

Hardening Communications Infrastructure to Reduce MTR's and Improve Reliability

Oct 19, 2017

Ted Villemaire



Meter Trouble Reports_MTR's

Measurement

Records / MSP Performance Reports

POWERSTREAM INC. (MSP) (108932) Performance Report for August - 2017




Summary News Related Actions

Download Report:

MSP Performance Report - MSPPWRST - August 2017.pdf

Measure	Target	MSP Monthly Results	All MSPs Monthly Results	MSP 12-month Results	All MSPs 12-month Results
1. Successful Daily Meter Communication on First Attempt	90 %	97.09 %	92.51 %	98.08 %	93.66 %
2. Successful Daily Meter Communication	95 %	99.87 %	97.78 %	99.64 %	97.72 %
3. Communication Meter Trouble Reports Issued					
- # of communication MTRs issued	0	0	200	6	757
- % of meter installations without communication MTRs issued	100 %	100.00 %	92.62 %	98.68 %	92.68 %
4. Validation Meter Trouble Reports Issued					
- # of validation MTRs issued	0	2	116	10	472
- % of meter installations without validation MTRs issued	100 %	97.36 %	95.49 %	96.72 %	95.36 %
5. Meter Trouble Reports Resolved Within 2 Business Days of Issuance	95 %	100.00 %	91.53 %	100.00 %	92.26 %

- 
- Vision
 - Estimates
 - Efficiency



NO



Goal

- Eliminate nuisance MTR's and minimize valid MTR's through continuous improvement of our wholesale metering system



Hardening

- Survey_Arrestors

Flir Testing - Arrestor

Thermal Problem Detail Report

Site: PowerStream Overhead 3-Phase Pole Distribution (Vaughan)

Problem Status: OPEN 

Severity: 3

Work order #:

Location: Vaughan (3-Phase Overhead Distribution) \ Primary Metering \ P39200 (North of P1064) \ West feeder

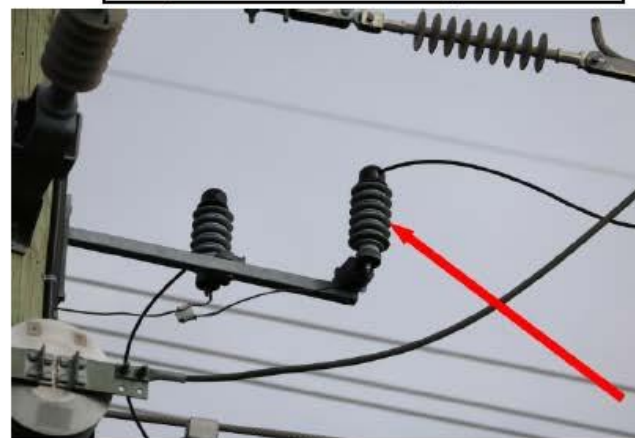
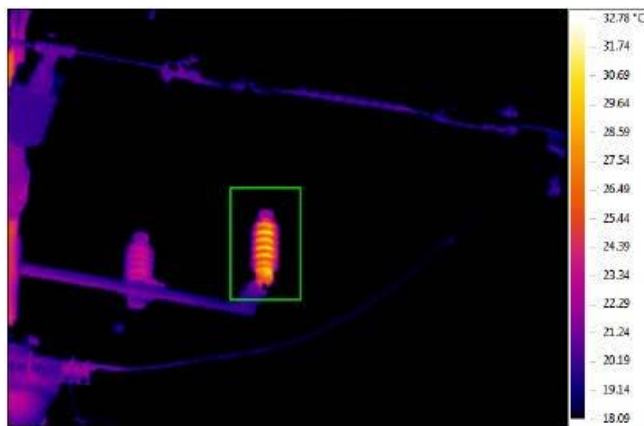
Equipment: V67-M45M3

Voltage: 27600 **Barcode:** 1000020600

Rated Load: **Asset ID:** 1000020600

IDN File: 41c20d04-71a8-4840-a86a-bb5bc01b0821.idn

Inspection#: 14	Prob#: 3
Prob Date&Time: 09/30/2016 15:52	
Indirect Temp.Measurement: Yes	
Component Temp.: 26.6@N/A	
Reference Temp.: 21.7@N/A	
Temp.Rise: 5.0@N/A	



Description: Bottom phase surge arrester

Probable Cause: Leakage current - varistor column deterioration

Recommendation: Monitor for temperature rise

Paddle Connection

Site: PowerStream Overhead Distribution (Barrie)

Problem Status: OPEN 🚫

Location: Barrie Overhead Distribution \ Primary Metering \ P-BUZCFU (Bayfield St. & Carson Rd. SW corner)

Equipment: PME-23M7

Voltage: 44000 **Barcode:** 1000011250

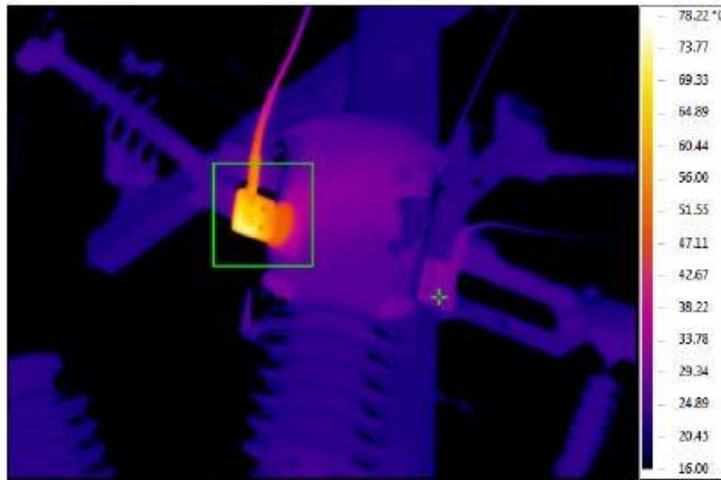
Rated Load: **Asset ID:** 1000011250

IDN File: 2c14b897-9c1b-44c7-83d6-d345717bd934.idn

Severity: 2

Work order #:

Inspection#: 18	Prob#: 1
Prob Date&Time:	09/27/2016 17:24
Indirect Temp.Measurement:	No
Component Temp.:	73.3@N/A
Reference Temp.:	24.7@N/A
Temp.Rise:	48.7@N/A



Description: Roadside (Blue) phase lug bolted connection at H2-C paddle

Probable Cause: High-resistance bolted connection. Significant oxidation on lug.

Recommendation: Clean/remake bolted connections on paddle

Loose Connection

Site: PowerStream Underground Distribution (Vaughan)

Problem Status: OPEN ●

Severity: 2

Work order #:

Location: Vaughan Underground Distribution \ Primary Metering \
#5869 Hwy #7 (~600m W/O Martingrove Rd.)

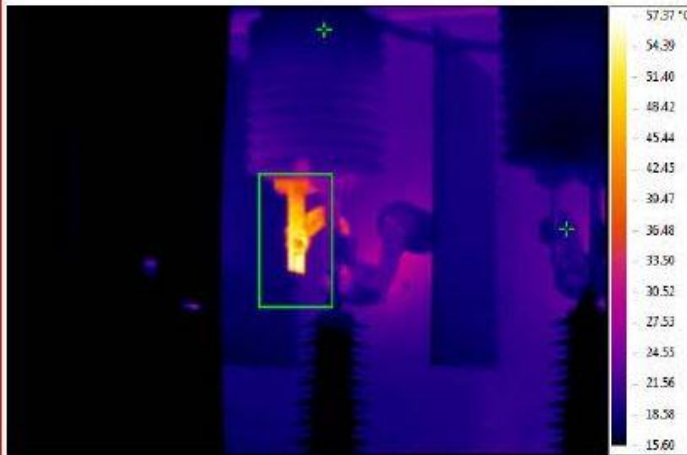
Equipment: PME-D6M6

Voltage: 27600 **Barcode:** 1000012300

Rated Load: **Asset ID:** 1000012300

IDN File: 3c932043-4670-48cc-9027-c40f2df80d18.idn

Inspection#: 12	Prob#: 2
Prob Date&Time:	10/12/2016 11:18
Indirect Temp.Measurement:	No
Component Temp.:	55.5@N/A
Reference Temp.:	19.5@N/A
Temp.Rise:	36.0@N/A



Description: White phase CT, lug connection at H2 paddle

Probable Cause: High-resistance bolted connection

Recommendation: Remake bolted connections to paddle

Ground Bus Hot



Thermal Problem Detail Report

Site: PowerStream Underground Distribution (Vaughan)

Problem Status: OPEN

Severity: 1

Work order #:

Location: Vaughan Underground Distribution \ Primary Metering \ #5869 Hwy #7 (~600m W/O Martingrove Rd.)

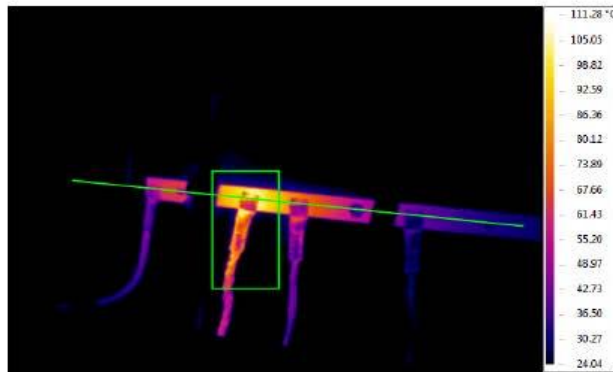
Equipment: PME-D6M6

Voltage: 27600 **Barcode:** 1000012300

Rated Load: **Asset ID:** 1000012300

IDN File: 43a03a38-b61d-4dae-8074-f2ddba1e57e9.idn

Inspection#: 12	Prob#: 1
Prob Date&Time: 10/12/2016 10:59	
Indirect Temp.Measurement: No	
Component Temp.: 105.3@N/A	
Reference Temp.: 20.1@N/A	
Temp.Rise: 85.1@N/A	



Description: Blue phase conductor ground lug bolted connection at ground bar

Probable Cause: High-resistance ground connection. High bleeder current.

Recommendation: Remake ground connections. Check ground currents.

