| | Winnipeg | | | | | | ION FO G METE | | | Page | 1 of 1 | | | |
|------------------------------|---------------------------------------|------------------------------------|------------------------|--------------|-------|--------|--------------------------|----------------------------|--------------|------------|---------------------|-----------------|------|--|
| | , , , , , , , , , , , , , , , , , , , | | | | | | | | | | ID: | | | |
| Project | Facility: | | | | | | Project | Project Name: | | | | | | |
| Pro | Area : | | | | | | Bid Op | portunity: | ity: | | | | | |
| | Lessting | | | | | | 0.011.00 | | | | | | | |
| Meter Data | Location: | | | | | | Cell #: | | | | | | | |
| 2 - | Manufactu | irer: | Туре: | | | | Range | | | | | | | |
| bu | Cover Gas | sket: | | G | ood | Accept | table | Poor | Cover Glass: | | Good | Acceptable | Poor | |
| leani | Spiral Spring: Good Accep | | | Accept | table | Poor | Disc Clearance: | | Good | Acceptable | Poor | | | |
| Visual Inspection / Cleaning | Contacts: | Contacts: Good Accep | | | | table |] Poor | Case Shorting Contacts: | □ N/A | Good | Acceptable | Poor | | |
| spect | Rotating D | Rotating Disc Movement: Good Accep | | | | table | Poor | or General Condition: | | | Good Acceptable Poo | | | |
| al Ins | Cleanlines | ss (as | s (as found) Good Acce | | | | table Deor Unit Cleaned: | | 🗌 Yes | | | | | |
| Visu | Connectio | nections (as found) | | | table |] Poor | Connections Torqued: | ☐ Yes | | | | | | |
| | Test Valu | ie | Reading As Found | Read As L | | Unit | s | | | | | | | |
| 2 | 0 | | | | | | | | | | | | | |
| Accuracy | | | | | | | | | | | | | | |
| Ac | | | | | | | | | | | | | | |
| | Unit Calibrated | Jnit Ves INo Calibrated: | | | | | | | | | | | | |
| | | | | | | | | Comm | onte: | | | | | |
| sis | Returned | | | | | Yes | 🗌 No | | ents. | | | | | |
| Final Analysis | Required: |) / Fu | rther Inspecti | on | | Yes | 🗌 No | | | | | | | |
| 4 | Repair / R | eplac | cement Requi | red: | | Yes | 🗌 No | | | | | | | |
| | | Con | npany | | Nam | e | | | Signature | | Da | te (yyyy/mm/dd) | | |
| Perfo | rmed By | | | | | | | | | | | | | |

Note: The person performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

Checked By

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| Winnipeg |
| minpeg |

Project

INSPECTION FORM AIR CIRCUIT BREAKER, 4160V

Breaker ID

| Facility: |
|-----------|
| Area : |

Project Name: Bid Opportunity:

| E | Location: | | Switchgear: | | | | Cell #: | |
|------------------------------|------------------------------------|-----------------|-----------------------------|-----------------------------|----------------|--------------------------|----------------------|---------------|
| r Data | Manufacturer: | | Type: Serial #: | | | Serial #: | | |
| Breaker | Rated Voltage: V | Current Rating: | - | А | A Interrupting | | kA | |
| Br | Momentary Fault Closing Amps: A | Trip Unit Type: | | Control \ | /oltage: | V | BIL Rating: | |
| | | | | | | | | |
| | Breaker Identification Tag Instal | led: 🗌 Yes | 🗌 No | Visual Signs | of Overhea | ting: | | ′es □No |
| | Cleanliness (As Found): | able 🗌 Poor | Support Insu | lators: | | Good 🔲 Acceptable 🗌 Poor | | |
| g | Connections: | able 🗌 Poor | Electro/Mech Interlock: | nanical |] N/A 🛛 G | ood 🗌 Accep | table 🗌 Poor | |
| eanin | Ground Connection: | Good CAccepta | ible 🗌 Poor | Arc Chutes: | | | ood 🗌 Accep | otable 🗌 Poor |
| Visual Inspection / Cleaning | Door Mechanical: | Good Accepta | ible 🗌 Poor | Contact Aligr Condition: | nment and | | Good 🗌 Acce | ptable 🗌 Poor |
| ectio | Cell Fit and Alignment: | Good Accepta | ıble 🗌 Poor | Operating Mechanism: | | | Good Acceptable Poor | |
| l Insp | Racking Mechanism: | Good CAccepta | ıble 🗌 Poor | ble Deor Contact Fingers | | | Good 🗌 Acce | ptable 🗌 Poor |
| /isua | Shutter: | Good Accepta | ible 🗌 Poor | Arcing Conta | icts: | | Good 🗌 Acce | ptable 🗌 Poor |
| - | Cables Supported Appropriately |] Yes 🗌 No | Yes 🗌 No Auxiliary Devices: | | | Good 🗌 Acce | otable 🗌 Poor | |
| | | | | Unit Cleaned | l: 🗌 Yes | s Photograp | h Taken: | □ Yes |

Comments:

| | Test Preparation : | Source Isolated Connected with Load Isolated leaving cables connected during the test. | | | | | | | |
|-----------------------|--------------------------|----------------------------------------------------------------------------------------|-------------------------------------------------|-----------------|--------------------------------------|--|--|--|--|
| | Test Voltage | | sulation Resistance (I e To GND (Breaker C | Temperature: °C | | | | | |
| Test | | Α | В | С | | | | | |
| | 2500 V | | | | | | | | |
| Insulation Resistance | Test Voltage | | ulation Resistance (I To Phase (Breaker C | | | | | | |
| on Re | | A – B | B – C | A - C | | | | | |
| ulati | 2500 V | | | | | | | | |
| lns | Test | | sulation Resistance (I e to Load (Breaker Op | | Test Summary | | | | |
| | Voltage | А | В | С | ☐ Test Passed ☐ Test Inconclusive | | | | |
| | 2500 V | | | | Further Investigation Required. | | | | |
| | Comments: | | | | | | | | |

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| Y Y Y | |
| Winnipeg | |

INSPECTION FORM AIR CIRCUIT BREAKER, 4160V

Page 2 of 2

Breaker ID

| Insulation Resistance (Control Wiring) | Wire | Tag Insulation Resistance (I | | | | | | Insulation Resistance (MΩ) | | Test Summary Test Passed Test Inconclusive Further Investigation Required. Test Failed | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----|----------------------|---|----|-------------------------------|----------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------|--|
| sulati (Con | | | | | | | | | | | | | |
| lns | Comment | s: | | | | | | | | | | | |
| | | - | | | | | | | | | | | |
| | | | | Α | | | в | | С | | Test Summary | | |
| nents | Re | Resistance (μΩ) | | | | | | | | | ☐ Test Passed ☐ Test Inconclusive Further Investigation Required. | | |
| surer | Arcing Contact Gap (mm) | | | | | | | | | | | | |
| e Mea | Arcing Contact Wipe (mm) | | | | | | | | | | Test Failed | | |
| Contact/Pole Measurements | _ | Main Contact Gap (mm) | | | | | | | | | | | |
| ontac | Main Contact Wipe (mm) | | | | | | | | | | | | |
| ŭ | Comment | s: | | | | I | | | | | | | |
| | | | | | | | | | | | | | |
| Test | Test Preparatio : | est Source: reparation Disconnected Note: Approval of City's Representative is required, prior to the test. Source Isolated Source Isolated | | | | | | quired, prior to leavir | ng cables connected during | | | | |
| High Potential Test | Peak D Test Volt | ak DC Voltage | | | Test Summary (μΑ) | | | | Test S | ummary | | | |
| n Pote | (1 minu duratio | | Α | B | | С | | С | C 🗌 Tes | | st Passed st Inconclusive | | |
| High | 12 kV | | | | | | | | | | irther Investigation Required. st Failed | | |
| | Comment | s: | | 1 | | | | | | | | | |
| | 1 | | | | _ | | | Comm | onto | | | | |
| al sis | | to Service | | L |] Yes | | No | Comm | ients. | | | | |
| Final Analysis | Required: | g/Further | Inspection | Ľ |] Yes | | No | | | | | | |
| | Repair / F | eplaceme | nt Required: | C |] Yes | | No | | | | | | |
| | | Compan | у | Nan | ne | | | | Signat | ure | | Date (yyyy/mm/dd) | |
| Perfo | rmed By | | | | | | | | | | | | |
| Check | ked By | | | | | | | | | | | | |
| Checked By Note: The person(s) performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, a that the analysis results are correct. | | | | | I | | | | | | | | |

| | <u> </u> | | | | PECTION | | | | Page 1 | of 3 |
|------------------------------|------------------------------|------------------------|-----------------------------------|-----------|--------------------------------------------|-----------------------------|--------------|----------------------------------|-------------------------|--------------------------------|
| V | Vinnipèg | | A | | UIT BREA | KER, 600V | | | Breaker II | D: |
| ect | Facility: | | | | Project Name: | | | | | |
| Project | Area : | | | | Bid Opportun | Bid Opportunity: | | | | |
| | Location: | | | | Switchgear: | | | | Cell #: | |
| Jata | Manufacturer: | | | | Type: | | | Serial #: | Cell #. | |
| Breaker Data | | | | | Type. | ٥ | Interruption | | 140 | |
| Brea | Rated Voltage | | Frame Si | ze: | | A | Interrupting | g Raung. | kA | |
| | Momentary Fa Closing Amps | | | Trip Unit | Туре: | | Control V | oltage: | V | |
| | Dracker Identi | figation Tag Insta | | | ∏ No | | of Overbeer | in a. | | |
| | | fication Tag Insta | ☐ Yes | | | | | Yes No | | |
| D | Cleanliness (A | s Found): | Good | | table 🗌 Poor | Support Insula | | | Good 🗌 Aco | ceptable 🗌 Poor |
| | Connections: | onnections: Good Accep | | | table Door Electro/Mechanical N/A God | | | iood 🗌 Acc | ood 🗌 Acceptable 🗌 Poor | |
| eanin | Ground Conne | ection: | Good 🗌 | Accept | able 🗌 Poor | Arc Chutes: | | | Good 🗌 Acc | eptable 🗌 Poor |
| Visual Inspection / Cleaning | Door Mechani | cal: | Good 🗌 | Accept | able 🗌 Poor | Contact Align Condition: | ment and | | Good 🗌 Acc | ceptable 🗌 Poor |
| bectic | Cell Fit and Al | ignment: | Good 🗌 | Accept | able 🗌 Poor | Operating Me | chanism: | | Good 🗌 Acc | ceptable 🗌 Poor |
| l Insp | Racking Mech | anism: | Good 🗌 | Accept | able 🗌 Poor | Contact Finge | ers: | | Good 🗌 Acc | ceptable 🗌 Poor |
| /isua | Shutter: | | Good 🗌 | Accept | able 🗌 Poor | able Deor Arcing Contacts: | | | Good Acceptable Poor | |
| - | Cables Suppo | rted Appropriatel | y: | ٢ |] Yes 🗌 No | Auxiliary Devi | ces: | | Good 🗌 Acc | ceptable 🗌 Poor |
| | | | | | | Unit Cleaned: | : 🗌 Yes | Photograp | oh Taken: | ☐ Yes |
| | Comments: | | | | | | | · | | |
| | | Source: | | | | | | | | |
| | Test Preparat | ion: Discon | nected cted with e Isolated | Disco | est. / Load: onnected ected with Loa | nr | | val of City's F ng cables con | | re is required, g the test. |

| Test | | sulation Resistance (N se To GND (Breaker Cl | Temperature: °C | |
|---------|-------|--------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------|
| Voltage | Α | В | С | |
| 1000 V | | | | |
| Test | | sulation Resistance (N e To Phase (Breaker C | | |
| Voltage | A – B | B – C | A - C | |
| 1000 V | | | | |
| Test | | sulation Resistance (N ne to Load (Breaker Op | Test Summary | |
| Voltage | Α | В | С | ☐ Test Passed ☐ Test Inconclusive |
| 1000 V | | | | — Further Investigation Required. □ Test Failed |

INSPECTION FORM AIR CIRCUIT BREAKER, 600V

Page 2 of 3

Breaker ID:

| Resistance I Wiring) | Wire Tag | Insulation Resistance (MΩ) | Wire Tag | Insulation | Test Summary |
|--------------------------|-----------|-------------------------------|----------|-----------------|-----------------------------------------------------|
| | | | | Resistance (MΩ) | Test Passed Test Inconclusive |
| Resis Wiri | | | | | ── Further Investigation Required. □ Test Failed |
| tion ntrol | | | | | |
| Insulation R (Control | | | | | |
| - | Comments: | L | | | |

| ts | | А | В | с | Test Summary |
|--------------|--------------------------|---|---|---|---------------------------------|
| Measurements | Resistance (μΩ) | | | | Test Passed Test Inconclusive |
| asure | Arcing Contact Gap (mm) | | | | Further Investigation Required. |
| | Arcing Contact Wipe (mm) | | | | |
| Contact/Pole | Main Contact Gap (mm) | | | | |
| onta | Main Contact Wipe (mm) | | | | |
| | Comments: | | | | |

| | Plug Rating: A | Sensor Tap | Ground Fa | ault 🗌 3W 🔲 4W | | |
|----------|-------------------------|------------|-----------|----------------|------------|------------------|
| sgr | Relay Setting (As Left) | Setpoin | : | Delay | Enabled | l ² T |
| Settings | Long Time | Х А | = A | sec | 🗌 Yes 🗌 No | 🗌 On 🔲 Off |
| Breaker | Short Time | Х А | = A | sec | 🗌 Yes 🗌 No | 🗌 On 🔲 Off |
| Bre | Instantaneous | X A | = A | N/A | 🗌 Yes 🗌 No | |
| | Ground Fault | A | | sec | 🗌 Yes 🗌 No | 🗌 On 🔲 Off |

| | TCC NO: | TCC NO: | | | | | | | | | | | | |
|---------|---------------|--------------|---------------|---------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------|-------------------|------------------|--|--|--|--|
| | | Test Current | Time Band | | A | A Contraction of the second se | E | 3 | С | | | | | |
| Test | Test | | Min. (sec) | Max. (sec) | As-Found (sec) | As-Left (sec) | As-Found (sec) | As-Left (sec) | As-Found (sec) | As-Left (sec) | | | | |
| Breaker | Long Time | А | | | | | | | | | | | | |
| Bre | Short Time | A | | | | | | | | | | | | |
| | Instantaneous | А | | | | | | | | | | | | |
| | Ground Fault | А | | | | | | | | | | | | |

INSPECTION FORM AIR CIRCUIT BREAKER, 600V

Breaker ID:

| is | Returned to Service: | ☐ Yes | 🗌 No | Comments: |
|-----------------|-------------------------------------------|-------|------|-----------|
| Final nalysi | Monitoring / Further Inspection Required: | 🗌 Yes | 🗌 No | |
| A | Repair / Replacement Required: | ☐ Yes | 🗌 No | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

| _ | | | | | ISPECTION I | - | | | Page 1 c | f 1 | |
|---------------------------------|-------------------------------------------|---------|-------------|-------|----------------|--------------------------------|------------------------|---------|------------------|------------------|--|
| I | Winnipèg | | MOLDED | CA | SE CIRCUIT | BREAKER, 60 | 00V | | ID: | | |
| Project | Facility: | | | Proje | ect Name: | | | | | | |
| Pro | Area : | | | Bid (| Opportunity: | | | | | | |
| | Location: | | | P | anelboard/MCC: | | | Cell # | : | | |
| Data | Manufacturer: | | | т | ype: | | Serial #: | | | | |
| Breaker Data | Rated Voltage: V | | Frame Size: | | A | | Trip Unit: | | | | |
| Bre | Interrupting kA Rating: | | С | Comr | ments: | | | | | | |
| | Breaker Identification Tag Ir | nstalle | ed: |] Ye | es 🗌 No | Visual Signs of O | verheating: | | | Yes 🗌 No | |
| on / | Cleanliness (As Found): | [| Good | Acce | eptable 🗌 Poor | Cables Supporte | oported Appropriately: | | | | |
| Visual Inspection / Cleaning | Connections: | [| Good | Acce | eptable 🗌 Poor | Electro/Mechanic Interlock: | al 🗌 N/A | 🗌 Goo | od 🗌 Acce | eptable 🗌 Poor | |
| ıal Inଃ Clea | Ground Connection: | [| Good | Acce | eptable 🗌 Poor | Exercise Circuit E | Breaker: | | | 🗌 Yes | |
| Visu | Door Mechanical: | | Good | Acce | eptable 🗌 Poor | Other: | | | | | |
| | Comments: | | | | | | | | | | |
| s | | | Α | | В | с | Test Summa | ary | | | |
| act ment | Resistance (mΩ) | | | | | | ☐ Test Pass | | 0 | | |
| Contact Measurements | Comments: | | | | 1 | | | nvestig | e jation Requ | ired. | |
| | | | | | | | | | | | |
| | Trip Unit Rating: | 4 | Trip Unit | Тур | e: 🗌 None [| Thermal Magne | etic 🗌 Electroni | c 🔲 I | LI 🗌 LSI | | |
| ings | Breaker Setting (As Left) | | | | Range | Set | point | | Delay | Ι ² Τ | |
| r Sett | Long Time | | Fixed 🗌 Ac | dj. | - | Х | A = A | | sec | 🗌 On 🔲 Off | |
| Breaker Settings | Short Time | - | Fixed 🗌 Ac | - | - | Х | A = A | | sec | 🗌 On 🔲 Off | |
| Br | Instantaneous | | Fixed 🗌 Ac | - | - | Х | A = A | | N/A | | |
| | Ground Fault | | Fixed 🗌 Ac | dj. | - | | A | | sec | On Off | |
| ~ | Returned to Service: | | □ Y | es | | mments: | | | | | |
| Final Analysis | Monitoring / Further Inspect Required: | ion | ΠY | es | □ No | | | | | | |
| 1 | | | | | | | | | | | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

