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Canada Centre for Inland Waters

Motor Control Centre MCC #1, 2, 12, 13 & 14 Upgrades

August 23, 2023

NRG Consultants Inc.

A handwritten signature in black ink, appearing to read 'S. Swing', written in a cursive style.

Steven C. Swing, PEng



Motor Control Centre MCC #1, 2, 12, 13 & 14 - Upgrades

1 General

1.1 SCOPE OF WORK

- .1 Existing following 600V, 3 Phase, 3 Wire, 25kAIC motor control centres manufactured in the 1970's to remain.
 - 1 MCC #1: Canadian General Electric, 6 Sections.
 - 2 MCC #2: Klockner – Moeller, 2 Sections.
 - 3 MCC #12: Klockner – Moeller, 1 Section.
 - 4 MCC #13: Klockner – Moeller, 2 Sections.
 - 5 MCC #14: Klockner – Moeller, 2 Sections.
- 2 Existing Starters, Disconnects, Variable Frequency Drives (VFD) and all related interior components including draw-out frames, doors, push buttons, selector switches, pilot lights, control transformers, etc. to be removed and replaced with all new units suitably sized to match existing.
- 3 All new components to be manufactured to match, be compatible to existing and shall be CSA approved for each MCC.
- 4 Electrical Contractor to disconnect, remove, replace and re-connect existing auxiliary wiring to new starters, disconnects, internal or adjacent VFD's and related components in each MCC.
- 5 Electrical Contractor must pre-arrange shut-down of each MCC unit with Owner at least forty-eight (48) hours in advance.
- 6 Refer to attached drawings E01, E02, E03, E04 & E05 Rev 0 for details and layout of all starters, disconnects, VFD's etc. in each existing MCC.

1.2 SOURCE QUALITY CONTROL

- .1 Conduct equipment inspection at manufacturer's plant.
- 2 Provide manufacturer's typical test certificates.
- 3 Consultant and Owner to witness standard factory testing of all completely new motor control centre components including operation of switches, circuit breakers starters and controls for each MCC.
- 4 Submit written test results to Consultant and Owner for each MCC.

1.3 SHOP DRAWINGS

- .1 Submit detailed and accurate shop drawings for each new component supplied for each MCC.

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- 2 Indicate:
 - .1 Outline dimensions.
 - .2 Configurator of identified compartments.
 - .3 Cable bus duct entry and exit locations.
 - .4 Schematic and wiring diagrams.

1.4 OPERATION AND MAINTENANCE DATA

- .1 Provide operations and maintenance manuals for all new components supplied for each MCC.
- .2 Include data for each type and style of starter, disconnect switch, VFD etc. for each MCC.

1.5 MAINTENANCE MATERIALS

- .1 Provide spare maintenance materials in accordance with Manufacturer's recommendations for each MCC.

2 Products

2.1 SUPPLY CHARACTERISTICS

- .1 Voltage and connections are 600V, 3 phase, 3 wire.
- .2 Acceptable manufacturer: Compatible components for Canadian General Electric MCC #1 enclosure and compatible components for Klockner-Moeller MCC #2, 12, 13 & 14 enclosures.
- .3 Alternate manufacturers: No alternate manufacturers shall be used.
- .4 New motor control centre components shall be c/w all panel mounted control modules as noted on each MCC layout drawing. Consisting of starters and adjustable speed drive control units. All modules shall be breaker type with built-in CPT's 600V/120V volt control transformers sized with an extra 100 Va. Control circuit fuse. Transformer type pilot lights.

2.2 EACH EXISTING MOTOR CONTROL CENTRE

- .1 Compartmentalized vertical sections with common power bus bars.
- .2 Floor mounted, free standing, endosed dead front.
- .3 Indoor CSA 1 gasketed enclosure.
- .4 Accommodating incoming main lugs, combination starters, disconnect switches and VFD's as indicated.
- .5 Front mounting.
- .6 Class 1 Type A.
- .7 Mounted on 100 mm (4") concrete housekeeping pad.

2.3

EXISTING VERTICAL SECTIONS CONSTRUCTION

- .1 Independent vertical sections fabricated from rolled flat steel sheets bolted together to form rigid, completely enclosed assembly.
- .2 Each vertical section divided into compartment units, minimum 305 mm high, as indicated.
- .3 Each unit has complete top and bottom steel plate for isolation between units.
- .4 Horizontal wireways, equipped with cable supports, across top and bottom, extending full width of motor control centre, isolated from bus bars by steel barriers.
- .5 Vertical wireways for load and control conductors extending full height of vertical sections, and equipped with cable tie supports. Installation wiring to units accessible with doors open and units in place.
- .6 Openings, with removable cover plates, in side of vertical sections for horizontal wiring between sections.
- .7 Incoming cables bus duct entering as indicated.
- .8 Outgoing cables exit via top or bottom with terminals as indicated.

2.4

EXISTING SILLS

- .1 Continuous 75 mm channel iron floor sills for mounting buses with 19 mm diameter holes for bolts.

