 pins inside of it that are approximately one centimetre apart from one another. The connector is not designed to be connected under load (See <a href="#">Photo 2</a>).</li> <li>• Arc flash evidence was present on the individual's safety glasses and work gloves (See <a href="#">Photo 4</a>).</li> <li>• Arc flash damaged electrical components were observed (See <a href="#">Photo 3</a>).</li> </ul>
<p>Causes and contributing factors</p>	<p>It is almost certain that the cause of the arc flash was due to the attempted connection of the heavy-duty cable connector that is not designed to be connected under an electrical load.</p> <p>The contributing factors are that the individual was not aware that the main power to the MCC was turned on, and that the gas detector was signalling the ventilation fans to turn on creating an energized power connection box.</p>

## Photos 1 – Locations

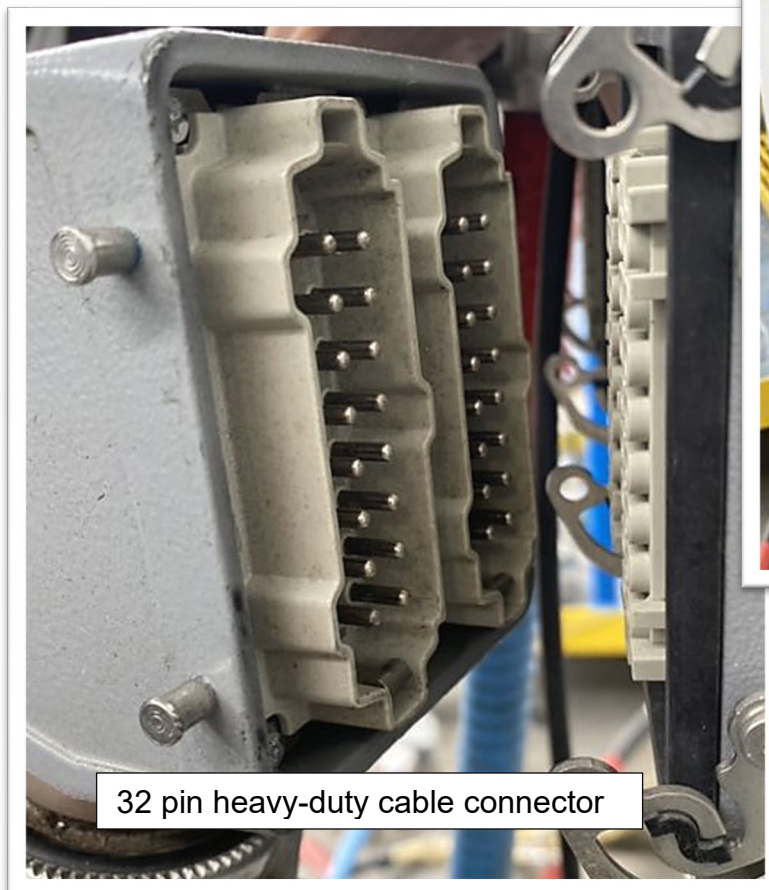
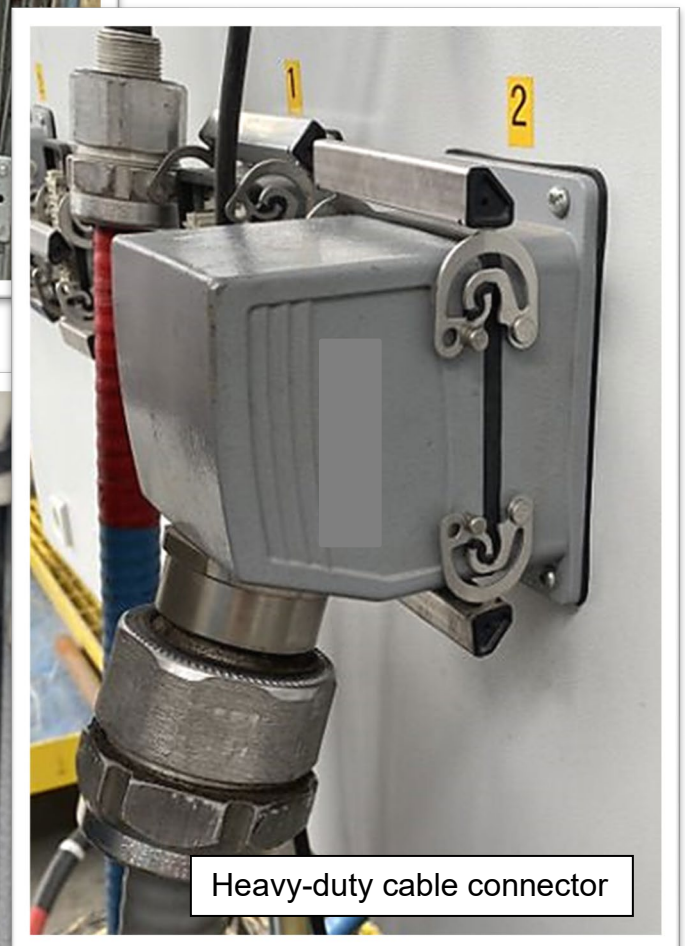
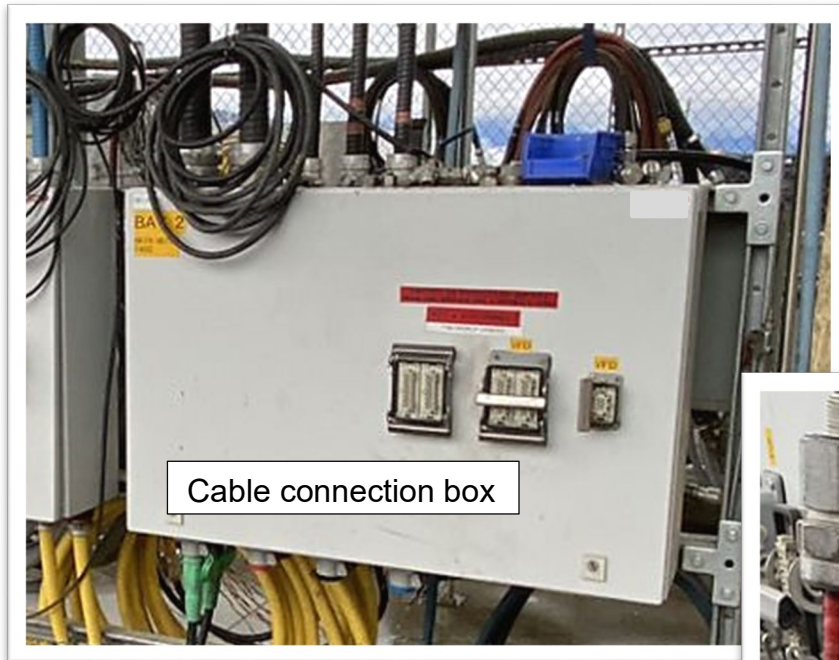


