

Incident Summary #II-1629847-2023 (#41057) (Final)

SUPPORTING INFORMATION	Incident Date	November 3, 2023	
	Location	Salmon Arm	
	Regulated industry sector	Electrical - High voltage electrical system (greater than 1000V)	
	Impact	Qty injuries	0
		Injury description	N/A
	Damage	Injury rating	None
		Damage description	High voltage 25kv unit sub-station was wetted and tripped the 'Utility' system overcurrent protection upstream from the high voltage equipment. The overcurrent protection for the high voltage unit sub-station failed to operate.
		Damage rating	Insignificant
	Incident rating	Insignificant	
Incident overview	An existing high voltage unit sub-station with a faulty main overcurrent disconnecting means became wetted from a cut water line which did not trip which resulted in tripping the utility supply overcurrent protection upstream.		
INVESTIGATION CONCLUSIONS	Site, system and components	A 25kv 3-phase high voltage unit sub station transforms the high voltage to end user voltage rated at 120/208volt 3-phase 4-wire. This end user voltage then provides a mall and the different tenants with power for lighting, receptacles, and heating. Both the high voltage and the low voltage power are protected by main overcurrent devices that activate when a fault occurs.	
	Failure scenario(s)	During saw cutting of a concrete floor, a water main 'elbow' in the concrete floor was cut and sprayed water in the air and over the plastic partition barrier the contractor installed to protect the high voltage equipment from moisture from the saw cutting process. The water land on top of the high voltage unit sub-station equipment and entered the equipment running down 25kv bussing between the main breaker section and the utility metering section. The water provided a path between phase and ground creating a short circuit condition. The main overcurrent in the high voltage unit sub-station failed to trip, which resulted in the Utility supply overcurrent protection to trip which was located off the property.	

Incident Summary #II-1629847-2023 (#41057) (Final)

<p>Facts and evidence</p>	<ul style="list-style-type: none"> • The high voltage unit was serviced in May of 2022 when it was noted the main 25kv breaker was inoperable noting numerous failed plastic parts, dried lubrication, and brittle components. • No prior servicing of the high voltage equipment was noted or known from original time of installation. • During the preparation phase, the Contractor obtained the services of a locator company and all drawings available for any underground in the area where trenching was noted to be performed, the plans and locates failed to be accurate. • A copy of service report from the high voltage service company supported the main breaker was faulty. A label applied to main disconnected noted 'Do Not Operate'. • Design of replacement service was acted on and put in motion with engineering and utility supply design. • During saw cutting of floor, a watermain was hit and sprayed water over the plastic barrier entering the high voltage equipment. • Main breaker failed to operate resulting in the utility supply overcurrent tripping upstream that was located off the property. • Initial discussion with utility noted: Utility cut-outs at customers pole were solid blades with no fusing installed, 2- 65T fuses upstream did not blow, 3- utility re-closures at other location saw the fault and tripped with automatic Utility re-attempts to re-energize prior to locking out. • Follow up discussion with utility noted: 1- the 65T fuses upstream 'did' trip and performed their function properly. • The only safety devices that operated were 'Utility owned' equipment, 'duty holders' safety devices failed.
<p>Causes and contributing factors</p>	<p>It is very likely the 'faulty' main breaker failed to open when the cutting of the water main, and the water spraying on top of the high voltage equipment, caused a fault to occur within the high voltage equipment resulting in the utility supply overcurrent devices to act as the safety device for de-energization regulated electrical equipment at the mall.</p>

