D. The Contractor shall coordinate with the TBS Electrical Sub Contractors for additional Control and Status points to be Monitored and Controlled.

3.03 INTEGRATION WITH OCC SCADA SYSTEM

A. RTU provided under this contract shall be tested for compatibility with the WMATA system servers. Compatibility tests shall be conducted at the WMATA SCADA engineering LAB where the provided RTU shall be connected to WMATA AIM and SCADA servers.

B. CONTRACTOR shall provide all labor, materials, software, configuration, equipment, engineering and incidentals required to perform system compatibility tests. AM2

C. The RTU shall be simulated for the complete ultimate size point counts. All requirements for exchanging data with AIM servers and SCADA servers shall be simulated.

D. Continuous operation test 48 (forty eight) hour period with simulated exchange with interconnected system AIM and SCADA server shall be performed.

3.04 SCADA SYSTEM START-UP AND FIELD TEST

A. CONTRACTOR shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install all equipment and coordinate all activities necessary to perform check-out and start-up of the equipment.

B. CONTRACTOR shall retain the services of the SCADA RTU manufacturer or their authorized representative to be the system integrator, supervise and/or perform check-out and start-up of all system components. As part of these services, the contractor shall include for those equipment items not manufactured by the RTU manufacturer, the services of an authorized manufacturers' representative to check the equipment installation and place the equipment in operation. The manufacturers' representative shall be thoroughly knowledgeable about the installation, operation and maintenance of the equipment. AM1

C. CONTRACTOR, under the supervision of the SCADA System integrator and other manufacturers' representative shall perform the following:

a. Check and approve the installation of all SCADA System components and all cable and wiring connections between the various system components prior to placing the various processes and equipment into operation.

b. Conduct a complete system checkout and adjustment, including calibration of all instruments, checking operation functions, and testing of final control actions. When there are future operational functions included in this work, they should be included in the system checkout. All problems encountered shall be documented and promptly corrected to prevent any delays in start-up of the various unit processes. The Contracting Officer Representative may witness any or all of this checkout and testing.

c. Upon completion, complete documentation for this checkout and testing shall be submitted.

d. CONTRACTOR shall provide test equipment necessary to perform the testing during system checkout and start-up. CONTRACTOR shall transfer the Laptop, software and the High Current test set to WMATA the after all final testing and commissioning.

e. CONTRACTOR and SCADA System integrator shall be responsible for initial operation of monitoring and control system and shall make any required changes, adjustment or replacements for operation, monitoring and control of the various processes and equipment necessary to perform the functions intended.

f. CONTRACTOR shall furnish to the Contracting Officer Representative certified calibration reports for field instruments and devices specified in Section 16606 and other sections as soon as calibration is completed.

g. CONTRACTOR shall furnish Contracting Officer Representative an installation inspection report certifying that all equipment has been installed correctly and is operating properly. The

boarding and lodging for three WMATA Engineers at a local hotel for the duration of testing, shall be included as a separate line item in the proposal for supplying respective Batteries.

1.05 QUALITY ASSURANCE

A. Source Quality Control

1. Design and production tests: Perform and submit, in accordance with the General Requirements, certified test results for the following tests on the Battery.

a. Storage battery: Perform tests (on new battery systems) to determine the following:

1) Ampere-hour rating of battery during 3-hour discharge period.

2) Charge rate starting from fully discharged state based on 105-volt terminal voltage, to 90 percent of fully charged state within 12 hours.

3) Maximum short-circuit current available at battery terminals at full charge.

B. Furnish products of a manufacturer regularly engaged in the manufacture of uninterruptible power systems.

C. Qualifications of Instructor for Operation and Maintenance Training: See Special Provisions.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Ship battery cells assembled and filled to proper level with electrolyte and fully charged. On charge date must be clearly marked on outside of boxes or pallets.

B. Store equipment in secure and dry storage facility.

1.07 WARRANTY FOR STORAGE BATTERY:

A. Manufacturer shall furnish a FULL 5-year warranty with a continued 15-year straight-line, prorated warranty against manufacturing defects and workmanship for a total of 20 years. In addition, the battery manufacturer shall furnish a 10-year warranty against any manufacturing defects in the post and post/seal construction of cells. It is acknowledged that temperature has an effect on battery service life. Manufacturer shall provide written statement of the prorate effect of temperature on warranty during service life. AM2

B. Instructional Equipment (Storage Batteries Instructional Equipment described in later sections)

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. The Battery shall be manufactured by the following or approved equal:

1. BAE (Lead-selenium)

2.02 PRODUCTS AND MATERIALS:

A. Storage Battery:

1. Complete with accessories and battery racks.

2. Battery: 60 Cells Battery: Industrial grade capable of full service life in either an industrial UPS duty cycle application or for standby DC power backup in a switchgear or communications application.

