

1. Client: Stony Mountain Penitentiary Vista Switchgear Setting Change 2016

Provided Engineering and technical services to perform the requested Vista Switchgear setting change to an S&C Vista protection relay based on the recommended settings in the coordination study of the facility, provided by Wescan.

2. Client: Versatile Vista Installation (2014)

Provided Engineering and technical services for 15kV Vista electrical distribution upgrade.

3. Client: Stony Mountain Penitentiary Manitoba, Canada (2011-2012)

- Provided detailed design for 15kV electrical distribution upgrade Phase 1 including installation of new three (3), 15kV Vista switchgear.
- Provides detailed engineering design for 600V electrical distribution system including underground cabling, gang operated switch, transformer and panel board specifications.
- Arc Flash Study using SKM software.

4. Client: Border Chemical Manitoba, Canada (2010-Present)

- Provided engineering detailed design for 15kV East side electrical distribution upgrade Phase 1 including installation of new one (1) 15kV Vista switchgear, 1x1MVA 12.47kV:480V and 1x750kVA 12.47KV:2400V transformers.
- Provided detailed design for 15kV west side electrical distribution upgrade including installation of new one (1) 15kV Pad mounted switchgear, 2x1MVA 12.47kV:480V transformers.
- Arc Flash Study using SKM software

5. Client: CG Canada Ltd, Winnipeg, Manitoba (2010)

- Provided detailed engineering design for 12.47 kV plant upgrade.
- Provided engineering detailed design for 25kV underground feed and installation of (2) new 25kV vista switchgear electrical distribution.
- Arc Flash Study using SKM software.

6. Client: Stony Mountain Penitentiary, Stony Mountain MB (2011-2012)

- Site wide 12.47kV protection coordination & programming (2012)
- Provided site wide 12.47kV protection coordination and programming by modelling the existing distribution and new equipment in SKM, Establishing new protection curves

- for proper device coordination and programming new & existing S&C Vista switchgear for protection curves.
- Detailed design for 15kV electrical distribution upgrade Phase 1 including installation of new (3) 15kV Vista switchgear.
 - Detailed design of 600V electrical distribution including underground cabling, gang operated switch, transformer and panel board specifications.
 - Arc Flash Study using SKM software.

7. Client : Vale, Thompson, Manitoba

- T1 235 Pole Dual Switch Pole Replacement Project Detailed Design (Current)
Supply and installation of 13.8 kV Overhead distribution line and replacement of Dual Switch Pole.
- P1 Vale Tailings Pump VFD Replacement Project (Current)
Detailed design and commissioning of the replacement of the existing Harvest mill tailings 1500 HP Variable Frequency Drives.
- T3 Security Building Replacement – Detailed Design Project (Current)
Demolition of existing T3 security building and construction and commissioning of a new guard house.
- T-3 378 Substation 3MVAR PFC Review & Commissioning (2015)
Review of de-tuned PFC bank and recommendation of tuning changes and design considerations.
Commissioning of the PFC: creation of SEL751 relay settings, PFC controller settings, onsite assistance with general switchgear testing and PFC operation
- T-3 2580L Main Breaker Retrofit (2015)
Design and commissioning of 5kV main breaker retrofit into existing switchgear and onsite commissioning assistance.
- E-House Commissioning of River Pumphouse (2015)
Construction and onsite commissioning of four 1250hp, 4160V pumps for process water & city water supply. Performed coordination, protection, arc flash study, PLC programming and development of protection relay settings (2 x SEL751A, 4 x Multilin 369).