Visual-look up









Blackened Gauge







Normal Gauge



Vines



Vines Impinging on Antenna Cable



IT Spot Checks

23/03/2017 @ 10:15

PT Spot Check				
Phase	Nominal	meter sec	meter prim	error
a	46000	114.42	45768.00	-0.51%
b	na	na	na	na
c	46000	114.24	45696.00	-0.67%

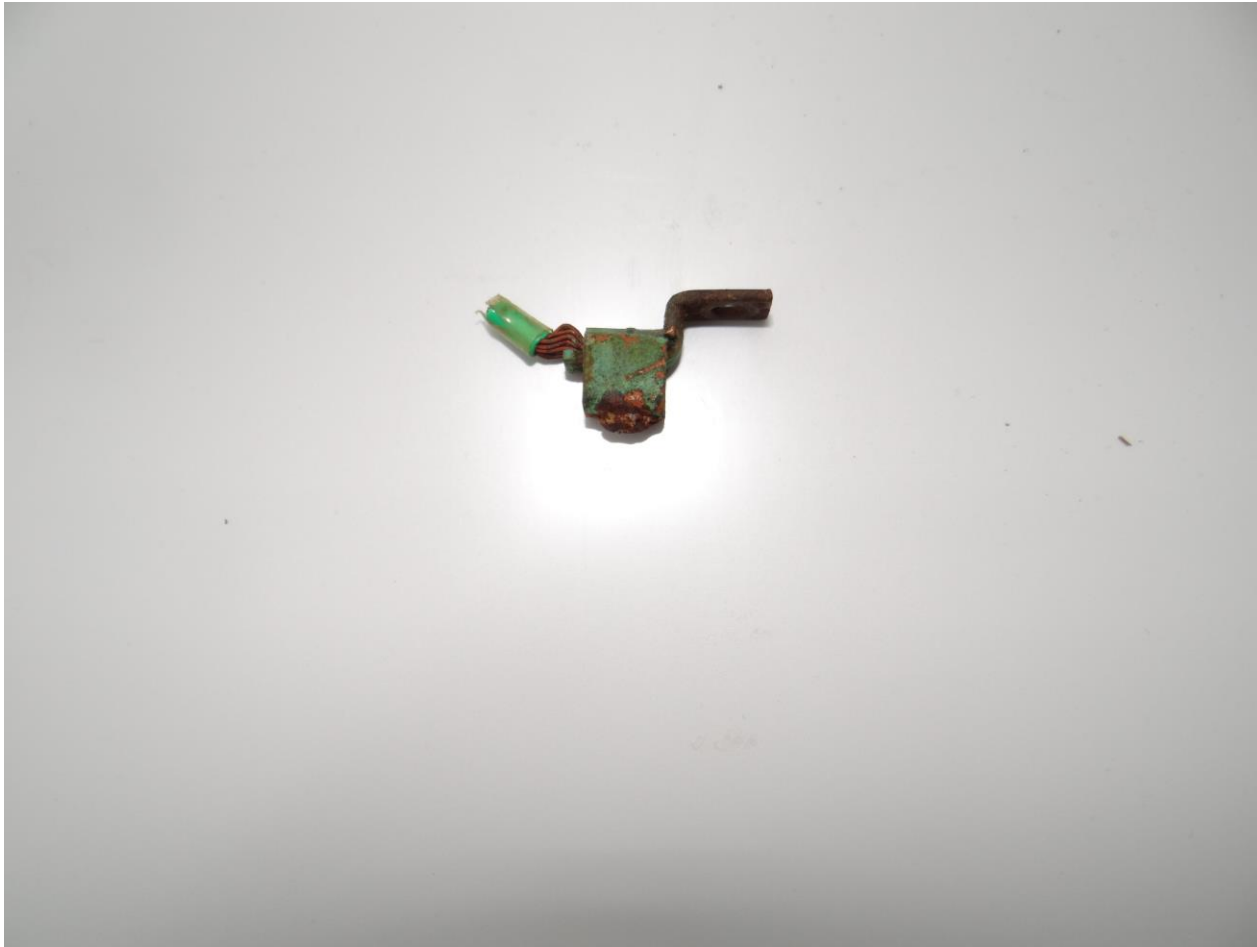
CT Spot Check				
Phase	Control	meter sec	meter prim	error
a	178	1.488	178.56	0.31%
b	na	na	na	na
c	182	1.494	179.28	-1.52%