AM2

a. Acceptable Lead Selenium Batteries are as follows: Lead Selenium-Low Antimony (Less than 1.6 percent antimony content preferred); tubular plate or equal construction with a minimum positive plate thickness of 0.31 inches.

1) Not used.

2) Note: The replacement Batteries Catalog Numbers listed below are given for a projected matchup with the existing batteries in the WMATA System. The Contractor shall provide necessary calculations to prove that the proposed batteries match the UPS and the Switchgear Control Power Requirements. The sizing calculations shall be performed by the Vendor/Contractor in accordance with the applicable Standards listed under Article 1.03, References, and such sizing calculations shall be submitted for WMATA approval before Batteries are ordered by the Contractor.

AM2

a) BAE 2V 4 OPzS 200 (8-Hour Rating: 208 Ah) approved equal

3) Cycling duty: Capable of numerous cycling discharges at full load. Corresponding minimum number of cycles for each discharge duration representing 100 percent of the available cycles: 30 seconds, up to 15,000 events; 30 seconds to 1.5 minutes, up to 8,000 events; 1.5 minutes to 4 minutes, up to 4500 events and 3 hours, 1500 events minimum.

4) The proposed Switchgear Power Control Batteries shall be capable of providing the necessary control power requirements of the applicable switchgear, which will be provided to the Contractor at the time of the Bid.

g. Factory test and shipping capacity: Batteries shall exhibit 100-percent capacity at time of delivery from factory. Cells shall be factory tested to confirm voltage and capacity. Float voltages shall also be confirmed to be within plus or minus 0.05 volts from the average cell voltage prior to shipment.

3. Accessory equipment: (For Battery Rooms System wide – AC Rooms, Traction Power Substations (TPSS), Traction Power Tie Breaker Stations (TBS) and other Facilities)

a. One thermometer.

b. One insulated (rated 1000V) torque wrench for battery connection. (Option when specified.)

c. Insulated tools for battery maintenance, testing, and installation, 1000V AC/DC rated insulation (Maximum Exposure) shall meet following standards:

1) IEC 900 or equivalent US Standards for insulated Hand Tools

2) ASTM 1505, Standards for insulated Tools

3) Impact Resistant and Flame Retardant

4) Comply with OSHA requirements 29 CFR Part 1910.331 to 335 Sub-part K, Meet NFPA 70E requirements

AM2

Tools for BAE OPzS Bank:

2) Suggested Racks (or approved equal):

a) The following racks are suggested for the 60 Cell String of Selenium- Lead Batteries:

i) BAE Rack No. BAE 172001072B for BAE 2V 4 OPzS 200 Batteries. (2-Step 2 Tier)

AM2

b) For Battery replacement at an existing location, a 3-step or other configuration rack may be used in lieu of a 2-tier rack if space is limited. Approval is required prior to installation of 3-tier or other configuration rack.

c) If a different rack configuration is chosen and approved by WMATA, consult with battery manufacturer to ensure that a correct spill containment system is ordered.

5. Training for Storage Batteries:

a. Training requirements for storage batteries should be divided into two types of scheduled sessions:

1) Installation and annual/bi-annual maintenance testing as recommended by the manufacturer.

2) Quarterly and regular scheduled maintenance requirements as recommended by the manufacturer.

b. Training for each segment shall take approximately 1/2 day (4 hours) each, and the schedule will be mutually agreed upon by the Authority, Contractor, and the manufacturer. A set of up to 4 days of training shall be provided at no-charge to the Authority. Additional sessions shall be subject to a training fee if required.

c. Course material shall include installation instruction manual(s) and operations and maintenance manuals as provided by the manufacturer.

d. Storage battery training shall be provided by a qualified instructor who has demonstrated experience in the installation and service of batteries and is agreed upon by the Authority, Contractor, and the manufacturer.

6. Battery Electrolyte Spill Containment

a. Battery Spill Containment and Safety Equipment: The following stationary battery compliance equipment shall be included to meet all the requirements of the building and fire codes including OSHA, NFPA, EPA, International Fire Code (IFC), International Building Code (IBC), Underwriters Laboratory (UL)-VXMB, and UL NEBS.

