General Scope and Purpose:

This specification is for an RFP to the City of Wichita Water and Pumping Department to provide an updated Control System for the existing Caterpillar Controls System at the Hess Pump Station, Hess Pump Station Substations, Generator facility, and the Water Treatment Facility.

The main purpose of this contract will be to provide Computer, Touchscreen, PLC, and Programming Modernization Upgrades. This project will upgrade by replacing obsolete and failing programmable logic controllers (PLC's), transducers, and software in the paralleling switchgear at the generator building, substations and the Hess Pumping station and Water plant. These components are part of Wichita's Water Department critical power systems and must be functioning 100% of the time. Because of the age of the equipment the existing components are not supported and when equipment or parts fail there needs to be the ability to find replacements quickly.

A. The work shall include all labor, materials, tools, transportation, equipment, services, and facilities, required for the complete, proper, and substantial installation of all work described within this RFP, and/or outlined in this specification. The installation shall include all materials, appliances, and apparatus not specifically mentioned herein or noted but which are necessary to make a complete working installation of all electrical systems.

B. All of the related work required for this project (unless specified otherwise) is a part of the Contract price but is not necessarily specified. Therefore, all divisions of the specifications or requirements of the solicitation shall be consulted.

C. All material and equipment shall be listed, labeled, or certified by UL LLC, where such standards have been established. Equipment and material which are not covered by UL Standards will be accepted provided equipment and material is listed, labeled, certified, or otherwise determined to meet safety requirements of a nationally recognized testing laboratory. Equipment of a class which no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe, will be considered if inspected or tested in accordance with national industrial standards, such as NEMA, or ANSI. Evidence of compliance shall include certified test reports and definitive shop drawings.

D. Definitions:

1. Certified: Equipment is "certified" if:

    a. Equipment has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards, or to be safe for use in a specified manner.

    b. Production is periodically inspected by a nationally recognized testing laboratory.

    c. It bears a label, tag, or other record of certification.

2. Nationally recognized testing laboratory: A testing laboratory, which is approved, in accordance with OSHA regulations, by the Secretary of Labor.

E. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and material specified for this project, and shall have manufactured the item for at least three years.

F. Product Qualification:

1. Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.

2. The Engineer reserves the right to require the Contractor to submit a list of installations where the products have been in operation before approval.

G. Service Qualifications: There shall be a permanent service organization maintained or trained by the manufacturer which will respond within two hours of receipt of notification that service is needed. The service technician team shall be capable of providing service on medium, voltage closed transition paralleling switchgear. Submit name and address of service organization.

H. Materials and equipment furnished shall be new, of best quality and design, free from defects, of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts should be available. All items used on this project shall be free of asbestos, PCB, and mercury material.

I. When more than one unit of the same class of equipment is required, such units shall be the product of a single manufacturer.

J. Equipment Assemblies and Components:

1. Components of an assembled unit need not be products of the same manufacturer unless indicated otherwise.

2. Manufacturers of equipment assemblies, which include components made by others, shall be completely responsible for the final assembled unit.

3. Components shall be compatible with each other and with the total assembly for the intended service.

4. Constituent parts which are similar shall be the product of a single manufacturer.

K. Factory and Field wiring shall be identified on the equipment being furnished and on all wiring diagrams.

L. When Factory Testing is Specified:

1. The Engineer shall have the option of witnessing factory tests. The Contractor shall notify the Owner and Engineer a minimum of 15 working days prior to the manufacturer making the factory tests.

2. Four copies of certified test reports containing all test data shall be furnished to the Engineer prior to final inspection and not more than 90 days after completion of the tests.

3. When equipment fails to meet factory test and reinspection is required, the Contractor shall be liable for all additional expenses, including expenses of the Engineer.

M. Equipment and material shall be protected during shipment and storage against physical damage, dirt, moisture, cold and rain.

N. During installation, equipment, controls, controllers, circuit protective devices, and other like items, shall be protected against entry of foreign matter and be vacuum cleaned both inside and outside before testing.