Model - ION 8300

Grounding



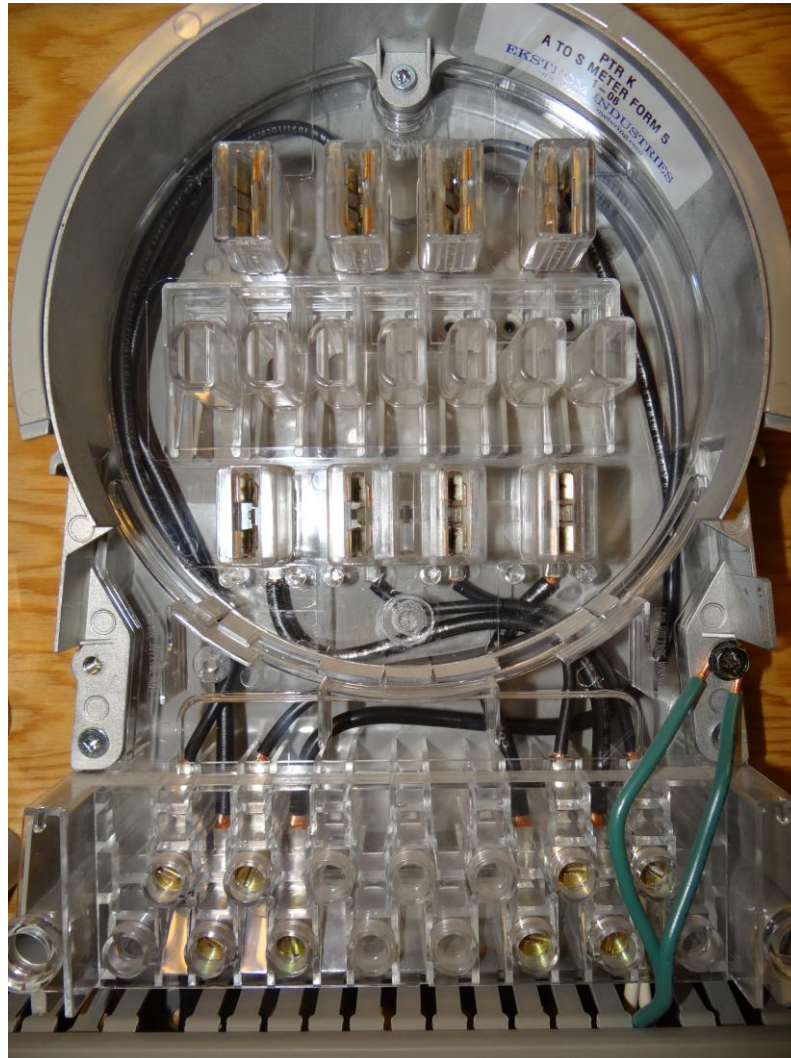
Main Ground Lug



Oxidation-Lug Bolt



Meter Base



TCPIP-Modem



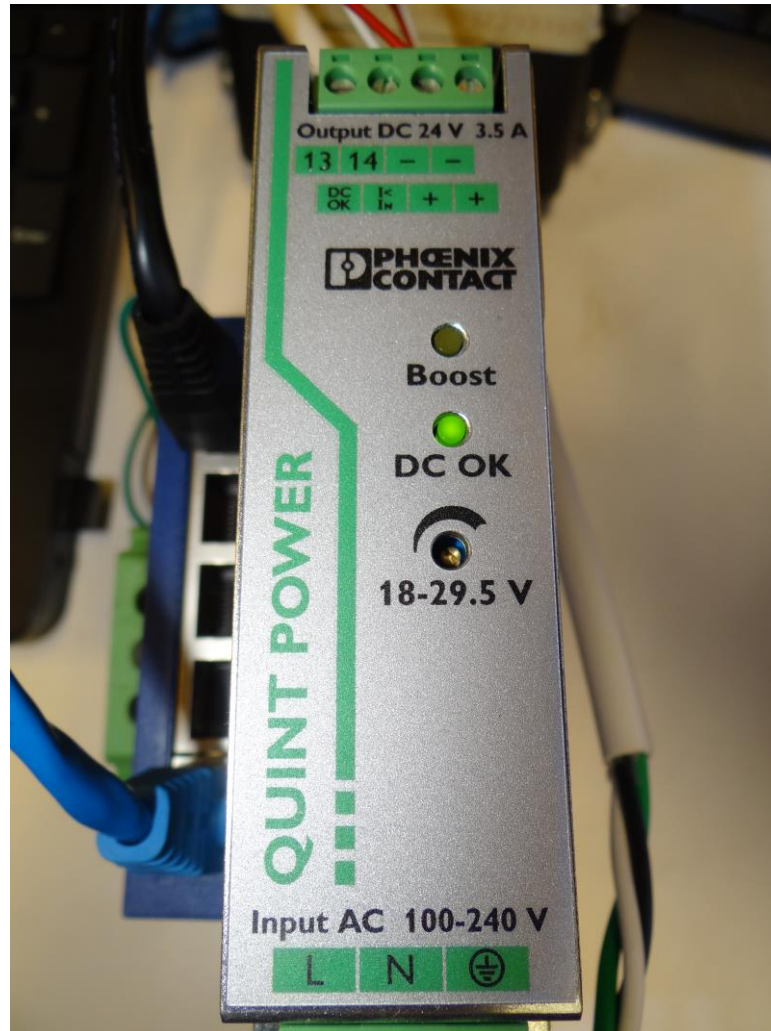
Surge Power Bar



Uninterruptible Power Supply - UPS



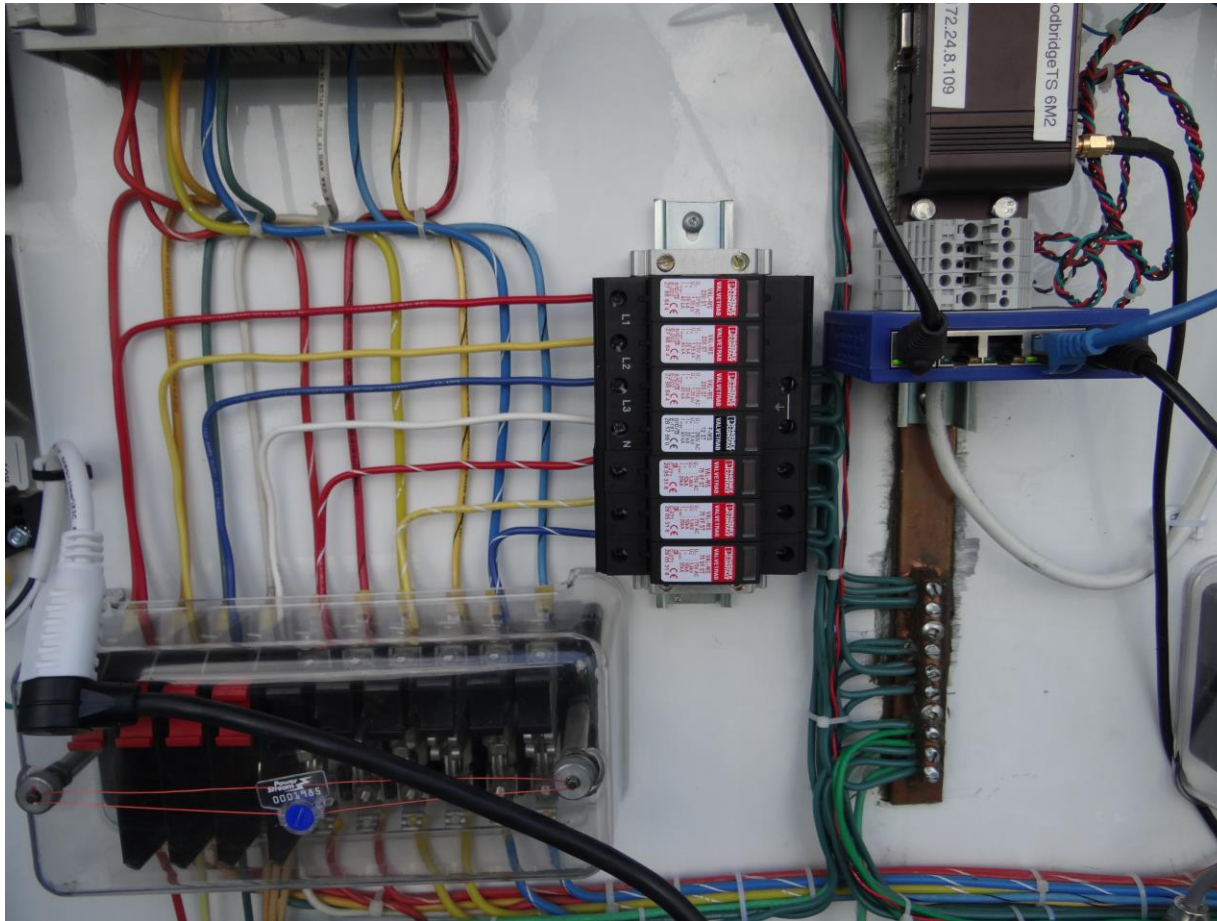
Modem Power Supply



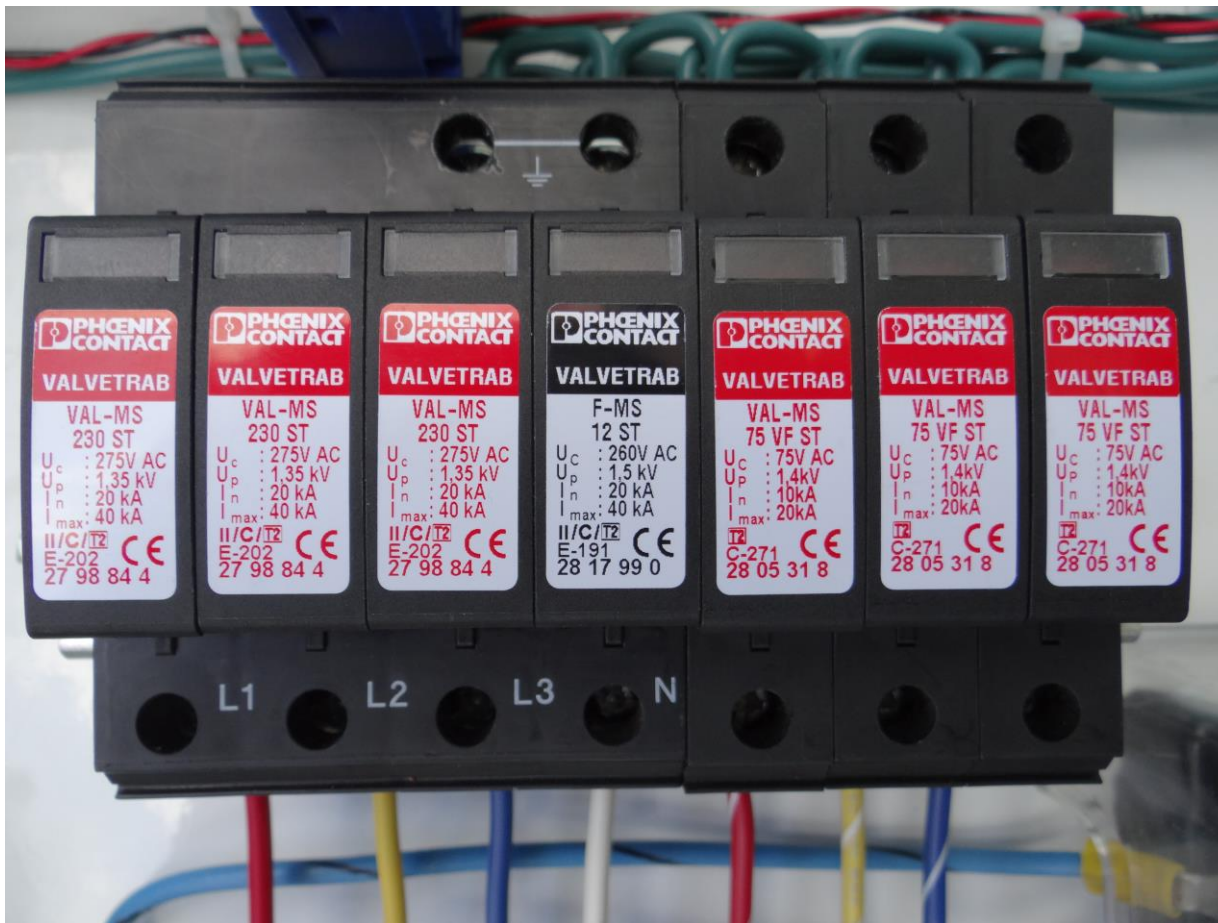
Ethernet Switch



Surge Protection IT's



Surge Protection IT's Wye