### EXTERIOR SECTION OF TEST BAY

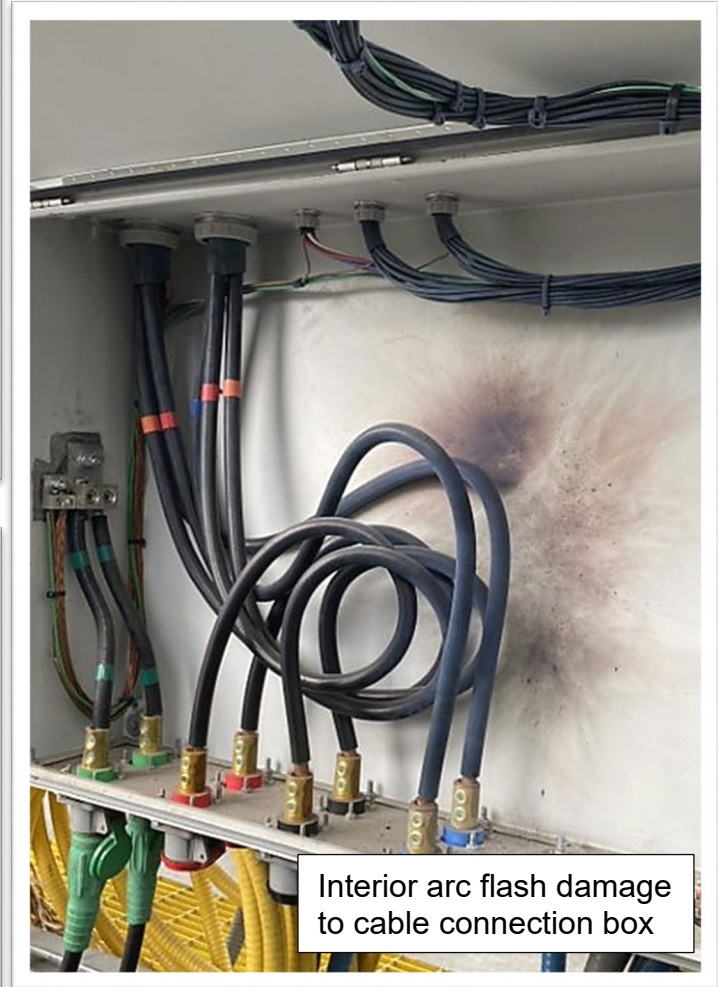
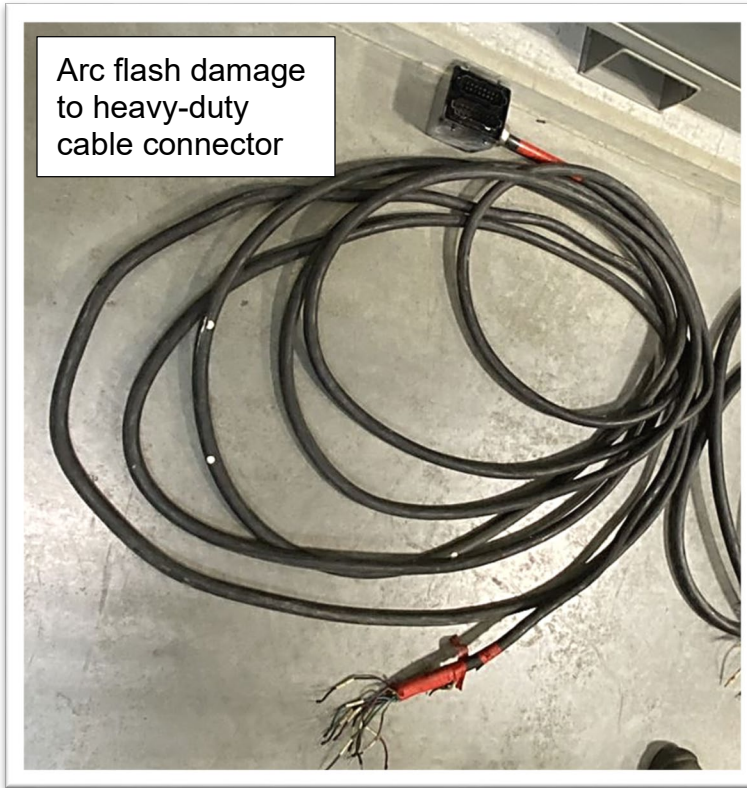
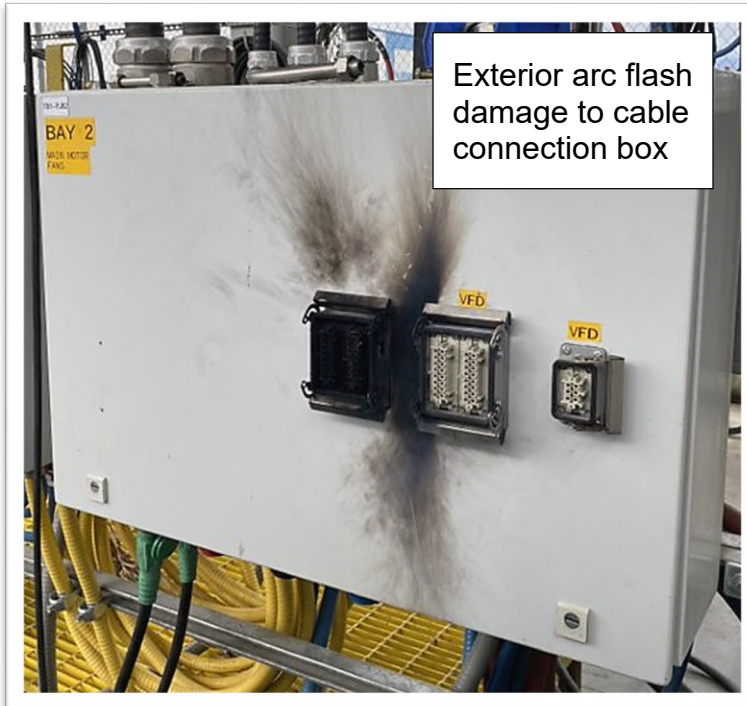


## INTERIOR SECTION OF TEST BAY

## Photos 2 – Before arc flash



## Photos 3 – After arc flash



## Photos 4 – Personal Protective Equipment



Arc flash damage to individual's personal protective equipment

