October 25, 2024

United States Department of the Interior
National Park Service
Denver Service Center
12795 W. Alameda Parkway
P.O. Box 25287
Denver, CO 80225-0287

ATTENTION: Susan Lehmann

Dear Susan,

REFERENCE: NPS Arc Flash Evaluation - WEAR Trip Report

On 12/04/23 through 12/06/23 Jason Gold, with Consolidated Contracting & Engineering, and Caleb Kopp with RSA Engineering travelled to Kotzebue to investigate the electrical distribution systems. The intent of the site visit was to gather enough information on the equipment to provide an accurate arc flash calculation, provide warning labels for the equipment, and determine any code deficiencies in the electrical systems. For any equipment that is single phase and 240V, or less, an arc flash calculation was not required. See one-line diagrams for further information on site electrical systems. The following report will address any code issues we discovered as part of our investigation.

Northwest Arctic Heritage Center:

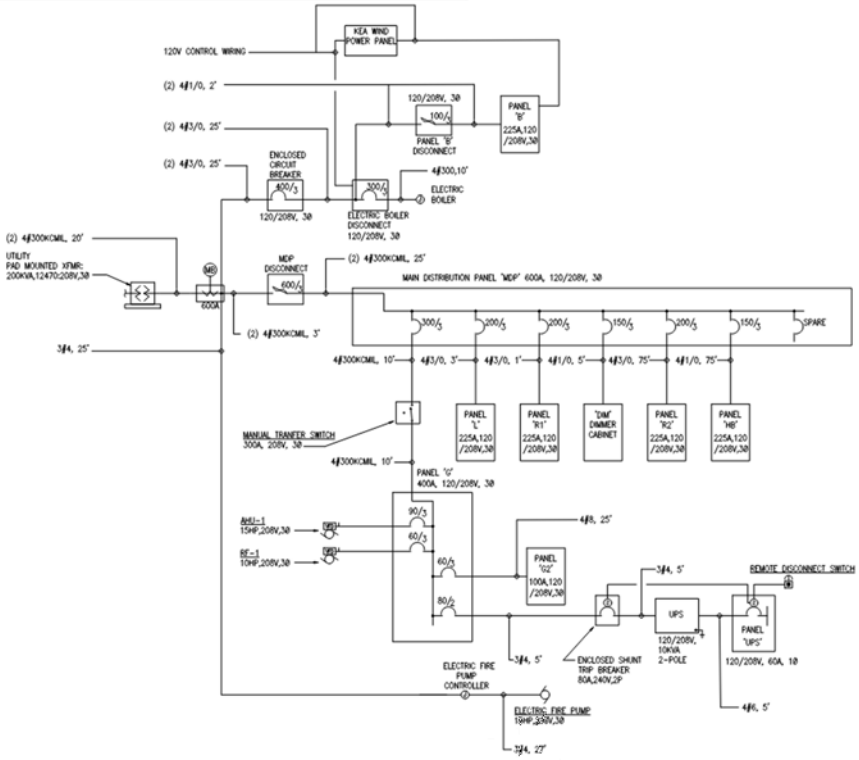


Figure 1 - Electrical One Line Diagram

The Northwest Arctic Heritage Center electrical service is provided by Kotzebue Electric Association (KEA). The building is served with an exterior utility pad-mounted transformer located adjacent to the building (Image #1). The secondary service, 120/208V, 3-phase, 4-wire, lateral feeds to a NEMA 3R current transformer (CT) cabinet, where a utility meter monitors power usage (Image #2). Due to lack of visible marking, CT cabinet is assumed to be 600A, based on size of connected service disconnect and record drawings for the original construction.

Within the CT enclosure are (3) three power taps. The main tap feeds the 600A 3-Pole building service disconnect. The second tap is for a 400A, 3-Pole, Square D enclosed circuit breaker serving as the service disconnect for the wind powered electric boiler equipment (Image #3). The third CT tap feeds the electric fire pump controller. Both the disconnects have separate enclosures and are building-mounted.

Due to lack of access to the equipment and lack of visible marking on accessible equipment, the electric fire pump controller and the electric fire pump are assumed to be Cutler-Hammer LMR Plus, and 15HP, 208V, 3Ø, respectively, based on archived submittals of the building.

The electric boiler service disconnect feeds a 120/208V, 300A, 3-Pole, Square D breaker as disconnect for the electric boiler (Image #4). Power is tapped from the line-side of the electric boiler disconnect to feed a 100A, 120/208V, 3-Pole, Square D disconnect fused at 100A (Image #5) which serves as the main disconnect for a sub panel, denoted as panel ‘B’. Panel ‘B’ is a 120/208V, 225A, 3Ø, 4W, Square D type NQ panel with main lugs only (Image #6).

The main building service disconnect supplies a 120/208V, 600A, 3Ø, 4W, Square D I-Line main distribution panel (MDP) located inside the building (Image #8). The MDP sub feeds several panels as denoted on the one line (figure - 1). The MDP also feeds a 120/208V, 300A, 3-Pole, Square D Manual Transfer Switch (MTS) (Image #2) through a 300A 3-Pole breaker. The MTS is located on the exterior of the building and is equipped with a portable generator plug-in, although at the time of the site visit no generator was installed. The MTS feeds a 120/208V, 400A, 3Ø, Square D Type NQ panelboard denoted as ‘G’ with main lugs only (Image #9).

Panel ‘G’ subfeeds AHU-1, RF-1, panel ‘G2’ (Image #10), and a 10KVA, 2-Pole UPS which in turn, feeds panel ‘UPS’ (Image #11). The UPS equipment is furnished with shunt trip devices and connected to a remote push button to serve as a disconnect.

Code Deficiencies

1. The main disconnects should be identified as “Main Disconnect 1 of 4”, “Main Disconnect 2 of 4”, etc.
2. The remote shunt trip to disconnect the UPS should be identified as such and mounted adjacent to the building main disconnect.
3. Panel ‘B’ missing a panel schedule. Trace out circuit in panel and provide clear, evident, and distinguishable typed circuit directories for panelboard per NEC section 408.4.
4. There is an existing sprinkler line below 6’-0” above electrical panelboards. Provide new sprinkler line routing or relocate panelboard to ensure NEC dedicated equipment space of 6’-0” is maintained above the panelboards per NEC Section 110.26(E).
5. There were instances of junction boxes with missing covers in the building. Provide new covers for all junction boxes as required per NEC Section 314.25.
6. Missing fire alarm manual pull station at stairs from mechanical room. Provide new pull station and connect to the existing fire alarm system (IBC 907.4.2.1).

Electrical Recommendations

1. Panel ‘R1’ Circuit 28 ‘Utilidor HT’ was tripped at the time of our site visit. Recommend identifying and fixing cause of trip.
2. Panel ‘R1’ has 27 neutrals wires with 32 circuits, which leads us to believe neutrals are being shared between circuits. Note that this may have not been a code requirement when the equipment was installed and therefore could be “grandfathered” but does not meet the current NEC minimum requirements. Recommend that all circuits with shared neutral are handle-tied together or dedicated neutrals be provided.
3. Panel ‘UPS’ has a recessed panel cover, while being a surface-mounted panel. Recommend providing new surface-mounted cover.
4. Panel ‘HB’ has 7 neutral wires with 19 circuits, which leads us to believe neutrals are being shared between circuits. Note that this may have not been a code requirement when the equipment was installed and therefore could be “grandfathered” but does not meet the current NEC minimum requirements. Recommend that all circuits with shared neutral are handle-tied together or dedicated neutrals be provided.
5. There are multiple instances of emergency lighting units being constantly powered in the lobby, the stairwell to the mechanical room, and the hall near boiler room. Recommend additional site investigation into the wiring connections and the relay/control modules for system failure points. If a solution cannot be found, recommend replacing emergency lighting units with new led type fixture.

Automotive Shop:

The Automotive Shop is served via a pole-mounted transformer fed to a building-mounted weatherhead, from the overhead utility distribution system (Image #12). This weatherhead feeds a NEMA 4X Current Transformer (CT) cabinet and a utility meter. The CT cabinet feeds a 120/208V, 400A, 3-Pole, Square D service disconnect, fused at 300A. The CT cabinet, utility meter, and service disconnect are all mounted on a unistrut rack located on the exterior of the building (Image #13). The service disconnect feeds a 120/208V, 400A, 3-Pole, 4W, Square D panelboard with main lugs only panel ‘A’ inside the Automotive Shop (Image #14). Inside panel 'A', a 90A 3-pole breaker sub feeds another 120/208V, 225A, 3-Pole, 4W, Square D panelboard with main lugs only, panel 'B' (Image #15).

Code Deficiencies

1. There are tools and shelves violating the working clearances of Panel ‘A’ (Image #16). Remove all foreign systems/material within the working clearances of the panel as required by NEC 110.26.
2. There were instances of junction boxes with missing covers in the building (Image #16). Provide new covers for all junction boxes as required per NEC Section 314.25.

Electrical Recommendations

1. Panel ‘A’ has 16 neutral wires with 35 circuits, which leads us to believe neutrals are being shared between circuits. Note that this may have not been a code requirement when the equipment was installed and therefore could be “grandfathered” but does not meet the current NEC minimum requirements. Recommend that all circuits with shared neutral are handle-tied together or dedicated neutrals be provided.
2. Service Disconnect has no duct seal in 4” conduit penetration into building. Recommend providing duct seal for conduit.

3. Panel ‘B’ has 13 neutral wires with 19 circuits, which leads us to believe neutrals are being shared between circuits. Note that this may have not been a code requirement when the equipment was installed and therefore could be “grandfathered” but does not meet the current NEC minimum requirements. Recommend that all circuits with shared neutral are handle-tied together or dedicated neutrals be provided.
4. As the electrical service and feeders are not properly identified we feel that new placards should be provided that read.
   “Service Disconnect”
   120/240V, 3-phase, 4-wire

Storage Warehouse:

The Storage Warehouse is served via a pole-mounted transformer fed to a building-mounted weatherhead, from the utility overhead distribution system (Image #17). The weatherhead feeds power down into a 120/240V, 125A, 2-Pole, 3W, Square D type combination meterbase/disconnect (CMD) with 125A disconnect(Image #18). The CMD feeds a 120/240V,125A, 1Ø, 3W, Square D load center with 100A, 2-Pole main circuit breaker, panel ‘A’ (Image #19). Panel ‘A’ feeds another 120/240V,100A, 1Ø, 3W, Square D load center with main lugs, panel ‘B’ (Image #20) through a 50A 2-Pole breaker.