2.5

EXISTING BUS BARS

- .1 Main horizontal and branch vertical, three phase and neutral high conductivity plated aluminium bus bars in separate compartment, bar self-cooled, extending entire width and height of motor control centre, supported on insulators and rated to match existing.
- .2 Branch vertical bus bars for distribution of power to units in vertical sections.
- .3 No other cables, wires, equipment in main and branch bus bar compartments.
- .4 All bus bars to be cleaned and inspected. All connection bolts to be re-torqued to manufacturer's specifications.
- .5 All bus supports, insulators and bushings to be inspected for signs of damage, cracking, warpage and ware. All defective items to be replaced.

2.6 EXISTING GROUND BUS

- .1 Copper ground bus size 50 x 3 mm extending entire width of motor control centre, located at the bottom.
- .2 Ground bus to be cleaned and inspected. All connection bolts to be re-torqued to manufacturer's specifications.

2.7 NEW MOTOR STARTERS AND DEVICES

- .1 Refer to attached drawings E01, E02, E03, E04 & E05 for details of existing motor starters, disconnects and devices to be replaced with new for each MCC.
- .2 Refer also to attached CCIW Motor Control Centre Studies for each MCC as a guide for additional details of existing motor starters, disconnects and devices.

2.8 NEW STARTER UNIT COMPARTMENTS

- .1 Unit EEMAC size 4 and smaller, circuit breaker units 225A and smaller, plug-in type with self-disconnect. Guide rail supports for units to ensure that stabs make positive contact with vertical bus. Provision for units to be installed or removed, off load, while buses energized.
- .2 Unit mounting:
 - .1 Engaged position – unit stabbed into vertical bus.
 - .2 Withdrawn position – unit isolated from vertical bus but supported by structure, terminal block accessible for electrical testing of starter.
 - .3 Provision for positive latching in either engaged or withdrawn position and padlocking in withdrawn position.
 - .4 Stab-on connectors free floating silver plated clips, self-aligning, backed up with steel springs.
- .3 External operating handle of circuit switch interlocked with door to prevent door openings with switch in "ON" position. Provision for three (3) padlocks to lock operating handle in "OFF" position and lock door closed.
- .4 New doors to replace existing with hinges on same side for each MCC.
- .5 Overload relays manually reset from front with door closed.
- .6 Pushbuttons, toggle switches, indicating lights and controllers mounted on door front.
- .7 Devices and components by one manufacturer for each MCC type to facilitate maintenance.
- .8 Auxiliary devices, contactors, breakers, suitably sized fuses and overloads (O/L's) as required.
- .9 Provide bus bar cover plates in each SPARE compartment in each MCC.

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2.9 WIRING IDENTIFICATION

- .1 Provide all new wiring identification to match existing in each MCC.

2.10 EQUIPMENT IDENTIFICATION

- .1 Provide all new equipment identification labels to match existing for each MCC
- .2 Refer to Drawings E01, E02, E03, E04 & E05 for Lamacoid Name Plate List for each MCC.

2.11 FINISHES

- .1 Paint new motor control centre components to match existing with low odour high strength paint.
- .2 Paint each existing motor control centre housing to match existing with low odour high strength paint.
- .3 New motor control centre components to be exterior light grey and with interiors white to match existing in each MCC.

3 Execution

3.1 INSTALLATION

- .1 Set and secure new motor control centre components in place within each existing MCC section, rigid, plum and square to building floor and wall
- .2 Make field power and control connections to match existing in each MCC.
- .3 Ensure correct overload heater setting for each cell in each MCC.
- .4 Electrical Contractor to isolate feed power to each MCC per isolation location indicated on each drawing. Provide all necessary lock-outs and tagging.
- .5 All work shall be performed daily on afternoon shift only between the hours of 5:00pm and 5:00am.
- .6 Power must be restored to each MCC and all cells to be operational at the end of each work shift and/or prior to 5:00am each day.

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3.2 TESTS

- .1 Perform tests in accordance with Manufacturer's instructions for each MCC.
- .2 Ensure moving and working parts are lubricated where required.
- .3 Electrical Contractor to obtain an Electrical Safety Authority (ESA) Inspection Permit and arrange to have the local Inspector review all the work for each MCC.
- .4 Manufacturer's representative to check out each MCC on completion of installation and connection of supply, load and control wiring. Allow 10 hours of Service Technician time to commission the variable speed starters and communication systems for each MCC.
- .5 Electrical Contractor to coordinate the testing of each new starter status, control and, stop / start for each MCC with Owner's Building Automation System Subcontractor (Delta Controls Inc.). Testing to be performed at night (after hours) with Delta Technician and the Owner's Building Operations Personnel prior to 5:00am each day to ensure correct operation of all air handlers, pumps, etc. in each MCC
- .6 Electrical Contractor to allow for fifteen (15) premium hours of Supreme Products & Services Technician (supremeVFD@gmail.com) on-site for each MCC to assist in testing and commissioning of new starter controls.

END OF SECTION