- Rod & Ball Mill Switchgear (2014-2015)
 - Design - Electrical equipment specification, layout, protection coordination settings, arc flash hazard settings, implementation of upstream trip logic.
 - Commissioning - Verification of testing procedures and results, troubleshooting arc flash light detection fiber, secondary injection witness testing of SEL 751A and Multilin 369 relay set points. Witness testing of SE-330 NGR protection relay.
- T3 378 Surface Slurry Plant HMI Upgrade (2015)
 - Installation of new PanelView Plus HMI panel in the 378 slurry building and upgrading HMI system for existing DH+ communication network.
- T1 Services PLC Replacement Phase 1 Detailed Design (2015)
 - Installation of PLC, Remote I/O s and a Process Control Network (PCN) to run the systems at 4000L feeder and 4080L crusher PLC.
- T3 Telemecanique PLC Replacement Detailed Design (2015)
 - Replacement of six Telemecanique PLCs: Topman`s Collarhouse (PLC44), 311 FAR (PLC8), 310 FAR (PLC32), 345 RAR (PLC49), 1403L Potable Water Pumps (PLC46), and 2403L Garage Lunchroom (PLC47)
 - Replacement of the existing dedicated Telemecanique PLCs network by an Ethernet/IP based PCN.
- Utilities Transformer Fire Separation (2015)
 - Feasibility study of using fire separation between outdoor Transformers/ Switch Room Building.
- 310 FAR Electric Heat Deficiencies and Gas Code Compliance Project (2015)
 - Modification and upgrades for the existing 310 FAR Electric Heating System, propane gas burner system and the valve train.
- River Pump House E-House VFD Detailed Design (2015)
 - Replacement of Variable Frequency Drive, starters and upgrading of switchgear, construction of electrical room and installation of reliable control and communicating flow data to existing utility substation operator within an existing Foxboro DCS system.

- T3 Headframe Transformer Yard Upgrade Detailed Design (2015)

Detailed design upgrade of ground grid, 13.8kV overhead distribution line continuation, FOP testing and burying the 13.8KV cable to come across from the hourly parking lot
- 4.16 kV Rack Power Upgrade Detailed Design project (2015)

Detailed engineering design for installation and upgrade of T1 1640L 600V Rack Power.
- Potable Water Tower Replacement – Detailed Engineering (2015)

The modifications of closed loop potable water circuit of Potable Water Tower for proper pressure control and Replacements of VFD's for existing booster pumps, isolation valve for the water tower and process water wall hydrants for Utilities and Mill east wall.
- Mill Cable Tray Replacement Detailed Design (2015)

Detailed design for demolition of the existing cable tray and installation of the new cable tray inside the Mill.
- Turbo Compressor Replacement (2014 – 2015)

Detailed design for installation of turbo compressor in the Vale Utilities building.
- Birchtree NO2 and CO Alarm Design (2014)

On-site commissioning assistance of ControlLogix PLC program changes and WonderWare HMI station.
- PILC Cable Replacement Project Detailed Design (2015)

Installation of 15kV Transmission line detailed design and commissioning.
- Sandfill Equipment Automation (2013 – 2014)

Detailed design of T1 Mine Sandfill Plant Automation system and commissioning of PLC programming.
- T-3 310 FAR Electric Heat (5MW) (2014)

Modification to the existing distribution equipment to meet CEC, changes to Telemecanique TSX PLC logic, coordination study and applying of settings to ABB SACE breaker & Startco SE-325, system commissioning, VAMP 221 arc flash relay commissioning, SKM modeling and applying of arc flash labels.

- Utility PFC Bank Review FEL 1 & 2 (2014)
 - PFC bank recommendation of size, location and design considerations.
- Emergency Potable Water Supply (2014)
 - Provide valve controller and associated modifications to the existing ladder logic, drawings, upgrading of communication network diagram and commissioning.
- T-1 235 FAR Control Upgrade (2014)
 - Provide specifications for purge function burner controller and apply associated modifications to existing ladder logic for burner control, drawing updates.
- T-3 Shower Upgrade (2014)
 - Removal of old control and shower equipment, provide specifications of new shower columns, industrial mixing chamber, and all the of control equipment and provide required modifications and drawing updates.
- T3 Mine – Surface to Underground Fuel Delivery – Detailed Design (2014)
 - Detailed engineering electrical design for installation of new Surface to Underground Fuel Delivery System. Design included construction package, specifications, RSLogix 5 and 500 PLC programs, HMI, Control Philosophy.
- Mill 2A6 Pump and VFD Installation (2014)
 - Detailed design of installation of Mill 2A6 150 Hp Pump and Variable Frequency Drive.
- MIBC Tank Replacement – T1 Mine (2014)
 - Preparation of construction and demolition drawing package using MicroStation, cable routing, lighting quotes and installation.
- Mill A3 Pump Detailed Design (2014)
 - Mill A3 50 Hp Pump and VFD Installation Detailed Design.
- 4250L Slurry Programming Support – T3 Mine (2014)
 - On-site commissioning, assisted in loading-up updated PLC Ladder Logic program and new Factory Talk View Machine Edition HMI screens for Panel View Plus 6 1000 and performed I/O check tests for Allen Bradley SLC 500 series PLC