Code Deficiencies

No code deficiencies noted for this building.

Electrical Recommendations

1. Panel ‘A’ is in poor condition with rust and degradation visible (Image #19). Recommend replacing panelboard with new panelboard in existing location, re-using existing branch circuit, and re-terminating existing branch circuits and feeders.
2. Panel ‘B’ is in poor condition with rust and degradation visible (Image #20). Recommend replacing panelboard with new panelboard in existing location, re-using existing branch circuit, and re-terminating existing branch circuits and feeders.
3. Panel ‘A’ schedule is barely legible. Recommend tracing out circuit in panel and provide clear and distinguishable typed circuit directories for panelboard.
4. Panel ‘B’ schedule is barely legible. Recommend tracing out circuit in panel and provide clear and distinguishable typed circuit directories for panelboard.
5. As the electrical service and feeders are not properly identified we feel that new placards should be provided that reads.
   “Service Disconnect”
   120/240V, 1-phase, 3-wire

Maintenance Shop:

The Maintenance Shop is served via a pole-mounted transformer fed to a building-mounted weatherhead, from the utility overhead distribution system (Image #21). The weatherhead feeds down to a meter base, which feeds an exterior 120/208V, 200A, 3-Pole, Cutler Hammer knife switch service disconnect fused at 200A (Image #22). The service feeds a 120/208V, 225A, 3Ø, 4W, Cutler Hammer main lug load center, panel ‘A’ within in the building.

Code Deficiencies

1. Panel ‘A’s cover has open spaces missing blank covers (Image #24). Provide panelboard blanks on unused openings per NEC section 408.7.

2. Neutrals spliced method is unclear (Image #23). Ensure appropriate splicing method such as wire nuts or push-fit connectors per NEC section 110.14.
3. There are instances of light fixtures in the wood shop without proper supports. Ensure all fixtures are securely supported per NEC section 410.30(A).
4. There are instances of disconnected speakers in the wood shop with exposed wires (Image #25). Ensure all disconnected speakers are stored away and all exposed wires are properly terminated or demolished per NEC section 640.4.
5. There were instances of junction boxes with missing covers in the wood shop (Image #26). Provide new covers for all junction boxes as required per NEC Section 314.25.
6. Neutral and ground are not bonded at service disconnect (Image #27). Provide a #2 AWG Cu main bonding jumper to connect the neutral and ground bus at service disconnect per NEC section 250.28.

Electrical Recommendations

1. Panel has a recessed panel cover, while being a surface-mounted panel. Recommend providing new surface-mounted cover.
2. Wires for old equipment unterminated in panel (Image #23). Recommend removing old conductors and conduit.
3. Remnants of previous boiler fire are not cleaned up (Image #28). Recommend verifying integrity of old equipment and cleaning surrounding area and replacing as necessary.
4. Broken lenses on light fixtures in wood shop (Image #25). Recommend replacing light fixtures with broken lenses per NEC.
5. There are instances of light fixtures with broken lenses (Image #25). Recommend replacing lens.

Bunkhouse:

The Bunkhouse electrical system is served via a pole-mounted transformer fed to a building-mounted weatherhead, from the utility overhead distribution system (Image #29). The service conductors route down the weatherhead to 120/240V, 125A, 2-Pole, 3W, Square D CMD with 125A disconnect (Image #30). The CMD feeds into the interior of the building to 120/240V, 125A, 1Ø, 3W, Square D type load center with main lugs only, panel ‘A’ (Image #31). Rating is assumed due to lack of any legible markings.

Code Deficiencies

1. Panel schedule is not legible. Trace out circuit in panel and provide clear and distinguishable typed circuit directories for panelboard per NEC section 408.4.
2. A couch is in the NEC working clearance of the panelboard. Move the couch out of the NEC working clearance per NEC Section 110.26.
3. Conductors are undersized for the ampacity of the service per NEC section 210.19. Replace existing 125A breaker with New 100A 2-Pole breaker for service disconnect.
4. GCFI receptacle in bathroom is missing faceplate. Provide receptacle faceplate per NEC section 406.6.
5. There are instances of broken receptacles within this building. Replace all broken receptacles per NEC 110.12(B).

Electrical Recommendations

1. As the electrical service and feeders are not properly identified we feel that new placards should be provided that reads.
   "Service Disconnect"
   120/240V, 1-phase, 3-wire

<u>Annex Visitor Info Center 154A:</u>

The Annex Visitor Center 154A electrical system is served via a pole-mounted transformer fed to a building-mounted weatherhead, from the utility overhead distribution system (Image #32). The weatherhead feeds down into a 120/240V, 200A, 2-Pole, 3W, Square D (CMD) with a 200A disconnect (Image #33). The CMD feeds into the interior of the building to a 120/240V, 200A, 1Ø, 3W, Square D load center with main lugs only, panel 'A' (Image #34).

Code Deficiencies

1. Exit signs at front entry and weight room do not have power. Investigate to identify failure point, and fix or provide a new fully illuminated exit sign per IBC – 1013.3
2. Unit heater in back room missing cover for electrical connection box. Provide a new cover for unit heater's electrical connection per NEC 110.27.

Electrical Recommendations

1. Panelboard circuit number and number of neutrals do not match, which leads us to believe neutrals are being shared between circuits. Note that this may have not been a code requirement when the equipment was installed and therefore could be "grandfathered" but does not meet the current NEC minimum requirements. Recommend that all circuits with shared neutral are handle-tied together or dedicated neutrals be provided.
2. Light fixtures in front room missing lenses. Recommend replacing light fixtures with new LED type or replacing lenses.
3. As the electrical service and feeders are not properly identified we feel that new placards should be provided that read.
   "Service Disconnect"
   120/240V, 1-phase, 3-wire

<u>Corner House 154B:</u>

The Corner House 154B electrical system is served via a pole-mounted transformer fed to a building-mounted weatherhead, from the utility overhead distribution system. The weatherhead feeds down into a 120/240V, 200A, 2-Pole, 3W, Siemens (CMD) with a 200A disconnect (Image #35). The CMD feeds into the interior of the building to a 120/240V, 200A, 1Ø, 3W, Square D load center with main lugs only, panel 'A' (Image #36).

Code Deficiencies

No code deficiencies noted for this building.

Electrical Recommendations

1. As the electrical service and feeders are not properly identified we feel that the new placards should be provided That reads.
   "Service Disconnect"
   120/240V, 1-phase, 3-wire

Duplex 154 C + D:

The Duplex 154 electrical system is served via a pole-mounted transformer fed to a building-mounted weatherhead, from the utility overhead distribution system. The weatherhead feeds down to a 120/240V, 200A, 2-Pole, 3W, Square D (CMD) with (2) 100A, 2-Pole disconnects (Image #37). The CMD feeds two 120/240V, 125A, 1Ø, 3W, Square D load centers in building 154 units C and D via the two 100A 2-Pole service disconnects, respectively. The load centers in building 154 units C and D will be denoted as panel 'C' (Image #38) and panel 'D' (Image #39).

Code Deficiencies

1. CMD breaker is located approximately 7' above ground. Relocate the service disconnect or provide a working platform such that the highest disconnect position is no greater than 6'-7" Above Finished Grade (AFG) per NEC section 240.24.

Electrical Recommendations

No recommendations for this building.

Duplex 152 A + B:

The Duplex 152 electrical system is served via a pole-mounted transformer feed to a building-mounted weatherhead, from the utility overhead distribution system (Image #40). The weatherhead feeds down the siding of the building to power a 120/240V, 200A, 2-Pole, 3W, Siemens CMD with (2) 100A, 2-Pole disconnects (Image #41). Each disconnect feeds a 120/240V, 100A, 1Ø, 3W Siemens load center with main lugs only, denoted as panels 'A' and 'B' (Images #42,43).

Code Deficiencies

No code deficiencies for this building.

Electrical Recommendations

1. As the electrical service and feeders are not properly identified we feel that new placards should be provided that read.
   "Service Disconnect"
   120/240V, 1-phase, 3-wire

4-Plex 153 A,B,C,D,E:

The 4-Plex's electrical system is served via a pole-mounted transformer fed to a building-mounted weatherhead, from the utility overhead distribution system. Weatherhead then feeds down into a 120/240V, 600A, 2-Pole, 3W, Square D Meter-Pak CMD (Image #44). The feeder within the weatherhead is (2)3#2/0 which is rated for 350A. As this is part of the service laterals and is not less than the utility feeder then there is no need to upgrade unless the utility upgrades their laterals. The Meter-Pak houses five meterbases, and five service disconnects in total. All service disconnects were locked during this site visit except for one 125A, 2-Pole service disconnect feeding to a 120/240V, 125A, 1Ø, 3W, Siemens load center, panel 'E' (Image #49) located in the boiler room. The four remaining service disconnects feed 120/240V, 125A, 1Ø, 3W, Siemens load centers denoted panel 'A', 'B', 'C', and 'D' (Images #45,46,47,48) all located within their respective unit.

Code Deficiencies

1. Exterior receptacle adjacent to boiler room door is not weatherproof and is not GFCI protected. Replace exterior receptacle with new GFCI type per NEC section 210.8(B) and provide new weatherproof enclosure per NEC section 406.9(A).
2. Smoke alarm has been removed in mechanical room. If the area of the interior floor exceeds 1000ft^2, ensure all points on the ceiling have a smoke alarm within 30 ft or have an equivalent of one smoke alarm per 500ft^2 of floor area. If not, provide a new smoke detector in location of removed smoke alarm per NFPA Section 29.8.
3. Junction box cover is missing in mechanical room. Provide new cover per NEC Section 314.25 (Image #50).
4. Panel 'E' circuit labeled "Heat trace water" was tripped at the time of our site visit. Further site investigating is required to identify and address cause of trip per NEC 110.7.

Electrical Recommendations

1. Panel 'E' has 18 circuits and 13 neutrals, which leads us to believe neutrals are being shared between circuits. Note that this may have not been a code requirement when the equipment was installed and therefore could be "grandfathered" but does not meet the current NEC minimum requirements. Recommend that all circuits with shared neutral are handle-tied together or dedicated neutrals be provided.
2. Panel 'E' is recessed style while being surface-mounted. Recommend providing new surface-mounted cover.
3. 12-3 Romex cable in units missing neutrals for individual circuits. Which leads us to believe neutrals are being shared between circuits. Note that this may have not been a code requirement when the equipment was installed and therefore could be "grandfathered" but does not meet the current NEC minimum requirements. Recommend that all circuits with shared neutral are handle-tied together.
4. Panels 'A', 'B', 'C', & 'D' do not have Arc Fault Interrupting Circuits (AFCI). Provide new AFCI breakers for all panels and provide dual AFCI/GFCI breakers for circuits that currently have GFCI breakers per NEC 210.12. This was likely not a code requirement at the time of installation but is now.