🗌 No

🗌 Yes

Note: The person(s) performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

Repair / Replacement Required:

INSPECTION FORM VACUUM CIRCUIT BREAKER, 4160V

Breaker ID

| | | | | | | | | | Dicakerib | |
|------------------------------|------------------------------|---------------------|----------------|--------|-------------------------------------------|--------------|--------------|-----------------------------------|-------------|-----------------|
| Project | Facility: | | | F | Project Name: | : | | | | |
| Pro | Area : | | | E | Bid Opportuni | ty: | | | | |
| | Location: | | | | Switchgear: | | | | Cell #: | |
| Data | Manufacturer: | | | | Type: | | | | | |
| Breaker Data | Rated Voltage | :: V | Current Rating | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | A | Interruptin | a Ratina: | Α | |
| Bre | Momentary Fa Closing Amps | ault A | Trip Unit Typ | | | Control V | | V | BIL Rating: | |
| | Breaker Identi | fication Tag Instal | led: | Yes | ∏ No | Visual Signs | of Overhea | tina: | | Yes 🗌 No |
| | Cleanliness (A | - | | | | Support Insu | | - | - | ceptable Poor |
| | Connections: | , | | | | Electro/Mech | anical | | | eptable |
| ning | Ground Conne | ection: | Good A | ccepta | ible 🗌 Poor | Contact Fing | ers: | □G | ood 🗌 Acc | eptable 🗌 Poor |
| Visual Inspection / Cleaning | Door Mechani | cal: | Good Ac | cepta | ble 🗌 Poor | Vacuum Bott | le | | Good 🗌 Acc | eptable 🗌 Poor |
| tion / | Cell Fit and Al | ignment: | Good Ac | cepta | ible 🗌 Poor | Contact Eros | ion Indicato | or 🗌 G | Good 🗌 Acc | eptable 🗌 Poor |
| spect | Racking Mech | anism: | Good Ac | cepta | ible 🗌 Poor | Operating Me | echanism: | | Good 🗌 Acc | eptable 🗌 Poor |
| ual In | Shutter: | | Good Ac | ccepta | ble 🗌 Poor | Arcing Conta | cts: | | Good 🗌 Acc | ceptable 🗌 Poor |
| Vis | Auxiliary Devic | ces: | Good A | ccept | able 🗌 Poor | | | | | |
| | Cables Suppo | rted Appropriately | : | |] Yes 🗌 No | Unit Cleaned | : 🗌 Yes | s Photograp | h Taken: | ☐ Yes |
| | Counter Read | ing: As-Found | d As- | -Left | | | | | | |
| | Comments: | | | | | | | | | |
| | Test Preparation | on: 🗍 Conne | nected | Disco | est. / Load: nnected ected with Loa | n | | oval of City's R ng cables con | | |

| | | Source | Isolated | ed with Load Isolated | F |
|-----------------------|-----------|--------|-------------------------------------------------|-----------------------|----------------------------------------------------|
| | Test | | sulation Resistance (l se To GND (Breaker C | | Temperature: °C |
| Test | Voltage | Α | В | с | |
| Ice To | 2500 V | | | | |
| Insulation Resistance | Test | | sulation Resistance (l e To Phase (Breaker C | | |
| on Re | Voltage | A – B | B – C | A - C | |
| ulati | 2500 V | | | | |
| lns | Test | | sulation Resistance (le to Load (Breaker O | | Test Summary |
| | Voltage | Α | В | С | ☐ Test Passed ☐ Test Inconclusive |
| | 2500 V | | | | ☐ Further Investigation Required. ☐ Test Failed |
| | Comments: | | | | |

Form F-BKR-VAC-4160V Rev 00, Created by SNC-Lavalin Inc. M:\113099\4ENG\47ELE\RA - Misc Reports & Forms\F-BKR-VAC-4160V.doc

INSPECTION FORM VACUUM CIRCUIT BREAKER, 4160V

Page 2 of 2

Breaker ID

| Insulation Resistance (Control Wiring) | Wire | Тад | Insulat Resistance | | VVIro Iad | | Re | Insulation Resistance (ΜΩ) | | Test Summary Test Passed Test Inconclusive Further Investiga | | |
|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------|-----------------------|------|----------------------|------|---------|-------------------------------|------|--------------------------------------------------------------|-------------------|--|
| tion R ntrol V | | | | | | | | | | Test Failed | | |
| insula (Co | | | | | | | | | | | | |
| _ | Comments | 3: | | | | | | | | | | |
| | | | | Α | | В | | С | | Test Summary | | |
| Contact/Pole Measurements | Pole | Resistance | ice (μΩ) | | | | | | | Test Passed Test Inconclusive | | |
| Contact/Pole //easurements | Contac | t Resistan | ce (μΩ) | | | | | | | Further Investigati | on Required. | |
| Co Meá | Contact Trav | | (mm) | | | | | | | | | |
| | Cor | nments: | | | | | | | | | | |
| Test Preparation: Source: Source: Disconnected Connected with Source Isolated Source Isolated | | | | | | | | leaving cables | | | | |
| ential | Peak DC Test Volta | | | Test | Test Summary (μΑ) | | | | | ımmary | | |
| High Potential Test | (1 min. duration |) | Α | | В | | C 🗌 Tes | | Test | t Passed t Inconclusive rther Investigation Required. | | |
| Hig | 12 kV | | | | | | | | Test | | unea. | |
| | Comments | : | | | | | | | | | | |
| | Returned | to Service: | | | Yes | 🗌 No | Comm | ents: | | | | |
| Final Analysis | s Monitoring / Further Inspection Required: | | | Yes | 🗌 No | | | | | | | |
| ٩ | Repair / R | eplacemen | t Required: | | Yes | 🗌 No | | | | | | |
| | | Company | | Nam | e | | | Signatu | ure | | Date (yyyy/mm/dd) | |
| Perfor | rmed By | | | | | | | | | | | |
| Check | Checked By | | | | | | | | | | | |

| | | | | | | ECTIC | | | | | | Pa | Page 1 of 1 | |
|----------------------------|------------------------------------------------------------------------------|--------------|-----------------|-------------------------|--------------------|----------------|----------|----------|--------------------------------------|----------------------------------|----------------------|--------------------|-------------|------------------|
| | Winnipeg | | | C | APACI | TOR | BAN | IK, 600 |)V | | | ID: | : | |
| Project | Facility: | | | | Ρ | roject N | lame: | : | | | | | | |
| Pro | Area : | | | | В | id Oppo | ortuni | ty: | | | | | | |
| ž | Location: | | | | : | Switchg | jear/N | MCC: | | | | Ce | ell #: | |
| Capacitor Bank Data | Manufactu | rer: | | | | Model: | | | | | Serial #: | ial #: | | |
| pacitor Data | Size: | | VAR F | Rated Voltag | le: | V Capacitance: | | | | | | μF | | |
| Cal | Configuration: Delta Wye-Ungrounded | | | | |] Wye | -Grou | unded | | | | | | |
| | Capacito | · Identifica | ation Tag Insta | alled: | Yes | 🗌 No | | Cables | Sup | ported Appr | opriately: | | 🗌 Yes 🗌 No | |
| Visual Inspection/ | Cleanline | ss (As Fo | und): [| Good | Acceptab | ole 🗌 P | oor | Anchora | age, | alignment: | | Good | Accepta | able 🗌 Poor |
| Visual | Cleanliness (As Found): Good Acception Connections: Good Acception | | | Acceptab | ole 🗌 P | oor | Require | d C | learances: | | Good | Accepta | ible 🗌 Poor | |
| _ | Ground Connection: Good Acceptab | | | | | le 🗌 P | oor | Unit Cle | eane | ed: 🗌 Yes | s Photo | graph ⁻ | Taken: | ☐ Yes |
| Insulation Resistance Test | Test Prepa | ration: | Source Cab | ce Isolate | ed | | | | | oval of City's ring cables co | | | | |
| sista | Test | | Ins | sulation Res Phase 1 | sistance ſo GND | (ΜΩ) | | | | Test Summ | nary | | | |
| on Re | Voltage | A | (А-В) | B (B | -C) | C (C-A) | | | | | | | | |
| sulatio | 1000 V | | | | | | | | | Further | Investigation led | Requi | red. | |
| sul | Comments | : | | 1 | | | | | | | | | | |
| | | | Capaci | tance (µF) | | | | Tes | st S | ummary | | | | |
| Capacitance | A (A | -В) | В (В | B-C) | | C (C-A) |) | | ☐ Test Passed □ Test Inconclusive | | | | | |
| apacit | | | | | | | | | Fu | | gation Require | ed. | | |
| ö | Comments | : | | | | | | | | | | | | |
| | | | Resist | tance (Ω) | | | | Tes | st Si | ummary | | | | |
| rge nce | A (A | -В) | | B-C) | | C (C-A) |) | | Tes | t Passed t Inconclusiv | | | | |
| Discharge Resistance | | | | | | | | | Fu | | gation Require | əd. | | |
| 0 8 | Comments | : | | | | | | | 103 | | | | | |
| | Poturpod t | o Sonvico | | | ос Г |] No | Corr | nments: | | | | | | |
| al ysis | Returned to Service: Yes | | | | _ | | | | | | | | | |
| Final | Monitoring / Further Inspection Yes Required: Repair / Replacement Required: | | |] No | - | | | | | | | | | |
| | Repair / R | eplaceme | nt Required: | Y | es L |] No | | | | | | | | |
| | Company Name | | | | | | Się | gna | ture | | | Date (yyyy/ | mm/dd) | |
| Perfo | Performed By | | | | | | | | | | | | | |
| Chec | ked By | | | | | | | | | | | | | |
| Motor | The nerre | n norform | ing the chert | in roomers! | la far ca | ouring 1 | h a t th | | - + | مسكراء مبالم مراقسم | بباممرهما ممالا ممر | | | المصالة امصد الم |

| INSPECTION FORM Page 1 of 1 Winnipeg CAPACITOR BANK, MEDIUM VOLTAGE Page 1 of 1 | | | | | | | | Page 1 of 1 | | | | |
|-------------------------------------------------------------------------------------------------------------------|-------------|--------------------------|---------------------------------|-------------------------------------|---------------------|-----------|--------|---------------------------|--------------------------------------------------|---------------|------------------------------------------------------|------|
| | Winnipeg | | | CAPACI | | NK, N | /IED | | LTAGE | | ID: | |
| Project | Facility: | | | | Pr | oject Na | ame: | | | | | |
| Pro | Area : | | | | Bi | d Oppor | rtunit | y: | | | | |
| ¥ | Location: | | | | | | | | | | Cell #: | |
| Capacitor Bank Data | Manufact | urer: | | | | Model: | | | | Serial #: | | |
| pacitor I Data | Size: | Size: VAR Rated Voltage: | | | | | V | Capacitance | e: | μF | | |
| Са | Configura | tion: | Delta |] Wye-Ungro | unded [|] Wye | -Gro | unded | | | | |
| | Capacito | r Identif | ication Tag Ins | stalled: |]Yes [| No | (| Cables Sur | oported Approp | riately: | 🗌 Yes 🗌 N | ٩o |
| al tion/ | | | | | | | | | , alignment: | | ood 🗌 Acceptable 🗌 F | Poor |
| Visual Inspection/ | Connectio | | - | Good | Acceptab | le 🗌 Po | oor I | Required C | learances: | 🗌 Go | bod 🗌 Acceptable 🗌 F | Poor |
| <u> </u> | Ground C | Connect | tion: | Good D | Acceptabl | e 🗌 Po | oor l | Unit Cleane | ed: 🗌 Yes | Photogra | aph Taken: 🗌 Yes | ; |
| | | | | | | | | | | | | |
| Insulation Resistance Test | Test Prepa | ration: | | ables: inected cted with Sour | ce Isolate | ed | | | | | epresentative is required lected during the test. | Ι, |
| sista | Test | | I | nsulation Res Phase 1 | sistance (o GND | (ΜΩ) | | | Test Summar | у | | |
| on Re | Voltage | | A (A-B) | B (B | -C) | | C (C | :-A) | Test Passe | clusive | | |
| sulati | 2500 V | | | | | | | Further In Test Failed | vestigation R | equired. | | |
| Ë | Comments | | | | | | | | | | | |
| | | | Сара | citance (µF) | | | | Test S | ummary | | | |
| ance | A (A | А-В) | - | (B-C) | | C (C-A) | | | t Passed | | | |
| apacitance | | | | | | | | Fu | rther Investigat | tion Required | | |
| ů | Comments | 5: | | | | | | | | | | |
| | | | Resi | stance (Ω) | | | | Test S | ummary | | | |
| ge nce | A (A | А-В) | | (B-C) | (| C (C-A) | | Tes | t Passed | | | |
| Discharge Resistance | | | | | | | | Fu | at Inconclusive rther Investigat at Failed | tion Required | | |
| Di Re | Comments | 5: | | | | | | | | | | |
| | | | | | . – | 7 | Car | nments: | | | | |
| al 'sis | Returned t | | ce: er Inspection | □ Y | | No | Con | ninents. | | | | |
| Final Analysis | Required: | / 1 0101 | | □ Y | ′es [|] No | | | | | | |
| | Repair / Re | eplacer | nent Required | : <u> </u> | ′es [|] No | | | | | | |
| | | Comp | any | Name | | | | Signa | ture | | Date (yyyy/mm/dd) | |
| Perfo | rmed By | | | | | | | | | | | |
| Chec | ked By | | | | | | | | | | | |
| Note: | | | rming the cheolist are correct. | | ble for ens | suring th | at the | e data is tra | anscribed from | the handwrit | ten form correctly, and th | nat |

| | Ĩ | | | - | | | | | | Page 1 of 3 | |
|----------------------------|---------------------|--------------------|--------------------------|----------|-----------|----------------------------------|---------------|------------|------------------------------|----------------------------------------|------------|
| V | Vinnipeg | | | POW | ER C | ABLE, 41 | 60V | | | Cable ID: | |
| Project | Facility: | | | | Projec | t Name: | | | | | |
| Proj | Area : | | | | Bid Op | oportunity: | | | | | |
| | | | | | | | - | | | | |
| | Source: | | | | | Dest. / Load: | | | | | |
| ta | Manufactu | Manufacturer: Type | | | | | | Conduc | tor: | Copper 🗌 Alu | minum |
| Cable Data | No. of Conductor | lo. of Size: | | | | | | | | us Data | |
| Cal | Voltage: | | | | | V Date Installed: | | | | | |
| | Installation | n: Cable Trans | | I Condu | uit | Alum. C | | Direct I | Buried ground Duct | Other: | |
| | | | | | | | | | 🗌 No | | |
| Visual Inspection | Visual Sig | ns of Overheating | /Corona: | Yes | 🗌 No | Cable S | supported Ap | propriatel | ly: | 🗌 Yes | 🗌 No |
| Vis Inspe | Damage t | o Splices/Termina | itions: | Yes | 🗌 No | □ No Shield Grounded: □ Yes □ No | | | | | 🗌 No |
| | Bend Rad | ius Acceptable: | | Yes | 🗌 No | Comme | nts: | | | | |
| | | Source: | | | Cable | Dest. / Loa | 4. | | Note: Appro | val of City's Repr | esentative |
| st | Test Preparatio | Disconne | cted d with Source Is | olated | 🗌 Dis | connected | h Load Isolat | ed | is required, p | prior to leaving ca uring the test. | |
| Insulation Resistance Test | Cable Ter | nperature: | °C Temperatu | ure Corr | rection F | Factor for 2 | D°C: | - | ound all cond ch reading. | luctors not under | test for |
| sistaı | Test | | | Insu | Iation F | Resistance | (ΜΩ) | | Test Summa | ary | |
| n Re | Voltage | | A-GNI | D | E | B-GND | C-GI | ND | Test Pass | | |
| ulatio | 2500V | Reading | | | | | | | | nvestigation Req | uired. |
| Insu | Corrected to 20°C | | | | | | | Test Faile | ed | | |
| | Comment | s: | | | | | | | | | |

INSPECTION FORM 4160V POWER CABLE

Page 2 of 3

Cable ID:

| | Test Prepara | tion: | Source: Disconnected Connected with Source Isolated | Cable Dest. / Load: | Note: Approval o leaving cables co | f City's Representative is required, prior to nnected during the test. |
|-------------------------------------------------|-----------------|-----------------|-----------------------------------------------------------------|---------------------|---------------------------------------|------------------------------------------------------------------------|
| | Frequency: | 0.1 Hz | Waveform: sinus | soidal | Ground all condu | ctors not under test for each reading. |
| | Test Voltage | Elapsed Time | Pea | k Leakage Current (| uA) | Test Summary |
| | (RMS) | (min) | A-GND | B-GND | C-GND | Test Passed Test Inconclusive |
| | 7000V | 0 | | | | Further Investigation Required. |
| | 7000V | 1 | | | | |
| | 7000V | 2 | | | | |
| Test | 7000V | 3 | | | | |
| High Potential Very Low Frequency (VLF) Test | 7000V | 4 | | | | |
| tentia ency (| 7000V | 5 | | | | |
| High Potential v Frequency (V | 7000V | 6 | | | | |
| Hiç ow F | 7000V | 7 | | | | |
| ery L | 7000V | 8 | | | | |
| > | 7000V | 9 | | | | |
| | 7000V | 10 | | | | |
| | 7000V | 11 | | | | |
| | 7000V | 12 | | | | |
| | 7000V | 13 | | | | |
| | 7000V | 14 | | | | |
| | 7000V | 15 | | | | |
| | Comments: | | | | | |
| | | | | | | |
| | | | | | | |

Cable Returned to Service:

Monitoring / Further Inspection

Repair / Replacement Required:

Comments:

Required:

Final Analysis

INSPECTION FORM 4160V POWER CABLE

Page 3 of 3

Cable ID:

| | Frequency: | 0.1 Hz | Waveform: si | inusoidal | | | | | | |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|--------------|---------------------|-----------------|--------------|---------------------|-----------------|--------------|---------------------|-----------------|
| | Test Voltage | | Α | | | В | | | С | |
| - 1 | (RMS) | Tan Delta | Capacitance (nF) | Current (µA) | Tan Delta | Capacitance (nF) | Current (µA) | Tan Delta | Capacitance (nF) | Current (µA) |
| acto a) Tes | 2400V | | | | | | | | | |
| ion F Delt | 4800V | | | | | | | | | |
| Dissipation Factor (Tangent Delta) Test | Difference | | | | | | | | | |
| Dis (Tar | Test Summary | | Comments: | | | | | | | |
| | Test Passed Test Inconclust Further Invest Required. Test Failed | | | | | | | | | |
| 1 | I | | Γ | | | | | | | |
| | Termina | tion | Con | nection Res | istance (µ | Ω) - As Left | | - | orque Check | |
| ion | | | Α | | В | С | | | | |
| Connection Resistance | Sourc | e | | | | | | | □ок | |
| Res | Dest. / L | oad | | | | | | | □ ОК | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

🗌 No

🗌 No

🗌 No

🗌 Yes

🗌 Yes

🗌 Yes

Comments:

| | Ĩ | | | | | | ON FOR | | | | Page | 1 of 1 | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------|-----------------------|---------------------|-------|------------|---------------------|-------------|------------|------------------------------|------------|-----------|-------------|
| W | Vinnipèg | | | PO | OWE | ER CAB | SLE < 10 | 00V | | | Cable I | D: | |
| Project | Facility: | | | | | Project N | lame: | | | | | | |
| Proj | Area : | | | | | Bid Opp | ortunity: | | | | | | |
| | • | | | | | | | | | | | | |
| | Source: | | | | | | Dest. / Lo | ad: | | | | | |
| ata | Manufactu No. of | irer: | | Iy | ype: | AWG | | | Cone | ductor: C | | Previou | |
| Cable Data | Conductor | rs: | Size: | | | MCM | Length | | m | Jacket Markin | igs 🗌 | TDR | 5 Dala |
| Ca | Rated Vol | | Operating Voltage: | g | | V | Date In | stalled: | | | | | |
| | Installatio | n: Cable Tra | iy [|] EMT] Steel Co | ondu | it 🗌 | Alum. Co PVC Cor | | | ect Buried lerground Duct | Other: | | |
| Ę | Physical E | Damage on Expose | ed Ends: | ☐ Yes | S | 🗌 No | Cable Id | entificatio | on Tag In: | stalled: | | 🗌 Yes | □ No |
| Visual Inspection | Visual Sig | ns of Overheating | : | 🗌 Yes | s | 🗌 No | Cable Su | pported | Appropria | ately: | | 🗌 Yes | □ No |
| > lai | Bend Rad | ius Acceptable: | | 🗌 Yes | s | 🗌 No | Commer | its: | | | | | |
| | | 0 | | | | | | | | | | . D | |
| Test Source: Cable Dest. / Load: Note: Approval of City's Representing the preparation: Test Disconnected Disconnected is required, prior to leaving cable Connected with Source Isolated Connected with Load Isolated connected during the test. | | | | | | | | | | | | | |
| Insulation Resistance Test | Cable Ter | nperature: | °C Te | mperature | e Cor | rrection F | actor for 2 | 0°C: | | Ground all conduc eading. | tors not u | under tes | st for each |
| sistar | Test | | | | Insu | lation Re | sistance | (ΜΩ) | | Test Summar | у | | |
| on Re | Voltage | | A-G | SND | В-0 | GND | C-GN | D | N-GND | Test Passe | | | |
| ulatic | 1000V | Reading | | | | | | | | Test Incon Further In | vestigatio | on Requi | red. |
| lns | | Corrected to 20° | С | | | | | | | Test Failed | 1 | | |
| | Comment | S: | | | | | | | | | | | |
| | Note: Tor | que check required | for all or | ables Cor | nnoo | tion Rosi | | | d for cab | les 4/0 AMC or lo | raer | | |
| lce | Note. Tore | | | | | | nce (μΩ) | | | | iger. | | |
| sistar | Те | rmination | A | | | B | С (µ12) | | N | т | orque C | heck | |
| Connection Resistance | | Source | ^ | | | | Ŭ | | | | | K | |
| lectio | De | est. / Load | | | | | | | | | | | |
| Conr | Comment | | | | | | | | | | | | |
| | Common | | | | | | | | | | | | |
| S | Cable Ret | urned to Service: | | 🗌 Yes | | 🗌 No | Commer | its: | | | | | |
| Final Analysis | Monitoring Required: | g / Further Inspecti | on | 🗌 Yes | | 🗌 No | | | | | | | |
| ∢ | Repair / R | eplacement Requi | red: | ☐ Yes | | 🗌 No | | | | | | | |
| | | Company | | Name | | | | Signatu | re | | Date | (yyyy/m | m/dd) |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

Form CBL-600V Rev 00, Created by SNC-Lavalin Inc. M:\113099\4ENG\47ELE\RA - Misc Reports & Forms\Forms\F-CBL-600V.doc

| | Ĩ | | | NSPECTI | | | | | F | Page 1 of 1 | | |
|---------------------------|------------------------|----------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------|-------------------------------|-----------|--------------------|-------------------------|----------|--|
| V | Vinnipeg | C | ONTROL P | OWER TR | RANS | FOR | MER, 4160V | | 11 | D: | | |
| ect | Facility: | | | Project I | Name: | | | | | | | |
| Project | Area : | | | Bid Opp | ortunity | y: | | | | | | |
| | 1 | | | | | | | | | | | |
| ta | Location: | | | | | Pri. V Ratin | oltage g: | | Sec. Vo Rating: | Sec. Voltage Rating: | | |
| PT Data | Manufact | urer: | | | | Pri. F | Fuse Size: Sec. | | | use Size: | | |
| д | Size: | | ٦ | Гуре: | | | | Other: | | | | |
| | Physical | Damage: | | s 🗌 No | Defe | ctive (| Connections/Wirin | a: | | ☐ Yes | □ No | |
| al tion | - | gns of Overheating: | | | Grou | nding | and Shorting Con | - | Provide | | | |
| Visual Inspection | | ound Connection: | | | Cont Verif | | ithdrawal Mechanism Function: | | | | | |
| - | Fuse Size | es Match Drawings: | 🗌 Yes | s 🗌 No | □ No Comments: | | | | | | | |
| Insulation Resistance Tes | Sec | Connect Test imary To GND ondary To GND ary To Secondary | | VDC Test Summary /DC Image: Straight of the straight of | | | | | connec | cted during the t | | |
| | Poturnod | to Service: | ☐ Yes | 🗌 No | Com | ments | : | | | | | |
| Final Analysis | Monitorin | g / Further Inspection | | | - | | | | | | | |
| Fi Ana | Required Repair / I | : Replacement Required: | | | | | | | | | | |
| | | - | | | | 1 | | | | | I | |
| | | Company | Name | | | S | ignature | | | Date (yyyy/mr | n/dd) | |
| Perfor | med By | | | | | | | | | | | |
| Check | ed By | | | | | | | | | | | |
| Note: | | on performing the check sis results are correct. | is responsible | for ensuring | that the | e data | is transcribed fror | n the han | dwritten | form correctly, | and that | |

| X. | | | | | | | | | | Page 1 of 1 | |
|---------------------------|-----------------------------------------------|-------------------------------------------------------------------------------|------------------|----------------|--------------------------------------------------------|---------------------------------------|---------------------|-----------|-------------------------------------------------|--------------------|----------|
| V | Vinnipeg | | CONTROL | POWERT | RAN | SFOR | RMER, 600V | | | ID: | |
| ject | Facility: | | | Project | Name | | | | | | |
| Project | Area : | | | Bid Op | portuni | ty: | | | | | |
| | | | | | | | | | 0 | | |
| ta | Location: | | | | Pri. Voltage Rating: | | | | Sec. Voltage Rating: | | |
| PT Data | Manufact | urer: | | | | Pri. F | use Size: | | Sec. I | Fuse Size: | |
| Ч | Size: | | | Туре: | | | | Other: | | | |
| | Physical | Damage: | □ Ye | s 🗌 No | Defe | ective (| Connections/Wiring | q: | | ☐ Yes | □ No |
| ial tion | | gns of Overheating: | □ Ye | s 🗌 No | Grounding and Shorting Connections Provide Contact: | | | | | | □ No |
| Visual Inspection | Verify Gr | ound Connection: | □ Ye | s 🗌 No | | Verify Withdrawal Mechanism Function: | | | | | |
| _ | Fuse Size | es Match Drawings: | □ Ye | s 🗌 No | Con | nments | : | | | | |
| Insulation Resistance Tes | Test Prepa Pri Sec Prima Comments | ected ted with Source Voltage 1000 VDC 500 VDC 1000 VDC | Insulation | n Resis MΩ) | stance | | ng cables | conne | presentative is re ected during the t ed. | | |
| | Returned | to Service: | ☐ Yes | 🗌 No | Con | nments | : | | | | |
| Final nalysis | Monitorin Required | g / Further Inspection | ☐ Yes | 🗌 No | | | | | | | |
| A | Repair / F | Replacement Required | : 🗌 Yes | 🗌 No | | | | | | | |
| | | Name | | | Si | gnature | | | Date (yyyy/mr | m/dd) | |
| Perfor | med By | | | | | | | | | | |
| Check | ed By | | | | | | | | | | |
| Note: | | on performing the checl sis results are correct. | k is responsible | for ensuring | that th | ie data | is transcribed fror | n the har | dwritte | en form correctly, | and that |

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|---------------------------------------|-------------------------------------------------------------------------------------------|-----------|-----------|--------------|-----------|----------|--------------------------------------------------------------|----------------------------------------------|--------|----------|-----------------------|----------------------------------------------------------------------------|----------------|---------------------------|-------------------|-------------|
| V | Vinnipèg | | | | C | URRE | :NI IR/ | ANSFO | KINEI | ۲ | | | | ID: | | |
| Project | Facility: | | | | | | Project N | Name: | | | | | | | | |
| Pro | Area : | | | | | | Bid Opp | ortunity: | | | | | | | | |
| | Location: | | | | | Curre | ent Ratio: | | : | А | | Volta | age Clas | s: | V | |
| CT Data | Manufact | urer: | | | Model | No.: | | | T | ype: | 🗌 Bar | | Window | (Solid) | Split | Core |
| о С | Burden R | ating: | | | BIL: | | kV | kV Accuracy Class: | | | | | | | | |
| 5 | Physical | Damage | : | | | Yes | 🗌 No | □ No Clean and Inspect Insulators: | | | | | ☐ Yes | 🗌 No | | |
| Visual Inspection | Visual Sig | gns of Ov | verheat | ing: | | Yes | 🗌 No | □ No Verify Connections are Correct: □ Yes □ | | | | | 🗌 No | | | |
| / Ins | Adequate | e Mountir | ng Supp | port: | | Yes | 🗌 No | □ No Comments: | | | | | | | | |
| Insulation Resistance Test | Test Preparation: Source: Disconnected Connected with Source Isolated Voltage | | | | | | Disconnected is required, p Connected with Load Isolated | | | | quired, p ected du | val of City's Representative prior to leaving cables uring the test. | | | | |
| stanc | Test Voltage | | | | | Insul | ation Res B | istanc | ;e (ML | 2) C | | | emperature: °C | | | |
| Resi | Primary To GND 1000 V | | | | | <u> </u> | | | | 0 | | Test Passed | | | | |
| ation | | | 500 V | / | | | | | | | | Furt | her Inve | ner Investigation Require | | |
| Insul | Primary To Secondary 1000 | | V | | | | | | | | Test | Falled | | | | |
| | Comments | : | | | | | | | | I | | | | | | |
| | Note: Atta | ch suppo | ortina da | ata and satu | uration (| curve. | | | | | | | | | | |
| ation | | | | | | | Ph | ase | | | | | | Test Sı | ummary | |
| tion, Saturation y Tests | | | | Α | | В | | | С | | | Ν | | | Passed | sivo |
| tion, Sat / Tests | Calculated | d Ratio | | | | | | | | | | | | Fur | ther Inves | |
| xcitat olarity | Measured | l Ratio | | | | | | | | | | | | □ Test | | |
| Turns Ratio, Excitati and Polarity | Exciting C (mA | | | | | | | | | | | | | | | |
| ns Ra a | Polarity C | Correct | 🗆 Ye | s 🗌 No | | Yes | 🗌 No | 🗌 Yes | | ٩o | 🗌 Yes | | No | | | |
| Tur | CT Satur Test Perfo | | 🗆 Ye | s 🗌 No | | Yes | 🗌 No | ☐ Yes | | ١o | 🗌 Yes | | No | | | |
| ú | CT Returned to Service: | | | | | Yes | □ No | Commer | nts: | | | | | | | |
| Final Analysis | Monitoring / Further Inspection | | | | | Yes | 🗌 No |] | | | | | | | | |
| A I | Repair / F | | nent Re | equired: | <u>с</u> | Yes | 🗌 No | | | | | | | | | |
| <u> </u> | | Compa | ny | | Nam | e | | | Signa | ature | | | | Dat | te (yyyy/m | nm/dd) |
| Perfor | med By | | , | | | | | | | | | | | | | · · · - · / |
| | ed By | | | | | | | | | | | | | | | |
| NISTER | T I | | | the check i | | | | | | | | | a handa | | | |

| |)© | | INS | PECTION | FORM | | Page | e 1 of 1 |
|------------------------|--------------|--------------|----------------|--------------|-------------------------|-------|--------|-----------------|
| ١ | Vinnipèg | | DI | GITAL ME | TER | | ID: | |
| ject | Facility: | | | Project Name | e: | | | |
| Project | Area : | | | Bid Opportur | iity: | | | |
| | T | | | | | | | |
| Meter Data | Location: | | | Cell #: | | | | |
| Me Da | Manufacturer | : | | Model: | | | | |
| 1 | | | | | - - | | | |
| - | Cover Gask | et: | Good Acceptab | le 🗌 Poor | Cover Glass: | | Good [| Acceptable Deor |
| Visual Inspection / | General Co | ndition: | Good Acceptab | le 🗌 Poor | | | | |
| Visu | General Col | (as found) | Good CAcceptab | le 🗌 Poor | Unit Cleaned: | 🗌 Yes | | |
| - | Connections | s (as found) | Good Acceptab | le 🗌 Poor | Connections Torqued: | 🗌 Yes | | |

| | | Test | Phas | e A | Pha | ise B | Pha | se C | |
|----------------------|------------|----------------------|----------------------------|---------------------------|----------------------------|---------------------------|----------------------------|---------------------------|--|
| | Voltage | Value (V) | Reading As Found (V) | Reading As Left (V) | Reading As Found (V) | Reading As Left (V) | Reading As Found (V) | Reading As Left (V) | |
| | | 0 | | | | | | | |
| cy | | | | | | | | | |
| Accuracy Accuracy | | Test Value (A) | Phas | e A | Pha | ise B | Phase C | | |
| Ac Ac | Current | | Reading As Found (A) | Reading As Left (A) | Reading As Found (A) | Reading As Left (A) | Reading As Found (A) | Reading As Left (A) | |
| | | 0 | | | | | | | |
| | | | | | | | | | |
| | Unit Calib | rated: | 🗌 Yes 🗌 No | | | | | | |

| s | Returned to Service: | 🗌 Yes | 🗌 No | Comments: |
|-----------------|-------------------------------------------|-------|------|-----------|
| Final nalysi | Monitoring / Further Inspection Required: | 🗌 Yes | 🗌 No | |
| ◄ | Repair / Replacement Required: | 🗌 Yes | 🗌 No | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

| | <u> </u> | | INSP | ECTION I | FORM | | | Page | 1 of 3 | | |
|---------------------------|---------------------------------------|--------------------|--------------|----------------------------|----------------|----------------------|-----------------------|------------|---------------|------|--|
| V | Vinnipeg | | GROU | NDING S | YSTEM | | | ID: | | | |
| ect | Facility: | | P | Project Name |): | | | | | | |
| Project | Area : | | В | 3id Opportun | ity: | | | | | | |
| | | | | | | | | | | | |
| ы | Connection to G Visible: | round Electrode is | ☐ Yes | □ No | Facility C | contains a Main Gr | ound Bus: | | ☐ Yes | □ No | |
| oecti | Connecting Con | ductor: Size: | Qty: | Torque Ground Connections: | | | | | | 🗌 No | |
| Visual Inspection | Visual signs of C | orrosion: | ☐ Yes | 🗌 No | | | | | | | |
| Visua | Soil Type: | | | | Soil Cond | dition: 🗌 Dry 🗌 | Damp 🗌 | Wet | | | |
| | Comments: | | | | | | | | | | |
| | Date of Test: | | | | Time of T | Test: | | | | | |
| | Weather and Te | mperature: | | | Terrain: | | | | | | |
| | Grounding Syste Connection Poin | m | UTM Coord | | E | Ν | | | | | |
| | Current Probe Injection Point: | · | UTM Coord | GPS | E | N | | | | | |
| | Test Conditions: | | | | Test La | yout: | | | | | |
| | Voltage Probe Distance (meters) | UTM GPS Cool | rdinate: | | Current nA) | Test Voltage (mV) | Resistanc H (Ω) | ce @ Iz | Resista (Ω | Hz | |
| st #1 | | E | N | 1 | | | | | | | |
| al Te | | E | N | 1 | | | | | | | |
| otenti | | E | N | 1 | | | | | | | |
| Fall Of Potential Test #1 | | E | N | 1 | | | | | | | |
| Fall | | E | Ν | 1 | | | | | | | |
| | | E | N | 1 | | | | | | | |
| | | E | N | 1 | | | | | | | |
| | | E | Ν | 1 | | | | | | | |
| | | E | N | 1 | | | | | | | |
| | | E | Ν | 1 | | | | | | | |
| | | E | Ν | 1 | | | | | | | |
| | | E | N | 1 | | | | | | | |
| | Comments: | | | • | | | | • | | | |

| | Date of Test: | | | | Time of T | est: | | | | | |
|---------------------------|---------------------------------------|--------------|-----------------------|--------------|-----------|----------------------|---------------------------|---------------------------|--|--|--|
| | Weather and Tempe | rature: | | | Terrain: | | | | | | |
| | Grounding System Connection Point: | | UTM GPS Coordinate | S e: | Е | Ν | | | | | |
| | Current Probe Injection Point: | | UTM GPS Coordinate | | E | Ν | | | | | |
| | Test Conditions: | | | | Test La | yout: | | | | | |
| | Voltage Probe Distance (meters) | UTM GPS Coor | dinate: | Test C (m | | Test Voltage (mV) | Resistance @ Hz (Ω) | Resistance @ Hz (Ω) | | | |
| st #2 | | E | Ν | | | | | | | | |
| Fall Of Potential Test #2 | | E | Ν | | | | | | | | |
| otent | | E | Ν | | | | | | | | |
| Of P | | E | Ν | | | | | | | | |
| Fall | | Е | Ν | | | | | | | | |
| | | E | Ν | | | | | | | | |
| | | E | Ν | | | | | | | | |
| | | E | Ν | | | | | | | | |
| | | E | Ν | | | | | | | | |
| | | E | Ν | | | | | | | | |
| | | E | Ν | | | | | | | | |
| | | Е | Ν | | | | | | | | |
| | Comments: | | | | | | | | | | |

