

Incident Summary #II-1539440-2023 (#34696) (FINAL)

SUPPORTING INFORMATION	Incident Date	April 23, 2023	
	Location	Vernon	
	Regulated industry sector	Electrical - Low voltage electrical system (30V to 1000V)	
	Impact	Qty injuries	0
		Injury description	N/A
		Injury rating	None
	Damage	Damage description	A detached electrical service building had a fault that caused a fire and destroyed the structure and regulated electrical equipment.
		Damage rating	Major
	Incident rating	Major	
Incident overview	A fire ignited in a detached structure that housed an 800amp 120/208volt electrical service and sub-distribution equipment on west half of structure and a mechanical room on east half of structure that provided power to an agricultural operation in a separate detached building. The fire destroyed the building, the regulated electrical equipment and the utilities pad mount transformer and cabling.		
INVESTIGATION CONCLUSIONS	Site, system and components	An 800amp 120/208 volt 3-phase 4-wire service and sub-distribution was in a detached and dedicated service building and used to provide power to various distribution panel boards located in a separate structure to operate lighting, heating/cooling, ventilation, and de-humidification equipment.	
	Failure scenario(s)	<ul style="list-style-type: none"> • The system has been in operation since 2018. • The site power was disconnected by the utility approx. 1-3 weeks prior to incident due to outstanding fees. • The power was re-energized on payment within 3 days of de-energization. This included the utility opening and closing of the main fused disconnect to isolate the system from another service connected to the same utility pad mounted transformer. • On the day of the incident in the early morning hours, a worker of a nearby building noted smoke coming from the electrical building at the area of where the main switch is located, photo provided supported information. • The building ignited and burnt to ground; fire fighting efforts were unable to save any part of the structure. 	

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<p>Facts and evidence</p>	<ul style="list-style-type: none"> • A large agricultural operation located in a separate building has been in operation since 2018, the 800amp 120/208volt 3-phase main fused disconnect has no documentation that it had any prior inspections or operation testing performed through discussion with the FSR listed on the operating Permit. • Information provided by the utility noted large loads operating at this site but were within the maximum continuous rating of the switch. • Utility performed a site review of the pad mounted transformer in prior months as there were concerns of the transformer running too hot. When looking at the internal transformer temperature gauge the temperatures showed 41 degrees Celsius. • Approx. 1-3 weeks prior to incident the Utility was required to physically open (de-energize) the owners main fused disconnect to isolate from a second 800amp service that was connected to same pad mount transformer. Once fees were paid, the owners fused disconnect was re-energized at the utility pad mount transformer. • In previous years the summer temperatures in the area have been noted in upwards of 49 degrees Celsius during summer months and there was no air conditioning observed for the cooling of the electrical building. • The Fire Department representative noted that when on scene, the fire/flames were located near the NW corner of the building where the main service switch was located. Initial photo support's location. • The utility L-pull box has all the utility conductors melted/ destroyed, along with the splitter lug connection blocks in the upper portion. • The main fused disconnect shows the lower portion of the load side fuses and cable terminations were still partially existing but laying in the bottom of the switch. The operating mechanism of the switch and all the upper cabling and switchgear were destroyed, excessive heat noted within the main fused disconnect switch.
<p>Causes and contributing factors</p>	<p>The cause of the incident likely originated within the main fused disconnect and may be directly related with the operation of the disconnect prior to the incident.</p> <p>Overtime, the safe operation of a fused disconnect switch can be affected by the electrical loading on the fused disconnect switch and the excessive heat within the room that could cause the factory installed grease to dry out on the blades of the fused disconnect switch and/or weaken the spring-operated mechanism causing the fused switch blades to not fully engage/close.</p> <p>The interior connections within the upper utility pull-box may be attributed to the incident as the unfused conductors from the utility transformer may have failed post initial incident which contributed to the faulting creating the heat and flames destroying the rest of the electrical equipment and burning the structure.</p>