O. Damaged equipment shall be, as determined by the Engineer, placed in satisfactory operating condition, or be returned to the source of supply for repair or replacement.

P. Arrange, phase, and perform work to assure electrical service both temporary and permanent for buildings at all times.

Q. Examination of Site:

1. Visit the site, inspect the existing conditions, and check the drawings and specifications so as to be fully informed of the requirements for completion of the work.

2. Lack of such information shall not justify an extra to the contract price.

R. Responsibility: This Contractor will be held responsible for any and all damage to any part of the building or to the work of other contractors, as may be caused through this contractor's operation. Any damage to building finishes or equipment initiated by this contract shall be properly corrected by the respective finishing contractor and paid for by the Contractor.

S. Workmanship and Coordination:

1. Make installation and adjustments substantially as described within this RFP.

2. Complete the installation in a workmanlike manner, completely connected and ready to give proper and continuous service.

3. Use only experienced licensed electricians where applicable.

T. Where items of equipment and/or materials are specifically identified herein by a manufacturer's name, model, or catalog number, and only such specific items may be used in the base bid, except as hereinafter provided.

U. Unless requests for changes in base bid specifications are received, approved, and noted by written addendum prior to the opening of bids, the successful contractor will be held to furnish specified items.

V. After contract is awarded, changes in specifications shall be made only as defined under "Substitution of Equipment".

W. Substitution of Equipment: After execution of the contract, substitution of equipment of makes other than those specifically named in the contract documents, may be approved by the Owner, only if the equipment named in the specifications cannot be delivered to the job in time to complete the work in proper sequence and due to conditions beyond control of the Contractor. Provide documentary proof in writing from the manufacturer that the specified equipment will not be available in time. If the Contractor is responsible for the delay, the substitution will not be approved. Requests for substitutions must be accompanied by documentary proof of equality or difference in price and delivery, if any, in form of certified quotations from suppliers of both specified and proposed equipment.

X. The Owners approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.

Y. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Owner to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.

Z. Submittals shall be complete and submitted together for each section. Individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assemble as a whole. Partial submittals will not be considered for approval.

AA. The submittals shall include the following:

1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.

2. Elementary and interconnection wiring diagrams for communication and signal systems, control system and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.

3. Parts list which shall include those replacement parts recommended by the equipment manufacturer, quantity of parts, current price, and availability of each part.

4. Quantities of materials will not be verified by the Owner. Approval stamp on shop drawings does not constitute approval of quantities listed on shop drawings.

5. Shop drawings:

   a. All shop drawings shall be checked and signed by this contractor and general contractor prior to submittal to the Owner.

   b. Shop drawings submitted without Contractor's signatures or approval and verification will not be approved.

   c. Shop drawings shall be submitted on components required for this contract.

   d. Each sheet shall be either 8 1/2" x 11"; 8 1/2" x 13"; or 11" x 17" bond with a 5" x 3" clear area for engineer's stamp. (This area shall not be used by this contractor or the general contractor's stamp.) Larger drawings shall be able to be blue printed.

BB. Owner's acceptance of Compliance Submittals will not relieve the Contractor from his responsibility for any deviations from the requirements of the contract documents, unless Contractor has in writing called Owner's attention to such deviation at the time of submission and the Engineer has given written approval to the specific deviation; nor shall any acceptance by Engineer relieve Contractor from responsibility for errors or omissions in Compliance Submittals.

CC. Before requesting final inspection, the following work must be completed.

DD. Operating Instructions:

1. The Contractor shall submit along with the shop drawings of the equipment, three (3) copies of operating instructions for all items. Instructions shall be prepared by the manufacturer of the equipment.

2. After the operating instructions have been approved by the Engineer, the Contractor shall include the three (3) copies in maintenance instructions brochures.

3. The Contractor shall also obtain all manufacturers' instructions, manuals, and one complete set of drawings and turn these over to the Architect at the completion of the project.