Duplex 297 C + B:
The Duplex 297 electrical system is served via a pole-mounted transformer fed to a building-mounted weatherhead, from the utility overhead distribution system. The Weatherhead feeds a CMD with (3) 125A disconnects (Image #51). One disconnect feeds a 120/240V, 200A, 1Ø, 3W load center with main lugs only, panel 'A' (Image #52). Another disconnect feeds a 120/240V, 125A, 1Ø, 3W load center with main lugs only, panel 'B' (Image #53). The last disconnect feeds a 120/240V, 125A, 1Ø, 3W load center with main lugs only, panel 'C' (Image #54).

Code Deficiencies

1. Panel 'A' has Arc Fault Circuit Interrupting (AFCI) breakers for circuits 5/6 but requires AFCI circuits for 1,2,3,4,5,6,7,9,10,12,14,17,18,20, and 22 as identified on panelboard. Provide AFCI breakers for all required circuits. This was likely not a code requirement at the time of installation but is now.
2. Panel 'C' has Arc Fault Circuit Interrupting (AFCI) breakers for circuits 5/6 but requires AFCI circuits for 1,2,3,4,5,6,7,9,10,11,12,13,14,16, and 20 as identified on panelboard. Provide AFCI breakers for all required circuits. This was likely not a code requirement at the time of installation but is now.

Electrical Recommendations

1. Mechanical equipment appears to be in poor condition. Recommend further investigation towards integrity of mechanical equipment and replacing if necessary (Image #55).

Image #1 – *Northwest Arctic Heritage Center – Utility Pad-Mounted Transformer*

Image #2 – *Northwest Arctic Heritage Center – Building Mounted Utility Meter, CT Cabinet,*

Image #3 – *Northwest Arctic Heritage Center – Building Mounted 400A 3-Pole Enclosed Circuit Breaker*

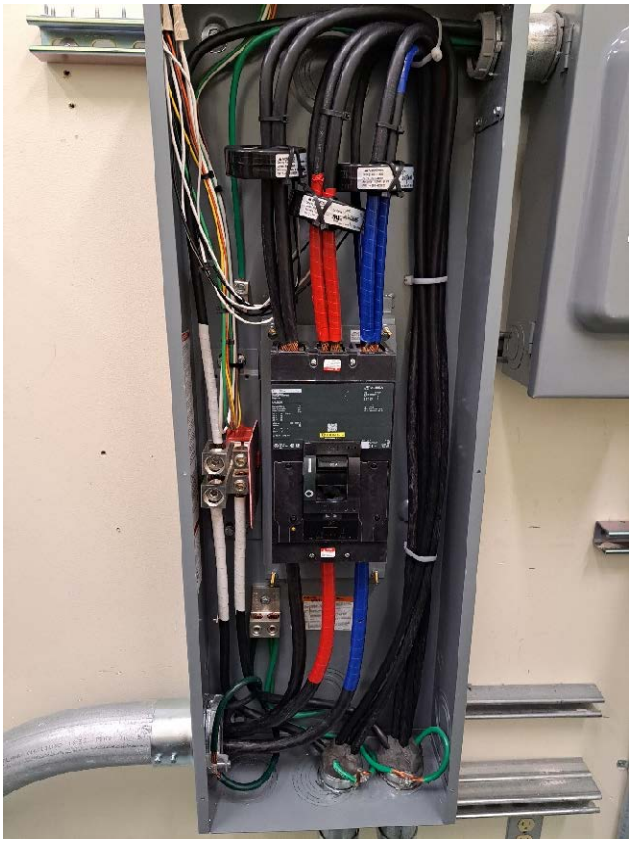


Image #4 – *Northwest Arctic Heritage Center – Interior 300A 3-Pole Electric Boiler Disconnect*

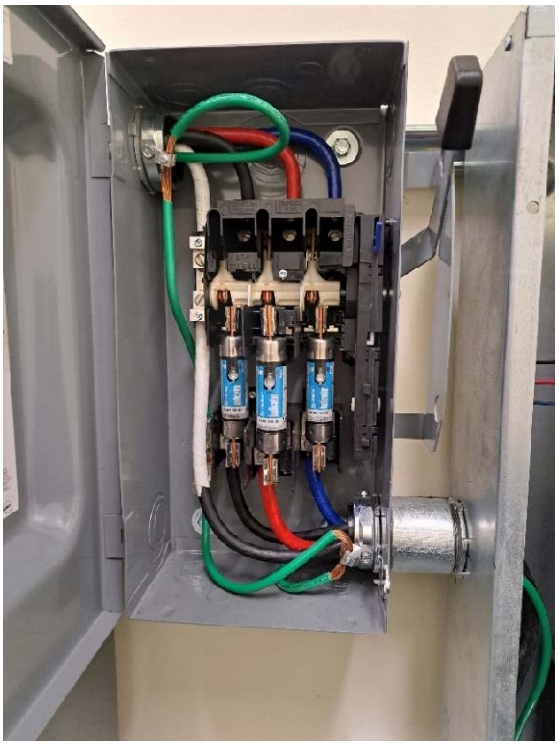


Image #5 – *Northwest Arctic Heritage Center – Interior 3-Pole Panel 'B' Fused Disconnect*

Image #6 – *Northwest Arctic Heritage Center – Panel 'B'*

Image #7 – *Northwest Arctic Heritage Center – KEA Wind Power Panel*

Image #8 – *Northwest Arctic Heritage Center – Panel 'MDP'*

Image #9 – *Northwest Arctic Heritage Center – Panel 'G'*

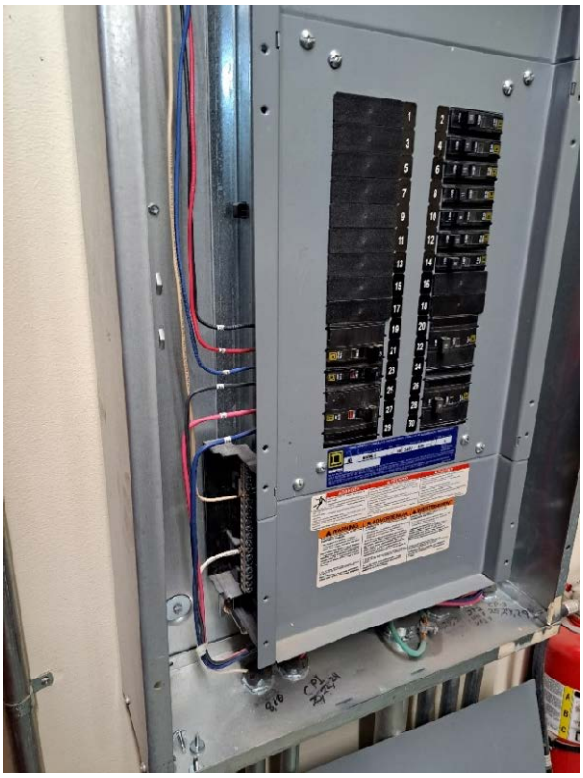


Image #10 – *Northwest Arctic Heritage Center – Panel 'G2'*

Image #11 – *Northwest Arctic Heritage Center – Panel 'UPS'*

Image #12 – *Automotive Shop – 4" Weatherhead*

Image #13 – *Automotive Shop – CT Cabinet, Remote Utility Meter, and Service Disconnect*