INSPECTION FORM GROUNDING SYSTEM

ID:

| | Poir | nt A | | Point B | Resistance (mΩ) | Test Summary | |
|------------------------------------|------------------|------------------|---------|-----------------|--------------------|---------------------|----------------------|
| | Facility Grou | nd Electrode | Ма | in Ground Bus | | Further Investigati | ion Required. |
| | Facility Grou | nd Electrode | 4160V S | witchgear GND | Bus |] | |
| | Facility Grou | nd Electrode | S | stem Neutral | | | |
| S) | Facility Grou | nd Electrode | 600V Sv | witchgear GND E | Bus | | |
| Resistance Checks (Ductor Test) | Facility Grou | nd Electrode | MCC | : GND Bu | 5 | | |
| sistance Chec (Ductor Test) | Facility Grou | nd Electrode | MCC | : GND Bu | 5 | | |
| sista (Duc | Facility Grou | nd Electrode | C |)ther : | | | |
| Re | Facility Grou | nd Electrode | C |)ther : | | | |
| | Facility Grou | nd Electrode | C | Other : | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | Comments: | | | | | | |
| | Monitoring / Inc | pection Required | | Yes 🗌 No | Comments: | | |
| al /sis | | | | | | | |
| Final Analysis | Repair / Replac | ement Required: | | Yes 🗌 No | | | |
| , | | | | | | | |
| | | Company | | Name | | Signature | Date (yyyy/mm/dd) |

| Performed By | | |
|--------------|--|--|
| Checked By | | |

| | Winnipeg | | Page 1 of 6 |
|---------|---------------|------------------|-------------|
| | Vinnipeg | MCC/CDP, 600V | ID: |
| Project | Facility: | Project Name: | |
| Proj | Area : | Bid Opportunity: | |
| | | | |
| Data | Location: | | # of Cells: |
| | Manufacturer: | Model: Serial #: | |

| 0/00 | Rated Voltage: | V | Main Bus Rating | g: A | Main Bus Neutral Rating: | А |
|------|----------------|--------|-----------------|---------------------------|--------------------------|---|
| ž | Bus Conductor: | Copper |] Aluminum | Current Withstand Rating: | А | |

| | Identification Tag Installed: | | 🗌 Yes | 🗌 No | Visual Signs of C | verheating | j : | 🗌 Yes | 🗌 No |
|---------------------|-------------------------------|---------|---------|-------------|--------------------------------------|------------|-----------------|------------|----------|
| | Visual Signs of Moisture: | | 🗌 Yes | 🗌 No | Visual Signs of C | Corona: | | 🗌 Yes | □ No |
| _ | Fuse/Breaker Sizes Match Dr | awings: | 🗌 Yes | □ No | PT and CT ratios | match dra | wings: | 🗌 Yes | □ No |
| Cleaning | Elevation Drawings Correct: | | 🗌 Yes | □ No | Cables Supporte | d Appropri | ately: | 🗌 Yes | 🗌 No |
| / Cle | Cleanliness (As Found): | Good 🗌 | Accepta | able 🗌 Poor | Insulators Condit | ion: | Good [| Acceptable | e 🗌 Poor |
| Visual Inspection / | Connections: | Good | | able 🗌 Poor | Electro/Mechanic Interlock System | | Good G | Acceptable | Poor |
| lnsp | Ground Connection: | Good 🗌 | Accepta | able 🗌 Poor | Vents/Filters: | | Good 🗌 | Acceptable | Poor |
| isual | Doors Mechanical: | Good 🗌 | Accepta | able 🗌 Poor | Exercise Active (| Component | ts: | 🗌 Yes | 🗌 No |
| > | Cell Fit and Alignment: | Good 🗌 | Accepta | able 🗌 Poor | | | | | |
| | Required Clearances are Met: | Good | Accepta | able 🗌 Poor | | | | | |
| | Indicating mechanisms: | Good 🗌 | Accepta | able 🗌 Poor | Unit Cleaned: | 🗌 Yes | Photograph Take | en: 🗌 Y | ′es |

| | Туре: | Inspection | | | | | | | | | |
|----------|----------------|-------------------------------|--------------------------------------------------|----|---|---|--|--|--|--|--|
| Power | 🗌 Main Breaker | Complete appropriate | breaker inspection forr | n. | | | | | | | |
| | Disconnect | Complete appropriate | Complete appropriate disconnect inspection form. | | | | | | | | |
| ning | | Visual Inspection: | Visual Inspection: | | | | | | | | |
| Incoming | 🗌 Main Lugs | Connections Torqued | : 🗌 Yes | | | | | | | | |
| | | Connection Resistance (μΩ) | А | В | С | N | | | | | |
| | | As Left | | | | | | | | | |

INSPECTION FORM MCC/CDP, 600V

ID:

| | Test Preparatio | Source: Disconnec n: Connected Isolated | note | able Dest. / Loa] Disconnected] Connected wi | | Note: Approval of City's Representative is required, prior to leaving cables connected during the test. | | | | |
|-------------------------------------------|--------------------|--------------------------------------------------|------------------------------------|------------------------------------------------------|-----------------------|---------------------------------------------------------------------------------------------------------|--|--|--|--|
| Insulation Resistance Test (Buswork) | Test Voltage | Insul | ation Resistance Phase To Phase | | Test Summary | Test Summary | | | | |
| stanco ork) | (dc) | A - B | B - C | C - A | | | | | | |
| n Resistar (Buswork) | 1000 V | | | | Further Inve | vestigation Required. | | | | |
| lation (B | Test | Insul | ation Resistance Phase To GND | (ΜΩ) | | | | | | |
| Insu | Voltage | A - GND | B - GND | C - GND | | | | | | |
| | 1000 V | | | | | | | | | |
| L | Comments | | | | | | | | | |
| ance Test) | | Point A | Point | Point B | | Test Summary | | | | |
| esista uctor | MCC/CDP GND Bus | | Facility Ground Electrode | | | Further Investigation Required. | | | | |
| Ground Resistance Checks (Ductor Test) | MCC/0 | CDP GND Bus | MCC/CDP Enclosure | | | | | | | |
| Grou | MCC/0 | CDP GND Bus | System N | eutral | | | | | | |
| | Comments | S: | | | | | | | | |
| | Visual Insp | ect Requirements: | G=Good, A | -Acceptable, F | P=Poor Comments a | are required for all items identified in Poor condition. | | | | |
| | | 1 | I. Confirm ide | entification tag / | lamacoid is installed | ed. | | | | |
| | | 2 | 2. Look for vis | sual signs of ov | erheating. | | | | | |
| | | 3 | Inspect and | d torque connec | ctions. | | | | | |
| kers | | 2 | Inspect and | d test any electi | ro/mechanical interlo | ocks. | | | | |
| Breal | | Ę | 5. Confirm dis | sconnect operat | tion. | | | | | |
| Feeder Breakers | | | | r mechanical co | ondition. | | | | | |
| Fee | | 7 | 7. Exercise ci | rcuit breaker. | | | | | | |

Confirm cables are supported and routed appropriately. 8.

Visually assess the general condition of the installation. 9. Complete an appropriate Breaker Inspection Form for all breakers with separate adjustable Long and Short trip settings, Ground trip settings, or > 400A frame size. Note: Continued on next page

INSPECTION FORM MCC/CDP, 600V

Page 3 of 6

ID:

| | | Continued from previous page | | | | | | | | | | |
|-----------------|----------------------|------------------------------|---------------------|--------------------|--------|-------|-------------------|--------------|----------------------|---------|----------|--|
| | D | Loc./ Cell | Frame Rating (A) | Trip Rating (A) | Manuf. | Model | Trip Unit Type | Inst Setting | Visual Inspection | Cleaned | Comments | |
| | | | | | | | | | | | | |
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| eake | | | | | | | | | | | | |
| er Br | | | | | | | | | | | | |
| Feeder Breakers | | | | | | | | | | | | |
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| | General Comments: | | | | | | | | | | | |

| | Overcurrent Protection Type: | B=Breaker (Thermal Magnetic), M=breaker(Motor Circuit Protector), F=Fuse | | | | | | |
|----------|------------------------------|----------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|
| | Overload Protection Type: | T=Thermal, SS=Solid State | | | | | | |
| | Visual Inspect Requirements: | G=Good, A=Acceptable, P=Poor Comments are required for all items identified in Poor condition. | | | | | | |
| | 1. | Confirm identification tag / lamacoid is installed. | | | | | | |
| | 2. | Look for visual signs of overheating. | | | | | | |
| Starters | 3. | Inspect and torque connections. | | | | | | |
| | 4. | Inspect and test any electro/mechanical interlocks. | | | | | | |
| Motor | 5. | Confirm disconnect operation. | | | | | | |
| 2 | 6. | Check door mechanical condition. | | | | | | |
| | 7. | Exercise circuit breaker. | | | | | | |
| | 8. | Confirm cables are supported and routed appropriately. | | | | | | |
| | 9. | Visually assess the general condition of the installation. | | | | | | |
| | | nplete a Motor Starter Inspection Form for all Motor Starters Size 4 or larger, with VFDs, or with Soft rters. | | | | | | |

| | | | | Overcu | Irrent Prof | tection | Contactor | | Overload | | | |
|----------------|----------------------|---------------|------|------------|-------------|---------|------------------|------|----------|--------------|---------|----------|
| | ID | Loc./ Cell | Type | Rating (A) | Manuf. | Model | Size / Rating | Type | Model | Visual Insp. | Cleaned | Comments |
| | | | | | | | | | | | | |
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| Motor Starters | | | | | | | | | | | | |
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| | General Comments: | | | | | | | | | | | |

INSPECTION FORM MCC/CDP, 600V

Page 5 of 6

ID:

| | | | | Overcu | rrent Prof | tection | Contactor | | Overload | | | |
|-----------------------|----------------------|---------------|------|------------|------------|---------|------------------|------|----------|--------------|---------|----------|
| | ID | Loc./ Cell | Type | Rating (A) | Manuf. | Model | Size / Rating | Type | Model | Visual Insp. | Cleaned | Comments |
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| Motor Starters | | | | | | | | | | | | |
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| | | | | | | | | | | | | |
| | General Comments: | | | | | | | | | | | |

INSPECTION FORM MCC/CDP, 600V

ID:

| al sis | Returned to Service: | 🗌 Yes | 🗌 No | Comments: |
|-----------|-----------------------------------|-------|------|-----------|
| Final | Monitoring / Inspection Required: | 🗌 Yes | 🗌 No | |
| Ā | Repair / Replacement Required: | 🗌 Yes | 🗌 No | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

INSPECTION FORM MOTOR STARTER, FVNR, 4160V

Page 1 of 4

ID

| oject | Facility: | Project Name: | |
|-------|-----------|------------------|--|
| Pro | Area : | Bid Opportunity: | |
| | | | |

| | Load: | | | | | | | | Starter Loc | ation: | | | | Cell #: | |
|------------------------------|--------------------|------------|-----------|-----------|---------|----------|---------------------------|------|-------------------------|----------|----------|------------|---------|----------|------------|
| | Manufacturer | 1 | | | Model | : | | | | | Serial | #: | | | |
| | Size: | | Rated ' | Voltage: | | V | Curren | nt R | ating: | А | | Control Vo | oltage: | | V |
| - Data | Interrupting F | Rating: | | kA @ | kV | | | | | | | | | | |
| Starter Data | Isolation: | ☐ Fuse | d Disc. | Rating: | | | ⁼ use Size: | | А | Fuse | Mfg. | | Cat. | #: | |
| | Control Power kVA: | | kVA: | | Voltage | : | | V | Manuf | acturer: | | Cat. | #: | | |
| | Transformer | : | | Primary F | use: | А | Seco | nda | ary Fuse: | | А | | | | |
| | Current Trar | nsformer | : Ratio | 0: | Ту | /pe: | | | Manufactu | rer: | | Cat. #: | | | |
| | Starter Identi | fication T | aa Ineta | llod: | | ∕es □ | No | Vi | isual Signs | of Ovo | boating | | | □ Yes | ∏ No |
| _ | | | 0 | | | | | | 0 | | Tieating | | . — | | |
| ning | Cleanliness (| As Found | l): | Good Good | I ∐ Ac | ceptable | _ Poor | S | upport Insul | ators: | | ∐ Go | od∟ | Acceptat | ole 🗌 Poor |
| Visual Inspection / Cleaning | Connections | | | Good Good | Ac 🗌 Ac | ceptable | Poor | | lectro/Mech terlock: | anical | | 🗌 Goo | od 🗌 . | Acceptab | le 🗌 Poor |
| tion / | Ground Conr | nection: | | Good 🗌 | | ceptable | Poor | С | ontactor Co | ndition | : | God God | d 🗌 | Acceptab | le 🗌 Poor |
| spec | Door Mechar | nical | | Good | | ceptable | Poor | С | ontact Align | ment: | | Go | od 🗌 | Acceptat | ole 🗌 Poor |
| ual In | Shutter | | 🗌 N/A | Good | | ceptable | 🗌 Poor | R | acking Devi | ces | | N/A 🗌 Goo | od 🗌 . | Acceptab | le 🗌 Poor |
| Visi | Cables Supp | orted App | propriate | ely: | | □ Yes | i 🗌 No | U | nit Cleaned | : [| Yes | Photograph | Taken | : 🗆 | Yes |
| | Comments: | | | | | | | | | | | | | | |

| Q | |
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| Winnipeg | r |

INSPECTION FORM MOTOR STARTER, 4160V

Page 2 of 4

| | Test | | А | | в | с | | | |
|----------------------------|-----------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------|---------------------------|----------------------------|------------------|----------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| | | | | | | | | est Summary | |
| | Contact Resistance (| . , | | | | | | Test Passed Test Inconclusiv | e |
| | Disconnect / Breaker/I Resistance (μΩ) | MCP | | | | | | Further Investig Test Failed | ation Required. |
| Contact/Pole Measurements | Fuse Resistance ($\mu\Omega$) | 1 | | | | | | | |
| suren | Air Contactor: | | | | | | | | |
| Mea | Arcing Contact G | Gap (mm) | | | | | | | |
| /Pole | Arcing Contact V | Vipe (mm) | | | | | | | |
| ntact | Main Contact Ga | ap (mm) | | | | | | | |
| ပိ | Main Contact Wi | ipe (mm) | | | | | | | |
| | Vacuum Contactor: | | | | | | | | |
| | Contact Travel (r | mm) | | | | | | | |
| | Comments: | | | | | | ľ | | |
| | | | | | | | | | |
| | | Source: | | | Dest. / Load: connected | No | ote: Ap | proval of City's Re | presentative is required |
| | | | ∐ Open | Con | nected with Lo | prid | or to le | | ected during the test. |
| Test | Test | | | | nected with L | nad Isolated pre | | - | Ground all phases not |
| ance Test | Test | | Voltage | | nected with Lo | bad isolated | istanc | - | ected during the test. |
| esistance Test | Test Disc. To Contactor Sta | abs | | e | | Insulation Res | istanc | e (MΩ) | ected during the test. Ground all phases not under test! Test Summary |
| ion Resistance Test | | | Voltage | e DC | | Insulation Res | istanc | e (MΩ) | Ground all phases not under test! Test Summary ☐ Test Passed ☐ Test Inconclusive |
| sulation Resistance Test | Disc. To Contactor Sta | ND | Voltage 2500 VD | e DC DC | | Insulation Res | istanc | e (MΩ) | Ground all phases not under test! Test Summary ☐ Test Passed ☐ Test Inconclusive Further Investigation Required. |
| Insulation Resistance Test | Disc. To Contactor Sta Contactor Line To GN | | Voltag 2500 VE 2500 VE | | | Insulation Res | istanc | e (MΩ) | Ground all phases not under test! Test Summary ☐ Test Passed ☐ Test Inconclusive Further Investigation |
| Insulation Resistance Test | Disc. To Contactor Sta Contactor Line To GN Contactor Load To Gt | | Voltag 2500 VC 2500 VC 2500 VC | e DC DC DC DC | | Insulation Res | istanc | e (MΩ) | Ground all phases not under test! Test Summary ☐ Test Passed ☐ Test Inconclusive Further Investigation Required. |
| Insulation Resistance Test | Disc. To Contactor Sta Contactor Line To GN Contactor Load To Gt Contactor Line to Loa | | Voltage 2500 VE 2500 VE 2500 VE 2500 VE | e DC DC DC DC | | Insulation Res | istanc | e (MΩ) | Ground all phases not under test! Test Summary ☐ Test Passed ☐ Test Inconclusive Further Investigation Required. |
| Insulation Resistance Test | Disc. To Contactor Sta Contactor Line To GN Contactor Load To GN Contactor Line to Loa Load Buswork | | Voltag 2500 VC 2500 VC 2500 VC 2500 VC 2500 VC | e DC DC DC DC | | Insulation Res | istanc | e (MΩ) | Ground all phases not under test! Test Summary ☐ Test Passed ☐ Test Inconclusive Further Investigation Required. |

| | Comments: | | |
|-------------------|-----------|--|--------------------------------------------------|
| Insulatio (Con | | | |
| ation | | | |
| Resista Wiring | | | Further Investigation Required. □ Test Failed |
| ng ng | | | Test Inconclusive |