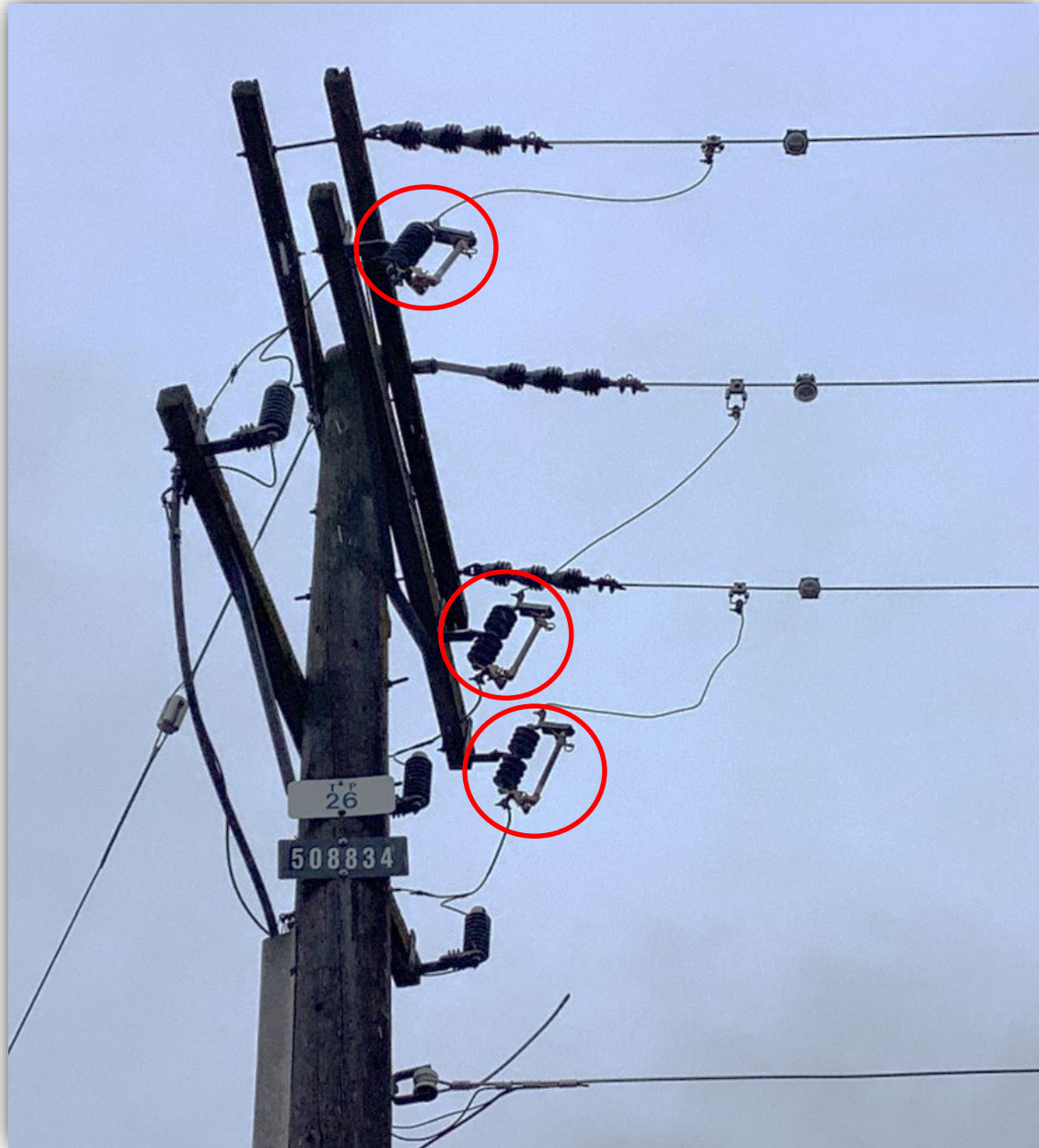


Image 1 - Existing utility cut-outs located outside back of mall in alley. Originally not fused (now has 40T fuses installed).



Image 2 - Original coring hole that hit watermain's cast iron pipe fitting that was encased in concrete.



Image 3 - Remaining floor cut open, exposing damaged waterline. Saw cut can be seen to cast iron elbow on the top, where it runs horizontally.