Image #14 – *Automotive Shop – Panel 'A'*

Image #15 – *Automotive Shop – Panel 'B'*

Image #16 – *Automotive Shop – Panel 'A' Working Area*

Image #17 – *Storage Warehouse - Weatherhead*

Image #18 – *Storage Warehouse – CMD*

Image #19 – *Storage Warehouse – Panel 'A'*

Image #20 – *Storage Warehouse – Panel 'B'*

Image #21 – *Maintenance Shop - Weatherhead*

Image #22 – *Maintenance Shop – Remote Meterbase & Service Disconnect*

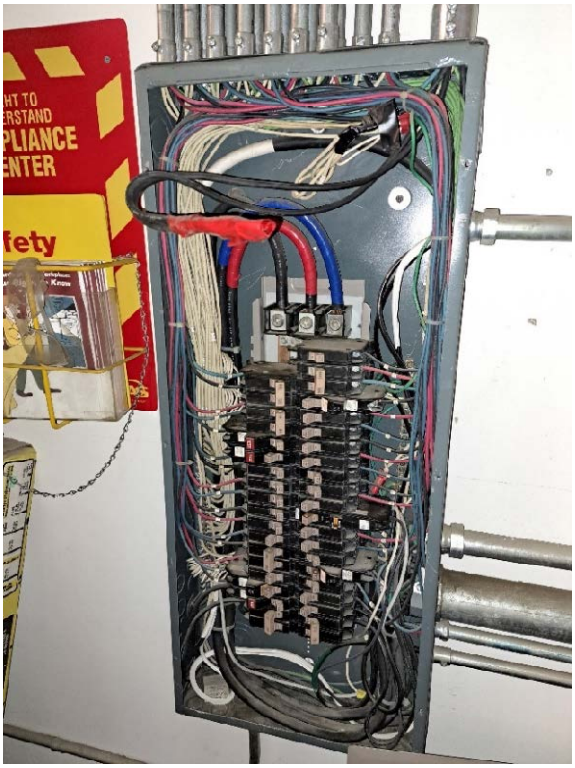


Image #23 – *Maintenance Shop – Panel 'A'*

Image #24 – *Maintenance Shop – Panel 'A' With Cover*

Image #25 – *Maintenance Shop – Wood Shop Lights*

Image #26 – *Maintenance Shop – Wood Shop Junction Box*

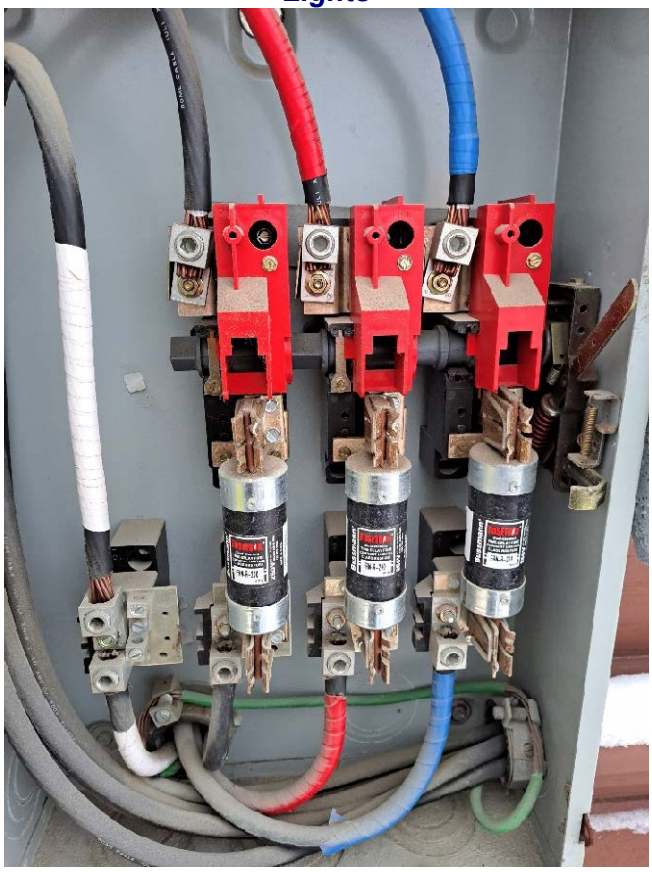


Image #27 – *Maintenance Shop – Service Disconnect*

Image #28 – *Maintenance Shop – Boiler Fire Remnants*

Image #29 – *Bunkhouse - Weatherhead*

Image #30 – *Bunkhouse – CMD*

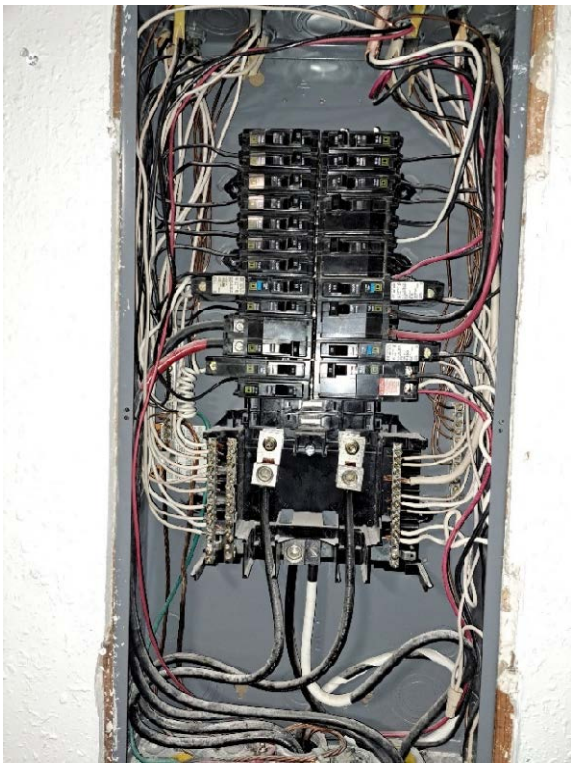


Image #31 – *Bunkhouse – Panel 'A'*

Image #32 – *Annex Visitor Info Center 154A - Weatherhead*

Image #33 – *Annex Visitor Info Center 154A – CMD*

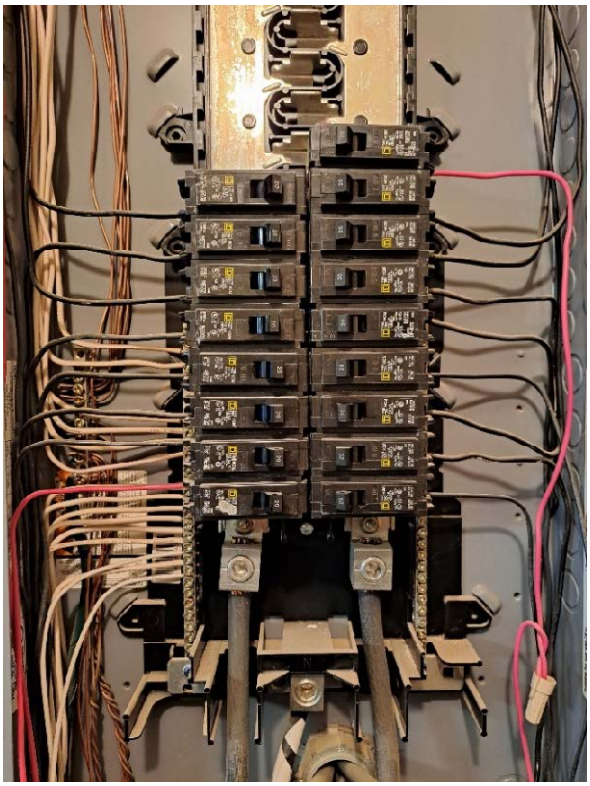


Image #34 – *Annex Visitor Info Center 154A – Panel 'A'*

Image #35 – *Corner House 154B – CMD*

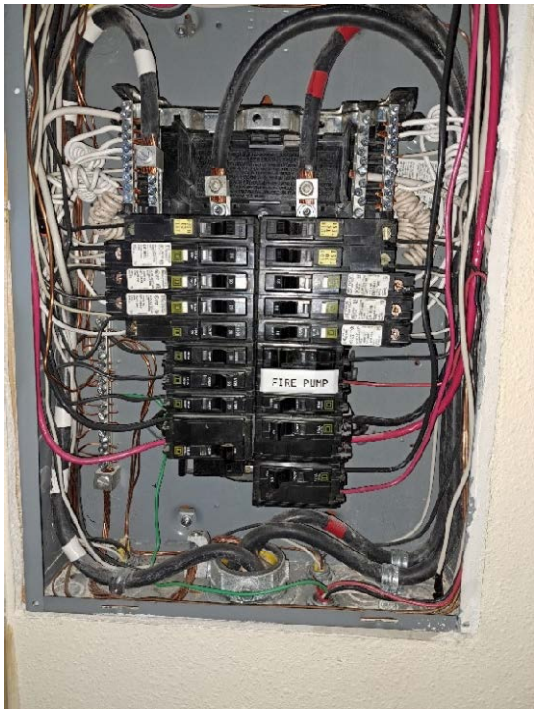


Image #36 – *Corner House 154B – Panel 'A'*

Image #37 – *Duplex 154 C + D – CMD*

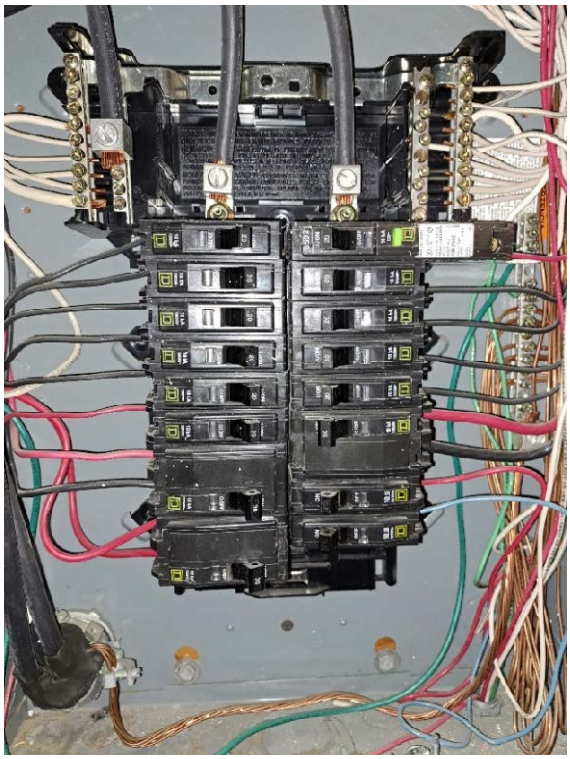


Image #38 – *Duplex 154 C + D – Panel 'C'*

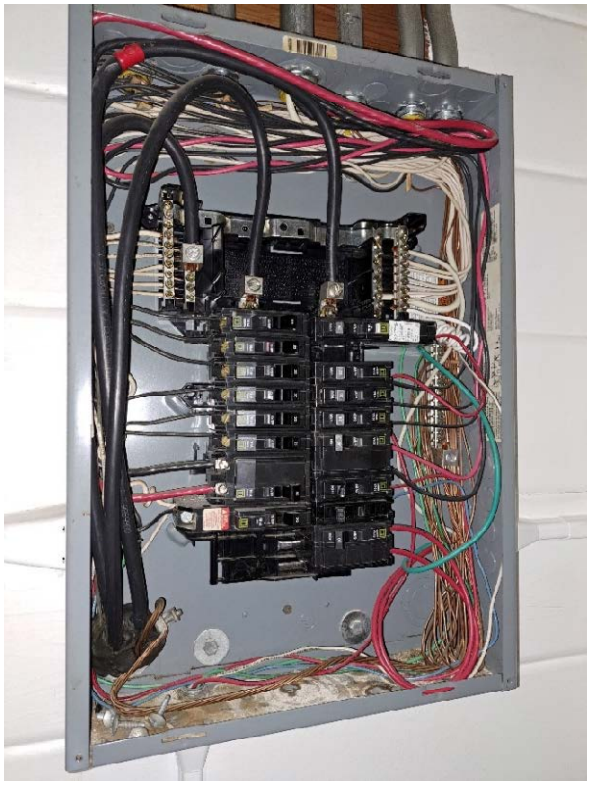


Image #39 – *Duplex 154 C + D – Panel 'D'*

Image #40 – *Duplex 152 A + B - Weatherhead*

Image #41 – *Duplex 152 A + B – CMD*

Image #42 – *Duplex 152 A + B – Panel 'A'*

Image #43 – *Duplex 152 A + B – Panel 'B'*

Image #44 – *4-Plex 153 A,B,C,D,E – Meter-Pak CMD*

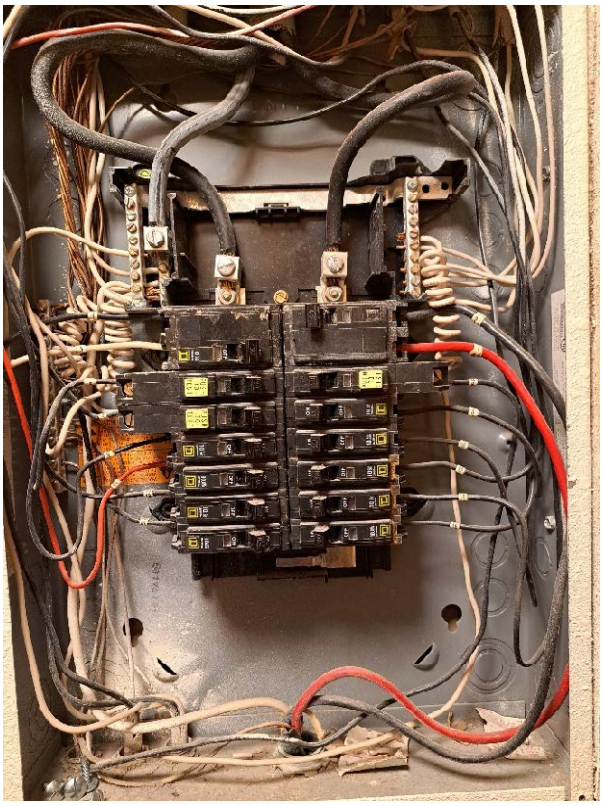


Image #45 – *4-Plex 153 A,B,C,D,E – Panel 'A'*