INSPECTION FORM MOTOR STARTER, 4160V

Page 3 of 4

ID

| | Test Preparation: Source: | ed | Load Cables | cted | | | Note: Ap required, during th | pproval of City's Representative is prior to leaving cables connected e test. |
|------------------------|------------------------------------|-------------|-------------------|----------------|-----|-------------------|------------------------------------|-------------------------------------------------------------------------------------|
| est | Test | Voltage | Time (Minutes) | | Tes | st Summar (μΑ) | y | Ground all phases not under test! |
| High Potential Test | | (kV DC) | (Minutes) | Α | A B | | с | 1051: |
| | Disconnect – Contactor Stabs | 12 | 1 | | | | | Test Summary |
| | Contactor - Line | 12 | 1 | | | | | Test Passed Test Inconclusive |
| | Contactor - Load | 12 | 1 | | | | | Further Investigation Required. |
| | Load Buswork | 12 | 1 | | | | | Test Failed |
| | Comments: | | | | • | | | |
| | Manufacturer: | | | Mod | el | | | |
| | Verify Relay Set Points Config | ured Correc | tly: | ۲ 🗆 | ′es | 🗌 No | | |
| | Verify Input Current Readings | Match Test | Current: | ۲ 🗆 | ′es | 🗌 No | | |
| | Verify the following relay setting | igs: | | | | | | |
| | Relay Setting | | Setpoint | Secondary Amps | | | Test Result | |
| | FLA – Full Load Amps | | | | | | | |
| | UTC – Ultimate Trip Current | | | | | | | |
| Ž | JMA – Jam Alarm Level | | | | | | | |
| ı Rela | JMT – Jam Trip Level | | | | | | | |
| Motor Protection Relay | JAMS – Jam Start Delay | | | | | | | |
| Prote | JAMR – Jam Run Delay | | | | | | | |
| lotor | LRC – Locked Rotor Current | | | | | | | |
| ≥ | LRT – L.R. Stall Time | | | | | | | |
| | IOC – Inst. Overcurrent | | | | | | | |
| | GFT – Ground Fault Trip | | | | | | | |
| | PUA – Phase Unbalance Alarr | n | | | | | | |
| | PURD – P.U. Run Delay | | | | | | | |
| | Phase Unbalance Trip | | | | | | | |
| | ST/T – Starts per Time Allowe | d | | | | | | |
| | ULT – Under-load Trip | | | | | | | |

INSPECTION FORM MOTOR STARTER, 4160V

| <u>is</u> | Returned to Service: | 🗌 Yes | 🗌 No | Comments: |
|-----------------|-------------------------------------------|-------|------|-----------|
| Final nalysi | Monitoring / Further Inspection Required: | 🗌 Yes | 🗌 No | |
| ٩ | Repair / Replacement Required: | 🗌 Yes | 🗌 No | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

| Q |
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| Winnipeg |

Area :

INSPECTION FORM MOTOR STARTER, FVNR, 600V

Page 1 of 2

ID:

| ject | Facility: |
|------|-----------|
| Pro | Area : |

Project Name:

Bid Opportunity:

| | Load: | | | | | Starte | r Lo | cation: | | | | | | | | Cell #: | |
|------------|-------------------------|-------------------|-------------|-----------|--------------------------------------|--------|------------------|-----------------|------|---------------|---------------|-----------------------|----------|------|------|---------|------|
| | Manufacturer | : | ٦ | Гуре: | | | | | | | Serial # | : | | 1 | | | |
| | Size: | | Rated | Voltage: | Voltage: | | | Current Rating: | | А | Control Volta | | ltage: | | V | | |
| _ | Circuit | 🗌 Fuse | Fused Disc. | | | | Fuse Size: | | A | 4 | Fuse N | ⁻ use Mfg. | | Cat. | #: | | |
| Starter Da | Protection: | Brea | | Rating: | | A | Inst. Setting | | | | A | Manufacturer: | | | Cat. | #: | |
| | Overload Protection: | ☐ Ther ☐ Elect | | Class: | □ 10 □ 20 □ 30 □ Not displ. | | Rating: A | | Ą | Manufacturer: | | | Cat. : | #: | | | |
| | Control Pow | | | VA: | | Sec. | Volt | age: | | N | / | | | | | | |
| | Transformer | : | | Primary F | use: | A | ٩ | Secon | Idai | dary Fuse: | | | A | | | | |
| | Current Tran | sformer | : Rat | io: | Ту | pe: | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | Starter Identif | fication T | ag Insta | alled: | □ Y | ′es [|] N | 0 | Vis | ual Sig | ins (| of Overl | heating: | | | 🗌 Yes | 🗌 No |

| | Starter Identification Tag Insta | alled: | 🗌 Yes | 🗌 No | Visual Signs of (| Overheating | g: | 🗌 Yes | 🗌 No |
|------------|-------------------------------------------|-----------|---------|-------------|-------------------------------|-------------|-------------------|------------|----------|
| bu | Cleanliness (As Found): | Good 🗌 | Accepta | able 🗌 Poor | Support Insulato | ors: | Good D | Acceptable | e 🗌 Poor |
| Cleaning | Connections | Good 🗌 | Accepta | able 🗌 Poor | Electro/Mechani Interlock: | cal | 🗌 Good 🔲 A | cceptable | e 🗌 Poor |
| ion / | Ground Connection: | Good 🗌 | Accepta | ible 🗌 Poor | Contactor Condi | tion: | 🗌 Good 🔲 A | cceptable | e 🗌 Poor |
| Inspection | Door Mechanical | Good 🗌 | Accepta | ible 🗌 Poor | Contact Alignme | ent: | Good D | Acceptable | e 🗌 Poor |
| _ | Verify O/L element is correctly the load: | sized for | |] Yes 🗌 No | Exercise Circuit | Breaker/M | CP/Disconnect | | ☐ Yes |
| Vis | Cables Supported Appropriate | ely: | |] Yes 🗌 No | Unit Cleaned: | ☐ Yes | Photograph Taken: | ا ا | ′es |
| | Comments: | | | | | | | | |

| | Test | Α | В | С | Test Summary |
|------------------------------|-----------------------------------------------|---|---|---|---------------------------------|
| Pole | Contact Resistance ($\mu\Omega$) | | | | Test Passed Test Inconclusive |
| Contact/Pole Measurements | Disconnect / Breaker / MCP Resistance (μΩ) | | | | Further Investigation Required. |
| Mea | Fuse Resistance ($\mu\Omega$) | | | | |
| | Comments: | | | | |

INSPECTION FORM MOTOR STARTER, FVNR, 600V

Page 2 of 2

ID:

| Test | Test Prepa | aration: Sour Cont | | epresentative is required, nected during the test. | | | | | | | | |
|-----------------------|-----------------------|-----------------------|---------|----------------------------------------------------|------|-------|---------------|---|--------------------------------------|--------------------------------------------|---|--|
| nce T | Test | | V | oltage | | Insu | lation Resist |) | Ground all phases not under test! | | | |
| sistaı | | | • | Voltage | | Α | В | | | | С | |
| on Re | Contacto | r Line To GND | 100 | 00 VDC | | | | | | Test Summary ☐ Test Passed | | |
| Insulation Resistance | Contactor | Load To GND | 100 | 00 VDC | | | | | | Test Inconclusive Further Investigation | | |
| lns | Contacto | r Line to Load | 100 | 00 VDC | | | | | | Required. | | |
| | Comments | S: | | | | | | | | | | |
| | Returned | I to Service: | | ☐ Yes | 🗌 No | Comme | nts: | | | | | |
| Final Analysis | Monitorin Required | g / Further Inspe | ection | 🗌 Yes | 🗌 No | | | | | | | |
| A | Repair / I | Replacement Re | quired: | 🗌 Yes | 🗌 No | | | | | | | |
| | | Company | | Name | | | Signature | | | Date (www/mm/dd) | | |
| Perfo | rmed By | Company | | Name | | | Signature | | | Date (yyyy/mm/dd) | | |
| Check | ked By | | | | | | | | | | | |

| O |
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| Winnipeg |

INSPECTION FORM AC MOTOR, 4160V

ID:

| Project | Facility: | | | | Project N | lame: | | | | | | |
|------------------------------|--------------------------------------|--------------------|-----------------------------------------------------------------|------------|-------------|-----------------------------------------|--------------|--------------|-----------------|----------------|---------|--------------|
| Pro | Area : | Bid Oppo | Bid Opportunity: | | | | | | | | | |
| | | | | | | | | | | | | |
| | Size: k | W / | HP | | Voltage: | | V | | R | .P.M: | | |
| Data | Manufacturer: | | | | Model: | | | | S | Serial Number: | | |
| Motor Data | Frame Type: | Service Factor: | | | | | Other: | | | | | |
| | Cooling: | , | Winding Material: | | | | | | | | | |
| | Motor Identification | | Visual Sig | gns of | Overheatir | ng: | □ Ye | es 🗌 No | | | | |
| ing | Connections: | cceptable | Poor | Air Baffle | s: | | Good 🗌 | | otable 🗌 Poor | | | |
| Visual Inspection / Cleaning | Paint: | cceptable | Poor | Filter Mee | dia: | | □ N/A □ Good | | table 🗌 Poor | | | |
| ion / | Cooling Fans: | ceptable | able Poor Fan Controls: N/A Good Acceptable | | | | | table 🗌 Poor | | | | |
| spect | Anchorage/Align | ceptable | ble Poor Brushes: Good Acceptable Poo | | | | | | otable 🗌 Poor | | | |
| ial Ins | Ground Connecti | cceptable 🗌 | Poor | Slip Ring | Wear | Within Tol | erances: | 🗌 Yes | 🗌 No | | | |
| Visu | Mechanical/Elect During Operation | □ Yes [| Lubrication Required: | | | | □ No | | | | | |
| | Cleanliness (As F | ound): | 🗌 Go | od 🗌 A | cceptable | r Unit Cleaned: Yes Photograph Taken: Y | | | | | Yes | |
| | | | | | | Resistance (MΩ) | | | | | | |
| on Ce | Stato | r Winding | | lest vo | Itage (Vdc) | 3 | 0 Sec 1 min. | | min. | 10 min. | Polaria | zation Index |
| Insulation Resistance | Phase | e A – GND | | 2 | 2500 | | | | | | | |
| In: Re: | Phase | e B – GND | | 2 | 2500 | | | | | | | |
| | Phase | e C – GND | | 2 | 2500 | | | | | | | |
| | | R | esistance (| μΩ) | | | Test S | Summa | ary | | | |
| or ance | A - B | | B – C | | A - C | | | st Pas | sed nclusive | | | |
| Stator Resistance | | | | | | | | urther I | nvestigatio | on Required. | | |
| Ľ | Comments: | | | | | | | | | | | |

INSPECTION FORM AC MOTOR, 4160V

Page: 2 of 2

ID:

| | Test Preparati | ion: 🗍 Cor | connected | Note: Approval of connected during | f City's Representative the test. | e is required, prior to leaving cables | | | | |
|------------------------|-----------------|------------|-----------|---------------------------------------|-----------------------------------|----------------------------------------|--|--|--|--|
| | Max Test DC | Elapsed | | Test Summary | | | | | | |
| | Voltage (kV) | Time (min) | Α | В | С | Test Passed Test Inconclusive | | | | |
| | 7 | 0 | | | | Further Investigation Required. | | | | |
| | 7 | 1 | | | | | | | | |
| tial | 7 | 2 | | | | | | | | |
| High Potential Test | 7 | 3 | | | | | | | | |
| igh P Tí | 7 | 4 | | | | | | | | |
| т | 7 | 5 | | | | | | | | |
| | 7 | 6 | | | | | | | | |
| | 7 | 7 | | | | | | | | |
| | 7 | 8 | | | | | | | | |
| | 7 | 9 | | | | | | | | |
| | 7 | 10 | | | | | | | | |
| | Comments: | | | | | | | | | |
| l sis | Returned to S | Service: | □ Ye | s 🗌 No | Comments: | | | | | |

| <u>s</u> | Returned to Service: | 🗌 Yes | 🗌 No | Comments: |
|-----------------|----------------------------------------------|-------|------|-----------|
| Final nalysi | Monitoring / Further Inspection Required: | ☐ Yes | 🗌 No | |
| ٨ | Repair / Replacement Required: | ☐ Yes | □ No | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

| | | | | _ | | | CTIO | | | | | | Page | 1 of 1 | |
|---------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------|-------------------------------------------------------------------|----------------------|--------------------------------------------------|------------------------------------|-------------------|--------|-------------------|----------------------------------------------|-----------------------------------------------------|-----------------------|----------|
| | Winnipèg | | | ŀ | PANELB | SOA | RD, L | OW V | /OLT/ | AGE | | | ID: | | |
| Project | Facility: | | | | | | Project | Name | : | | | | | | |
| Pro | Area : | | | | | | Bid Opp | portuni | ty: | | | | | | |
| | Location: | | | | | | Fed F | rom: | | | | | No. | of Circuits: | |
| Panelboard Data | Manufact | urer: | | | | | Model: Serial N | | | | Serial No | : | | | |
| board | Rated Vo | ltage: | V | Curre | nt Rating: | | A Withstand Rating: | | | | | А | | | |
| Panel | Single | Phase | 🗌 3 PI | nase, 3 \ | Vire | □ 3 | Phase, 4 Wire Neutral Bonded to Ground I Yes I N | | | | Yes 🗌 No | | | | |
| | Aain Lugs Aain Breaker: Ra | | | | | | | ing: A Manufacturer: | | | | | Model: | _ | |
| | Identifica | Yes | 🗌 No |) | Visual S | Signs | of Overhe | ating: | | ☐ Yes | 🗌 No | | | | |
| / uo | Visual sig | ins of Mois | sture: | | <u>с</u> | Yes | 🗌 No |) | Visual S | Signs | of Corona | rona: 🗌 Yes 🗌 N | | | |
| Visual Inspection / Cleaning | Fuse/Bre | aker Sizes | Match D | rawings: | ́П | Yes | 🗌 No | No Cables Supported Appropriately: | | | | | 🗌 No | | |
| al Inspect Cleaning | Cleanline | ss (As Fou | und): | 🗌 Go | ood 🗌 Ac | cepta | able 🗌 | Poor | Connec | ctions | : | [| Good | d 🗌 Acceptabl | e 🗌 Poor |
| Visu | Door Med | chanical: | | 🗌 Go | od 🗌 Aco | cepta | ble 🗌 | Poor | Ground | l Con | nection: | C | Good | Acceptable | e 🗌 Poor |
| | Exercise | Circuit Bre | eakers: | | | Yes | 🗌 No |) | Comme | ents: | | | | | |
| | Test Preparatior | Source: Disconnected ation: Source Isolated Note: App required, p during the | | | | | | | | | | Equipment Temperatur | - | | °C |
| | | Insulation Resistance (MΩ) Ground all Phases not under tes | | | | | | | | | | Factor to 20 | | | |
| nce | Tost | | | | | | | | | | | Factor to 20 Test Summ |)°C: | | |
| esistance | Test Voltage | A-G | ND | Grour | | | | ler tes | 1 | N-GN | ND | Test Sumn |)°C: nary ssed | | |
| on Resistance | | A-G RDG | ND 20°C | Grour | nd all Pha | ses r | not und C-GNI | ler tes | 1 | | ND 20°C | Test Sumn |)°C: nary ssed onclusiv Investig | | |
| sulation Resistance | | - | r | Grour B- | nd all Pha GND | ses r | not und C-GNI | ler test D | | | | Test Sumn Test Pas Test Inc Test Inc Further |)°C: nary ssed onclusiv Investig | /e | |
| Insulation Resistance Test | | RDG | 20°C | Grour B- RDG | nd all Pha GND | ses r RI | DG | ler test D 20°C | RDG | 3 | 20°C | Test Sumn Test Pas Test Inc Test Inc Further |)°C: nary ssed onclusiv Investig led | /e | |
| | Voltage | RDG les: 120 | 20°C | Grour B- RDG | nd all Pha GND 20°C | ses r RI | DG | ler test D 20°C | RDG | 3 | 20°C | Test Summ Test Pag Test Inc Further Test Fai |)°C: nary ssed onclusiv Investig led | /e | |
| | Voltage Test Voltag | RDG es: 120 | 20°C | Grour B- RDG | nd all Pha GND 20°C | ses r RI | DG | ler test D 20°C | RDG | 3 | 20°C | Test Summ Test Pag Test Inc Further Test Fai |)°C: nary ssed onclusiv Investig led | /e | |
| | Voltage Test Voltag Comments | RDG es: 120 | 20°C | Grour B-(RDG 500 VD | nd all Pha GND 20°C C Test Vo | ses r RI Itage | not und C-GNI DG | ler test D 20°C | RDG 301-600 | 3 | 20°C | Test Summ Test Pag Test Inc Further Test Fai |)°C: nary ssed onclusiv Investig led | /e | |
| | Voltage Test Voltag Comments Returned | RDG es: 120 to Service: / Inspectio | 20°C D-300V → | Grour B-(RDG 500 VD | nd all Pha GND 20°C C Test Vo | ses r R[ltage | C-GNI | ler test D 20°C | RDG 301-600 | 3 | 20°C | Test Summ Test Pag Test Inc Further Test Fai |)°C: nary ssed onclusiv Investig led | /e | |
| | Voltage Test Voltag Comments Returned Monitoring | RDG es: 120 co Service: / Inspectioneplacement | 20°C D-300V → on Require | Grour B-(RDG 500 VD | ad all Pha GND 20°C C Test Vo C Test Vo Yes Yes | ses r R[ltage | DG | ler test D 20°C | 301-600 ments: | 3 0∨ → | 20°C | Test Summ Test Pag Test Inc Further Test Fai |)°C: nary ssed onclusiv Investig led | /e gation Required | |
| Final Analysis | Voltage Test Voltag Comments Returned f Monitoring Repair / R | RDG es: 120 to Service: / Inspectio | 20°C D-300V → on Require | Grour B-(RDG 500 VD | nd all Pha GND 20°C C Test Vo C Test Vo | ses r R[ltage | DG | ler test D 20°C | 301-600 ments: | 3 | 20°C | Test Summ Test Pag Test Inc Further Test Fai |)°C: nary ssed onclusiv Investig led | /e | |
| Perfor | Voltage Test Voltag Comments Returned Monitoring | RDG es: 120 co Service: / Inspectioneplacement | 20°C D-300V → on Require | Grour B-(RDG 500 VD | ad all Pha GND 20°C C Test Vo C Test Vo Yes Yes | ses r R[ltage | DG | ler test D 20°C | 301-600 ments: | 3 0∨ → | 20°C | Test Summ Test Pag Test Inc Further Test Fai |)°C: nary ssed onclusiv Investig led | /e gation Required | |