4. The Contractor shall prepare a complete brochure, covering all systems and equipment furnished and installed under his contract. Brochures shall be submitted to the Architect Engineer for approval and delivery to the Owner. The cost of this

brochure shall be included in the contract cost. Brochures shall contain the following:

a. Certified equipment drawings and/or catalog data clearly marked for equipment furnished as required for approval submission under detailed section of the specifications.

b. Complete operating and maintenance instructions for each item of equipment.

c. Complete part list for each equipment item.

d. Any special emergency operating instructions or a list of service organizations (including addresses and telephone numbers) capable of rendering emergency service to the various parts of the system.

5. Brochures shall be included on flash drive for owner and loaded on to each of the system computers provided by this contract.

6. In addition to these written instructions, the Contractor shall fully and carefully instruct the Owner, or Owner's selected representatives, as to the proper operation, care and maintenance of the system and its equipment.

EE. Check, test, and adjust the mechanisms of all electrical equipment and adjustable parts of lighting fixtures as required for optimum performance.

FF. Final inspection will be made upon written request from the contractor after the project is completed.

GG. Furnish a workman familiar with this project to accompany the owner on final inspection and have available equipment as required to demonstrate operation of the system.

HH. This Contractor and his principal subcontractors shall be represented at the inspection by a person of authority responsible to demonstrate to the owner that his work conforms to the intent of this specifications.

II. Guarantee all work, material, and equipment for a period of two years after date of substantial completion.

JJ. During the guarantee period the Contractor shall be responsible for any defects which develop in the systems provided and installed as part of this contract. Upon notification of a defect by the Owner, the Contractor shall make immediate effort to correct it and shall notify the Owner when this work is completed.

KK. Repairs and/or replacements shall be made with no cost to Owner.

General Information:

The successful bidder will be the prime contractor for the project for modernization of the Caterpillar paralleling switchgear. The prime contractor shall coordinate all subcontractors needed for the successful implementation of the upgraded components.

The Contractor's management team should consist of: The Prime Contractor and the optional (electrical contractor, engineer, relay testing company, and etc. as necessary).

Scope to include:

1. Prime Contractor and Full Project Management
2. Single point of contact throughout the project
3. Risk Mitigation Specialist
4. Project Timeline Adherence
5. Rental Coordination if needed
6. MOP Development
7. Full Safety evaluation and project kickoff prior to work commencing

Base Bid Scope of Work:

The successful contractor shall provide Controls Modernization for project #036019 – for the Wichita Water Utility in Wichita Kansas. Contractor shall remove the existing Windows 7 Touchscreen Processors (TSPs), Momentum PLCs, Lynxblocks, and replace with Modicon M1E Unity PLC's and PowerPlex II transducers, running on a dual ring ethernet communication network. The existing Caterpillar Switchgear once updated shall be programmed and provided with new Windows 10 TSP's. The two existing remote PCs for the Hess Pump Station and the City of Wichita Water Treatment facility shall be replaced with new desktop computers with new 24" flat panel monitors and these systems shall be compatible with the new controls systems and connected to the existing City of Wichita communications infrastructure and shall be provided with updated FactoryTalk and Kepware software. The project shall include replacement of all end-of-life Multi-Function Relays located at each of the breakers and this shall also be included this project. This project includes and shall replace all station batteries for the switchgear at the Hess Generator building, Sub-station #1 and Sub-station #2.

Definition of Services:

In house:

1. Project Management-Communication, planning, scheduling.
2. Engineering – PLC & HMI Programming, Hardware Design, drawing markups, workplan.

3. Graphics – Update HMI hardware to Win 10.

4. Logistics - Materials, tools, shipping preparation.

5. CAD – Update drawings, issue field startup and As Built drawings with current changes.

Onsite:

1. Trips as necessary for Power Systems engineer to be on site for days as necessary for pre-site inspection to verify PLC code, back-up HMI applications, upload relay settings files, & project kick-off meeting.

