

SITE SURVEY

April 12, 2017, Tom Butcher, Senior Power Quality Technologist-Engineering, Surge Suppression LLC, and I met with [redacted] Electrical Supervisor, [redacted], at the [redacted]. The purpose of the meeting was to conduct a site survey of the plant electrical system for application of surge protective devices.

The survey began at the 4,160 Vrms Main MCC.



4,160 V Main MCC

Spare Breaker Panel



Proposed medium voltage Surge Protective Device (SPD) in spare breaker panel of 4,160 V Main MCC. Install in blank space below breaker inside cabinet.

Proposed SPD: CMV1603Y2400/4160

The Main MCC supplies three transformers. The North Side Transformer is a 4,160 to 277/480 V, 3 \emptyset , Ungrounded Wye, 2000 KVA, 2.4kA system feeding the Old MCC. The Finishing Mill Transformer is a 4,160 to 680 V, Delta, 770 kVA system. The South Side Transformer is a 4,160 to 277/480 V, 3 \emptyset , 4 Wire, Wye, 2,000 kVA, 2.4 kA system feeding MCC 4.

The North Side Transformer Main Service Switchgear powers the North Side Electrical Room.



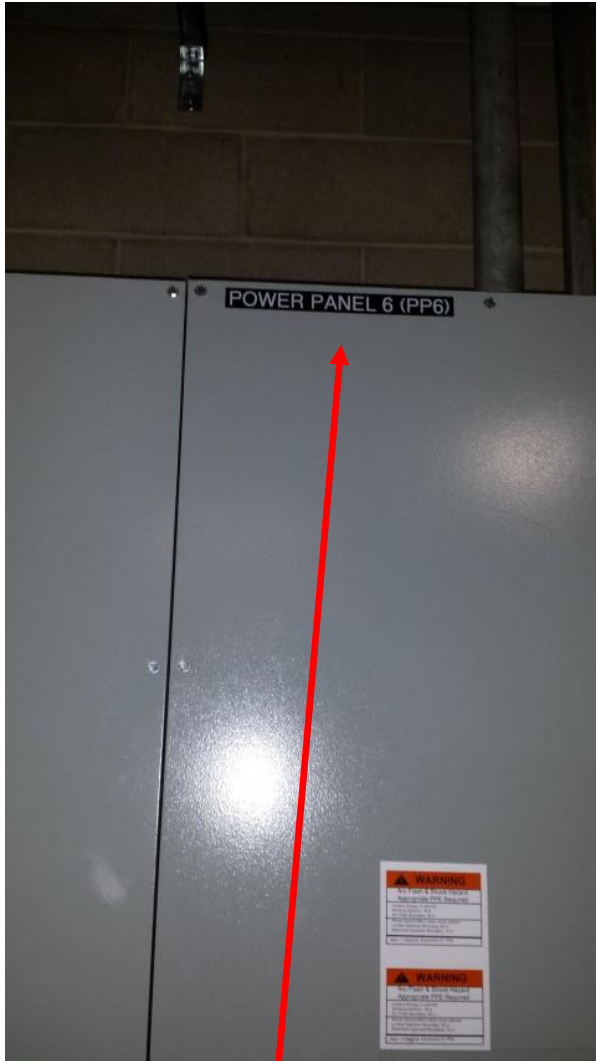


Mount the North Side Main Switchgear SPD on the top right corner of the switchgear and connect to the buss through the top of the gear.

Proposed SPD: Advantage SILB3N4D5M or SpecPRO SSMD363N4D5

This SPD on the North Side Main Switchgear will provide the second level of surge protection from catastrophic surge events on the grid, as well as internal protection between Power Panels and MCCs powered from the gear.

Power Panel 6 is powered from the 277/480 V, 3 \emptyset , Ungrounded Wye, North Side Transformer, and supplies the UPS.



Power Panel 6



PP6A

PP6B

Power Panel 6 has two sections, each of which requires a separate SPD to provide third tier protection from catastrophic surge events, and to protect internal circuits from each other.

Proposed SPDs: Advantage CDLB3N4-LP or SpecPRO CSMB163N4-LP for PP6A

Advantage CDLB3N4-LP or SpecPRO CSMB163N4-LP for PP6B

Install SPDs internal to the cabinets with external LED lights on sides of the cabinet. Connect to 30 Amp, 3-pole spare breakers, or install 30 Amp, 3-pole breakers in empty slots.

MCC No. 1 is powered from the 277/480 V, 3 Ø, Ungrounded Wye, North Side Transformer.