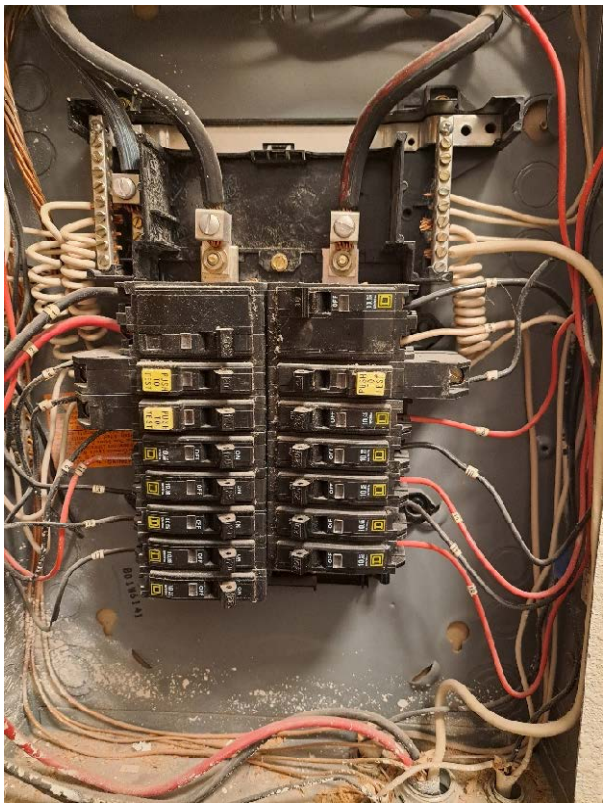


Image #46 – *4-Plex 153 A,B,C,D,E – Panel 'B'*

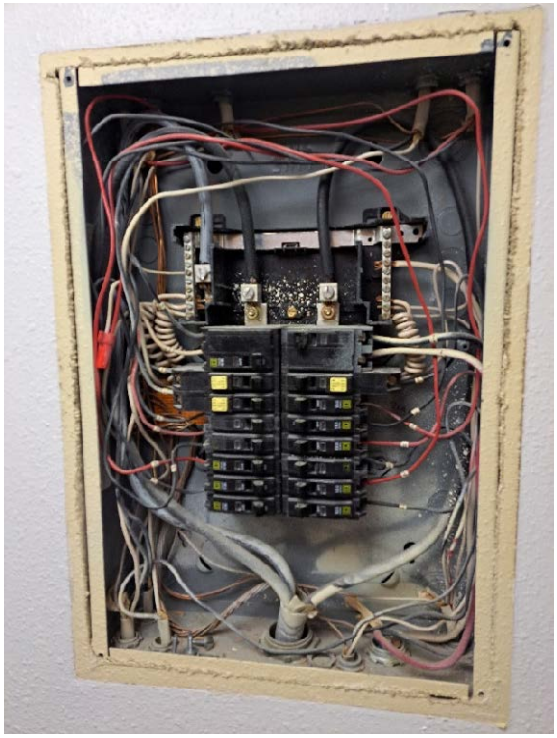


Image #47 – *4-Plex 153 A,B,C,D,E – Panel 'C'*

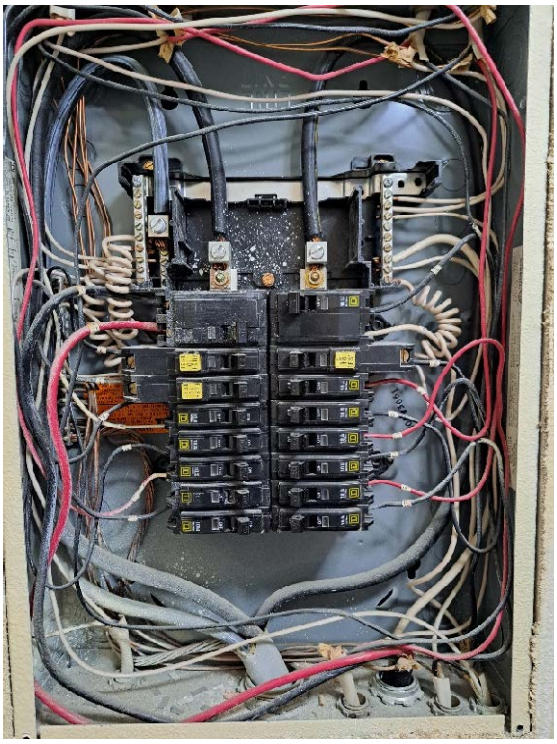


Image #48 – *4-Plex 153 A,B,C,D,E – Panel 'D'*

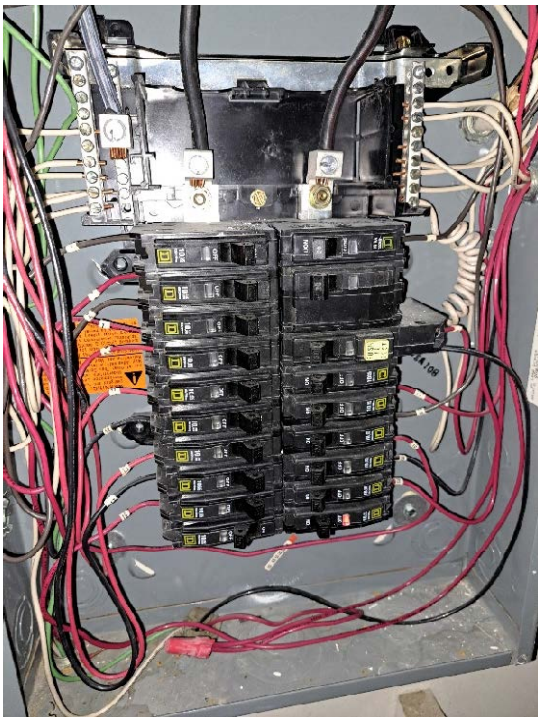


Image #49 – *4-Plex 153 A,B,C,D,E – Panel 'E'*

Image #50 – *4-Plex 153 A,B,C,D,E – Mechanical Room Junction Box*

Image #51 – *Duplex 297 C + B – CMD 125A, 2-Pole Service Disconnects*

Image #52 – *Duplex 297 C + B – Panel 'A'*

Image #53 – *Duplex 297 C + B – Panel 'B'*

Image #54 – *Duplex 297 C + B – Panel 'C'*

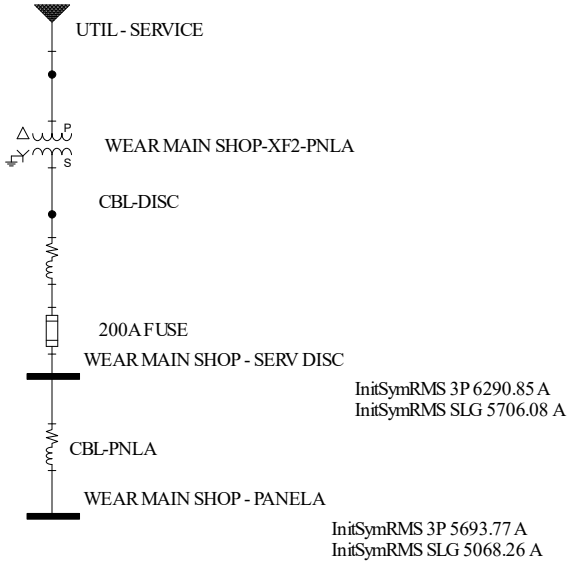
Image #55 – *Duplex 297 C + B – Mechanical Equipment*

If you have any questions concerning the above, please do not hesitate to call me.

Sincerely,

Jeremy Maxie, P.E., LC, RCDD
Principal Electrical Engineer

jam/pcc/ab/hhm
24-0350/M3144



WEAR - ARC FLASH ANALYSIS - MAINTENANCE SHOP
FACILITY ONE-LINE DIAGRAM
AUGUST 31, 2024

Project: Kotzebue Maintenance Shop
Base Project

DAPPER Fault Analysis Input Report (English)

Utilities

Contribution From Name	Bus Name	In/Out Service	Nominal Voltage	-------- Contribution Data --------					PU (100 MVA Base)		
					Duty	Units	X/R			R PU	X PU
UTIL - SERVICE	BUS-0006	In	12,470	3P:	1,000,000	MVA	9,999.00		Pos:	0.0000	0.0001
				SLG:	333,333	MVA	9,999.00		Zero:	0.0000	0.0001

Cables

Cable Name	From Bus To Bus	In/Out Service	Qty /Ph	Length Feet	------ Cable Description ------				Per Unit (100 MVA Base)		
					Size	Cond. Type	Duct Type	Insul		R pu	jX pu
CBL-DISC	BUS-0007	In	1	75	3/0	Copper	Non-Magnetic		Pos:	13.2789	7.1942
									Zero:	21.0972	18.2889
	WEAR MAIN SHOP - SERV DISC										
CBL-PNL A	WEAR MAIN SHOP - SERV DISC	In	1	25	3/0	Copper	Non-Magnetic		Pos:	4.4263	2.3981
									Zero:	7.0324	6.0963
	WEAR MAIN SHOP - PANEL A										