- Birchtree Pump Controls (2014)

On-site commissioning, assisted in loading-up new ControlLogix PLC Ladder Logic program additions and WonderWare HMI interface

Updating the PLC Ladder Logic program reflecting the newly designed HMI interface, preparation of the Operator Manual for the new WonderWare HMI interface

8. Client : Thompson Creek Minerals, Mount Milligan, BC (2014 - ongoing)

- Ball Mill Drive and site Troubleshooting (2016 - ongoing)

Remote and onsite troubleshooting of two ABB ACS6000 VFDs. Coordination with Mill control staff to determine origin of Mill shutdown faults. Network GE Multilin interface to obtain triggered fault data from multiple sites/origins

- Troubleshooting of 54MVar filter bank, SATEC PFC controller settings and uploading of parameters.
- Adjustment of stage timing to minimize plant disturbance and over voltages.
- Power system coordination review with CIMA+ of multiple issues (equipment specification, configuration).
- Arc Flash Study certification training

9. Client : Griffin Wheel, Winnipeg, Manitoba (2015 - ongoing)

- Site reclamation of fire damage and provide assistance with onsite staff in the construction, sizing, Substation Ground Grid design and protection of new and existing equipment.
- Low Voltage Power redistribution and restoration, Life Safety System Design.

10. Client: Gerdau, Selkirk, Manitoba (2015 - ongoing)

- Design and Installation of 12.47kV Pole mount reclosers
- Detailed design for arc flash mitigation of downstream 600V switchgear

11. Client: Louisiana-Pacific, Manitoba (2014)

- Detailed design for the integration of (3) MV starters functioning as Remote Disconnect switches

12. Client: Swan River Debarker Replacement (2013)

- Detailed design for installation of new Debarker

13. Client: Atomic Energy of Canada Limited (AECL), Pinawa, Manitoba (2013-2014)

- Standpipe Hydrogen (H₂) & Methane (CH₄) Gas Detection System

Provide conceptual design and specification of detection system 4160 Volt, 6x100 kVar Capacitor Bank Connection

Design of Technical Scope of Work Bid Document for power systems studies

Created bid document which describes the scope of work to updating single line drawing and perform power system studies which includes short circuit study, protection coordination study, equipment evaluation, arc flash hazard analysis, and arc flash mitigation

- AECL Building 100 Battery Bank and Rectifier Replacement (2013– 2014)

Design of Battery Bank and charging equipment replacement. Provide specification of new equipment, ventilation requirements, and configuration options.

- AECL Standpipe Hydrogen Methane Flammable Gas Detection System (2013)

Preparation of building elevation and plan equipment layout drawings for the gas detection system highlighting wiring installation methods and specifications

Preparation of Hydrogen Methane Flammable Gas Detection Design Description, flow diagram for gas detection process and functional block diagram

- AECL Building 300 Stage 4 and Stage 7 Segregation with Minimal Heating Project (2013)

Preparation of material take-off list based on data collected during site visit, provided technical recommendations for emergency lighting replacement, preparation of drawings for electrical arrangement for Building 300's Stage 4 and Stage 7

- AECL Building 300 Annunciation Panel 1-180PL3 Project (2013)

Assistance in selection of cooling system design for Annunciation Panel 1-180PL3.

Preparation of model, drawings, cable and panel schedule for the new cooling system for Annunciation Panel 1-180PL3.

Preparation of Building 300 Annunciation Panel 180PL3 Design Requirements Report for new Cooling System Electrical Design.