1) Each spill containment barrier shall have a 4-inch sill at least 1 inch greater than the overall rack dimensions. Barriers shall be coated in safety yellow to ensure resistance to acid and dielectric properties. The barrier shall be of adjustable design. Barriers shall be complete with all hardware for assembly and shall be anchored to the floor with drop-in anchor bolts.

2) A liquid-tight containment liner with a minimum thickness of 80 mils shall protect the flooring within the containment area. The liner shall be ULC recognized, Class A fire rated, acid resistant, with dielectric properties and meet the flame-retardant requirements of ASTM.

b. Battery Electrolyte neutralization and absorption pillows shall be included unless otherwise specified to completely fill the spill containment area. Each pillow shall be double lined and individually serialized and tagged for traceability. Each pillow shall have the ability to absorb at least 3 quarts of liquid. All battery electrolyte neutralization and absorption pillows shall be treated with fire-retardant material that meets ASTM standards. Provide 30 percent spare pillows Acceptable Spill Containment Systems (or approved equal).

1) Enviroguard Spill Containment System for 2V 4 OPzS 200 Batteries and Rack Model: Eagle-19-148 UL listed Barrier

AM2

a. Storage battery: The storage battery associated with operation of these charger-inverter systems are either existing-to-remain or are to be replaced under this Contract.

b. The battery charger sized to charge a fully discharged Battery to 90 percent of its capacity within 12-hour rectifier/charger.

B. Furnish products of specified manufacturers.

C. The Authority reserves the right to witness any testing of equipment.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Ship each unit securely packaged and labeled for safe handling in shipment and to avoid damage or distortion.

1. Temporary Bracing: Where necessary, brace each unit for hoisting, lowering, and skidding into position. Temporary internal bracing of the equipment shall be labeled as follows: TEMPORARY-REMOVE BEFORE OPERATION.

2. Store equipment in secure and dry storage facility.

1.07 SITE OPERATIONS AND MAINTENANCE TRAINING

A. Conduct Site training utilizing equipment in normal operating condition permitting trainees to perform hands-on work. Refer to Special Provisions.

PART 2 - PRODUCTS

2.01 PRODUCTS AND MATERIALS

A. Rectifier/Charger: Hindle Power (or pre-approved equal) AT30-130-050-E-480-M-X-M-X-A-G-L-F-S with Cabinet style 5018 with following options and requirements:

1. Input voltage: 480 volts, 3-phase, 60 hz; Output at nominal 130 volts DC: 50amps AM2

2. Input and output circuit breaker rating: Trip rating as recommended by manufacturer with medium AIC.

3. Communication board with Ethernet and fiber optic interfaces; Fan control contactor; NEMA Type 2 drip shield.

4. Efficiency: 95 percent at nominal input voltage

5. Power factor: Input power factor 0.7 minimum with rated input voltage

6. Battery eliminator DC output filtering

7. Copper ground bus; AC lightning arrester; fungus proofing; static proofing; temperature compensation; barrier type alarm terminal blocks

8. Auxiliary Alarm Relay Board: Consists the following alarm relays combined together on a single board. Each relay has one set of isolated, dry form C contacts (SPDT) wired to a terminal strip:

a. High-Low AC Voltage Alarm Relay

b. High DC Voltage Alarm Relay

c. Low DC Voltage Alarm Relay

d. Ground Detection Alarm Relay

e. Charger Failure Alarm Relay

f. Common Alarm Relay

AM2

10. 1% digital LED meter for Vdc, Adc, timer hours, alarm settings

11. Ground detection indicator lights.

12. High/Low AC voltage alarm and indicator lights.

13. Automatic charger shutdown due to battery room ventilation fan failure.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Equipment locations: Locations for equipment may require adjustment due to larger sizes of replacement equipment. Develop detailed layout plans for alternate locations as necessary (submit to Authority in accordance with requirements of Section 01110, Scope of Work) and Special Provisions; maintain all required code-required clearances and access requirements during development of alternate layouts.

B. Install charger in accordance with the following requirements:

1. Anchor equipment to floor. Install input and output power and control wiring as shown. Ground enclosures.

C. Initial Energizing:

1. Initial energizing of each inverter and charger shall be under the guidance of the manufacturer's engineering representative who will advise Contractor and Authority personnel on step-by-step procedures.