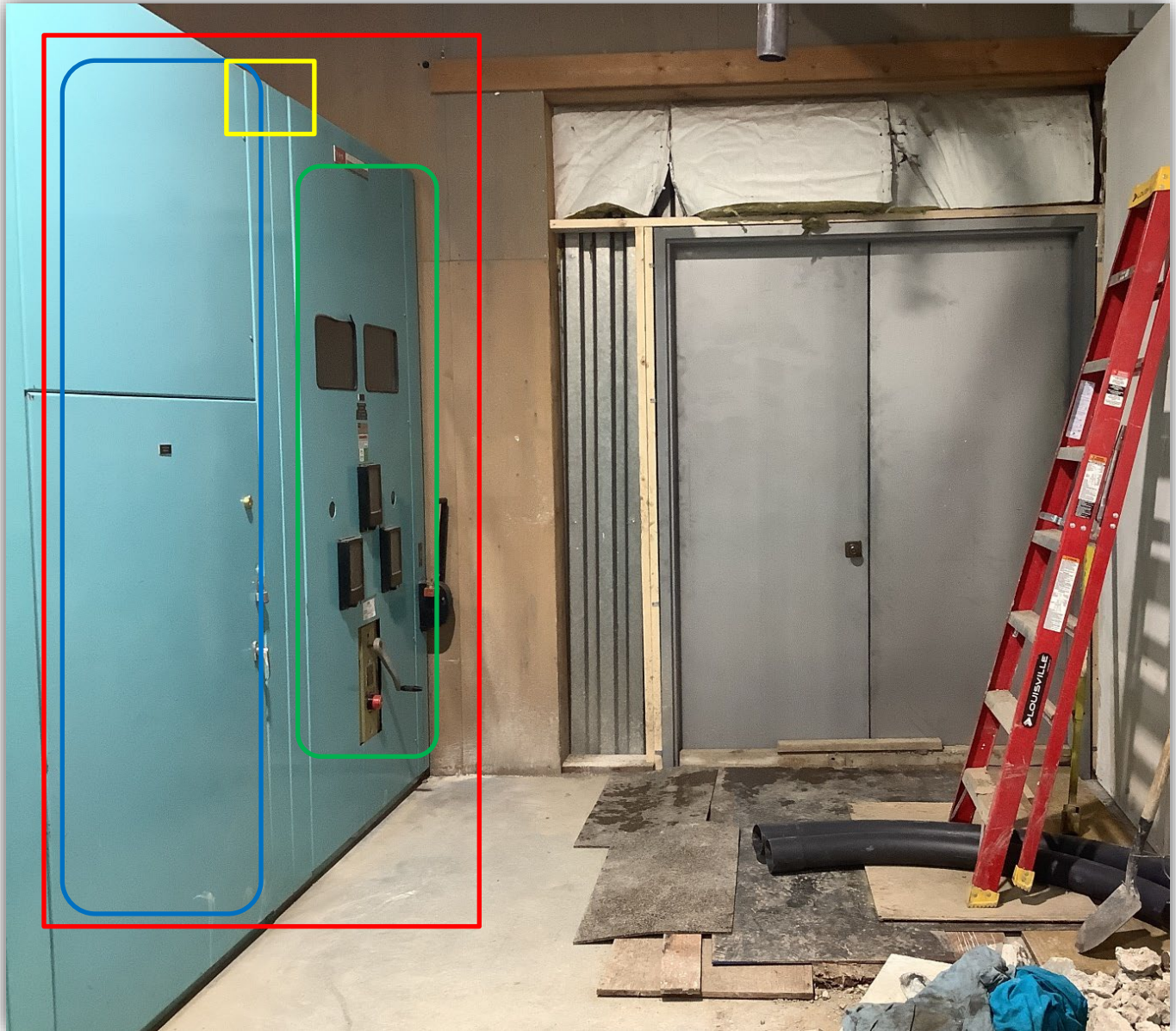


Image 4 - Saw cut area in front of man-doors covered with plywood

Red: Main High Voltage equipment located to left of the door.