- AECL WMA Power Distribution Reconfiguration (2012-2013)
Preparation of shop drawings and sized all conduit and sweeps for new concrete pads and their associated equipment

14. Client: Magellan Aerospace Bus Duct, Manitoba

Revision of previous test results and onsite inspection of multiple Bus Duct installations. Recommendation report.

15. Client: CFB Shilo, Shilo, Manitoba (2014)

Maintenance testing of main substation equipment. Transformer (TTR, winding resistance, Capacitance Bridge, oil & wdg temp, oil sample), main breaker (Insulation & contact resistance), circuit switcher (insulation & contact resistance, operational checks), ground switch (contact resistance, operational checks).

16. Client: Manitoba Hydro International, Winnipeg, Manitoba (2012)

- Performed Dunn-Rite Food Ltd. New Addition
- Detailed design for HV electrical upgrade expansion

17. Client: Winpak Winnipeg, Manitoba, Canada (2013-Current)

- Multibarrier 4 Power distribution design (2015)
- Trim baler electrical design (2015)
- Comexi Laminator Electrical design (2014)
- W&H Printing Press (2013)

18. Client: Areva Resources Canada Inc., McClean Lake Saskatchewan, (2008)

- JEB Mill Modifications, Electrical, Instrumentation, and Controls Discipline Lead for mine modifications, for \$118 million dollar expansion

19. Client: Boeing Canada, Winnipeg, MB (2012 - Ongoing)

- Autoclave PLC control upgrade - Onsite data collection for as-built of Autoclave starter and VFD wiring.
- Backup Generator design - Modification to distribution for backup generators for Autoclave and emergency feeders.
- Coordination Study - 600V feeder coordination study to determine breaker trip set points of new feeder.
- MV Air Compressor MCC and Floxal Nitrogen MCC Design Upgrade

Preparation of detailed design and specification for MCCs and main distribution panel c/w two (2) electronic circuit breaker for the MCCs

- Participated on preparing bid package document for construction
Correspondence with client to ensure requirements are met and onsite data collection of the existing electrical equipment information for the design.
- 4000A 600V Cable Bus Construction Package (2015 – 2016)
Site verification of 25kV breaker control, MV & LV distribution equipment, new LV cable bus orientation and assist with structural approach and requirements. Creation of construction package for removal of existing bus duct and MV breaker control relays, installation of new cable bus and SEPAM relay.
- 25kV Breaker testing assistance (2015)
Modification of relay settings protecting Ph1 Sub 6 main transformer. Upload and assistance, verification of main breaker & relay testing during shutdown.
- Autoclave PLC control upgrade (2012)
Onsite data collection for as-builts of Autoclave starter and VFD wiring. Backup Generator distribution modifications (2014)
- Provided modification to distribution for backup generators for Autoclave and emergency feeders.

20. Client: AMPS Powerline, Winnipeg, Canada

- Cargill - Detailed design for New 25kV electrical distribution upgrade (2015)
- Glacial Aggregates - Detailed design for New 15kV electrical distribution upgrade (2014)
- Granny's Poultry MV Power Distribution - Detailed design for New 15kV electrical distribution upgrade (2014)

21. Client: Mulder Construction, Stonewall Manitoba (2010 to Current)

Detailed design for new 2-15kV mining skids E

Electrical Services Upgrade and Ground Design in a Limestone Quarry for Compliance with Manitoba Mines Branch Grounding Improvement directive.

22. Client: Hutterite Colony in Manitoba

- Ridgeland Colony: Detailed design of 15kV Electrical service upgrade (2016)
- Grand Colony: Detailed design of 15kV Electrical service upgrade (2015)
- Maxwell Colony: Detailed design of 15kV Electrical service upgrade (2014)
- Ridgeland Colony: Detailed design of 15kV Electrical service upgrade (2013)
- Suncrest Colony: Detailed design of 15kV Electrical service upgrade (2012)

- Meadow View Colony: Detailed design of 15kV Electrical service upgrade (2011)
- Horizon Colony: Detailed design of 25kV Electrical service upgrade (2010)

23. Client: Hylife Foods, Neepawa, Manitoba (2013)

- Provided power quality measurements (Hioki 3196) of main four distribution feeders.
- Data collection of facility for power system modeling.