2-Winding Transformers

Xformer Name	In/Out Service	----------Primary & Secondary---------- Bus	Conn.	Volts	FLA	Nominal kVA	Z PU (100 MVA Base)	R pu	jX pu
WEAR MAIN SHOP-XF2-PNL A	In	BUS-0006	D	12,470	3	75.0	Pos:	13.3333	28.0000
			WG	208	208		Zero:	13.3333	28.0000
		BUS-0007							

Project: Kotzebue Maintenance Shop

DAPPER Fault Contribution Complete Report

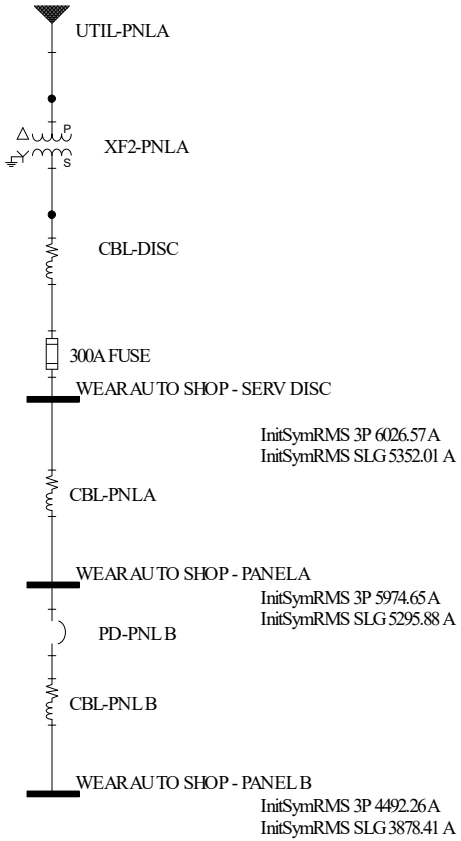
Comprehensive Short Circuit Study Settings

Three Phase Fault	Yes	**Faulted Bus**	All Buses
Single Line to Ground	Yes	**Bus Voltages**	First Bus From Fault
Line to Line Fault	No	**Branch Currents**	First Branch From Fault
Line to Line to Ground	No	**Phase or Sequence**	Report phase quantities
Motor Contribution	Yes	**Fault Current Calculation**	Asymmetrical RMS (with DC offset and Decay)
Transformer Tap	Yes	**Asym Fault Current at Time**	0.50 **Cycles**
Xformer Phase Shift	Yes		

			----------Initial Symmetrical Amps----------				----------Asymmetrical Amps----------				---Init Sym Neutral Amps---	
Bus Name	**---------Contributions---------**		**3 Phase**	**SLG**	**LLG**	**LL**	**3 Phase**	**SLG**	**LLG**	**LL**	**SLG**	**LLG**
WEAR MAIN SHOP - PANEL A			**5,694**	**5,068**	**0**	**0**	**5,725**	**5,099**	**0**	**0**		
	CBL-PNL A CABLE	In	5,694	5,068	0	0	5,725	5,099	0	0	5,068	
WEAR MAIN SHOP - SERV DISC			**6,291**	**5,706**	**0**	**0**	**6,345**	**5,757**	**0**	**0**		
	CBL-PNL A CABLE	In	0	0	0	0	0	0	0	0		
	CBL-DISC CABLE	In	6,291	5,706	0	0	6,345	5,757	0	0	5,706	

Arc Flash Evaluation Report

Bus Name	Bus kV	Protective Device Name	Bus Bolted Fault (kA)	Bus Arcing Fault (kA)	Prot Bolted Fault (kA)	Prot Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Arc Duration	Arc Type	ArcFlash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	PPE
WEAR MAIN SHOP - PANEL A	0.208	200A FUSE	5.69	2.14	5.69	2.14	0.291	0.000	0.291	In Box	19.75	18.00	1.39	Arc-rated FR Shirt & Pants
WEAR MAIN SHOP - SERV DISC	0.208	200A FUSE	6.29	2.38	6.29	2.38	0.191	0.000	0.191	In Box	16.32	18.00	1.03	Nonmelting Materials



WEAR - ARC FLASH ANALYSIS - AUTOMOTIVE SHOP
FACILITY ONE-LINE DIAGRAM
AUGUST 31, 2024

Project: Kotzebue Automotive Shop
Base Project

DAPPER Fault Analysis Input Report (English)

Utilities

Contribution From Name	Bus Name	In/Out Service	Nominal Voltage	-------- Contribution Data --------					PU (100 MVA Base)		
					Duty	Units	X/R			R PU	X PU
UTIL-PNL A	BUS-0007	In	12,470	3P:	1,000,000	MVA	9,999.00		Pos:	0.0000	0.0001
				SLG:	333,333	MVA	9,999.00		Zero:	0.0000	0.0001

Cables

Cable Name	From Bus To Bus	In/Out Service	Qty /Ph	Length Feet	------ Cable Description ------				Per Unit (100 MVA Base)		
					Size	Cond. Type	Duct Type	Insul		R pu	jX pu
CBL-DISC	BUS-0008	In	1	115	300	Copper	Non-Magnetic		Pos:	11.9880	10.4729
									Zero:	19.0586	26.6342
	WEAR AUTO SHOP - SERV DISC										
CBL-PNL A	WEAR AUTO SHOP - SERV DISC	In	1	3	300	Copper	Non-Magnetic		Pos:	0.3127	0.2732
									Zero:	0.4972	0.6948
	WEAR AUTO SHOP - PANEL A										

Cable Name	From Bus To Bus	In/Out Service	Qty /Ph	Length Feet	------ Cable Description ------ Size	Cond. Type	Duct Type	Insul	Per Unit (100 MVA Base)	R pu	jX pu
CBL-PNL B	WEAR AUTO SHOP - PANEL A	In	1	40	2	Copper	Non-Magnetic		Pos:	18.6760	4.3177
									Zero:	29.6875	10.9837
	WEAR AUTO SHOP - PANEL B										

2-Winding Transformers

Xformer Name	In/Out Service	----------Primary & Secondary---------- Bus	Conn.	Volts	FLA	Nominal kVA	Z PU (100 MVA Base)	R pu	jX pu
XF2-PNL A	In	BUS-0007	D	12,470	3	75.0	Pos:	13.3333	28.0000
			WG	208	208		Zero:	13.3333	28.0000
		BUS-0008							

Project: Kotzebue Automotive Shop

DAPPER Fault Contribution Complete Report

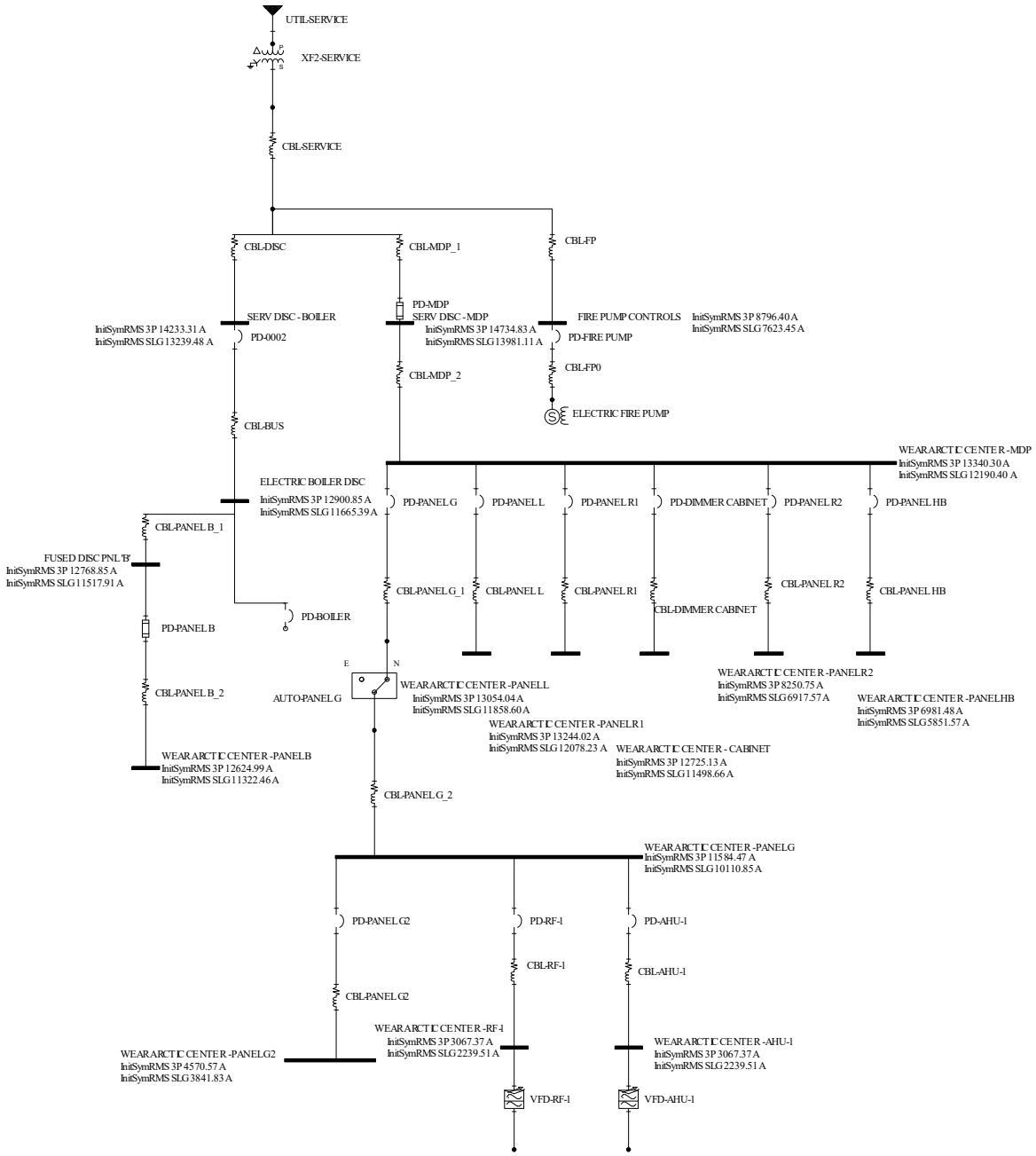
Comprehensive Short Circuit Study Settings