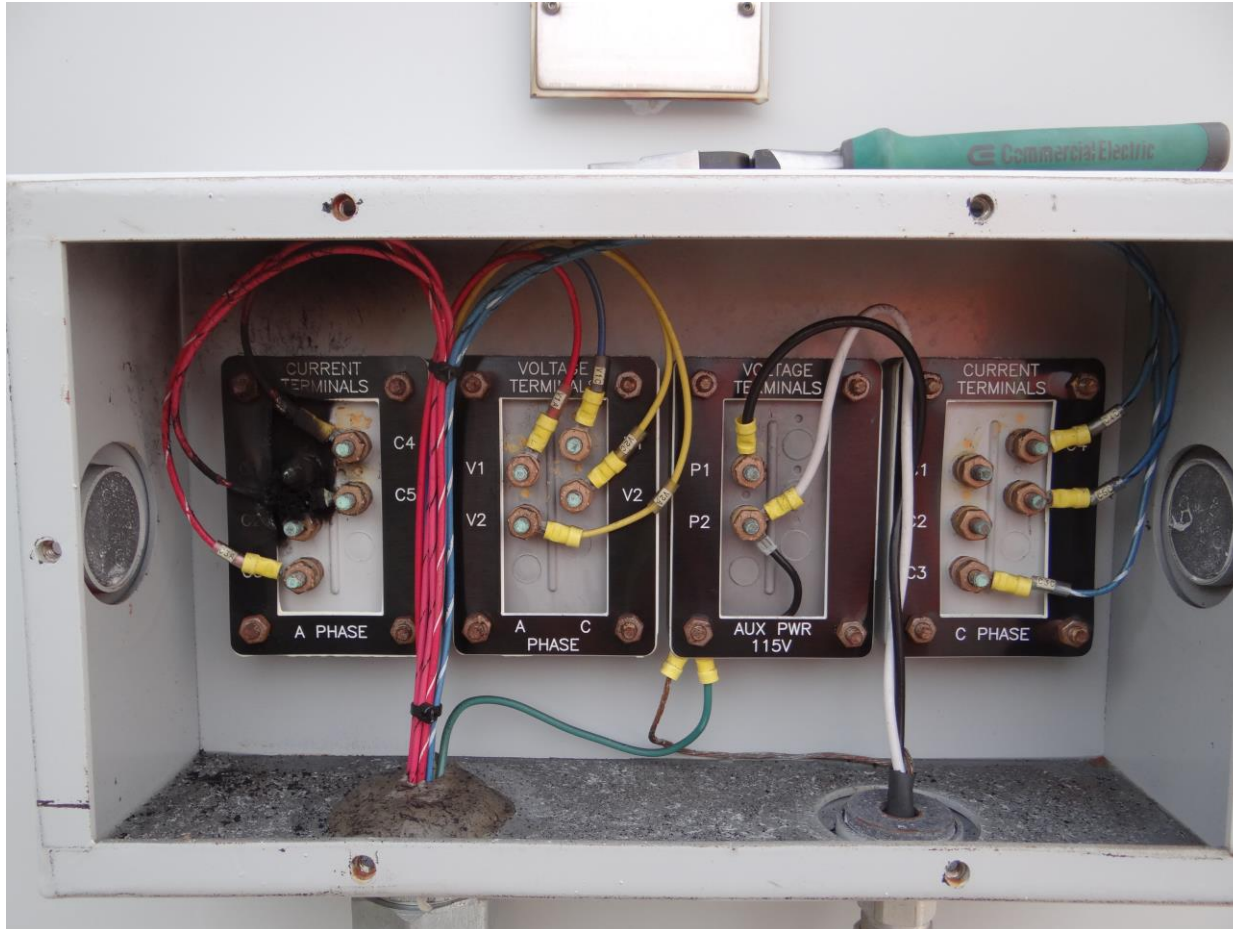
Surge – Supporting Evidence



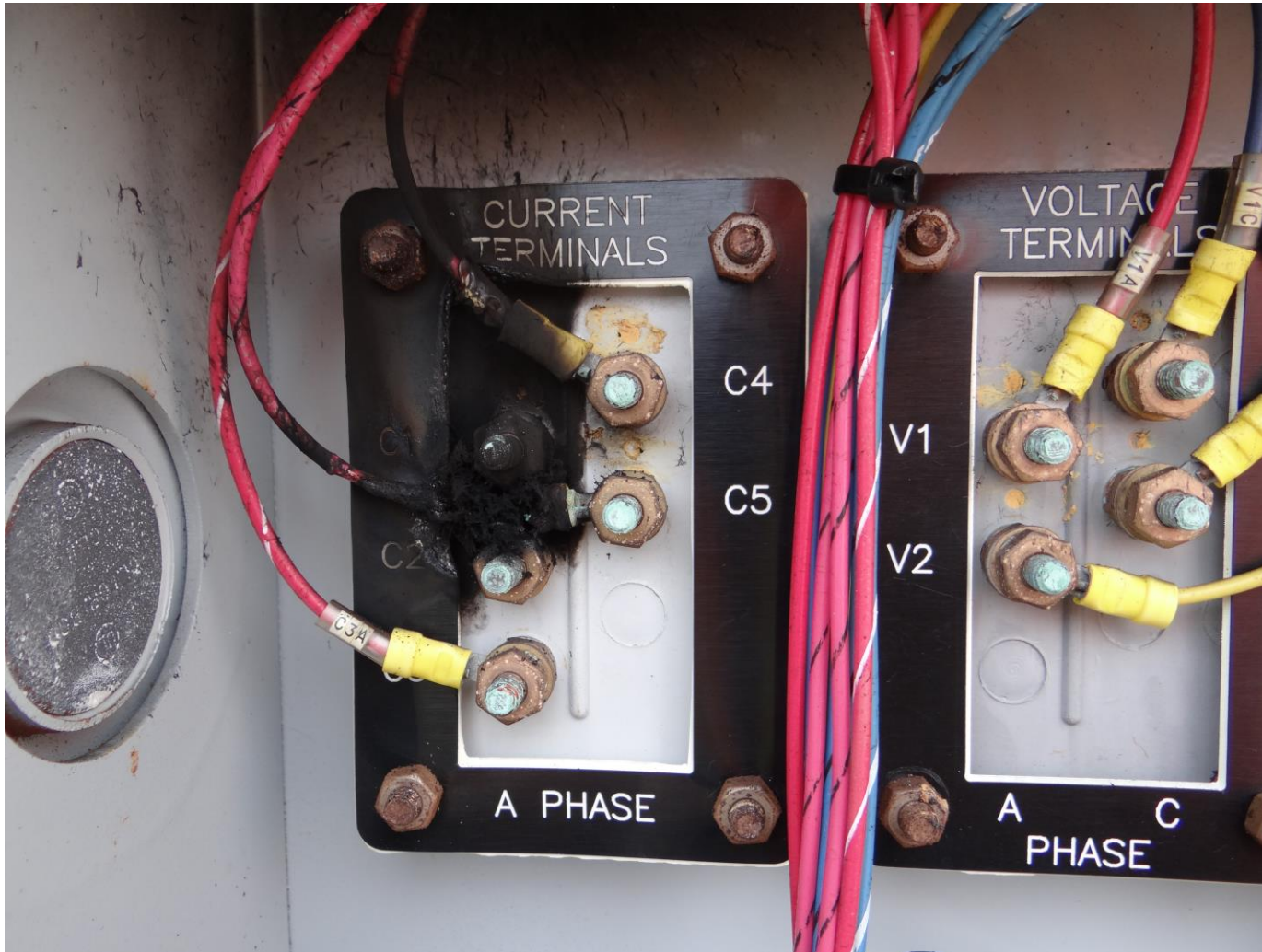
Meter – Lightning Arrestor



Surge – CT

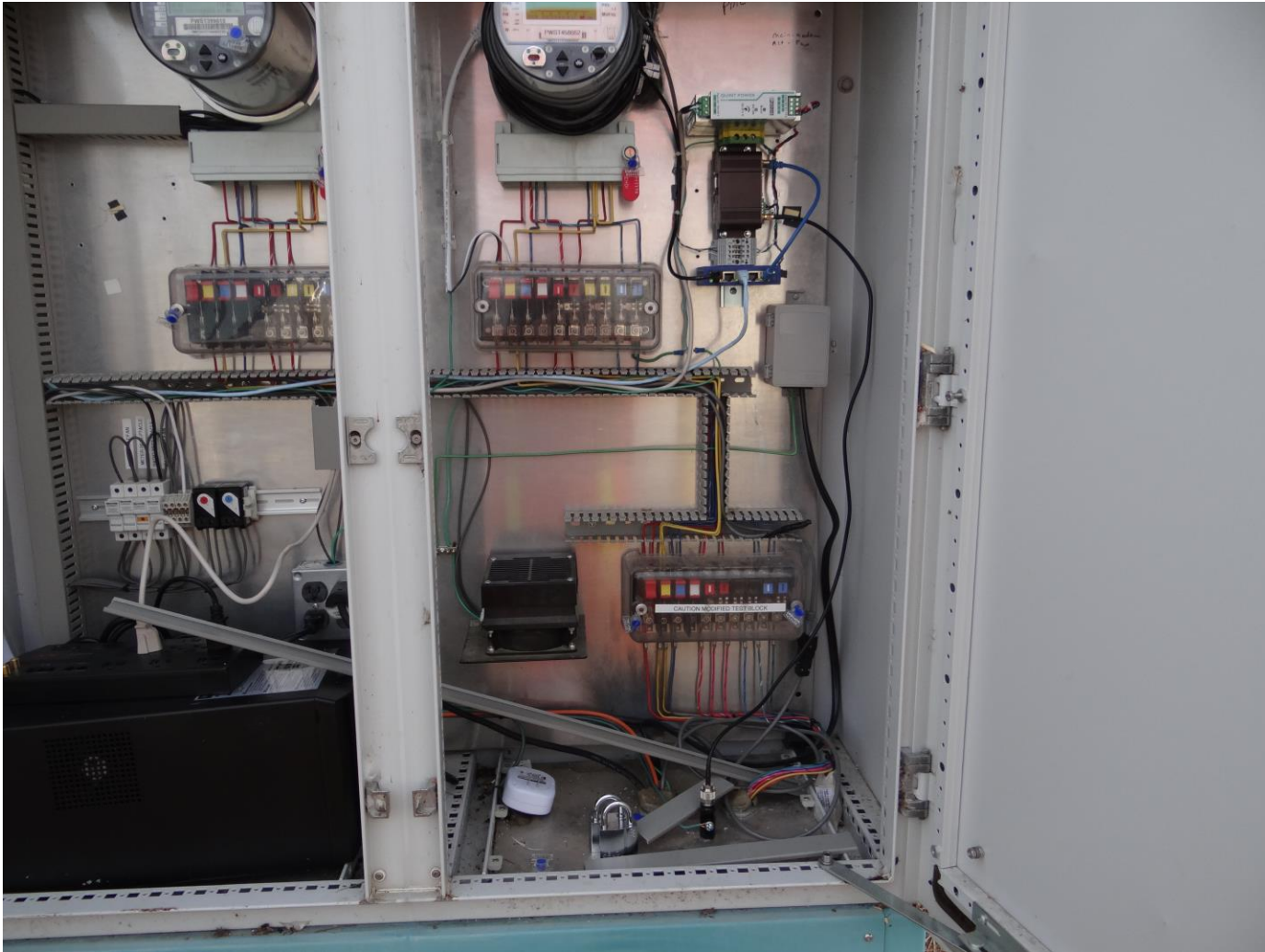




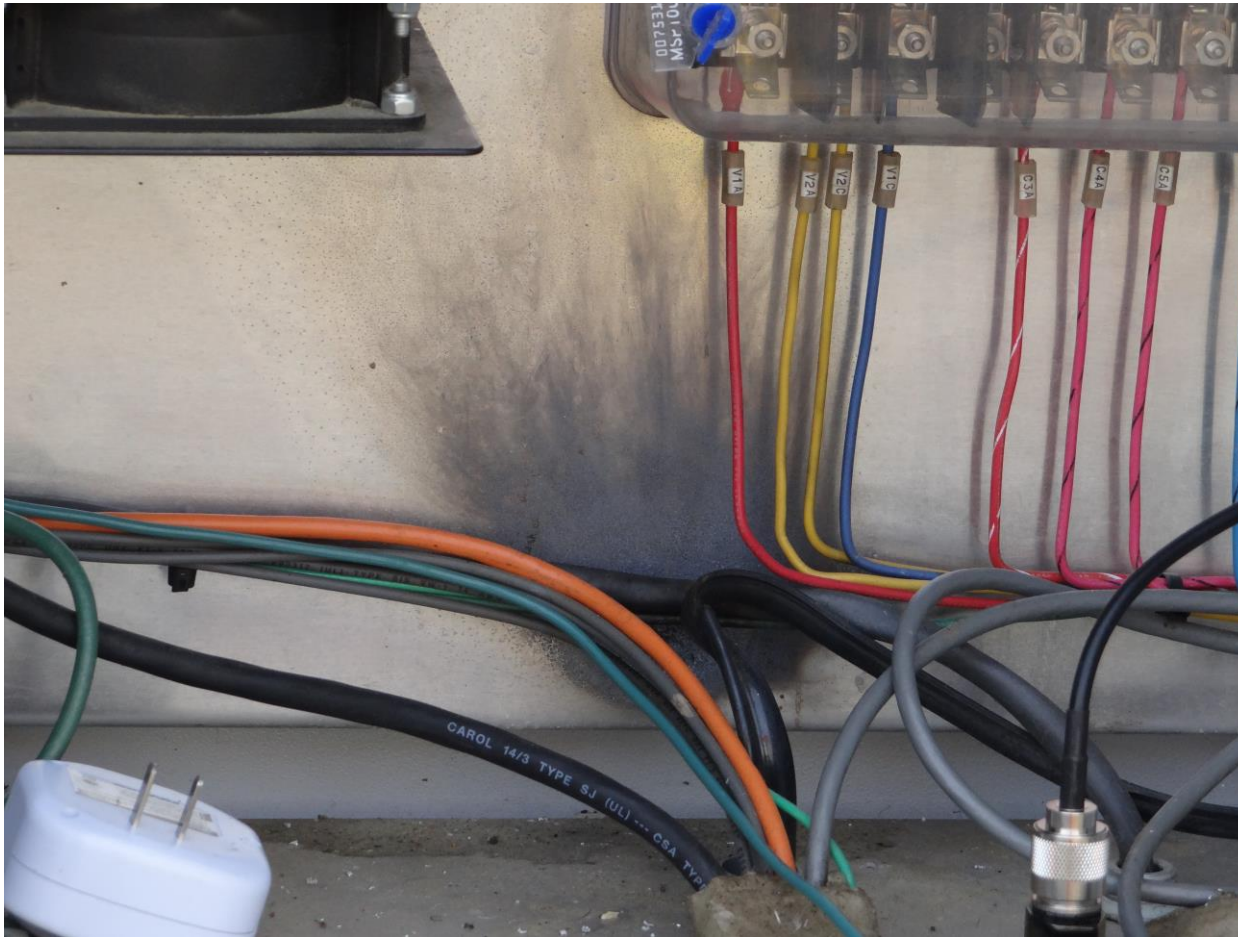


Surge - Backplate

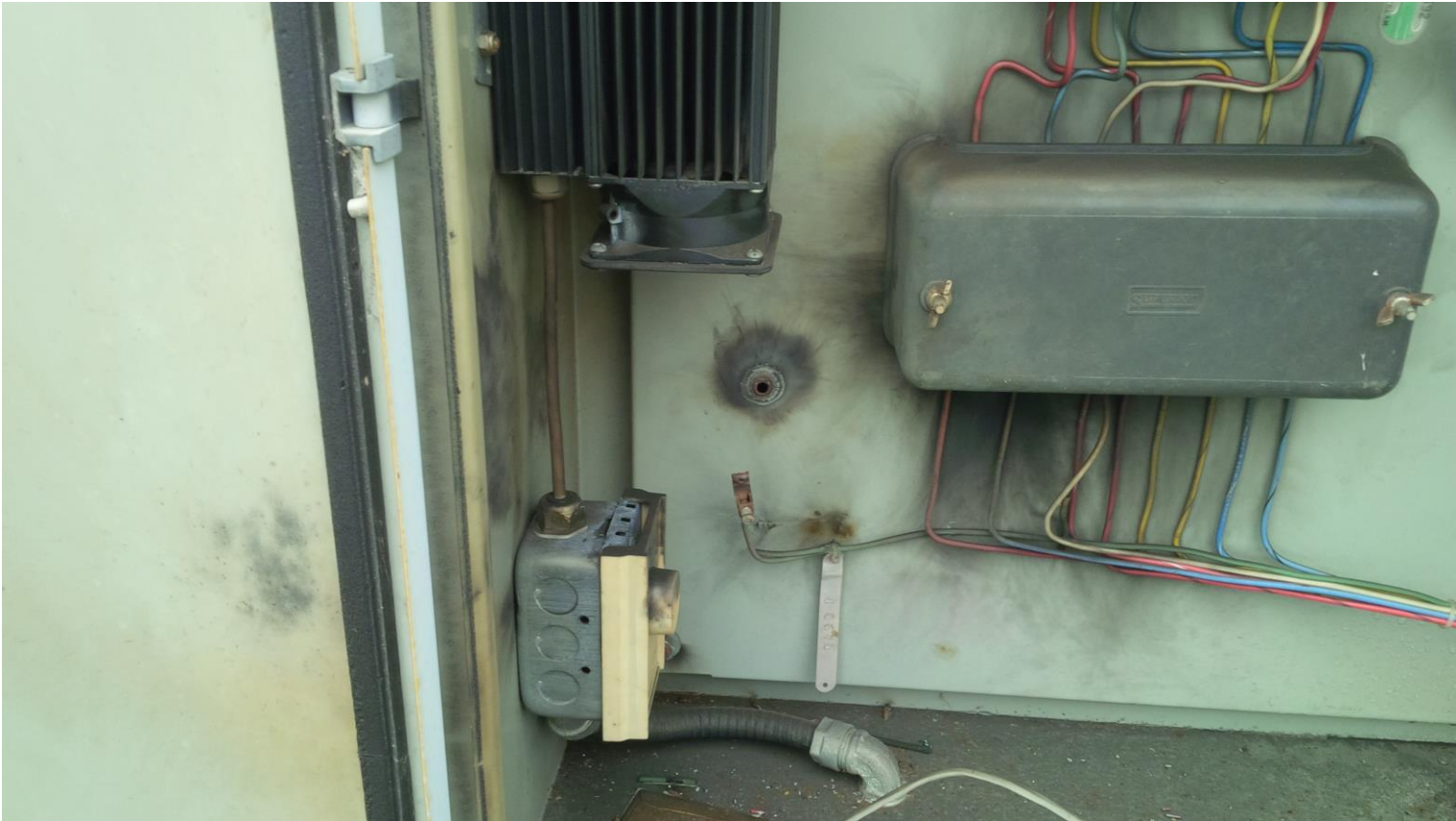




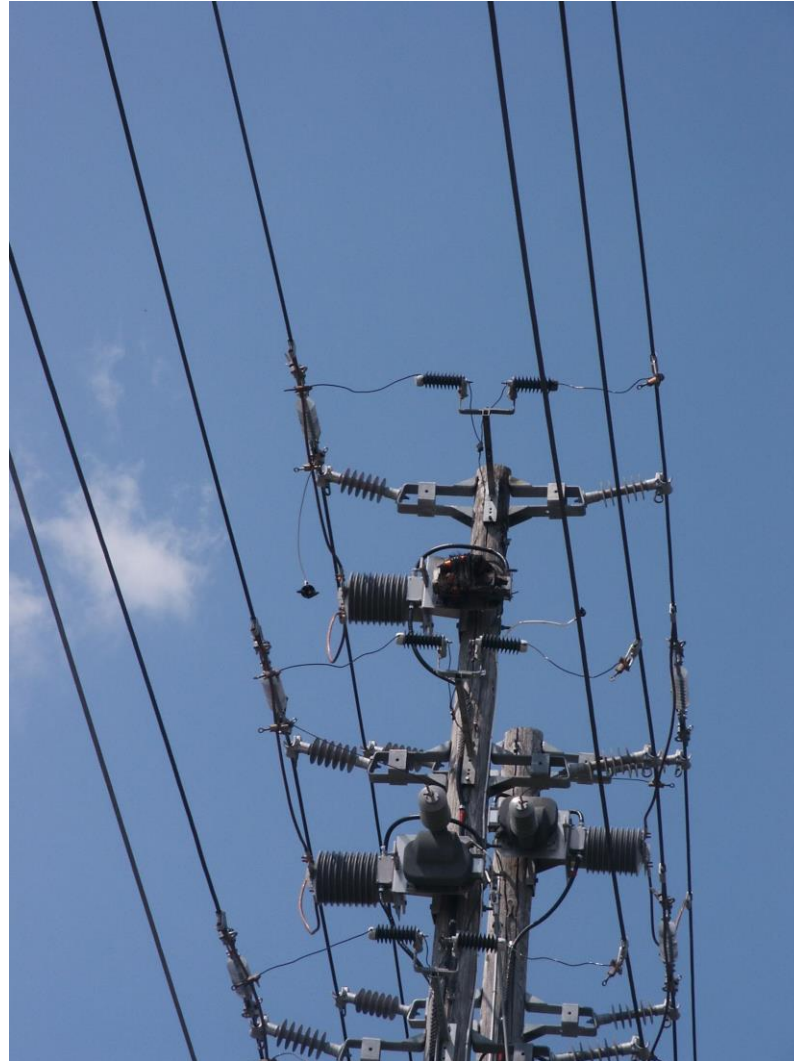
Phone Line



Ground Lug Burn Off



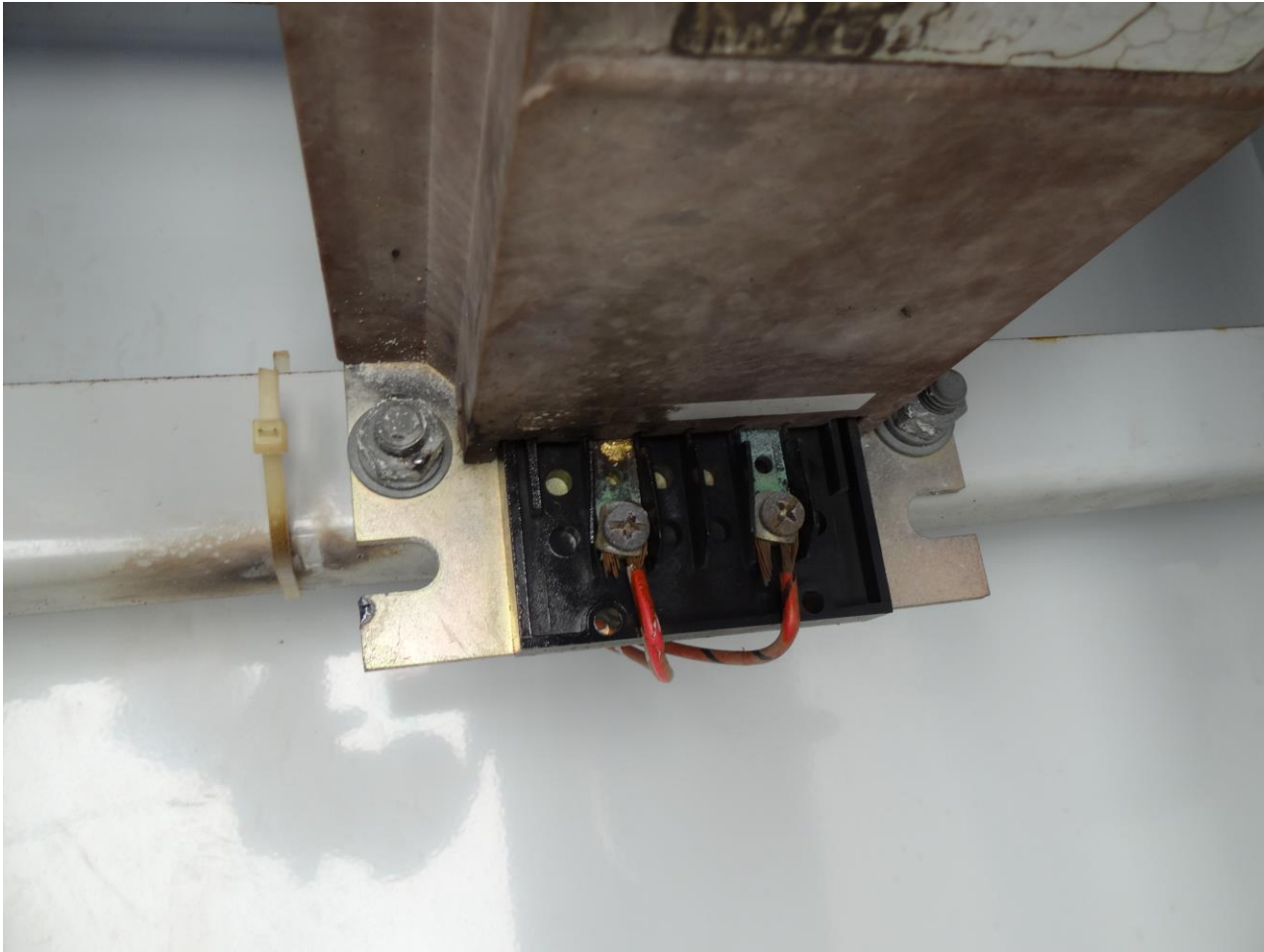