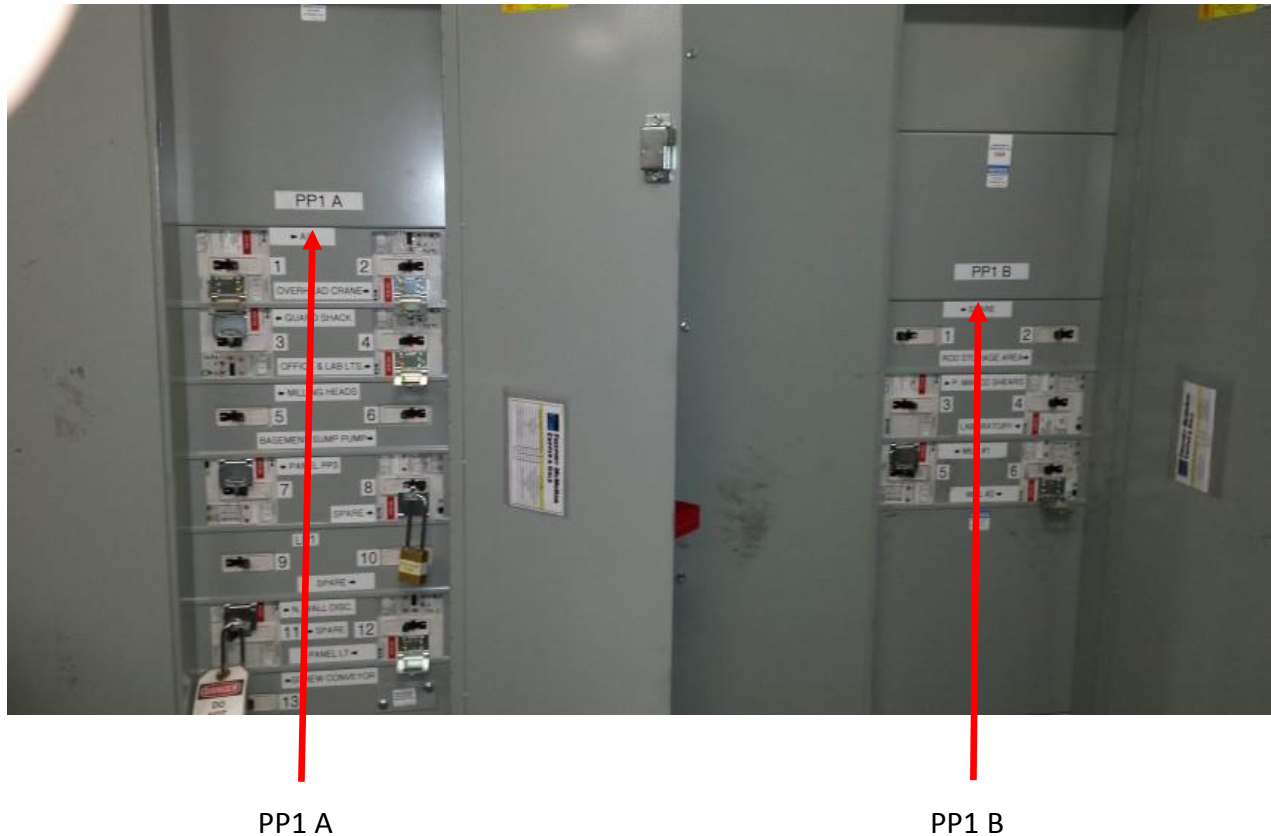


MCC No. 1 SPD to be install inside unoccupied bucket with external LED lights

Proposed SPD: Advantage CDLB3N4-LP or SpecPRO CSMB163N4-LP

This unit will provide third tier catastrophic protection as well as internal circuit to circuit protection within the MCC.

Power Panel 1 is a two-column panel powered from the 277/480 V, 3 ϕ , Ungrounded Wye, North Side Transformer.



There are spare breakers available on PP1 A and PP1 B. The SPDs should be installed internally within each of the two cabinets, connected to a spare 30 Amp, 3-pole breaker, with external LED light kits on the exterior of the cabinets.



PP1 A



PP1 B

These units will provide third tier catastrophic protection as well as internal circuit to circuit protection within the Power Panels.

Proposed SPDs: Advantage 2 x CDLB3N4-LP or SpecPRO 2 x CSMB163N4-LP

MCC No. 2 is powered from the 277/480 V, 3 Ø, Ungrounded Wye, North Side Transformer.



This is a 6-column MCC. To provide closest common junction points, install SPDs on 2nd and 5th columns, inside unused buckets with external LED light kits. If no spare buckets, mount on top of MCC with external disconnects.

Proposed SPDs: Advantage 2 x CMLB3N4-LP if internal, or 2 x CMLB3N4D3 if external
SpecPRO 2 x CSMB283N4-LP if internal, or 2 x CSMB283N4D3 if external

Power Panel 2 is a two-column panel powered from the 277/480 V, 3 Ø, Ungrounded Wye, North Side Transformer. It is the same configuration as Power Panel 1.