Three Phase Fault	Yes	**Faulted Bus**	All Buses
Single Line to Ground	Yes	**Bus Voltages**	First Bus From Fault
Line to Line Fault	No	**Branch Currents**	First Branch From Fault
Line to Line to Ground	No	**Phase or Sequence**	Report phase quantities
Motor Contribution	Yes	**Fault Current Calculation**	Asymmetrical RMS (with DC offset and Decay)
Transformer Tap	Yes	**Asym Fault Current at Time**	0.50 **Cycles**
Xformer Phase Shift	Yes		

			----------Initial Symmetrical Amps----------				----------Asymmetrical Amps----------				---Init Sym Neutral Amps---	
Bus Name	**---------Contributions---------**		**3 Phase**	**SLG**	**LLG**	**LL**	**3 Phase**	**SLG**	**LLG**	**LL**	**SLG**	**LLG**
WEAR AUTO SHOP - PANEL A			**5,975**	**5,296**	**0**	**0**	**6,067**	**5,394**	**0**	**0**		
	CBL-PNL B CABLE	In	0	0	0	0	0	0	0	0		
	CBL-PNL A CABLE	In	5,975	5,296	0	0	6,067	5,394	0	0	5,296	
WEAR AUTO SHOP - PANEL B			**4,492**	**3,878**	**0**	**0**	**4,499**	**3,886**	**0**	**0**		
	CBL-PNL B CABLE	In	4,492	3,878	0	0	4,499	3,886	0	0	3,878	
WEAR AUTO SHOP - SERV DISC			**6,027**	**5,352**	**0**	**0**	**6,122**	**5,453**	**0**	**0**		
	CBL-PNL A CABLE	In	0	0	0	0	0	0	0	0		
	CBL-DISC CABLE	In	6,027	5,352	0	0	6,122	5,453	0	0	5,352	

Arc Flash Evaluation Report

Bus Name	Bus kV	Protective Device Name	Bus Bolted Fault (kA)	Bus Arcing Fault (kA)	Prot Bolted Fault (kA)	Prot Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Arc Duration	Arc Type	ArcFlash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	PPE
WEAR AUTO SHOP - PANEL A	0.208	300A FUSE	5.97	2.25	5.97	2.25	2.000	0.000	2.000	In Box	68.28	18.00	10.10	Arc-rated FR Shirt & Pants & Arc Flash Suit
WEAR AUTO SHOP - PANEL B	0.208	PD-PNL B	4.49	1.91	4.49	1.91	0.017	0.000	0.017	In Box	3.11	18.00	0.07	Nonmelting Materials
WEAR AUTO SHOP - SERV DISC	0.208	300A FUSE	6.03	2.27	6.03	2.27	2.000	0.000	2.000	In Box	68.71	18.00	10.20	Arc-rated FR Shirt & Pants & Arc Flash Suit



WEAR - ARC FLASH ANALYSIS - ARCTIC HERITAGE CENTER
FACILITY ONE-LINE DIAGRAM
AUGUST 31, 2024

Project: Kotzebue NW Arctic Heritage Center
Base Project

DAPPER Fault Analysis Input Report (English)

Utilities

Contribution From Name	Bus Name	In/Out Service	Nominal Voltage		Contribution Data Duty	Units	X/R		PU (100 MVA Base) R PU	X PU
UTIL-SERVICE	BUS-0021	In	12,470	3P:	1,000,000	MVA	9,999.00	Pos:	0.0000	0.0001
				SLG:	333,333	MVA	9,999.00	Zero:	0.0000	0.0001

Synchronous Motors

Contribution Name	# of Motors	Bus Name	In/Out Service	Nominal Voltage	Contribution Data Base kVA	X"	X/R		PU (100 MVA Base) R PU	X PU
ELECTRIC FIRE PUMP	1	BUS-0035	In	208.00	13.99	0.1500	20.00	Pos	53.619	,072.386
						0.1500	20.00	Neg	53.619	1,072.386
						0.1500	20.00	Zero	,480.000	INF

Cables

Cable Name	From Bus To Bus	In/Out Service	Qty /Ph	Length Feet	Cable Description Size	Cond. Type	Duct Type	Insul		Per Unit (100 MVA Base) R pu	jX pu
CBL-AHU-1	WEAR ARCTIC CENTER - PANEL G WEAR ARCTIC CENTER - AHU-1	In	1	10	4	Copper	Non-Magnetic		Pos:	32.4780	58.3506
									Zero:	51.6332	148.4569

Cable Name	From Bus To Bus	In/Out Service	Qty /Ph	Length Feet	Size	Cond. Type	Duct Type	Insul		R pu	jX pu
					------ Cable Description ------				Per Unit (100 MVA Base)		
CBL-BUS	SERV DISC - BOILER	In	2	25	3/0	Copper	Non-Magnetic		Pos:	2.2132	1.1990
									Zero:	3.5162	3.0481
	ELECTRIC BOILER DISC										
CBL-DIMMER CABINET	WEAR ARCTIC CENTER - MDP	In	1	5	1/0	Copper	Non-Magnetic		Pos:	1.4677	0.4993
									Zero:	2.3333	1.2701
	WEAR ARCTIC CENTER - CABINET										
CBL-DISC	BUS-0002	In	2	10	3/0	Copper	Magnetic		Pos:	0.9303	0.5998
									Zero:	2.9320	1.4770
	SERV DISC - BOILER										
CBL-FP	BUS-0002	In	1	25	4	Copper	Non-Magnetic		Pos:	18.0288	2.9239
									Zero:	28.6612	7.4369
	FIRE PUMP CONTROLS										
CBL-FP0	FIRE PUMP CONTROLS	In	1	27	4	Copper	Non-Magnetic		Pos:	19.4712	3.1578
									Zero:	30.9541	8.0319
	BUS-0035										
CBL-MDP_1	BUS-0002	In	2	3	300	Copper	Non-Magnetic		Pos:	0.0634	0.2285
									Zero:	0.1009	0.5814
	SERV DISC - MDP										
CBL-MDP_2	SERV DISC - MDP	In	2	25	300	Copper	Non-Magnetic		Pos:	0.5287	1.9040
									Zero:	0.8408	4.8453
	WEAR ARCTIC CENTER - MDP										

Cable Name	From Bus To Bus	In/Out Service	Qty /Ph	Length Feet	------ Cable Description ------ Size	Cond. Type	Duct Type	Insul	Per Unit (100 MVA Base)	R pu	jX pu
CBL-PANEL B_1	ELECTRIC BOILER DISC FUSED DISC PNL 'B'	In	2	2	1/0	Copper	Non-Magnetic		Pos: Zero:	0.2935 0.4667	0.0999 0.2540
CBL-PANEL B_2	FUSED DISC PNL 'B' WEAR ARCTIC CENTER - PANEL B	In	2	2	1/0	Copper	Magnetic		Pos: Zero:	0.2959 0.9324	0.1248 0.3072
CBL-PANEL G_1	WEAR ARCTIC CENTER - MDP BUS-0008	In	1	10	300	Copper	Non-Magnetic		Pos: Zero:	0.4230 0.6726	1.5232 3.8762
CBL-PANEL G_2	BUS-0009 WEAR ARCTIC CENTER - PANEL G	In	1	10	300	Copper	Non-Magnetic		Pos: Zero:	0.4234 0.6731	1.5237 3.8769
CBL-PANEL G2	WEAR ARCTIC CENTER - PANEL G WEAR ARCTIC CENTER - PANEL G2	In	1	25	8	Copper	Non-Magnetic		Pos: Zero:	46.8634 74.5019	3.4844 8.8642
CBL-PANEL HB	WEAR ARCTIC CENTER - MDP WEAR ARCTIC CENTER - PANEL HB	In	1	75	1/0	Copper	Non-Magnetic		Pos: Zero:	22.0160 35.0002	7.4889 19.0516
CBL-PANEL L	WEAR ARCTIC CENTER - MDP WEAR ARCTIC CENTER - PANEL L	In	1	3	3/0	Copper	Non-Magnetic		Pos: Zero:	0.5312 0.8439	0.2878 0.7316

Cable Name	From Bus To Bus	In/Out Service	Qty /Ph	Length Feet	------ Cable Description ------ Size	Cond. Type	Duct Type	Insul	Per Unit (100 MVA Base)	R pu	jX pu
CBL-PANEL R1	WEAR ARCTIC CENTER - MDP	In	1	1	3/0	Copper	Non-Magnetic		Pos:	0.1771	0.0959
									Zero:	0.2813	0.2439
	WEAR ARCTIC CENTER - PANEL R1										
CBL-PANEL R2	WEAR ARCTIC CENTER - MDP	In	1	75	3/0	Copper	Non-Magnetic		Pos:	13.2789	7.1942
									Zero:	21.0972	18.2889
	WEAR ARCTIC CENTER - PANEL R2										
CBL-RF-1	WEAR ARCTIC CENTER - PANEL G	In	1	10	4	Copper	Non-Magnetic		Pos:	32.4780	58.3506
									Zero:	51.6332	148.4569
	WEAR ARCTIC CENTER - RF-1										
CBL-SERVICE	BUS-0020	In	2	20	300	Copper	Magnetic		Pos:	1.0725	1.1395
									Zero:	3.3793	2.8060
	BUS-0002										

2-Winding Transformers

Xformer Name	In/Out Service	----------Primary & Secondary---------- Bus	Conn.	Volts	FLA	Nominal kVA	Z PU (100 MVA Base)	R pu	jX pu
XF2-SERVICE	In	BUS-0021	D	12,470	16	300.0	Pos:	5.6667	16.5333
			WG	208	958		Zero:	5.6667	16.5333
		BUS-0020							

Project: Kotzebue NW Arctic Heritage Center

DAPPER Fault Contribution Complete Report

Comprehensive Short Circuit Study Settings

Three Phase Fault	Yes	**Faulted Bus**	All Buses
Single Line to Ground	Yes	**Bus Voltages**	First Bus From Fault
Line to Line Fault	No	**Branch Currents**	First Branch From Fault
Line to Line to Ground	No	**Phase or Sequence**	Report phase quantities
Motor Contribution	Yes	**Fault Current Calculation**	Initial Symmetrical RMS (with 1/2 Cycle Asym)
Transformer Tap	Yes	**Asym Fault Current at Time**	0.50 **Cycles**
Xformer Phase Shift	Yes		