Blue & Green: Utility metering section located to left side of main switch compartment.

Yellow: Water entered through the topside of high voltage equipment between the 2 sections.



Image 5 - High Voltage Unit Sub-station labelling.

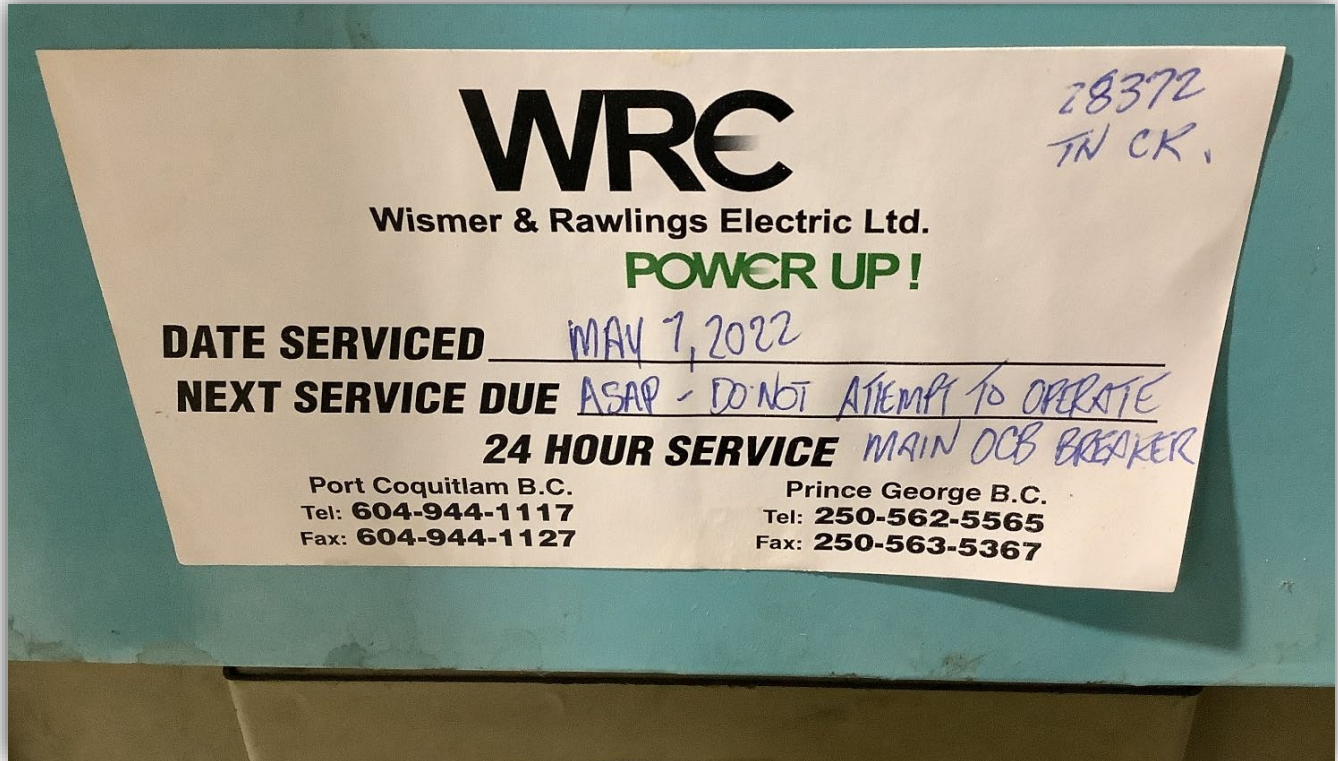


Image 6 - Testing company label applied May 7, 2022 noting "DO NOT attempt to operate main OCB breaker".