PT Failure



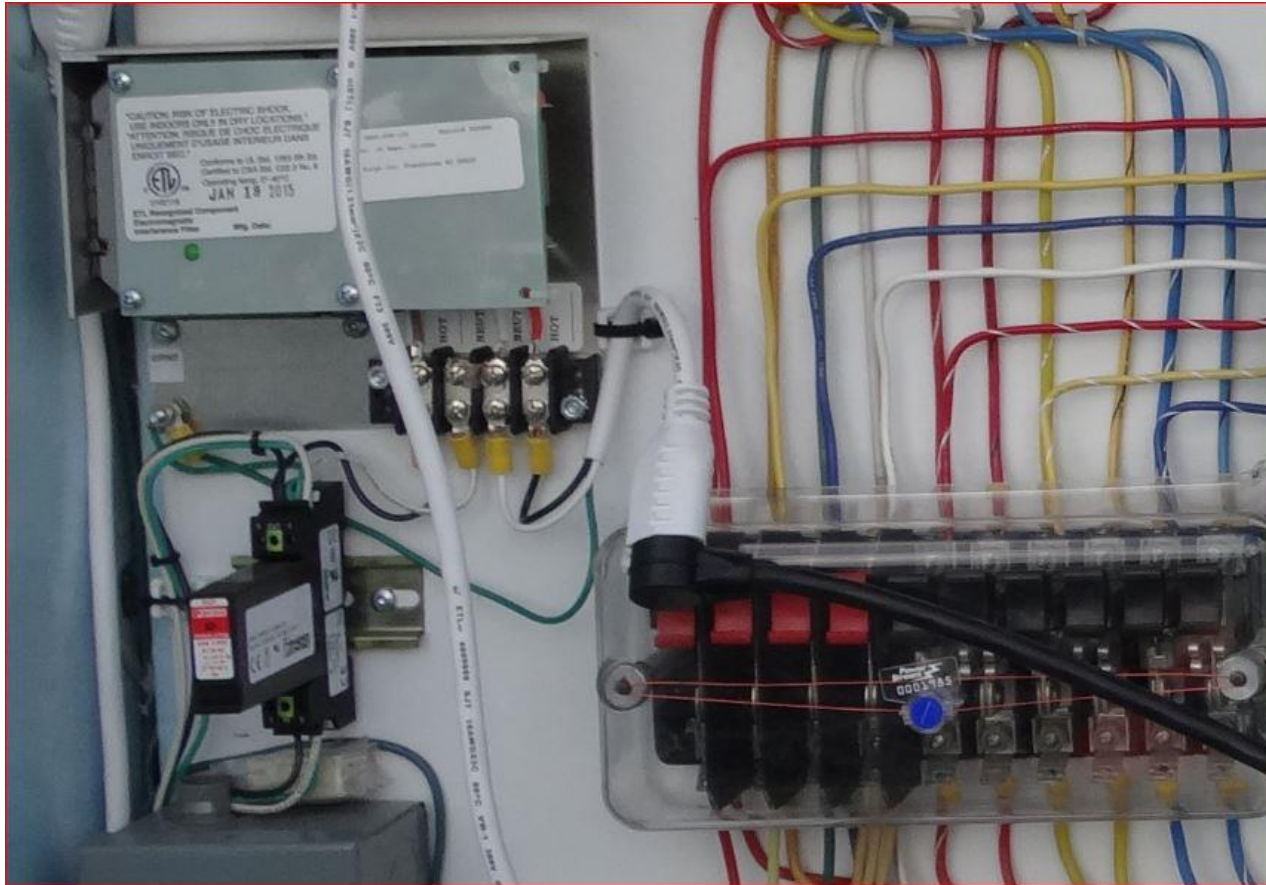
CTPT Failure



CT Terminal Flash



Distribution Surge Protection





"CAUTION: RISK OF ELECTRIC SHOCK.
USE INDOORS ONLY IN DRY LOCATIONS."
"ATTENTION: RISQUE DE CHOC ELECTRIQUE
UNIQUEMENT D'USAGE INTERIEUR DANS
ENROIT SEC."
Conforms to UL Std. 1283 5th Ed.
Certified to CSA Std. C22.2 No. 8
Operating temp. 0°-40°C
JAN 19 2015
Mfg. Date:



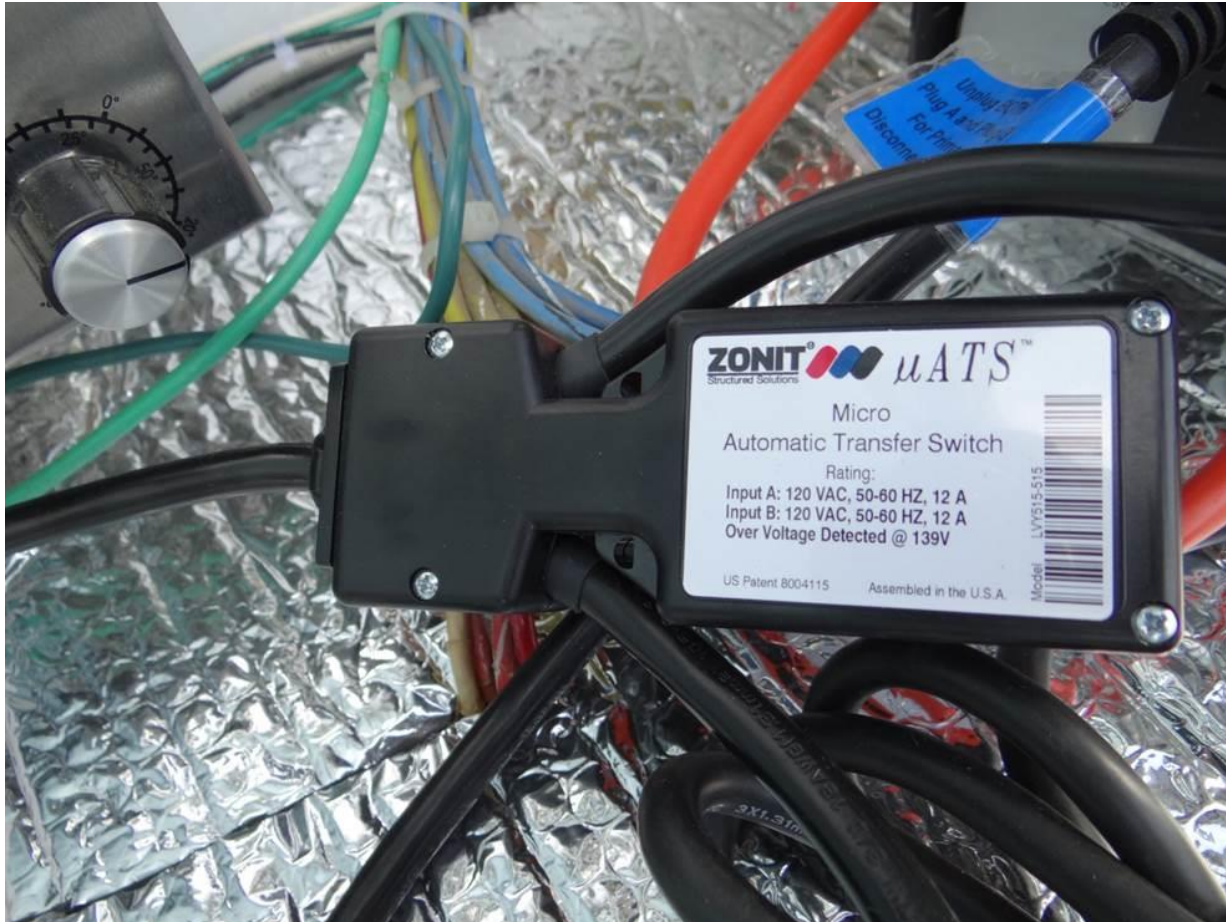
ETL Recognized Component
Electromagnetic
Interference Filter

Model OEM6-20W-120 Serial# 340466
120 Vac. 20 Amps. 50-60Hz
Zero Surge Inc. Frenchtown NJ 08825