D. Apply touch-up paint where necessary.

E. Install all required communication cables between the inverter and charger and the facility RTU.

3.02 FIELD QUALITY CONTROL

A. Field Testing and Inspection:

1. General:

a. Conduct field inspection and field testing at each Site to ensure proper operation of devices and equipment provided.

4. Paint interior per manufacturer's standard.

5. Fabrication

   a. Cabinet with fixed side, rear and roof panels, front swing, full hinged door with flush latch operable by both Screwdriver and hand.

   b. Provide Cut-out for flush mounting of the HMI.

   c. The cabinet layout as referenced in Section 1.02. B.1

6. Mounting: Cabinet shall be wall mounted type using metallic mounting ears, welded to the enclosure. No holes at the back of the enclosure are allowed for mounting.

7. Field Wiring Terminals:

   a. Provide terminal blocks in the HMI cabinet to accommodate all field wires including spares.

8. Nameplate:

   a. Black laminated plastic composition with permanent white engraved lettering, and beveled edges.

   b. Nameplate 2-1/2 inches by 6-1/2 inches, inscribed in letters ½ inch high: “SCADA HMI”

   c. Fastened to panel using small round-head screws.

   d. Installed inside cubicle and cabinets with cement.

   e. Submitted for approval.

9. Audible Signal (Buzzer Circuit):

   a. Provide a horn/buzzer mounted on the HMI cabinet capable of reproducing sustained tones through the use of HMI control. The recommended horn is supplied by Federal Signal, Model Streamline part #LP4-09-028 or equal.

   b. The audible signal shall be triggered by the HMI under WMATA’s defined alarms.

   c. The buzzer circuit as referenced in Section 1.02.B.3

C. Wiring/Cabling: Wiring for the HMI system operation shall be done as shown in the drawings, referenced in Section 1.02. B and specified here and other related Sections.

D. HMI CONFIGURATION

1. The contractor is responsible for the development of HMI configuration files and the complete point to point tests of all HMI points. AM2

2. The development of the HMI configuration will use as inputs:

   a. I/O point listed on Section 16051D Part 4.0 Tables

AM2

PART 3 EXECUTION

3.01 INSTALLATION

A. HMIs shall be delivered and installed as shown in accordance with approved shop drawings at the following facilities:

1. Tie Breaker Stations

B. Perform work in accordance with the NEC.

C. Terminate interface points in the HMI cabinet.

D. Ground HMI cabinet and power supplies as shown on the drawings, in accordance with Section 16060 and as specified here.

E. Communications between HMI and RTU shall be via the station Network Switch (gateway) using Ethernet connection. HMI accesses each power system equipment through the RTU.

G. The Contractor is responsible for testing all HMI input signals to verify correct status and telemetry signal levels, control and annunciation. I/O equipment supplied under this contract that is not reporting properly shall be corrected and retested at no extra cost to WMATA. The Contractor shall submit a discrepancy report for all I/O points indicating problems found and required action.

3.02 FIELD QUALITY CONTROL

A. The Contractor shall perform polarity and continuity test on all interconnection wiring.

B. HMI field test shall be integrated with the SCADA field acceptance test. Refer to section 16606 SCADA System Integration Site Acceptance Test Plan.

C. The Contractor shall label all wiring terminations to reflect the connection points.

END OF SECTION

d. Equipment shall function as intended when subjected to all electromagnetic interference present in the vicinity of 750V dc power circuits and traction power equipment.

7. Other Features: The multifunction DC protective relay shall also include the following features:

a. Built in voltage/current metering

b. Built in Soft Scope (system level troubleshooting)

c. Self-Diagnostics

d. Multiple Protections

e. Plug in Connectors

f. Fault Annunciation

g. Bi-Directional Load Measuring

h. Internal Power Supply operates on and auto-compensates for 125 Volts dc

i. Capability to accept an independent backup power source

j. High resolution measurements of voltages and current to check the sensor drift, available through PC interface

k. User interface (PC) with English language

8. Each microprocessor-based relay shall be connected to the substation Network switch using fiber cable

S. DC Breaker and Relay Test Equipment

1. The contract shall provide one (1) portable High Current Injection Test set for DC breakers and relays tests.

2. The test set shall perform a primary current injection up to 20KA.

3. The Test set shall be programmable and capable to generate user defined waveforms/curves in order to test protective relays deployed in substations.