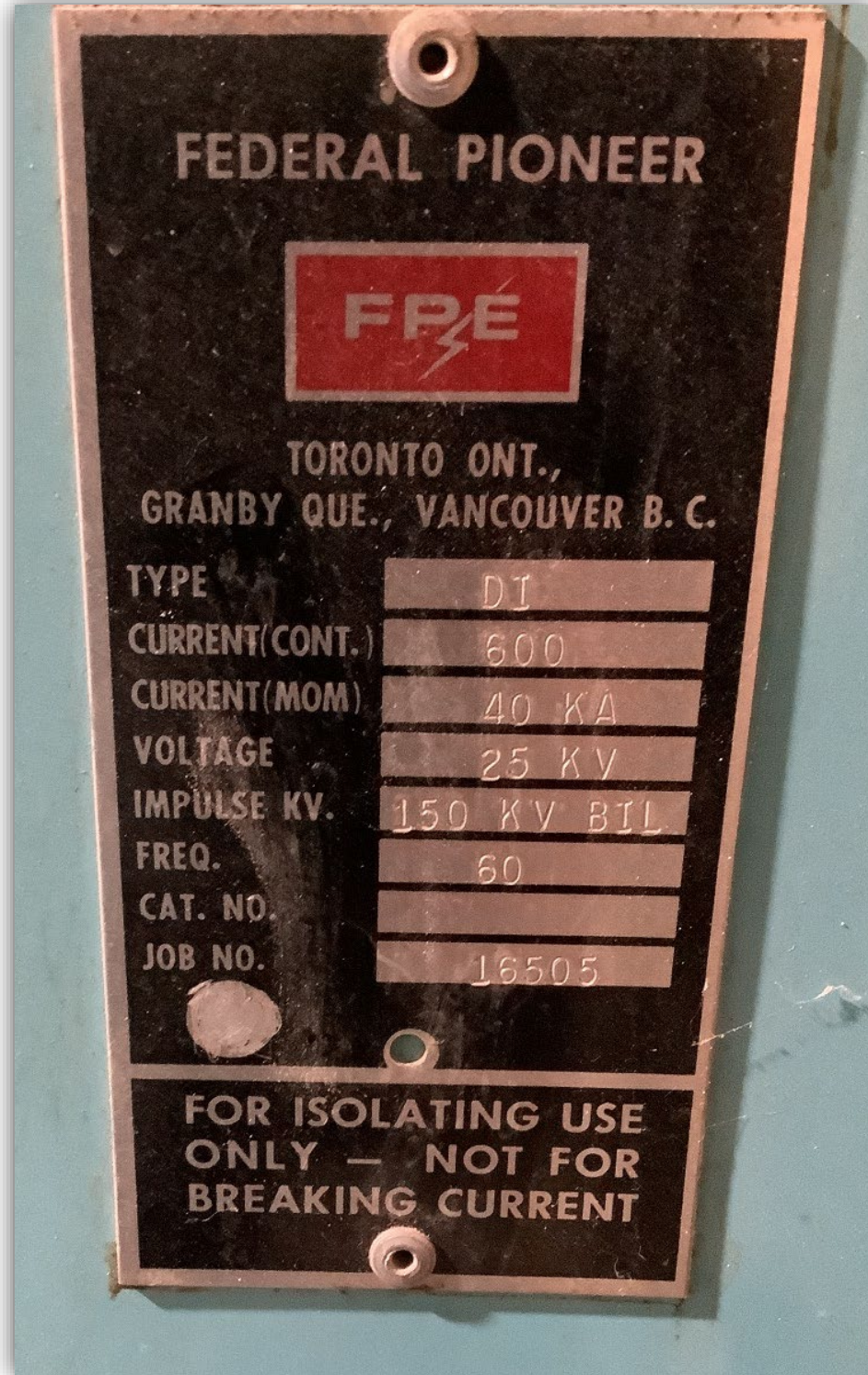


Image 7 - Additional equipment label.