GRND

SJT 16AWG23C 60°C

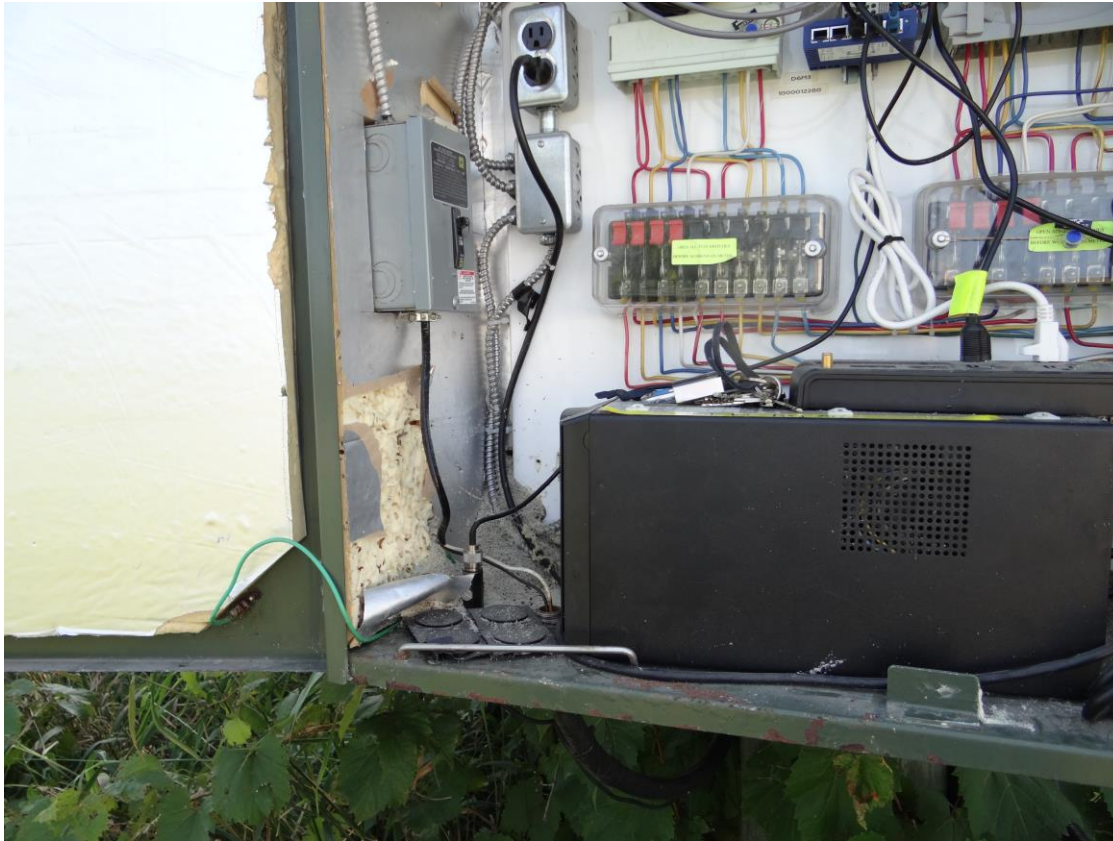
Transfer Switch

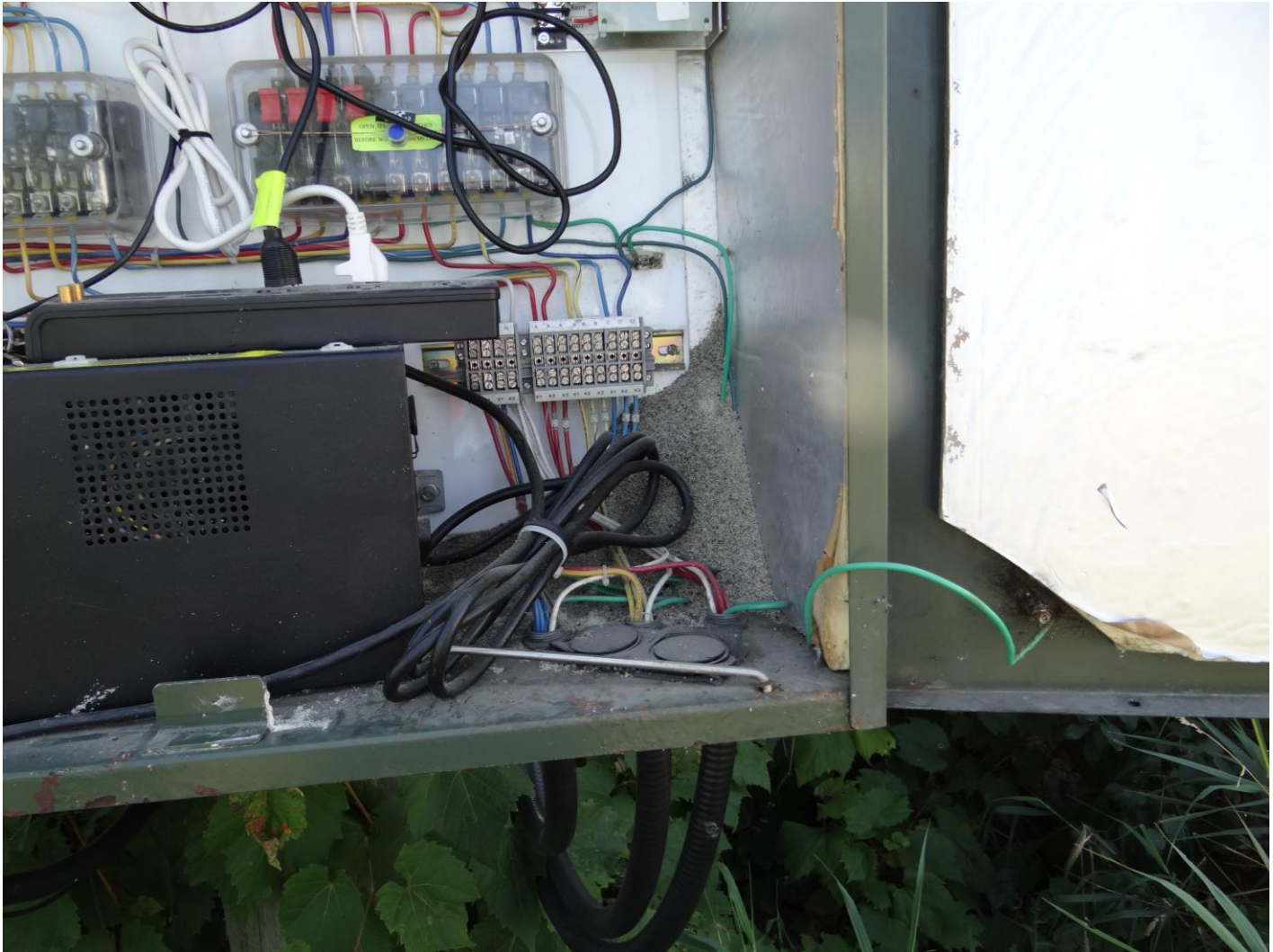


DC Redundant Supply



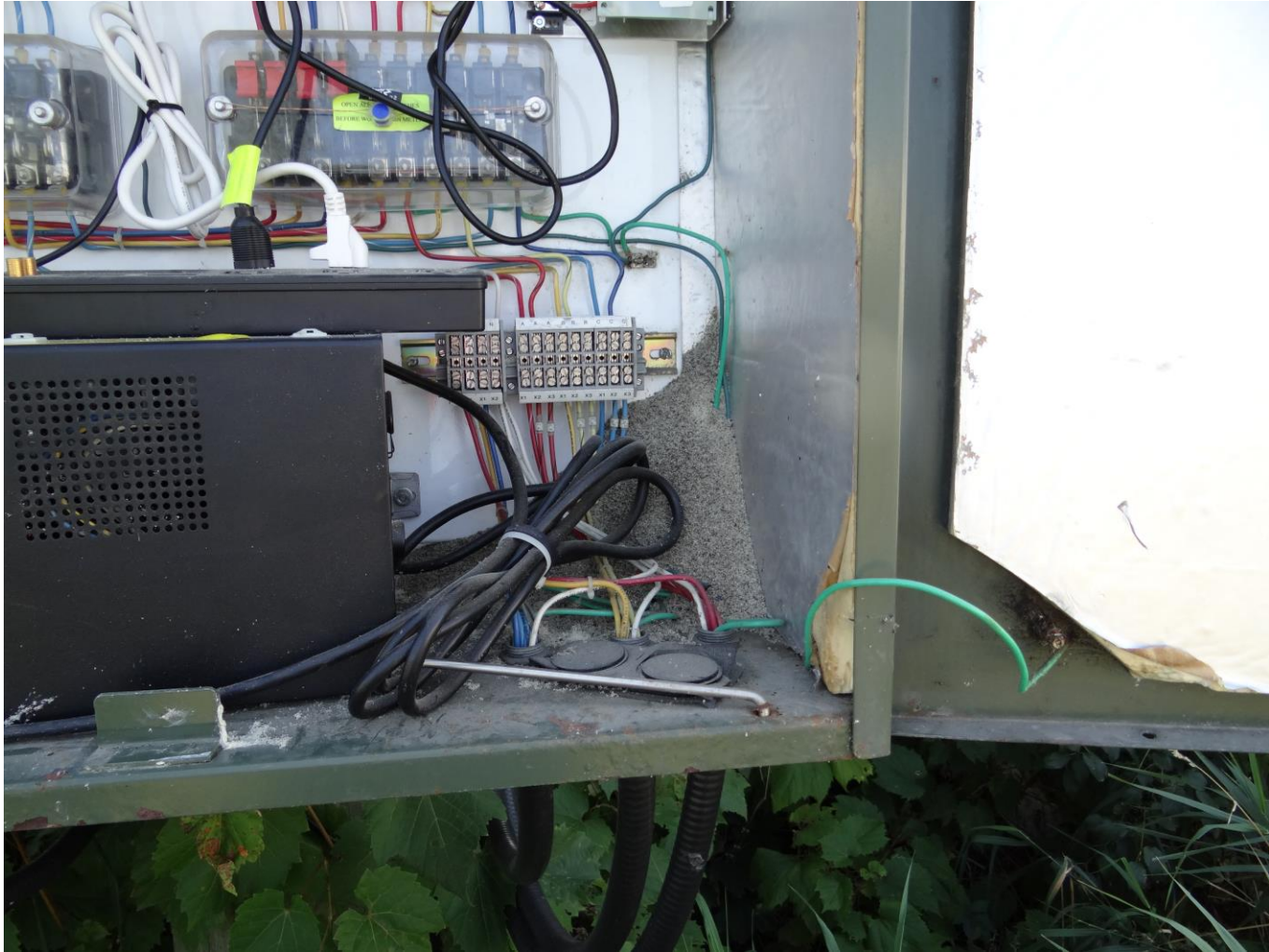
Lessons Learned - Ants

















Lesson - Maintenance



Heat - Damage

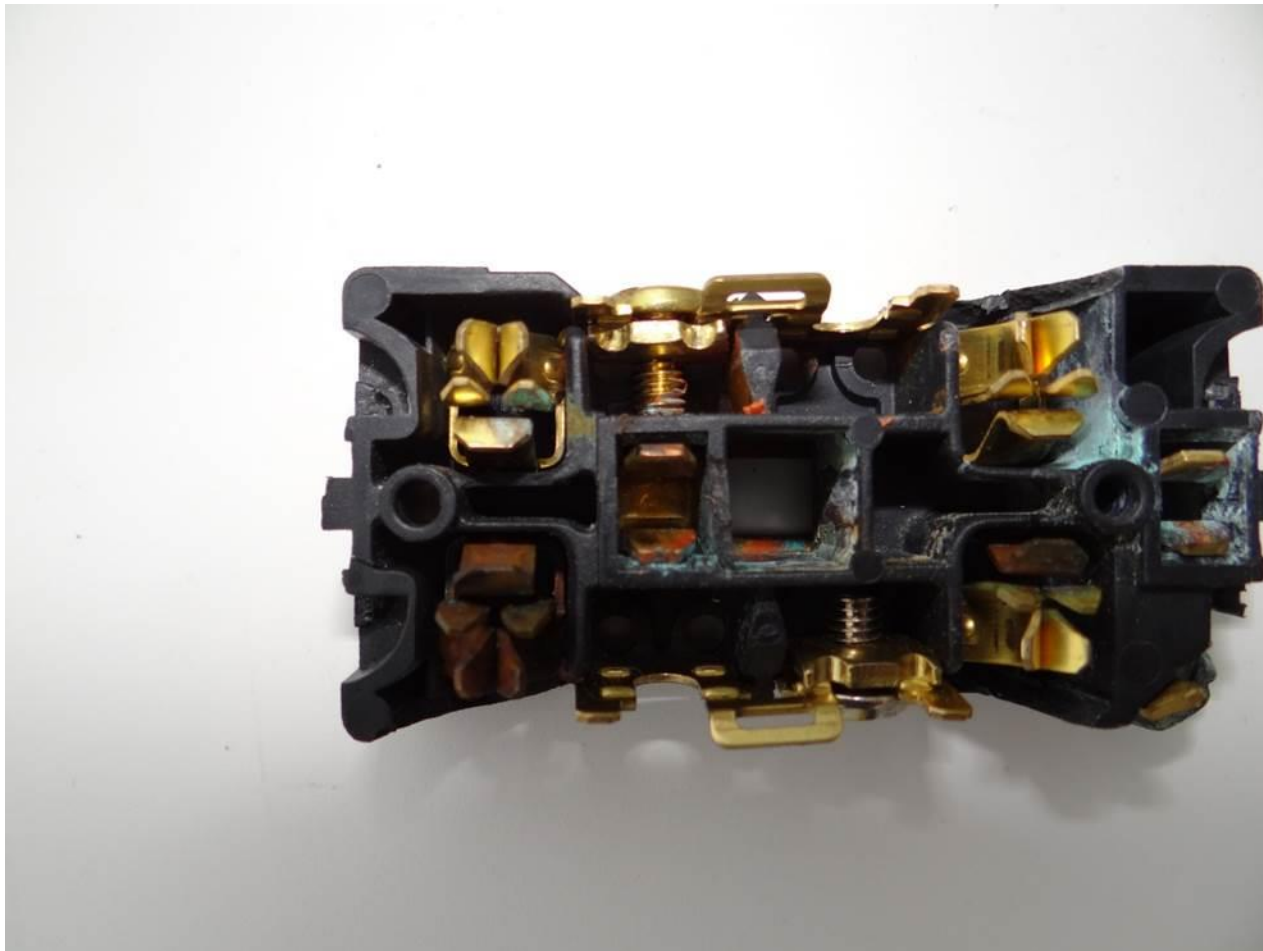


Timers



Lessons - Water









Repeat Offenders



Human Error

Successes - Performance

Records / MSP Performance Reports

POWERSTREAM INC. (MSP) (108932) Performance Report for August - 2017



Summary News Related Actions

Download Report:

MSP Performance Report - MSPPWRST - August 2017.pdf

Measure	Target	MSP Monthly Results	All MSPs Monthly Results	MSP 12-month Results	All MSPs 12-month Results
1. Successful Daily Meter Communication on First Attempt	90 %	97.09 %	92.51 %	98.08 %	93.66 %
2. Successful Daily Meter Communication	95 %	99.87 %	97.78 %	99.64 %	97.72 %
3. Communication Meter Trouble Reports Issued					
- # of communication MTRs issued	0	0	200	6	757
- % of meter installations without communication MTRs issued	100 %	100.00 %	92.62 %	98.68 %	92.68 %
4. Validation Meter Trouble Reports Issued					
- # of validation MTRs issued	0	2	116	10	472
- % of meter installations without validation MTRs issued	100 %	97.36 %	95.49 %	96.72 %	95.36 %
5. Meter Trouble Reports Resolved Within 2 Business Days of Issuance	95 %	100.00 %	91.53 %	100.00 %	92.26 %

Outage Prevention



Thermal Problem Detail Report

Site: PowerStream Underground Distribution (Vaughan)

Problem Status: OPEN ●

Severity: 1

Work order #:

Location: Vaughan Underground Distribution \ Primary Metering \ #5869 Hwy #7 (~600m W/O Martingrove Rd.)

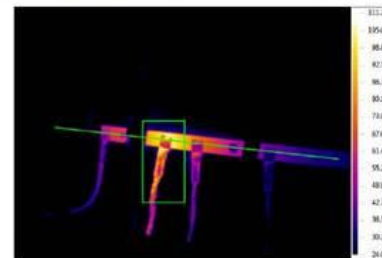
Equipment: PME-D6M6

Voltage: 27600 **Barcode:** 1000012300

Rated Load: **Asset ID:** 1000012300

IDN File: 43a03a38-b61d-4dae-8074-f2ddba1e57e9.idn

Inspection#: 12	Prob#: 1
Prob Date&Time: 10/12/2016 10:59	
Indirect Temp.Measurement: No	
Component Temp.: 105.3@N/A	
Reference Temp.: 20.1@N/A	
Temp.Rise: 85.1@N/A	



Description: Blue phase conductor ground lug bolted connection at ground bar

Probable Cause: High-resistance ground connection. High bleeder current.

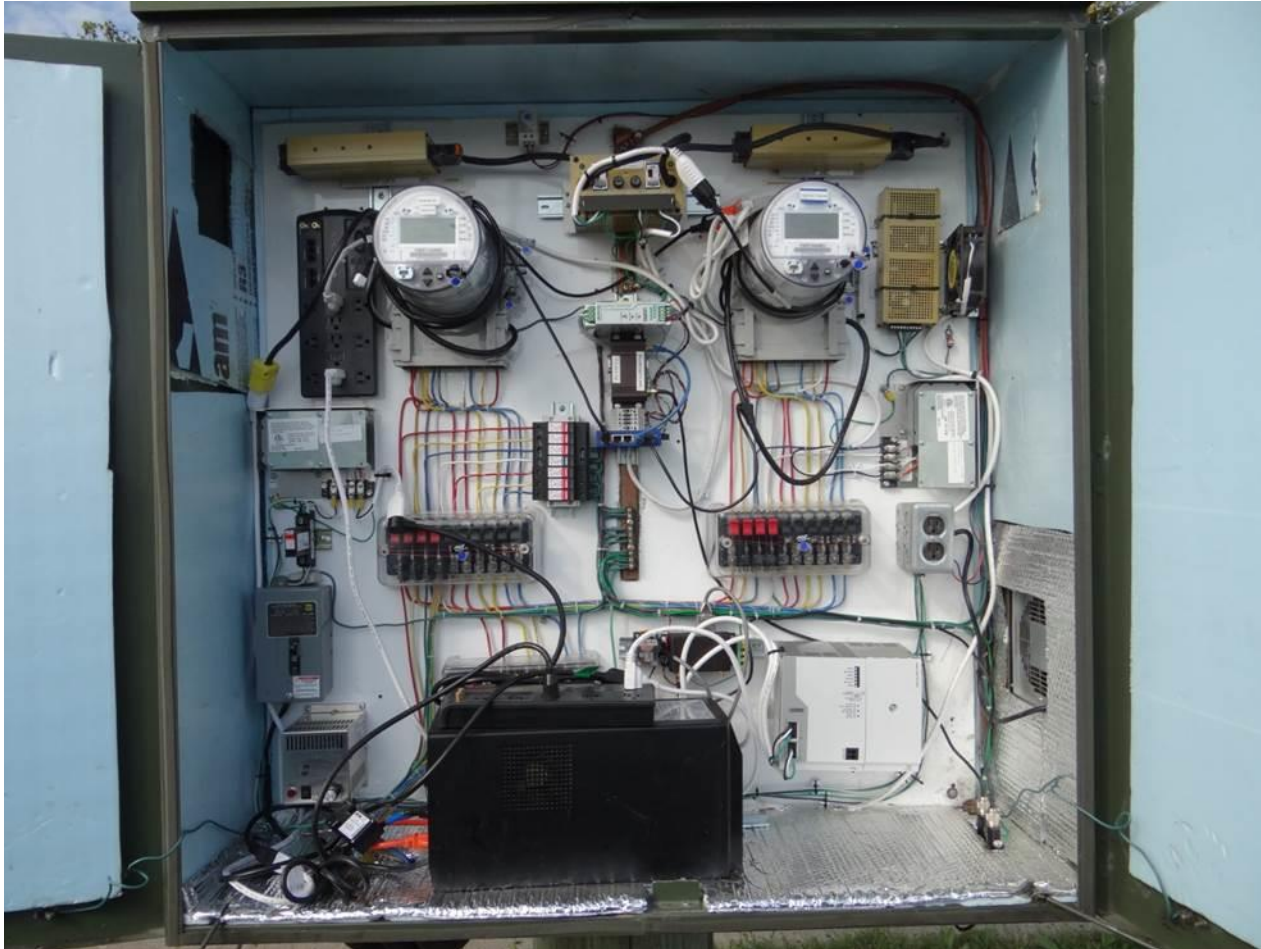
Recommendation: Remake ground connections. Check ground currents.