INSPECTION FORM POTENTIAL TRANSFORMER, 4160V

| Project | Facility: | | | | | | Project | Name: | : | | | | | | | |
|---------------------------|---------------------------------------------------------|---------|-------------------------------------------|-----------|--------------------|---------|-----------------------------------|----------|-----------------------|---------------------|--------------------------|----------------------|--------------------|------------------------------------|-------------------|--|
| Proj | Area : | | | | | | Bid Op | portuni | ty: | | | | | | | |
| g | PT Locati | on or D | Designati | on: | | | | | Pri. Volta Rating: | age | | | Sec. Vo Rating: | | | |
| PT Data | Manufact | urer: | | | Catalogu | ie #: | | | Pri. Fuse | e Size: | | s | Sec. Fu | ise Size: | | |
| Δ. | Size: | | ١ | /A | | Ту | vpe: | | | | Oth | ner: | | | | |
| | Physical I | Damaq | 0. | | г |] Yes | Yes No Verify Connections are Cor | | | | Correct: | □ Yes □ No | | | | |
| _ 5 | - | | | | | | | | | d Shorting | | tions Pi | Provide | | | |
| Visual Inspection | Visual Sig | - | | - | |] Yes | | Con | tact: | | - | | | | | |
| / Ins | Verify Ground Connection: Fuse Sizes Match Drawings: | | | | | | | | - | awal Mech | ianism Fu | inction: | | ☐ Yes | □ No | |
| | Fuse Size | es Mato | ch Drawir | ngs: | L | Yes | □ No | Con | nments: | | | | | | | |
| Test | Test Prepa | ration: | | Disconne | ected ed with S | ource l | solated | | | Note: A prior to | Approval o leaving ca | of City's ables c | s Repre | esentative is re ted during the | equired, test. | |
| nsulation Resistance Test | Test | | Vol | tage | | Ins | ulation | Resistan | ce (MΩ) | | Temp | Temperature: °C | | | | |
| | | | | | | PT 1 | | PT 2 | F | РТ 3 | | Sumn est Pas | sed | | | |
| | Primar | | | | | | | | | | | _ 🗖 те | est Inc | onclusive | Required. | |
| nsula | Seconda | - | | | 00 V | | | | | | | | est Fai | | | |
| _ | Primary T | | ondary | 200 | 00 V | | | | | | | | | | | |
| | Comments | • | | | | | | | | | | | | | | |
| | Test Preparation | | irce: Disconne Connecte Isolated | ed with S | Source | | | | | | | | | | | |
| larity | | | | | | | F | hase | | - | | | | Fest Summary | | |
| | | | | PT ? | 1 | | | PT 2 | | | PT 3 | | | Test Passed | lusive | |
| Turns Ratio and P | Calculated | Ratio | | | | | | | | | | | | Further Inv Required. | estigation | |
| ns Ra | Measured Ratio | | | | | | | | | | | | L | Test Failed | | |
| Tur | Polarity Co | orrect | ΠY | es | 🗌 No | | ☐ Yes | | 🗌 No | □ Ye | es | □ No |) | | | |
| (| Comments: | | | | | | | - | | | | | | | | |
| l sis | PT Return | | | | | Yes | 🗌 No | Com | nments: | | | | | | | |
| Final Analysis | Monitorin Required: | | ner Insp | ection | | Yes | 🗌 No | | | | | | | | | |
| ٩ | Repair / Replacement Required: Yes | | | | | | | | | | | | | | | |
| Company Name | | | | | | | | | Sigr | nature | | | | Date (yyyy/m | ım/dd) | |

INSPECTION FORM POTENTIAL TRANSFORMER, 4160V

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ID:

| Performed By | | |
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| Checked By | | |

INSPECTION FORM POTENTIAL TRANSFORMER, 600V

| ect | Facility: | | | | Р | Project N | lame: | | | | | | | |
|----------------------------|--------------------------------|---------------------------------------------|---------------------------------|-----------|------------|-----------|---------|------------------------------------------|-----------|--------------|---------------|---------------|----------------------------|------------|
| Project | Area : | | | | В | Bid Oppo | ortunit | y: | | | | | | |
| ta | PT Location or D | Designatio | n: | | | | | Pri. Volta Rating: | ige | | Sec. Ratir | Voltag ng: | je | |
| PT Data | Manufacturer: | | Cat | talogue # | <i>t</i> : | | | Pri. Fuse | Size: | | Sec. | Fuse | Size: | |
| ₽. | Size: | V | A | | Type: | Other: | | | | | | | | |
| | Physical Damag | | | | | | Vorif | Connoo | tiono oro | Corrot | | | ☐ Yes | |
| ы | Physical Damag | | | <u></u> Ч | | | | ounding and Shorting Connections Provide | | | | | | |
| Visual Inspection | | Visual Signs of Overheating: | | | |] No | Cont | act: | | | | | ☐ Yes | □ No |
| V Ins | Verify Ground Connection: | | | <u> </u> | |] No | | | wal Mech | anism Fur | nction: | | 🗌 Yes | 🗌 No |
| | Fuse Sizes Matc | h Drawing | gs: | <u> </u> | res [|] No | Com | ments: | | | | | | |
| Test | Test Preparation: | | ce: isconnecte onnected v | | ce Isolat | ted | | | | | | | ntative is reduring the to | |
| Insulation Resistance Test | Test | | Voltag | e | | Insula | ation | Resistan | ce (MΩ) | | Tempera | ature: | °C | |
| | | | | | PT 1 | 1 | | PT 2 | F | РТ 3 | Test Su | | | |
| | Primary To G | | 1000 \ | | | | | | | | Test | Inconc | | Pequired |
| | Secondary To (| | 500 V | | | | | | | | Test | | esugation | tequireu. |
| 5 | Primary To Seco | ondary | 1000 \ | / | | | | | | | | | | |
| | Comments: | | | | | | | | | | | | | |
| | Test 🔲 🛙 | irce: Disconnec Connected Isolated | cted d with Sou | rce | | | | | | | | | | |
| larity | | | | | | Ph | ase | | | | | | Summary | |
| d Po | | | PT 1 | | | P | Т 2 | | | PT 3 | | | est Passed | usive |
| Turns Ratio and Po | Calculated Ratio | | | | | | | | | | | F | Further Inve Required. | estigation |
| s Rat | Measured Ratio | | | | | | | | | | | ТП | est Failed | |
| Turn | Polarity Correct | 🗌 Ye | es [| □ No | | Yes | [|] No | □ Ye | es | 🗌 No | | | |
| (| Comments: | | | | | | | | | | | | | |
| s | PT Returned to S | Service: | | ∏ Y€ | es [|] No | Com | ments: | | | | | | |
| Final Analysis | Monitoring / Furt Required: | her Inspe | ction | ∏ Ye | es [|] No | | | | | | | | |
| ٩ | es [|] No | | | | | | | | | | | | |
| | Comp | | | | Sign | ature | | | Da | ate (yyyy/mi | m/dd) | | | |

INSPECTION FORM POTENTIAL TRANSFORMER, 600V

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ID:

| Performed By | | |
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| Checked By | | |

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|-------------------|--------------------|---------------------------------|-------------|-------|------------|----------------|------------------------|------------------------|-------------------|-------------|---------------|--------------|--|
| V | Winnipèg | | TIME | OVER | CURRE | | OTECTION | RELAY | | ID: | | | |
| Project | Facility: | | | Ρ | roject Nar | me: | | | | | | | |
| Proj | Area : | | | В | id Opport | unity: | | | | | | | |
| | | | | | | | | | | | | | |
| ta | Location: | | | | Cell #: | | | Electro-m | | | ctronic | | |
| Relay Data | Manufacturer: | | | | Model: | | | | Type: | | | | |
| Rela | Style: | | | | Serial No | 0: | | | | | | | |
| | Comments: | | | | | | | | | | | | |
| CT Data | Current Ratio: : A | | | | | | | | | | | | |
| | | | А | В | С | N | | | Α | В | С | N | |
| | Moisture/Rust: | | | | | | Relay Cleaned: | | | | | | |
| | Spiral Spring: | | | | | | Screws Tigh | tened: | | | | | |
| tion | Disk Clearance | e: | | | | | Trip Indicato | Trip Indicator & Reset | | | | | |
| Visual Inspection | Over-heating: | | | | | | Zero Adjustment Check: | | | | | | |
| ual In | Cover/Case: | | | | | | Magnet: | | | | | | |
| Vis | Paddle: | | | | | | Jewel Bearin | ng: | | | | | |
| | Trip Function T | est: | | | | | | | | | | | |
| | | Legend: | A-Acceptabl | e C-C | orrected | N-Needs | s Repair NA | -Not Applicabl | e | | | | |
| | Comments: | | | | | | | | | | | | |
| | | | Phase | | | | | | Neutral | | | | |
| | Parame | Parameter Setting (As Found) | | | Se (As | tting Left) | Para | meter | Settir (As Fou | ig ind) | Sett (As I | ing _eft) | |
| | Curv | е | | | | | Cı | Curve | | | | | |
| gs | тос т | Тар | | | | | то | С Тар | | | | | |
| ttings | TOC Mul | tinlier | | | | | TOC | Aultiplier | | | | | |

TOC Multiplier TOC Multiplier Relay Sett Time Dial/Delay Time Dial/Delay Inst. Tap Inst. Tap Seal-in Seal-in

INSPECTION FORM TIME OVERCURRENT PROTECTION RELAY

| | Parameter | Calculated Value | | Measured Pick-Up (Amps | 5) |
|---------------------|-----------------|------------------|---|------------------------|----|
| | P | hase | A | В | С |
| | TOC Pick-up | | | | |
| | Seal-in Pick-up | | | | |
| ts | IOC Pick-up | | | | |
| Relay Pick-up Tests | | | | | |
| | Ne | eutral | N | | |
| lay P | TOC Pick-up | | | | |
| Re | Seal-in Pick-up | | | | |
| | IOC Pick-up | | | | |
| | | | | | |
| | Comments: | • | | | |
| | | | | | |

| | Parameter | x PU | Test Value (Amps) | Calculated Value (sec.) | | Measured Timing (sec.) | | | | | |
|--------------|-----------|------|-------------------------|-------------------------------|---|------------------------|---|--|--|--|--|
| | | | Phase | | A | В | с | | | | |
| | TOC | | | | | | | | | | |
| ests | TOC | | | | | | | | | | |
| Timing Tests | IOC | | | | | | | | | | |
| Timi | | | Neutral | | N | | | | | | |
| Relay | TOC | | | | | | | | | | |
| - | TOC | | | | | | | | | | |
| | IOC | | | | | | | | | | |
| | Comments: | | | | | | | | | | |
| | | | | | | | | | | | |

INSPECTION FORM TIME OVERCURRENT PROTECTION RELAY

ID:

| Insulation Resistance Test | Test Preparatior | | onnected nected with Sourc | 14 | Note: Approval of City's Representative is required, prior to leaving cables connected during the test. | | | | |
|-------------------------------|---------------------|-------|-------------------------------|--------------|---------------------------------------------------------------------------------------------------------|-----------------------------------|--|--|--|
| | Test Voltage | | Insulation Re | sistance (MΩ | Test Summary | | | | |
| | | A-GND | B-GND | C-GND | N-GND | Test Passed Test Inconclusive | | | |
| | 500V | | | | | Further Investigation Required. | | | |
| 5 | Comments | | | | | | | | |

| <u>s</u> | Returned to Service: | ☐ Yes | 🗌 No | Comments: |
|----------|----------------------------------------------|-------|------|-----------|
| E S | Monitoring / Further Inspection Required: | ☐ Yes | 🗌 No | |
| ▲ | Repair / Replacement Required: | ☐ Yes | 🗌 No | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

| Winnipeg INSPECTION FORM UNDER-VOLTAGE PROTECTION RELAY | | | | | | | | | Page 1 of 2 | | | |
|-------------------------------------------------------------------|-----------------|----------------------|-------|------------|--------|---------------|----------------|-------|-----------------|---|---|--|
| Ň | Winnipeg | UNDI | ER-VO | OLTAG | E PRO | TECTION R | ELAY | | ID: | | | |
| Project | Facility: | | P | roject Nar | ne: | | | | | | | |
| Proj | Area : | | Bi | id Opportu | unity: | | | | | | | |
| | Location: | | | Cell #: | | | Electro-mecha | nical | al 🔲 Electronic | | | |
| ata | Manufacturer: | | | Model: | | | | Type: | | | | |
| Relay Data | | | | Serial No: | | | | | | | | |
| Rel | Style: | | | Senai No | J. | | | | | | | |
| | Comments: | | | | | | | | | | | |
| PT Data | Voltage Ratio | : : V | | | | | | | | | | |
| | | | A | В | С | | | | Α | В | с | |
| | Moisture/Rust: | | | | | Relay Cleane | ed: | | | | | |
| | Spiral Spring: | | | | | Screws Tight | tened: | | | | | |
| ion | Disk Clearance |): | | | | Trip Indicato | r & Reset | | | | | |
| Visual Inspection | Over-heating: | | | | | Zero Adjustm | nent Check: | | | | | |
| al In | Cover/Case: | | | | | Magnet: | | | | | | |
| Visu | Paddle: | | | | | Jewel Bearin | g: | | | | | |
| | Trip Function T | est: | | | | | | | | | | |
| | | Legend: A-Acceptable | C-C | orrected | N-Need | s Repair NA | Not Applicable | | | | | |
| | Comments: | | | | | | | | | | | |
| | | DL - | | | | | | | | | | |
| 6 | | Phase | | | | | | | | | | |

| s | | Phase | |
|----------|--------------|-----------------------|----------------------|
| Settings | Parameter | Setting (As Found) | Setting (As Left) |
| Relay (| U.V. Pick-up | | |
| Ř | U.V. Delay | | |

| dn | Parameter | Calculated Value | Measured Pick-Up (Volts) | | | | | |
|----------------|--------------|------------------|--------------------------|---|---|--|--|--|
| Pick- | Р | hase | А | В | с | | | |
| Relay F Tee | U.V. Pick-up | | | | | | | |
| Ř | Comments: | | | | | | | |

| Timing sts | Parameter | Injected Value (Voltage) | Calculated Value (sec.) | Measured Timing (sec.) | | | | | |
|----------------|------------|--------------------------------|-------------------------------|------------------------|---|---|--|--|--|
| Relay T Tes | | Phase | | А | В | с | | | |
| Re | U.V. Delay | | | | | | | | |

Form F-RELAY-UV Rev 00, Created by SNC-Lavalin Inc. M:\113099\4ENG\47ELE\RA - Misc Reports & Forms\F-RELAY-UV.doc

Repair / Replacement Required:

INSPECTION FORM UNDER-VOLTAGE PROTECTION RELAY

Page 2 of 2

ID:

| Test | Test Preparatio | Source: | d vith Source Isolated | | | f City's Representative is required, prior to nnected during the test. |
|------------------|-------------------------|----------------------|---------------------------|------|-------|-------------------------------------------------------------------------|
| ance | Test | Insu | lation Resistance (| ΜΩ) | | Test Summary |
| Resistance | Voltage | A-GND | B-GND | C-G | ND | ☐ Test Passed |
| Insulation R | 500V | | | | | ☐ Test Inconclusive Further Investigation Required. ☐ Test Failed |
| Insul | Comments | 5: | | | | |
| 0 | Returned to | Service: | 🗌 Yes | 🗌 No | Comme | ents: |
| Final nalysis | Monitoring Required: | / Further Inspection | 🗌 Yes | 🗌 No | | |