				----------Initial Symmetrical Amps----------				----------Asymmetrical Amps----------				---Init Sym Neutral Amps---	
Bus Name	**---------Contributions---------**			**3 Phase**	**SLG**	**LLG**	**LL**	**3 Phase**	**SLG**	**LLG**	**LL**	**SLG**	**LLG**
ELECTRIC BOILER DISC				**12,901**	**11,665**	**0**	**0**	**13,432**	**12,006**	**0**	**0**		
	CBL-PANEL B_1	CABLE	In	0	0	0	0	0	0	0	0		
	CBL-BUS	CABLE	In	12,901	11,665	0	0	13,432	12,006	0	0	11,665	
FIRE PUMP CONTROLS				**8,796**	**7,623**	**0**	**0**	**8,803**	**7,626**	**0**	**0**		
	CBL-FP0	CABLE	In	257	149	0	0	258	149	0	0		
	CBL-FP	CABLE	In	8,617	7,519	0	0	8,623	7,522	0	0	7,623	
FUSED DISC PNL 'B'				**12,769**	**11,518**	**0**	**0**	**13,256**	**11,829**	**0**	**0**		
	CBL-PANEL B_2	CABLE	In	0	0	0	0	0	0	0	0		
	CBL-PANEL B_1	CABLE	In	12,769	11,518	0	0	13,256	11,829	0	0	11,518	
SERV DISC - BOILER				**14,233**	**13,239**	**0**	**0**	**15,246**	**13,898**	**0**	**0**		
	CBL-BUS	CABLE	In	0	0	0	0	0	0	0	0		
	CBL-DISC	CABLE	In	14,233	13,239	0	0	15,246	13,898	0	0	13,239	
SERV DISC - MDP				**14,735**	**13,981**	**0**	**0**	**16,074**	**15,038**	**0**	**0**		
	CBL-MDP_2	CABLE	In	0	0	0	0	0	0	0	0		

Bus Name	---------Contributions---------		----------Initial Symmetrical Amps---------- 3 Phase	SLG	LLG	LL	----------Asymmetrical Amps---------- 3 Phase	SLG	LLG	LL	---Init Sym Neutral Amps--- SLG	LLG
CBL-MDP_1	CABLE	In	14,735	13,981	0	0	16,074	15,038	0	0	13,981	
WEAR ARCTIC CENTER - CABINET			**12,725**	**11,499**	**0**	**0**	**13,555**	**12,174**	**0**	**0**		
CBL-DIMMER CABINET	CABLE	In	12,725	11,499	0	0	13,555	12,174	0	0	11,499	
WEAR ARCTIC CENTER - AHU-1			**3,067**	**2,240**	**0**	**0**	**3,197**	**2,394**	**0**	**0**		
VFD-AHU-1		In	0	0	0	0	0	0	0	0		
CBL-AHU-1	CABLE	In	3,067	2,240	0	0	3,197	2,394	0	0	2,240	
WEAR ARCTIC CENTER - MDP			**13,340**	**12,190**	**0**	**0**	**14,623**	**13,263**	**0**	**0**		
CBL-PANEL HB	CABLE	In	0	0	0	0	0	0	0	0		
CBL-PANEL R2	CABLE	In	0	0	0	0	0	0	0	0		
CBL-DIMMER CABINET	CABLE	In	0	0	0	0	0	0	0	0		
CBL-PANEL L	CABLE	In	0	0	0	0	0	0	0	0		
CBL-PANEL R1	CABLE	In	0	0	0	0	0	0	0	0		
CBL-PANEL G_1	CABLE	In	0	0	0	0	0	0	0	0		
CBL-MDP_2	CABLE	In	13,340	12,190	0	0	14,623	13,263	0	0	12,190	
WEAR ARCTIC CENTER - PANEL B			**12,625**	**11,322**	**0**	**0**	**13,072**	**11,594**	**0**	**0**		
CBL-PANEL B_2	CABLE	In	12,625	11,322	0	0	13,072	11,594	0	0	11,322	
WEAR ARCTIC CENTER - PANEL G			**11,584**	**10,111**	**0**	**0**	**12,780**	**11,167**	**0**	**0**		
CBL-PANEL G2	CABLE	In	0	0	0	0	0	0	0	0		
CBL-AHU-1	CABLE	In	0	0	0	0	0	0	0	0		
CBL-RF-1	CABLE	In	0	0	0	0	0	0	0	0		
CBL-PANEL G_2	CABLE	In	11,584	10,111	0	0	12,780	11,167	0	0	10,111	
WEAR ARCTIC CENTER - PANEL G2			**4,571**	**3,842**	**0**	**0**	**4,571**	**3,842**	**0**	**0**		
CBL-PANEL G2	CABLE	In	4,571	3,842	0	0	4,571	3,842	0	0	3,842	
WEAR ARCTIC CENTER - PANEL HB			**6,981**	**5,852**	**0**	**0**	**6,989**	**5,859**	**0**	**0**		
CBL-PANEL HB	CABLE	In	6,981	5,852	0	0	6,989	5,859	0	0	5,852	
WEAR ARCTIC CENTER - PANEL L			**13,054**	**11,859**	**0**	**0**	**14,157**	**12,774**	**0**	**0**		
CBL-PANEL L	CABLE	In	13,054	11,859	0	0	14,157	12,774	0	0	11,859	
WEAR ARCTIC CENTER - PANEL R1			**13,244**	**12,078**	**0**	**0**	**14,464**	**13,095**	**0**	**0**		
CBL-PANEL R1	CABLE	In	13,244	12,078	0	0	14,464	13,095	0	0	12,078	
WEAR ARCTIC CENTER - PANEL R2			**8,251**	**6,918**	**0**	**0**	**8,319**	**6,981**	**0**	**0**		
CBL-PANEL R2	CABLE	In	8,251	6,918	0	0	8,319	6,981	0	0	6,918	
WEAR ARCTIC CENTER - RF-1			**3,067**	**2,240**	**0**	**0**	**3,197**	**2,394**	**0**	**0**		
VFD-RF-1		In	0	0	0	0	0	0	0	0		
CBL-RF-1	CABLE	In	3,067	2,240	0	0	3,197	2,394	0	0	2,240	

Arc Flash Evaluation Report

Bus Name	Bus kV	Protective Device Name	Bus Bolted Fault (kA)	Bus Arcing Fault (kA)	Prot Bolted Fault (kA)	Prot Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Arc Duration	Arc Type	ArcFlash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	PPE
ELECTRIC BOILER DISC	0.208	PD-0002	12.90	5.15	12.90	5.15	0.077	0.000	0.077	In Box	15.36	18.00	0.93	Nonmelting Materials
FIRE PUMP CONTROLS	0.208	MaxTripTime @2.0s	8.80	3.98	8.62	3.90	2.000	0.000	2.000	In Box	98.51	18.00	18.15	Arc-rated FR Shirt & Pants & Arc Flash Suit
FUSED DISC PNL 'B'	0.208	PD-0002	12.77	5.09	12.77	5.09	0.080	0.000	0.080	In Box	15.63	18.00	0.96	Nonmelting Materials
SERV DISC - BOILER	0.208	MaxTripTime @2.0s	14.23	6.61	13.99	6.49	2.000	0.000	2.000	In Box	137.79	18.00	31.03	Arc-rated FR Shirt & Pants & Arc Flash Suit
SERV DISC - MDP	0.208	PD-MDP	14.74	5.90	14.73	5.90	0.793	0.000	0.793	In Box	72.31	18.00	11.07	Arc-rated FR Shirt & Pants & Arc Flash Suit

Bus Name	Bus kV	Protective Device Name	Bus Bolted Fault (kA)	Bus Arcing Fault (kA)	Prot Bolted Fault (kA)	Prot Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Arc Duration	Arc Type	ArcFlash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	PPE
WEAR ARCTIC CENTER - CABINET	0.208	PD-DIMMER CABINET	12.73	5.89	12.73	5.89	0.017	0.000	0.017	In Box	6.42	18.00	0.23	Nonmelting Materials
WEAR ARCTIC CENTER - AHU-1	0.208	PD-AHU-1	3.07	1.26	3.07	1.26	2.000	0.000	2.000	In Box	46.24	18.00	5.42	Arc-rated FR Shirt & Pants
WEAR ARCTIC CENTER - MDP	0.208	PD-MDP	13.34	5.33	13.34	5.33	1.263	0.000	1.263	In Box	90.47	18.00	15.84	Arc-rated FR Shirt & Pants & Arc Flash Suit
WEAR ARCTIC CENTER - PANEL B	0.208	PD-PANEL B	12.63	5.84	12.63	5.84	0.008	0.000	0.008	In Box	4.11	18.00	0.11	Nonmelting Materials
WEAR ARCTIC CENTER - PANEL G	0.208	PD-PANEL G	11.58	5.34	11.58	5.34	0.017	0.000	0.017	In Box	5.99	18.00	0.21	Nonmelting Materials
WEAR ARCTIC CENTER - PANEL G2	0.208	PD-PANEL G2	4.57	1.95	4.57	1.95	0.020	0.000	0.020	In Box	3.40	18.00	0.08	Nonmelting Materials
WEAR ARCTIC CENTER - PANEL HB	0.208	PD-PANEL HB	6.98	2.67	6.98	2.67	2.000	0.000	2.000	In Box	76.37	18.00	12.08	Arc-rated FR Shirt & Pants & Arc Flash Suit
WEAR ARCTIC CENTER - PANEL L	0.208	PD-PANEL L	13.05	6.05	13.05	6.05	0.016	0.000	0.016	In Box	6.40	18.00	0.23	Nonmelting Materials

Bus Name	Bus kV	Protective Device Name	Bus Bolted Fault (kA)	Bus Arcing Fault (kA)	Prot Bolted Fault (kA)	Prot Arcing Fault (kA)	Trip/ Delay Time (sec.)	Breaker Opening Time (sec.)	Arc Duration	Arc Type	ArcFlash Boundary (in)	Working Distance (in)	Incident Energy (cal/cm2)	PPE
WEAR ARCTIC CENTER - PANEL R1	0.208	PD-PANEL R1	13.24	6.14	13.24	6.14	0.016	0.000	0.016	In Box	6.47	18.00	0.23	Nonmelting Materials
WEAR ARCTIC CENTER - PANEL R2	0.208	PD-PANEL R2	8.25	3.71	8.25	3.71	0.024	0.000	0.024	In Box	5.91	18.00	0.20	Nonmelting Materials
WEAR ARCTIC CENTER - RF-1	0.208	PD-RF-1	3.07	1.26	3.07	1.26	1.998	0.000	1.998	In Box	46.22	18.00	5.42	Arc-rated FR Shirt & Pants