Proposed SPDs: Advantage 2 x CDLB3N4-LP or SpecPRO CSMB163N4-LP

Power Panel 3 is a single column panel powered from the 277/480 V, 3 Ø, Ungrounded Wye, North Side Transformer. It is the same configuration as Power Panel 1A.

Proposed SPD: Advantage CDLB3N4-LP or SpecPRO CSMB163N4-LP

UPS By-Pass Switch, 480 V, 3 Ø, 250 A.



Install SPD internally, on load side of BIB breaker

Proposed SPD: Advantage CDLB3N4-LP or SpecPRO CSMB163N4-LP

Finishing Mill Main Power Cabinet, 690 V, 3 ϕ , Delta, 644 Amps.



Mount internal to cabinet with external LED light kit if possible. If SPD needs to be outside cabinet, mount SPD on top of cabinet, through top to connection point inside cabinet.

Proposed SPD: Advantage LSEB3N7-LP or SpecPRO SSMD203N7-LP if internal installation possible, with external LED light kit

Advantage LSEB3N7D3 or SpecPRO SSMD203N7D3 if external mounting is required

Finishing Mill Switchgear and Drive Cabinet, 690 V, 3 ϕ , Delta.



Finishing Mill Drive Cabinet



Main Switchgear

Install SPD at switch

Proposed SPD: Advantage LSEB3N7-LP or SpecPRO SSMD203N7-LP if there is room inside to mount to load side of main breaker

Advantage LSEB3N7D3 or SpecPRO SSMD203N4D3 if it is necessary to mount to outside of cabinet

MCC 4 is supplied from South Side Transformer with 277/480 V, 3 ϕ , 4 Wire service.



MCC 4 Main Lugs panel



Open bucket in 3rd slot of panel



Install SPD inside bucket with a 30 Amp, 3-pole breaker and remote LED lights in bucket door.

Proposed SPD: Advantage SMLB3N4-LP or SpecPRO SSMD283N4-LP

MCC 4 is a multi-columned motor control center. To protect the equipment from catastrophic surge activity on the grid, as well as provide a path for internal surges created by the operation of the equipment in the plant, a SPD is proposed for the first column, and another for the opposite end of the MCC in bucket MCC 4/26, which is currently unoccupied.



Right side of MCC 4. Bucket MCC 4/26

Proposed SPD: Advantage CMLB3N4-LP or SpecPRO CSMB283N4-LP

Summary of units:

Main Service Entrance: 1 x CMV1603Y2400/4160

Old Main MCC: 1 x Advantage SILB3N4D5M or SpecPRO SSMD363N4D5

PP1, PP2, PP3, PP6, MCC1: 8 x Advantage CDLB3N4-LP or SpecPRO CSMB163N4-LP

Right side column MCC 4: 1 x Advantage CMLB3N4-LP or SpecPRO CSMB283N4-LP

MCC No. 2: 2 x Advantage CMLB3N4-LP if internal, or 2 x Advantage CMLB3N4D3 if external
2 x SpecPRO CSMB283N4-LP if internal, or 2 x SpecPRO CSMB283N4D3 if external

Finishing Mill Main Cabinet: Advantage LSEB3N7-LP or SpecPRO SSMD203N4-LP if internal installation possible, with external LED light kit, or Advantage LSEB3N7D3 or SpecPRO SSMD203N4D3 if external mounting is required

Finishing Mill Switchgear: Advantage LSEB3N7-LP or SpecPRO SSMD203N4-LP if there is room inside to mount to load side of main breaker, or Advantage LSEB3N7D3 or SpecPRO SSMD203N4D3 if it is necessary to mount to outside of cabinet

Final determination of internal or external installations, and confirmation of 690 V, 3 \emptyset , Delta power on Finishing Mill Main Cabinet and Switchgear will need to be completed prior to final pricing and proposal. Spec sheets for units are attached which provide sizing of units for determination of install location.

SUMMARY CONCLUSIONS:

The plant has been experiencing outages and downtime from surge activity, both external and internal. The installation of a staged surge protective device system will provide the ability to reduce catastrophic surge activity from the power grid to survivable levels at each stage of the distribution system within the plant. It will also provide circuit to circuit and panel to panel protection from the internal surge events that are created by the normal operation of the electrical and electronic equipment within the plant. The internal surge events, while not catastrophic, do have a cumulative damaging effect on the equipment, particularly the electronic control circuits. This cumulative damage leads to early failures and downtime that can be prevented with the application of the proper surge protective devices, at the key junction points, with the correct installation in compliance with the National Electrical Code.