24. Client: Kildonan Place Shopping Centre (2012 - Ongoing)

- Power Quality Analysis & PFC Replacement Onsite harmonic and power factor data sampling. Recommendation report and detailed design for de-tuned PFC units for East and West distributions.

25. Client: Churchill School, Winnipeg, Manitoba (2012)

- Provided detailed design for school site wide heating upgrade.

27. Client: Hudbay Mineral Snow Lake Manitoba (2012)

- Conceptual electrical design of the 66kV and 15kV substation for the proposed copper Reed Mine.

28. Client: Canexus Brandon Manitoba (2011)

Detailed design for 15kV Electrical Distribution Upgrade

29. Client: Border Chemical Manitoba, Canada (2010-Present)

- Detailed design for 15kV East side electrical distribution upgrade Phase 1 including installation of new (1) 15kV Vista switchgear, 1x1MVA, 12.47kV:480V and 1x750kVA 12.47KV:2400V transformers.
- Detailed design for 15kV West side electrical distribution upgrade including installation of new (1) 15kV Pad mounted switchgear, 2x1MVA, 12.47kV:480V transformers.
- Arc Flash Study using SKM software

30. Client: KVA Dynamo/IPS, Winnipeg Manitoba (2010-Present)

- CF Industries Arc Flash Study, Brandon Manitoba (2016)
- Industrial Metals, Manitoba Canada: Grounding Study (2014)
- Inland Quarry, Manitoba Canada: Grounding Study (2013)
- Mulder Quarry, Manitoba Canada: Detailed design for 15kV overhead electrical distribution upgrade (2013)
- Inland Quarry, Manitoba Canada: Detailed design for 15kV electrical distribution upgrade (2012)

31. Client: Husky Minnedosa, Manitoba (2016)

- New Dust Collector PLC & HMI Upgrade (2016)
 - Preparation of fuel diliHMI for the new dust collector
 - On-site commissioning of server based Factory Talk Site Edition HMI
 - Provided operator training on the new dust collector controls

32. Client: Village Enterprise Ltd., Winnipeg, Manitoba (2012)

- Penn West 25 kV Dip Pole Upgrade
- Provided short circuit study and protection coordination for 2.5 MVA
- 24940Y/14400 to 600Y/347 V

33. Client: Adelaide Mini Storage, Winnipeg, Manitoba (2012)

- Adelaide Existing Electrical System Code Review
- Preparation of electrical drawings for the electrical distribution system
- Provided recommendation and capital cost estimate to upgrade the existing fire alarm system to bring the existing system up-to code

34. Client: Diageo Global Supply, Gimili, Manitoba (2012)

- Preparation of Grain Handling System Control Philosophy, Specification & Cost Summary
- Preparation of control philosophy report, specifications and preliminary drawings. The preliminary design includes bucket elevator, pit screw conveyor, electric actuator for diverter, zero speed switches, and GE Fanuc series 90-30 PLC card

35. Client: Stony Mountain Penitentiary, Manitoba (2011)

- 15 kV Electrical Distribution Upgrade

36. Client: Heartland Colony Winnipeg Manitoba (2011)

- 15 kV Electrical Distribution Upgrade v Meadowview Colony, Winnipeg Manitoba (2011)
- 15 kV Electrical Distribution Upgrade v Border Chemical Ltd, Winnipeg, Manitoba (2011)
- Provided the detailed design of 12.47 kV plant upgrade.