4. The test set shall be a compact and modular solution that eases portability into switchgear rooms with limited space.

5. Provide one of the following test sets:
   a. Gillam-Fei -Model /Part # IDC20K
   b. Stevo Electric Balto-Model /Part# BM20D00
   c. or approved equal.

AM2

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install power jumper cable as shown in Contract Drawings to ensure the reliable connection between contact rails and reconfigure ETS system as required.

1. Coordinate with the Contracting Officer Representative to establish the specific schedule for connecting temporary power jumper cable to contact rails at each location.

2. Not used

AM2

3. Not used

4. Remove the gasket and open the two-piece insulating cover of the designated cable connector assembly. Disconnect the 1000 Kcmil feeder cable from the feeder breaker in tie breaker station from the existing cable connector assembly. The WMATA Information Drawing DD-TW-CR-017 exhibits the present configuration of the cable connector assembly.

5. Temporarily insulate the disconnected cable terminal with waterproof insulation tape to prevent water damage during the duration of tie breaker station upgrade.

6. Install the power jumper cable in the cable connector assembly the same way the 1000 Kcmil feeder cable from the feeder breaker in tie breaker station was installed.

7. Re-assemble the two-piece insulating cover and gasket.

8. Install the other end of the power jumper cable to the designated cable connector assembly, as shown in the Contract Drawings, following the same steps.

9. At the section of contact rail where the number of cable connector assembly is not enough to accommodate all jumper cables, clamp or exothermically weld jumper cables to steel contact rail or clamp or bolt jumper cables to composite contact rail. Submit the proposed connecting means to the Contracting Officer Representative for approval 10 days before scheduled Work commences.

10. Contract Drawings indicate the number of temporary jumper cables that shall be installed across each contact rail gap to ensure the reliable connection between contact rails. All jumper cables shall be tie-wrapped to fiberglass channels, which are laid perpendicular to the contact rail and properly anchored to the ground.

11. Upon completion of the DC switchgear upgrade in tie-breaker station, remove the temporary power jumpers and re-install all disconnected 1000 Kcmil feeder cables from the feeder breaker in tie breaker station to their original cable connector assemblies. Restore functions to appropriate DC feeder breakers.

12. Not used

AM2

B. Electric Cabling and Connections:

1. Temporary power jumper cable furnished and installed by the Contractor, including the lug terminals.

a. All cabling shall be continuous without splices between terminations.

b. Cables shall not be bent, either permanently or during installation, to radii less than ten times the outer diameters, except where shorter radii are approved for conditions making the specified radius impractical. Provide suitable installation equipment to prevent cutting and abrasions of cable during installation.

C. Cable Connector Assemblies:

1. Qualifications for Performing Compression Connections: Prior to installation, the Contractor shall have prepared, under the direction of each foreman who will supervise a crew performing compression connections, two compression assemblies. The test compression assemblies shall be made using the methods and equipment the Contractor proposes to use for the installation. The electrical resistance of the completed connection, when measured between the distal end of cable and the connector tongue, shall not be greater than the resistance of an equivalent length of uncut cable.

2. Installation of Compression Connectors: Compression connectors shall be attached to the cable with the manufacturer's recommended tooling. When bolting tongues together, a lock washer shall be installed under the head of each bolt and under each nut. All bolted connections shall be tightened with torque wrenches to a uniform torque of 450 inch-pounds.

3.02 FIELD QUALITY CONTROL

A. Field Testing and Inspection:

1. General requirements: Conduct field testing and inspection at each station to ensure proper operation of equipment provided and installed.

2. Field Inspection:

a. Prior to field testing, check equipment installation in accordance with manufacturer's recommendations including, but not limited to, verification of the following:

1) Tightness of connections.

2) Proper securing (anchoring) of temporary jumper cables to prevent movement under operational conditions or fault conditions.

3. Field Testing:

a. Notify the Contracting Officer Representative 1 week in advance of each test. Conduct tests in presence of Contracting Officer Representative.

b. Temporary Power Jumper Cable: Perform dielectric withstand test of 1 minute duration on each cable prior to connect the cable to contact rail. Test shall be performed at 2775 volts, rms, 60 Hertz or 3900 volts DC.

c. Not used

AM2

d. Upon completion of DC switchgear related installation, restore all functions to appropriate DC feeder breakers in tie-breaker stations.

e. Submit certified test reports for each field test within 5 days of completion for approval.