🗌 No

🗌 Yes

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

| Wimping SUBCE ARRESTOR MEDIUM VOLTAGE | | | | | | | | | | | | | |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|---------|----------------|--------|---------------------|-------------|------------|-------------|----------------------------------------------------------|---------------------------------|-------------|---------------|
| v | Winnipèg SURGE ARRESTOR, MEDIU | | | | | | | _ / / | AGE | | ID: | | |
| Project | Facility: | | | | Projec | oject Name: | | | | | | | |
| Pro | Area : | | | | Bid O | pportur | nity: | | | | | | |
| | Switchgea | ar: | | | Loca | ation: | | | | | Cel | II: | |
| ata | Manufact | | Cat | alogue #: | | | Type: | | | | Serial #: | : | |
| Arrestor Data | Housing: | | Rate | ed Voltage: | | | V | | Rated MCOV: | I | | V | |
| Arres | RMS Cur | MS Current Rating: A Arrestor Class: Station Distribution | | | | 🗌 In | termedia | ate | | | | | |
| | Material: | Porcelain | 🗌 Polyı | mer 🗌 Othe | r: | | | | | | | | |
| | Identific | ation Tag Installed: | | 🗌 Yes | | 10 | General C | Con | dition: | | Good | I 🗌 Accep | otable 🗌 Poor |
| ial tion / | Cleanlin | ess (As Found): | Go | od 🗌 Accept | able 🗌 |] Poor | Anchorag | e, a | alignment: | | Good | I 🗌 Accep | otable 🗌 Poor |
| Visual Inspection / | Connec | tions: | Go | od 🗌 Accept | able 🗌 | | | | Good | I 🗌 Accep | otable 🗌 Poor | | |
| - | Ground | Connections: | 🗌 Go | od 🗌 Accept | able [|] Poor | Unit Clear | ned | l: 🗌 Yes | Pho | otograph | Taken: | ☐ Yes |
| Insulation Resistance Test | Test Preparation: Test Preparation: Source: Disconnected Connected with Source Isolated Insulation Resistance Phase To GND A B | | | | | e (MΩ) Test Summary | | | 's Repre | s Representative is required, connected during the test. | | | |
| latio | 1000 V | | | | | | | | | | on Required. | | |
| lnsı | Comments | : | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| esistance Check | | Point A | | Point B | | | Resi: (I | sta JΩ) | | Te: | Summar st Passe st Incond | d | |
| Resista Chec | Gro | und Terminal | Facili | ity Ground Ele | ctrode | | | | | Fu Tes | urther Inv st Failed | vestigation | Required. |
| | Comment | S: | | | | | | | | | | | |
| | Returned | to Service: | | ☐ Yes | □ No | , Co | mments: | | | | | | |
| Final Analysis | Monitoring Required | g / Further Inspectio | n | ☐ Yes | □ No | , | | | | | | | |
| _ A | Repair / F | Replacement Requir | ed: | ☐ Yes | 🗌 No |) | | | | | | | |
| | • | Company | | Name | n | • | Sign | atu | ıre | | | Date (yyy | v/mm/dd) |
| Perfor | med By | | | | | | | | - | | | ())) | ,, |
| Check | ed By | | | | | | | | | | | | |

| | Q | | | PECTION | | | | Page 1 | of 2 | |
|-----------------------------------|--------------------|--------------------|--------------------------------------|--------------------------------------------|-----------------------------|--------------|----------------------------------|-------------|----------|----------|
| r I | Winnipèg | | SWI | TCHGEAR, | , 4160V | | | ID: | | |
| Project | Facility: | | | Project Name | e: | | | | | |
| Pro | Area : | | | Bid Opportur | nity: | | | | | |
| ar | ID: | | | Location: | | | | # of Cells: | | |
| Switchgear Data | Manufactu | rer: | | Туре: | | | Serial #: | | | |
| Swi | Rated Volt | age: V | Current Rating: | | А | Withstand | Rating: | А | | |
| | Identificatio | on Tag Installed: | ☐ Yes | □ No | Visual Sign | s of Overhea | ting: | C |] Yes | □ No |
| | Visual sign | s of Moisture: | 🗌 Yes | 🗌 No | Visual Sign | s of Corona: | | Γ | Yes | 🗌 No |
| | Fuse/Brea | ker Sizes Match Dr | awings: 🗌 Yes | 🗌 No | PT and CT | ratios match | drawings: | Γ | Yes | 🗌 No |
| aning | Elevation [| Drawings Correct: | 🗌 Yes | 🗌 No | Cables Sup | ported Appro | priately: | C | Yes | 🗌 No |
| / Clea | Cleanlines | s (As Found): | Good Accep | table 🗌 Poor | Insulators (| Condition: | | Good 🗌 Ac | ceptabl | e 🗌 Poor |
| Visual Inspection / Cleaning | Connection | ns: | Good Accep | table 🗌 Poor | Electro/Med Interlock Sy | | | Good 🗌 Acc | ceptable | e 🗌 Poor |
| Inspe | Ground Co | onnection: | Good Accept | able 🗌 Poor | Vents/Filter | 'S: | | Good 🗌 Acc | ceptable | e 🗌 Poor |
| isual | Doors Med | hanical: | Good Accept | able 🗌 Poor | | | | | | |
| > | Cell Fit and | d Alignment: | Good Accept | able 🗌 Poor | | | | | | |
| | Required C Met: | Clearances are | Good Accept | able 🗌 Poor | | | | | | |
| | Indicating | mechanisms: | Good Accept | able 🗌 Poor | Unit Cleane | ed: 🗌 Ye | s Photograp | ph Taken: | | /es |
| | Test Prepar | ation: Conne | nnected Disco | est. / Load: onnected nected with Lo | ad Isolated | | val of City's F ng cables cor | | | |
| tion Resistance Test (Buswork) | Test | | Insulation Resistand Phase To GNI | | | Temperature | e: °C | | | |
| stanc ırk) | Voltage | Α | В | | С | | | | | |
| on Resistar (Buswork) | 2500 V | | | | | | | | | |
| tion (B | Test | | Insulation Resistant | | | | | | | |

| | | | Source Isolated | | | ables connected during the test. |
|------------------------------------|-----------|-------|---------------------------------------|--------------|----|----------------------------------|
| e Test | Test | Ir | sulation Resistance Phase To GND | Temperature: | °C | |
| stanc ork) | Voltage | Α | В | С | | |
| Resiuswo | 2500 V | | | | | |
| Insulation Resistance (Buswork) | Test | Ir | sulation Resistance Phase To Phase | (ΜΩ) | | |
| Insu | Voltage | A – B | B – C | A - C | | |
| | 2500 V | | | | | |
| | Comments: | | | | | |

INSPECTION FORM SWITCHGEAR, 4160V

Page 2 of 2

ID:

| псе | | Point A | | Point B | | Resista (μΩ) |) | est Summar Test Passe Test Incond | ed |
|-----------------------|-----------------------------------|----------------|------------------------------------------------|-----------------------|------------------------------------|--------------------|---------------------------|-----------------------------------------|-------------------------|
| sista | Switch | gear GND Bus | s Fa | cility Ground Electro | de | | | | vestigation Required. |
| Ground Resistance | Switch | gear GND Bus | s S | witchgear Enclosure | e | | L | | |
| Grou | Switch | gear GND Bus | 3 | System Neutral | | | | | |
| | Comments | 3: | 1 | | | | l. | | |
| | То | | From | | Resista (mΩ) | | | Test Sumn | nary |
| | | | Α | В | | С | Test Pas | | |
| | | | | | | | | | Investigation Required. |
| ance | | | | | | | | | |
| Connection Resistance | | | | | | | | | |
| tion R | | | | | | | | | |
| nnect | | | | | | | | | |
| Ŝ | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | Comments | : | | | | | | | |
| | Test Prepa | | urce: Disconnect Connected Source Iso | with conne | Approval of Cit cted during the | /'s Repre test. | esentative is requ | uired, prior to | leaving cables |
| itial T | Peak DC Test | | | Test Summary (mA) | | Т | Test Summary | | |
| gh Potential Test | Voltage (1 minute duration) | A | | В | с | | Test Passed | sive | |
| Ĩ | 12 kV | | | | | C | Further Inves Test Failed | tigation Requ | ired. |
| | Comments | | | | | • | | | |
| | Returned | to Service: | | Yes I | No Commen | ts: | | | |
| Final Analysis | | g / Inspection | Required: | | | | | | |
| Ε Αná | | Replacement R | - | Yes I | | | | | |
| | | Company | | Name | | Signatu | ure | | Date (yyyy/mm/dd) |
| Perfor | rmed By | | | | | | | | |

Note: The person performing the check is responsible for ensuring that the data is transcribed from the handwritten form correctly, and that the analysis results are correct.

Checked By

| | Q | | INSP | ECTION FO |)RM | | | Page 1 of 2 | | |
|------------------------------|--------------------|---------------------|-------------------------------------|---------------------------------------------|---------------------------|---------------|-----------|------------------------------------|---------|----------|
| ' | Winnipeg | | - | CHGEAR, (| - | | | ID: | | |
| ect | Facility: | | | Project Name | э: | | | | | |
| Project | Area : | | | Bid Opportur | nity: | | | | | |
| | | | | | | | | | | |
| igear a | Location: | | | No. of Cells | : | | | | | |
| Switchgear Data | Manufactu | rer: | Γ | Type: | | | Serial #: | | | |
| S | Rated Volt | age: V | Current Rating: | | A | Interrupting | g Rating: | A | | |
| | Identificatio | on Tag Installed: | ☐ Yes | □ No | Visual Sigr | ns of Overhea | ting: | | Yes | □ No |
| | Visual sign | s of Moisture: | 🗌 Yes | 🗌 No | Visual Sigr | ns of Corona: | | | Yes | □ No |
| | Fuse/Brea | ker Sizes Match Dra | wings: 🗌 Yes | 🗌 No | PT and CT | ratios match | drawings: | | Yes | □ No |
| aning | Elevation [| Drawings Correct: | 🗌 Yes | 🗌 No | Cables Sup | pported Appro | priately: | | Yes | 🗌 No |
| / Cle | Cleanlines | s (As Found): | Good Accep | table 🗌 Poor | Insulators (| Condition: | [| Good 🗌 Acc | eptabl | e 🗌 Poor |
| Visual Inspection / Cleaning | Connection | าร: | Good Accep | table 🗌 Poor | Electro/Me Interlock S | | C | Good 🗌 Acce | eptable | e 🗌 Poor |
| lnspe | Ground Co | nnection: | Good Accept | able 🗌 Poor | Vents/Filte | rs: | Ľ | Good 🗌 Acce | eptable | e 🗌 Poor |
| 'isual | Doors Med | hanical: | Good 🗌 Accept | able 🗌 Poor | Exercise A | ctive Compor | ients: | | Yes | □ No |
| > | Cell Fit and | d Alignment: | 🗌 Good 🔲 Accept | able 🗌 Poor | | | | | | |
| | Required C Met: | Clearances are | Good 🗌 Accept | able 🗌 Poor | | | | | | |
| | Indicating I | nechanisms: | Good Accept | able 🗌 Poor | Unit Cleane | ed: 🗌 Yes | s Photog | graph Taken: | □ ` | Yes |
| | | Source: | | | | | | | | |
| | Test Prepara | ation: Discon | nected Disco | est. / Load: onnected nected with Loa | ad Isolated | | | 's Representative connected during | | |
| e Test | Test | li | nsulation Resistan Phase To GN | | | Temperature | e: °(| с | | |
| stance | Voltage | А | В | | С | | | | | |
| Resis | 1000 V | | | | | | | | | |
| Insulation Resistance Te | Test | lı | nsulation Resistan Phase To Phas | | | | | | | |
| Insul | Voltage | A – B | B – C | A | - C | | | | | |

1000 V Comments:

INSPECTION FORM SWITCHGEAR, 600V

Page 2 of 2

ID:

| ance | Point A | Point B | Resistance (μΩ) | Test Summary □ Test Passed □ Test Inconclusive |
|------------|--------------------|---------------------------|--------------------|------------------------------------------------------|
| Resistance | Switchgear GND Bus | Facility Ground Electrode | | Further Investigation Required. |
| Ind R | Switchgear GND Bus | Switchgear Enclosure | | |
| Grou | Switchgear GND Bus | System Neutral | | |
| | | | | |

Comments:

| | То | From | | Resistance (μΩ) | Test Summary | |
|-----------------------|-----------|------|---|--------------------|--------------|-----------------------------------|
| | | | Α | В | С | Test Passed Test Inconclusive |
| | | | | | | Further Investigation Required. |
| ance | | | | | | |
| sista | | | | | | |
| on Re | | | | | | |
| Connection Resistance | | | | | | |
| Con | | | | | | |
| | | | | | | - |
| | | | | | | |
| | Comments: | | | 1 | | |

| <u>.</u> | Returned to Service: | 🗌 Yes | 🗌 No | Comments: |
|----------|-----------------------------------|-------|------|-----------|
| Final | Monitoring / Inspection Required: | 🗌 Yes | 🗌 No | |
| ▼ | Repair / Replacement Required: | 🗌 Yes | 🗌 No | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

INSPECTION FORM SWITCH, AIR, METAL-ENCLOSED, 4160V

ID:

| Project | Facility: | | | | Project Name | e: | | | | |
|------------------------------|----------------------------------------------|-------------|---------------------------|-------------|--------------|-----------------------------------------------|-------------------|-------------|----------------------|-------------------|
| Pro | Area : | | | | Bid Opportun | ity: | | | | |
| , D | Location: | | | | Switchgear: | | | | Cell #: | |
| Disconnect Data | Manufacturer: | | | | Model: | | | Serial #: | | |
| sonne | Rated Voltage: | V | Current R | ating: | А | | Interrupting | g Rating: A | | |
| Disc | Momentary Fault Closing Amps: | | | | | | | | BIL Rating | : |
| se ta | Manufacturer: | | | | Туре: | | | Cat. #: | | |
| Fuse Data | Rated Voltage: | V | Cur | rent Ratin | g: A Holder: | | | | | |
| | Disconnect Identific | □ No | Visual Signs | of Overheat | ing: | | □ Yes □ No | | | |
| _ | Cleanliness (As Fo | und): | Good | Accept | able 🗌 Poor | Support Insu | lators: | | Good 🗌 / | Acceptable 🗌 Poor |
| | Connections | able 🗌 Poor | Electro/Mech Interlock | anical | | Good 🗌 A | Acceptable 🗌 Poor | | | |
| / Clea | Ground Connectior | ו: | Good [| Accepta | able 🗌 Poor | Blade Condit | ion: | | Good 🗌 A | Acceptable 🗌 Poor |
| ction | Door Mechanical | | Good [| Accepta | able 🗌 Poor | Poor Blade Alignment: | | | Good Acceptable Poor | |
| Visual Inspection / Cleaning | Fit Plumb & Square |): | | |] Yes 🗌 No | Yes I No Verify Blade Mechanical Operation | | | Good Acceptable Poor | |
| Visual | Cables Supported | Appropriate | y: | |] Yes 🗌 No | Fuse Holder Contact Integ | | | Good Acceptable Poo | |
| - | Phase Barrier Intac | rt: | | |] Yes 🗌 No | Unit Cleaned | : 🗌 Yes | Unit Lub | ricated: | ☐ Yes |
| | Indicating and Contained are Working Correct | | | |] Yes 🗌 No | Other: | | | | |
| | | | ance (μΩ) s Left) | | | Test Summary | | | | |
| blad(tance | А | E | 3 | | с | Test Pa | ssed onclusive | | | |
| Switchblade Resistance | | | | | | | Investigatio | on Required | | |

Comments:

| nce | | Resistance (μΩ) (As Left) | | Test Summary |
|----------|-----------|------------------------------|---|-----------------------------------|
| Resistan | Α | В | с | Test Passed Test Inconclusive |
| se | | | | Further Investigation Required. |
| Fu | Comments: | _ | | |