37. Client: 11 Evergreen Place, Winnipeg Manitoba (2010)

- Boiler Heating and Chiller Plant Replacement AHU Replacement
- AHU Replacement
- Chiller and Water pump replacement

38. Client: WSD 1 – George V High School, Winnipeg Manitoba (2012)

- Supervision of the power system study project
- Coordinate with WSD 1 to meet study requirements
- Reviewed power system study which includes short circuit study, coordination study, equipment evaluation and arc flash mitigation and recommendation

39. Client: WSD 1 – St. John High School, Winnipeg, Manitoba (2012)

- Supervision of the power system study project
- Coordinate with WSD 1 to meet study requirements
- Reviewed power system study which includes short circuit study, coordination
- Equipment evaluation, arc flash mitigation and provide recommendations

40. Client: National Research Council of Canada, Winnipeg Manitoba, (2010)

- Steam Boiler Replacement
- Animal Holding HVAC Replacement

41. Client: R.B. Russell School, Winnipeg, Manitoba (2010)

- Boiler Replacement Phase 1
- Boiler Replacement Phase 2

42. Client: CG Canada Ltd, Winnipeg, Manitoba (2010)

- Provided detailed design for 12.47 kV plant upgrade
- Provided detailed design for 25kV underground feed and installation of (2) new 25kV vista switchgear electrical distribution.
- Arc Flash Study using SKM software

43. Client: San Gold Corporation, Bissett, Manitoba, Canada (2009-2012)

- Dust Collection System

Installation of a new 200hp dust collector for the crushing plant, upgrading of existing Crusher MCC and PLC.

Programming parameters for Benshaw soft start, and protection relay settings for rotary airlock valve, positive displacement blower, and discharge arm. System commissioning and troubleshooting. Verification of motor sequence start HMI feedback, and required interlocking.

- Regrind Mill Replacement
350Hp Drive procurement, MCC upgrade to accommodate new Regrind Ball Mill Motor, commissioning drive

- 12.47kV Underground Feeder to 007
 - Design, procurement, and onsite management of construction of the surface distribution switchgear and 3MVA portable mining substation and Hi-potting of HV cables.
- PLC Audit of Automation Systems
 - Site wide audit of all PLC systems Backup of existing programs on PLCs, smart overloads, VFDs, and HMIs.
- Mill Low Pressure Compressor
 - Design, procurement, and managing the construction of a 250Hp compressor addition to the Mill.
 - Updating of the electrical infrastructure to accommodate addition and supply existing loads, re-establishing transformer ground protection and NGR.
- Raise Bore Hole Electrical Distribution
 - Design, procurement, troubleshooting, and managing the construction of the electrical distribution building servicing the fresh air raise for the Cohiba zone.
- 5kV Switchgear Upgrade
 - Protection coordination, arc flash analysis, programming of protection relays.
- 12.47kV Power Factor Correction
 - Design and procurement of de-tuned 2.4MVAR power factor correction bank. Correspondence with MB Hydro to meet Power Quality Specifications.
 - Troubleshooting bank from overheating issues.
- Power Monitoring of Electrical Distribution
 - Real time data collection of metering devices and web reporting service using Ion Enterprise software.
- 12.47kV Main Switchyard
 - Performed ground grid study, commission testing of breakers, cables, voltage regulators, and programming of protection relays.
 - Arc flash analysis and coordination study. Procurement of materials for construction.
- Site Work
 - Design and development of electrical infrastructure (Hinge, 007, Maintenance Shop, Crusher upgrades, Old Substation, additional camp installations) and site wide arc flash study.

44. Client: Farm Genisis Group, Waskada Manitoba (2010)

E/I&C Engineering lead for a green field \$6 million Hemp Production Facility.

45. Client: Nelson River Construction, Stonewall Manitoba (2010)

Electrical Services Upgrade and Ground Design in a Limestone Quarry for Compliance with Manitoba Mines Branch Grounding Improvement directive.

46. Client: Graymont, Faulkner Manitoba, (2009)

Plant wide arc flash study

47. Client: Potash Corporation of Saskatchewan Inc. Saskatchewan, (2008-2009)

- Rocnaville Expansion Project

Mine expansions, for \$2.8 billion dollar expansion Rocanville

Product Expansion Project, Electrical, Instrumentation, and Controls Discipline Lead for mine expansions, for \$1.6 billion dollar expansion Cory.

48. Client: Tundra Oil and Gas, Elkhorn, MB

- Electrical Engineering Design of 1000KW Co-Gen installation project