B. Submit five copies of certified test reports within 10 days of Substantial Completion Inspection (SCI) for each tie-breaker station.

END OF SECTION

shall be able to be created automatically from a RTU file using an intermediate conversion program.

2. The contractor shall be responsible for all RTU to master station DNP3 Protocol communication.
3. The contractor shall provide all software required for the normal operation, testing and configuration of the RTU's.
4. RTU installer shall review and modify if required existing mechanical and electric equipment designs to provide telemetering, operational status, and equipment control for items identified in the Interface Points List Requirements in PART 3 of this section.

C. For Code, Regulations, Reference Standards and Specifications, refer to Article 1.02 above.

D. Defects warranty period: RTU shall have defects warranty period, which shall be for a period of 24 months from the date of commissioning. During the warranty period, defective parts shall be returned to the Supplier for replacement on an exchange basis.

E. Factory Acceptance Test:

1. The RTU shall be supplied defect free. Defects found during site testing/commissioning and within the warranty period shall result in the part(s) concerned being returned to the supplier for immediate correction/replacement at the cost of the supplier.
2. An Inspection & Test Plan shall be submitted to WMATA SCADA engineer for approval, prior to the commencement of any tests.
3. Factory testing of each RTU shall be conducted at the RTU manufacturer's facility in the USA. Provision shall be made for witness testing of all equipment, although WMATA may elect to only undertake a visual inspection before accepting delivery. A minimum of 21(twenty one) working days notice shall be provided to WMATA prior to testing. AM2
4. Each RTU shall be fully assembled and configured for factory testing, prior to dispatch.
5. Tests shall include, but not be limited to:

    a. Point to point wiring check including proper labelling of wires and wire termination devices.

    b. Confirmation of all digital inputs & outputs, from the field terminal through to the diagnostic laptop.

    c. Verification of analogue values received (at least zero, half full scale, full scale values and negative full scale values for bipolar analogues) using a

C. Operating Requirements

1. Designed for continuous, unattended operation to perform:

a. Analog, digital and pulse data acquisition.

b. Digital control.

D. Power Requirements

1. 125 Volts DC from facility control power.

1.02 REFERENCES

A. Code, Regulations, Reference Standards and Specifications

1. Code and Regulation of jurisdictional authorities
2. NEC
3. NEMA 250, ICS-6, WC8, 12
4. ANSI C37.90, Z55.1, C12
5. EIA: RS 232.C
6. ASTM: B138
7. ASHRAE/ANSI : 135P
8. ICEA: S-68-516

1.03 QUALIY ASSURANCE

A. Qualifications:

1. DTR equipment manufacturer: The following Data Acquisition System manufacturers are pre-qualified to manufacture and supply DTR to WMATA on the condition the proposed equipment and software meet all the requirements in this specification. AM2

a. CG Automation Solutions (CGA)

b. Dewesoft

c. Dewetron

d. National Instrument

e. Astro Nova Test Measurement

B. For Code, Regulations, Reference Standards and Specifications, refer to Article 1.02 above.

C. Coordination:

a. Network Switch port assignment charts

b. RTU cabinet installation detail drawings

2. As-Built Documents: Prior to Substantial Completion, develop as-built documents as follows:

a. As-built drawings of the installation: 11-inch by 17-inch composite interconnection wiring diagram showing the entire Network Switch interface system. Provide sufficient copies to be stored in each switchgear cabinet door pocket.

b. Approved copies of each Submittal.

c. Provide As-built drawing in both AutoCAD and PDF formats on CD in sleeves.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Network Switch: Equipment manufacturer and Model Number:

a. CISCO CGS 2520-16S-8PC

2. Network Switch Patch Panel installer: Installer shall follow current industry standard and Contract Drawings.

3. Network Switch installer: Network Switch will be configured by WMATA IT.

B. Coordination:

1. WMATA IT will furnish, configure and install network switches in the RTU installed by the contractor. It is the contractor responsibility to schedule the installation of the network switches. Two weeks advanced notice is required. AM2

2. TBS Network switches will be installed by WMATA IT only after the approval of the TBS communication cables test reports.

PART 2 - PRODUCTS

2.01 GENERAL

A. Fiber patch panels: As indicated on Contract Drawings.

B. Network Switch (125VDC): Cisco CGS-2520-16PS-8PC

C. Wiring: In accordance with Section 16149, WIRE, CABLE, CABLE TRAY, AND TERMINATION PANEL FOR SCADA SYSTEMS