INSPECTION FORM SWITCH, AIR, METAL-ENCLOSED, 4160V

ID

| Test | Test Prepa | Test Preparation: Source: Isolated Cable Dest. / Load: Note: Approval of City's Representative is required, Disconnect: Open Disconnected prior to leaving cables connected during the test. | | | | | | | | | | |
|-----------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|------|-----------------|-----------|--------------------------------------------|--|--|--|--|
| nce T | Test | | V | oltage | Insu | lation Resistan | ce (MΩ) | Ground all phases not | | | | |
| sistaı | | | v | Jilage | Α | A B | | under test! | | | | |
| n Re | Disconneo | t Line To GND | 250 | 00 VDC | | | | Test Summary | | | | |
| Insulation Resistance | Disconnec | t Load To GND | 250 | 00 VDC | | | | Test Inconclusive Further Investigation | | | | |
| Insu | Disconneo | Disconnect Line to Load 25 | | | | | | Required. | | | | |
| | Comments | : | | | | | | | | | | |
| s | Returned to Service: | | | ☐ Yes | |] No | Comments: | | | | | |
| Final Analysis | Monitoring | J / Further Inspec | tion Requir | ed: 🗌 Yes | Ľ |] No | | | | | | |
| Ā | Repair / R | eplacement Req | uired: | 🗌 Yes | Ľ |] No | | | | | | |
| | | | | | | | | | | | | |
| | | Company | | Name | | Signature | | Date (yyyy/mm/dd) | | | | |
| Perfo | rmed By | | | | | | | | | | | |
| Checl | ked By | | | | | | | | | | | |

| | | | | | | | ECTI | | | | | | | | Page: | 1 of | 3 | |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------|-----------|--------------------|-------------------------------------|-----------------|---------------------------------|-------|--------------|---------------|--------------|--------|-----------------|---------------|------------|------|--------|---------------|
| V | Vinnipèg | | TR/ | ANSF | ORME | R, DI | RY TY | YPE, | ME | DIU | ΜV | OLT | AGE | | ID: | | | |
| Project | Facility: | | | | | | Projec | t Nam | e: | | | | | | | | | |
| Pro | Area : | | Bid Oppor | | | | | | | | | | | | | | | |
| | 1010 | | Dhasai | | | - 14 | | | | | | V | Casa | | 140.000 | | | N/ |
| | KVA: | | Phase: | F | Primary V | | | | | | | V | | ndary Vo | | | | V |
| Data | Manufacturer: | | | | | | odel: | | | | | | | Serial Nu | mber: | | | |
| mer [| Primary Winding: | | | econda /inding: | | □ Δ □ Υ | Imp | edanc | e: | | | %Z | Temp | Rise: | | °C K | Facto | or: |
| ansfor | Primary △ Secondary Winding: Y Winding: Cooling: ANN # Cooling Fa | | | | | | | | Vind Nate | | | | | | | | | |
| Tra | No Load Tap | Тар | | 1 | 2 | | 3 | 4 | | Į | 5 | | | | | | Settir | |
| | Changer Voltage | | | | | | | | | | | | | | | (As | Found | d): |
| | Transformer Identification Tag Installed: Yes No Visual Signs of Overheating: Yes No | | | | | | | | | | | | | | | | | |
| b | | - | | | | | | - | | | 0 | | | ating: | | | | |
| Visual Inspection / Cleaning | Bushings: | | | G | ood 🗌 A | Ассер | table [| Poo | | | | ulator | 'S: | | Good Good | 1 🗌 | Accep | otable 🗌 Poor |
| 1 / Cle | Paint: | | | | | | table [|] Poo | | o Loa hang | ad Ta er: | р | | 🗌 N/A | 🗌 Good | | Ассер | table 🗌 Poor |
| ectior | Fans: | □ N/A □ Good □ Acceptable □ | | | | | |] Poo | or F | an Co | ontrol | s: | | 🗆 N/A | Good | | Accep | table 🗌 Poor |
| lnspe | Temp. Gauge | : | 🗌 N/A | G | ood 🗌 A | ccept | ptable Poor Connections: Good | | | | | d 🗌 | Accep | otable 🗌 Poor | | | | |
| /isual | Ground Connection: | | | □G | ood 🗌 A | Ассер | table [|] Poo | or G | roun | d Cor | nducto | or Size | : | | | | |
| 1 | Cleanliness (A | As Four | nd): | □G | ood 🗌 A | Ассер | table [|] Poo | or U | nit Cl | leane | d: | ∐ Y€ | es Pho | tograph Ta | aken | : | 🗌 Yes |
| | Operational C | onditio | no / Note | | | | | | | | | | | | | | | |
| ۲ | · . | | | | | | | | | | | | | | | | | |
| ectio | Primary Volta | - | H1:H2 | | | H2:H | | | V | H3:I | | | V | | | | | |
| odsu | Secondary Vo | oltage: | X1:X2 | | V | X2:X | 3: | | V | X3:) | K1: | | V | / Measu | red at: | | | |
| nal | Current: | | Ph A: | | A | Ph B | : | | A | Ph (| C: | | Α | Measu | red at: | | | |
| Operational Inspection | Tap Setting: | | 🗌 Fui | ther Mo | atisfactor onitoring nd Chang | Řeco | | ded. | | | Тар | Settir | ng (As | Left): | | | | |
| - | Thermograph Performed: | ic Inspe | ection | 🗆 Ye | | tach r parat | eport ely | Resi | ults: | _ | | | Found sue Id | entified. | | | | |

TRANSFORMER INSPECTION FORM DRY TYPE, MEDIUM VOLTAGE

| | | Winding | Temperature: | °C Tempera | ture Correction Facto | or (20°C): | | |
|-----------------------|-----------------------|------------|-------------------|------------|-----------------------|--------------------------|-------------------|--|
| | | | | Resistar | nce (MΩ) | | | |
| | | PRI | -GND | SEC- | GND | PRI-SEC Test Voltage: | | |
| | Time | Test Volta | age: | Test Volta | ige: | | | |
| | | Reading | Corrected to 20°C | Reading | Corrected to 20°C | Reading | Corrected to 20°C | |
| | 1 min. | | | | | | | |
| tance | 2 min. | | | | | | | |
| Insulation Resistance | 3 min. | | | | | | | |
| tion F | 4 min. | | | | | | | |
| sulat | 5 min. | | | | | | | |
| L | 6 min. | | | | | | | |
| | 7 min. | | | | | | | |
| | 8 min. | | | | | | | |
| | 9 min. | | | | | | | |
| | 10 min. | | | | | | | |
| | Polarization Index | | | | | | | |

| е | Winding Temperature: | ٥C | | |
|---------|----------------------|----------------------------------|---------|----------------------------------|
| istance | Winding | Winding Resistance (m Ω) | Winding | Winding Resistance (m Ω) |
| g Res | H2 – H1 | | X0 – X1 | |
| Winding | H3 – H2 | | X0 – X2 | |
| Wi | H3 – H1 | | X0 – X3 | |

| Turns tio Test | Тар | Primary | Secondary | Calculated | Measured Ratios | | | |
|-------------------|--------------|-------------|-------------|------------|-----------------|---------------|---------------|--|
| | (Designated) | Voltage (V) | Voltage (V) | Ratio | H3 H1 / X0 X1 | H1 H2 / X0 X2 | H2 H3 / X0 X3 | |
| Ra | | | | | | | | |

| | Note: Torque check required | lote: Torque check required for all cables. Connection Resistance Test required for cables 250MCM or larger. | | | | | | | | | | |
|----------------------------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------|-----------------|--------------|---|--------------|--|--|--|--|--|--|
| ion | Termination | Cor | nection Resista | Torque Check | | | | | | | | |
| Connection Resistance | | Α | В | С | N | roique oncox | | | | | | |
| Cor Re | Source | | | | | □ ок | | | | | | |
| | Dest. / Load | | | | | □ ок | | | | | | |

TRANSFORMER INSPECTION FORM DRY TYPE, MEDIUM VOLTAGE

| is | Returned to Service: | 🗌 Yes | 🗌 No | Comments: |
|-----------------|-------------------------------------------|-------|------|-----------|
| Final nalysi | Monitoring / Further Inspection Required: | 🗌 Yes | 🗌 No | |
| ٩ | Repair / Replacement Required: | 🗌 Yes | 🗌 No | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

| W | Vinnipeg | TRA | NSFOR | | | ECTI ID-F | | | RM MEDIUM | | OLT/ | ٩GE | | ŀ | Page: ID: | 1 of 3 | |
|------------------------------|-------------------------------------|-----------------|----------------------|------------|-------|--------------|--------------|------|------------------------|--------|--------|-------|--------|-------------|--------------|-------------|-----------|
| ect | Facility: | | | | F | Project | t Nam | | | | | | | | | | |
| Project | Area : | | | | B | Bid Op | Opportunity: | | | | | | | | | | |
| | | , , | | | | | - · | | | | | | 0 | | | | |
| | KVA: | | Phas | se: | 1 | | Prim | ary | Voltage: | | | V | Seco | onda | iry Volta | age: | V |
| | Manufacturer: N | | | | | del: | | | | | | Seri | ial Nu | umb | er: | | |
| Transformer Data | Primary Winding: | □ Δ □ Y | Secondar Winding: |] A] Y | Impe | edanc | e: | | %Z | Tem | np Ris | se: | | o | C K Factor: | | |
| sforme | Cooling: | | | | | | | | inding aterial: | | | | | Oil | Гуре: | | |
| Transf | BIL Rating Primary: BIL Rating Seco | | | | | | onda | ary: | | | | | Oil | Capaci | ty: | | |
| - | No Load Tap | 1 | 2 | | 3 | | ŀ | 5 | | | | | | Tap Setting | | | |
| | Changer | Voltage | | | | | | | | | | | | | | (As Found): | |
| | Transformer lo | dentification 1 | ag Installe | ed: □` | res | | No | \ | √isual Signs | s of C |)verh | eatin | a: | | | ☐ Yes | □ No |
| | | | - | | | - | - | | | | | | 9. | | | | |
| ing | Bushings: | | L Go | ood 🗌 Ac | cepta | able L | | | Support Ins | | rs: | | | L | Good | Acceptab | le 🗌 Poor |
| Clean | Paint: | | 🗌 Go | ood 🗌 Ac | cepta | able [|] Poo | | No Load Ta Changer: | р | | |] N/A | |] Good | Acceptabl | e 🗌 Poor |
| tion / | Fans: | | I/A 🗌 Go | od 🗌 Aco | cepta | able [|] Poo | or F | an Control | s: | | |] N/A | |] Good | Acceptabl | e 🗌 Poor |
| spect | Temp. Gauge: | | I/A 🗌 Go | od 🗌 Aco | cepta | able [|] Poo | or (| Connections | S: | | | | | Good | Acceptab | le 🗌 Poor |
| Visual Inspection / Cleaning | Ground Connection: | | 🗌 Go | ood 🗌 Ac | cepta | able [|] Poo | or I | _iquid Level | Corr | rect: | | | | | 🗌 Yes | 🗌 No |
| Vis | Ground Condu | uctor Size: | | | | | | F | Radiators: | | | | | |] Good | Acceptab | le 🗌 Poor |

| | Operational Condition | s / Note | s: | | | | | | | |
|------------------------|-------------------------------------|-------------------|------------------------------------------------|----------------|------|----------------------------------------|------------------------|--------------|--|--|
| | Primary Voltage: | H1:H2: | ١ | / H2:H3: | V | H3:I | H1: V | Measured at: | | |
| Б | Secondary Voltage: | X1:X2: | ١ | / X2:X3: | V | X3:) | K1: V | Measured at: | | |
| pecti | Current: | Ph A: | / | A Ph B: | А | Ph (| C: A | Measured at: | | |
| Operational Inspection | Tap Setting: | 🗌 Fur | ears Satisfac ther Monitorin commend Cha | g Recommend | led. | | Tap Setting (As Left): | | | |
| Operat | Gauges: | Cooling Curren | g Temperatur t °C | e: Maximum: | °C | Coolant Level: ℃ | | | | |
| | | Pressu | re/Vacuum: | | | | Other: | | | |
| | Thermographic Inspect Performed: | I YAS | Attach report separately | Results: | | No Issues Found Potential Issue Ide | ntified. | | | |

Photograph Taken:

🗌 Yes

🗌 Yes

Good Acceptable Poor Unit Cleaned:

Cleanliness (As Found):

TRANSFORMER INSPECTION FORM TRANSFORMER, LIQUID-FILLED, MEDIUM VOLTAGE

| | | Winding | Temperature: | °C Tempera | ture Correction Fact | or (20°C): | | |
|-----------------------|-----------------------|------------|-------------------|------------|----------------------|---------------|-------------------|--|
| | | | | Resistar | nce (MΩ) | | | |
| | | PRI- | GND | SEC- | GND | PRI- | SEC | |
| | Time | Test Volta | age: | Test Volta | ige: | Test Voltage: | | |
| | | Reading | Corrected to 20°C | Reading | Corrected to 20°C | Reading | Corrected to 20°C | |
| _ | 1 min. | | | | | | | |
| ance | 2 min. | | | | | | | |
| Insulation Resistance | 3 min. | | | | | | | |
| tion F | 4 min. | | | | | | | |
| Isulat | 5 min. | | | | | | | |
| 5 | 6 min. | | | | | | | |
| | 7 min. | | | | | | | |
| | 8 min. | | | | | | | |
| | 9 min. | | | | | | | |
| | 10 min. | | | | | | | |
| | Polarization Index | | | | | | | |

| е | | Winding Temperature: °C | | | | | | | | | |
|----------|---------|----------------------------------|---------|-------------------------|--|--|--|--|--|--|--|
| Resistan | Winding | Winding Resistance (m Ω) | Winding | Winding Resistance (mΩ) | | | | | | | |
| | H2 – H1 | | X0 – X1 | | | | | | | | |
| nding | H3 – H2 | | X0 – X2 | | | | | | | | |
| Wi | H3 – H1 | | X0 – X3 | | | | | | | | |

| Turns tio Test | Тар | Primary | Secondary | Calculated | Measured Ratios | | | | |
|-------------------|--------------|-------------|-------------|------------|-----------------|---------------|---------------|--|--|
| | (Designated) | Voltage (V) | Voltage (V) | Ratio | H3 H1 / X0 X1 | H1 H2 / X0 X2 | H2 H3 / X0 X3 | | |
| Ra | | | | | | | | | |

| | Note: Torque check required | ote: Torque check required for all cables. Connection Resistance Test required for cables 250MCM or larger. | | | | | | | | | | |
|--------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------|-----------------|----------------|--------------|------|--|--|--|--|--|--|
| ion | Termination | Cor | nection Resista | nce (μΩ) - As | Torque Check | | | | | | | |
| Connection Resistance | remination | А | В | С | N | | | | | | | |
| Col Re: | Source | | | | | □ ок | | | | | | |
| | Dest. / Load | | | | | □ ок | | | | | | |

TRANSFORMER INSPECTION FORM TRANSFORMER, LIQUID-FILLED, MEDIUM VOLTAGE

| id | Dielectric Breakdown Voltage: | Colour: |
|------------------|----------------------------------|----------------------------------------|
| ıg Liqu sts | Acid Neutralization Number: | Visual Condition: |
| sulating Test | Specific Gravity: | Power Factor or Dissipation Factor: |
| lns | Dissolved Gas Analysis: | Other: |

| is | Returned to Service: | 🗌 Yes | 🗌 No | Comments: |
|-----------------|-------------------------------------------|-------|------|-----------|
| Final nalysi | Monitoring / Further Inspection Required: | 🗌 Yes | 🗌 No | |
| ◄ | Repair / Replacement Required: | 🗌 Yes | 🗌 No | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |

| | Ĩ | | | | | | | ON FC | | | | | | Page | 1 of 2 | | |
|------------------------------|------------------------------|------------|----------|----------------------------------|----------|-----------------------|----------------------------------|----------------------|--------|------------------|------------|---------|-----------------------------|------------|----------------|--|--|
| W N | Vinnipèg | | Т | RANSI | FORM | IER, | DRY | TYPE, | LOW | | LTA | GE | | ID: | | | |
| ect | Facility: | | | | | | Projec | t Name: | | | | | | • | | | |
| Project | Area : | | | | | | Bid Opportunity: | | | | | | | | | | |
| | | | | | | | | | | | | | Seconda | <u>.</u> | , | | |
| | KVA: | | Pha | se: | | | Primar | y Voltag | e: | | | V | Voltage: | ly , | V | | |
| Data | Manufacturer: | | | | | Туре: | | | | | | | Serial Nu | mber: | | | |
| Transformer Data | Primary Winding: | | | econdar Vinding: | У | | lmp | edance: | | | %Z | Tem | p Rise: | 0 | C K Factor: | | |
| ansfo | Winding Mater | rial: | Copp | er 🗌 Al | luminur | n | | | | | | | | | | | |
| Tra | No Load Tap | Тар | | 1 | 2 | | 3 | 4 | ę | 5 | | | | | Tap Setting | | |
| | Changer | Voltage | ; | | | | | | | | | | | | (As Found): | | |
| | Transformer Io | dentificat | ion Ta | a Installe | d. ۲ | Yes | 1 0 | No | Visual | Signs | s of O | verh | eating: | | Yes No | | |
| ing | Bushings: | dentineat | | - | | | ptable [| | Suppo | - | | | cating. | Good | | | |
| Visual Inspection / Cleaning | | | | | | | No.Lood Ton | | | | | | A Good Acceptable Poor | | | | |
| on / 0 | Paint: Good C | | | | | | - | | Chang | | | | | | | | |
| pecti | Fans: | | | | | | | | Fan Co | | - | | ∐ N/A | | | | |
| al Ins | Temp. Gauge: Ground | | ∐ N/A | A 🗌 Goo | od 📋 | Accep | otable [| _ Poor | Conne | ctions | 8: | | | ∐ Good | Acceptable Poc | | |
| Visu | Connection: | | | 🗌 Go | od 🗌 | Acce | ptable [|] Poor | | | | | | | | | |
| | Cleanliness (A | s Found |): | 🗌 Go | od 🗌 | Acce | Acceptable Poor Unit Cleaned: Ye | | | | | 'es Pho | tograph Ta | ken: 🗌 Yes | | | |
| | Operational C | onditions | s / Note | es: | | | | | | | | | | | | | |
| io | Primary Voltag | ge: | H1:H2 | 2: | V | H2:H | H3: | | V H3:I | H1: | | | V Measured at: | | | | |
| spect | Secondary Vo | oltage: | X1:X2 | | V | X2:> | X 3: | | V X3:) | X 1: | | | V Measu | red at: | | | |
| ial Ins | Current: | | Ph A: | | A | Ph E | 3: | | A Ph (| C: | | | A Measu | | | | |
| Operational Inspection | Tap Setting: | | 🗌 Fui | pears Sa rther More commen | nitoring | g Řecc | | ded. | | Тар | Settir | ng (A | s Left): | | | | |
| | Thermographic Inspection Yes | | | | | | report itely | Results | | No Iss Potent | | | d dentified. | | | | |
| a | | | | | | Re | sista | nce | (MΩ) | | Dielectric | | | | | | |
| Insulation Resistance | | Windi | ng | | | Test Voltage (Vdc) | | Resistance 30 sec | | | | 60 s | Absorption Ratio 60s/30s | | | | |
| on Re | Primary to Gr | round, Se | econda | ary Guaro | ded | | | | | | | | | | | | |
| ulatic | Secondary to | Ground | , Prima | ary Guaro | ded | | | | | | | | | | | | |
| lns | Primary to Se | econdary | , Grou | nd Guard | ded | | | | | | | | | | | | |

INSPECTION FORM TRANSFORMER, DRY TYPE, LOW VOLTAGE

ID:

| <u>.s</u> | Returned to Service: | ☐ Yes | 🗌 No | Comments: |
|-----------------|-------------------------------------------|-------|------|-----------|
| Final nalysi | Monitoring / Further Inspection Required: | 🗌 Yes | 🗌 No | |
| ◄ | Repair / Replacement Required: | 🗌 Yes | 🗌 No | |

| | Company | Name | Signature | Date (yyyy/mm/dd) |
|--------------|---------|------|-----------|-------------------|
| Performed By | | | | |
| Checked By | | | | |