Effectiveness

- Time is better spent on hardening than repairing failures

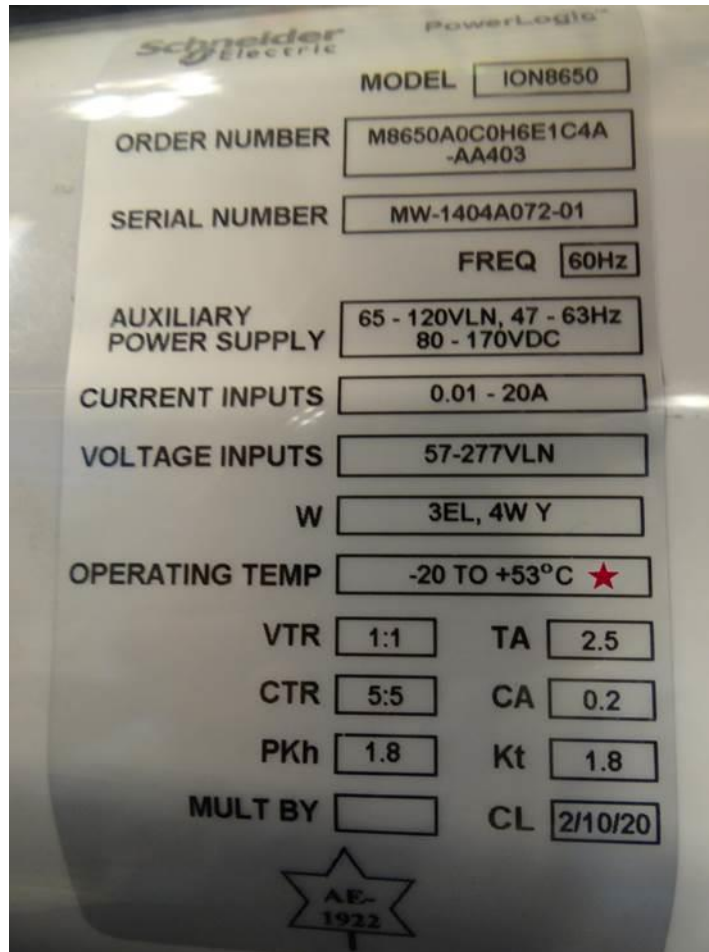
Proof of Concept





Future - Distribution Supply

Climate Control



Cooling Fan



Exhaust Hood





Conventional Filtration



5 Months Post Install



Industrial Filter_5 Months Post Install



Filter Media



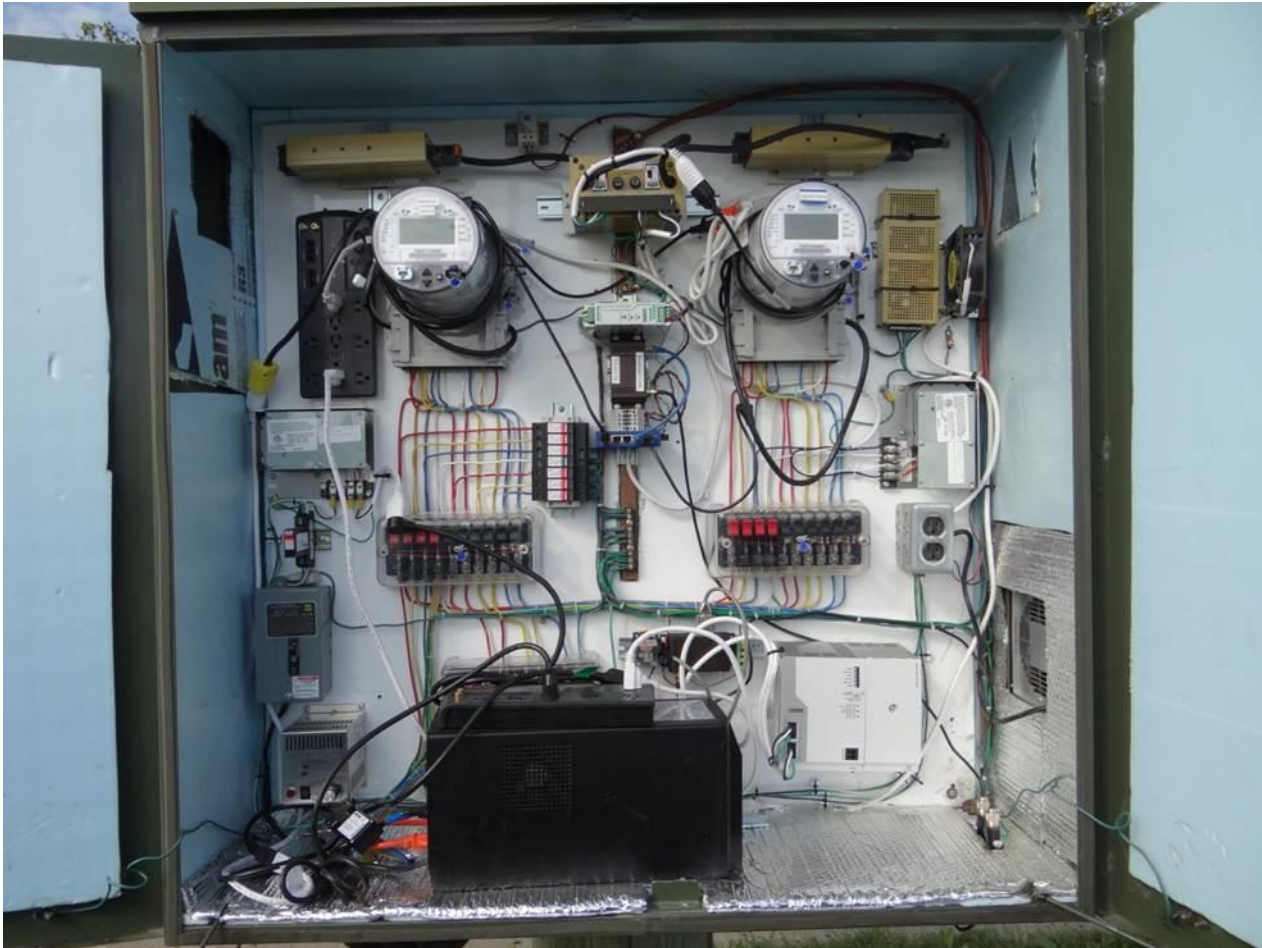


Critical Equipment

Drones



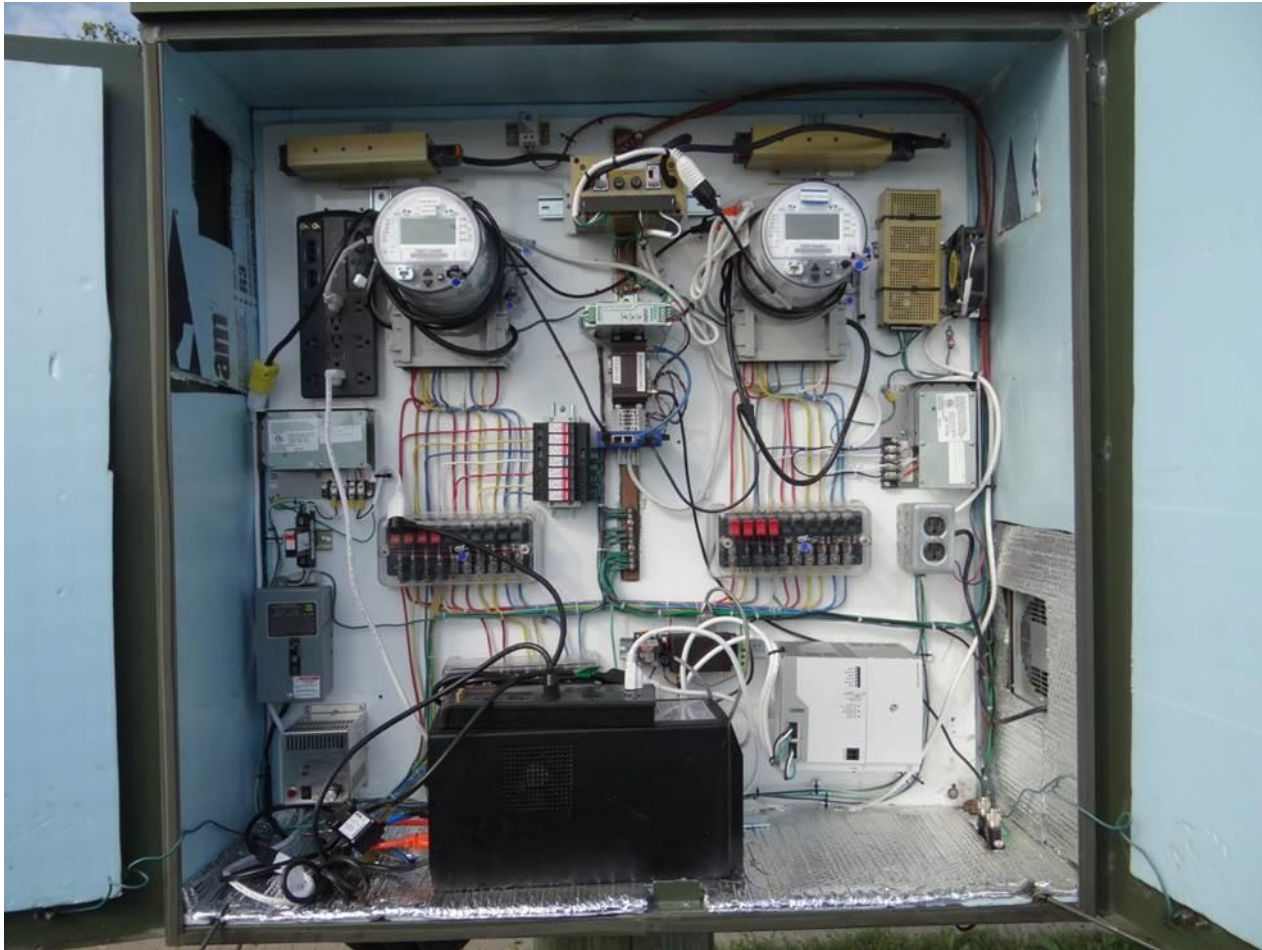
Telemetry





Mobile Virtual Network Operator MVNO

Pilot





Thank You