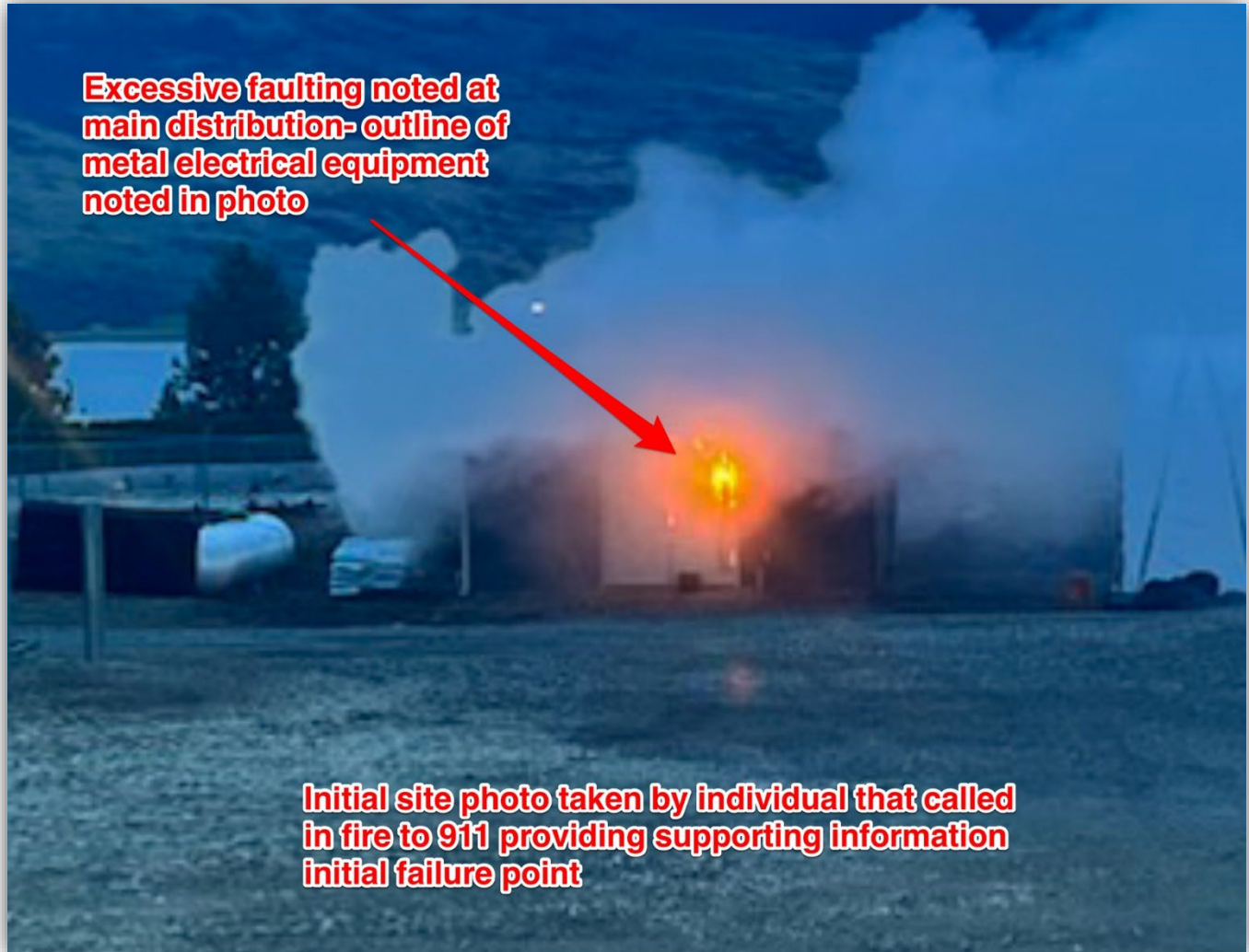


Image 1 – This image was provided by first person on scene taken at time when 911 was called. This provides supporting evidence source of ignition at main service equipment area.



Image 2 – Site view facing south of as-found site review.



Image 3 – Main Service entrance equipment:

- Vertical Utility pull box/splitter section has all conductors and conductor mounting hardware destroyed. This is where the unfused utility conductors enter the building from the pad mount transformer.
- Upper Utility Pull-box splitter portion has all the 'bussing and conductors destroyed.
- 800amp Main fused disconnect operating hardware and conductors are destroyed.



Image 4 – Interior of the 800amp fused disconnect switch, with the load side fusing laying in bottom with lugs still attached, all line side operating hardware mechanisms, and all conductors are destroyed.



Image 5 – Main Upper interior view of 800amp main fused disconnect switch, all conductors are destroyed, evidence of excessive interior arc-faulting occurrence.



Image 6 – Interior view of 800amp main fused disconnect door providing evidence of arc-faulting occurring within main switch.



Image 7 – As-found view of fuses laying in bottom of 800amp main fused disconnect switch.



Image 8 – Main 800amp fuses pulled out from disconnect for viewing noting damaged load side fuses/connections remain with partial pieces of switching hardware connect to line side.



Image 9 – Interior view of main 800amp fused disconnect switch and the location where neutral block would be installed. Excessive heat noted with melting of metal enclosure noted.



Exterior view of hole burnt through identified neutral block location to combustible wall

Image 10 – Hole burnt through backside of 800amp fused main disconnect switch located at neutral block mounting position.



Image 11 – Utility 'L' Pull-box vertical section. This section provides cable mounting blocks for utility to support incoming underground conductors from utility pad mount transformer.



Image 12 – Backside edge view of upper utility pull-box showing signs of deformation from interior fault allowing excessive arcing to release from cabinet. Intense heat within utility L-pull box deformed joints, creating openings for heat/sparks/flames to escape to combustible walls.



Image 13 – View of interior of upper utility pull box showing excessive interior electrical faulting.



Image 14 – View from outside of the electrical room building on the westside, showing the damage to the sub-distribution equipment, the existing splitter and feeder conductors. Main 800amp fused disconnect switch viewed on left, and utility CT cabinet at lower mid area fell during fire.



Image 15 – South backside exterior wall of electrical room that sub-distribution was secured to laying on ground with studs and sheathing showing fire damage with areas not burnt.



Image 16 – Internal view of electrical room looking south note burnt studs to left standing which was the separation wall between electrical and mechanical areas of the structure.



Image 17 – View of Mechanical room from south side, evidence of structure plywood and insulation not fully destroyed. Boiler noted at upper-right of photo. Metal water racks still standing, plastic interior water containers destroyed.