2. Trips as necessary for (2) engineer(s) on site for up to seventeen (17) consecutive day(s).

3. Replace existing bases and processors with Modicon M1E Unity bases and processors.

4. Replace existing Lynx Block Transducers with PowerPlex II transducers.

5. Replace the existing touchscreen processors with Windows 10 TSPs

6. Replace the existing touchscreens with new touchscreens

7. Replace Remote PCs with Windows 10 Remote PCs and monitors.

8. Replace Utility Protective Relays

9. Testing of Utility Protective Relays

10. System Start-up and programming.

11. System Commissioning and testing of all system components for proper operation.

Bill of Material to include and not limited to:

(1) Master Control Section:

- Modicon M1E Unity Controllers (Ap1, Ap2, Data)
- Replacement Touchscreens (3)
- Windows 10 Touchscreen processors (3) with most current FactoryTalk software version
- Remote PC with Monitors (2). Monitors size to match existing.
- Data Table Gateway dedicated for switchgear system data points with the following protocols:
    - Serial Modbus RTU
    - Various Ethernet protocols
    - Managed Ethernet switches

(5) Generator Control & Protection Sections:

- Modicon M1E Unity Controller (1 per generator breaker)
- PowerPlex II Transducer
- Device 25 Sync Check
- Managed ethernet switch

(1) Utility Control & Protection Section:

- Modicon M1E Unity Controller (1 per utility breaker, total of (2))
- PowerPlex II Transducer
- Managed ethernet switch
- Device 25 Sync Check

(4) Tie Controls Hardware & Protection Section:

- Modicon M1E Unity Controller (1 per tie breaker)
- PowerPlex II Transducer
- Device 25 Sync Checks
- Managed ethernet switch

(1) Distribution Controls, Hardware, and Protection:

- Modicon M1E Unity Controller (3)
- Managed ethernet switch

Additional Items:

- Miscellaneous Hardware (wiring, cables, labels, etc.)
- Fiber Optic Repeaters
- Kepware ver. 6 software
- Protective Relays

General Notes and Clarifications:

A. The proposal shall assume that all pre-work will occur in 1 trip to the site and all implementation work will performed in 1 trip and performed in consecutive days. If this cannot happen the quote will need to be revised to include additional costs as well as a description of how the work will be performed allowing the systems to operate as intended throughout the installation, testing and commissioning process.

B. This proposal requires that the contractor provide a Standard Operating Procedure (SOP) that includes all procedures for doing the work including but not limited to Lock out Tag Out, shifting of loads between the sub-stations, how the system will remain operational throughout the construction process and a written procedure for emergency management in event of a power outage or outage caused due to the work. The Hess Pump Station and the City of Wichita Water Treatment facility are fed from this facility and at no time during the construction can power to these facilities be off-line. The proposal shall assume that work may be performed during normal business hours. This work may take multiple days and/or weeks and all work shall be in consecutive days and shall include weekends. The contractor at no time shall leave the site, leaving the emergency generator system or system in general in a state that it is not functioning properly. Functioning properly means that the generator system can be used for operation of the loads as it is intended upon loss of power to the facility at either of the 69kV substation locations. All necessary time for the contactor to ensure operation or manual control shall be provided until the system is installed and fully functional. If additional time on site is required for reasons outside the control of contractor, those hours will be negotiated and may be handled via change order using published rates plus expenses. Published rates shall be included with the bid.

C. Any changes to the Scope of Work or Bill of Material that will result in a price change will require the proposal to be revised and this may also change the schedule for the work.

D. Contractor shall procure all specified components and programing. Because the existing equipment is manufactured by Caterpillar, the successful contractor shall test at the Caterpillar site in Alpharetta, GA on a simulator to ensure all components are operating as they are intended prior to installation on site. The successful contractor shall include all time for travel to and from the Caterpillar site as well as the fees from Caterpillar for assisting with the modeling of the simulated system for testing. The PLC and HMI programming shall be tested on a simulator prior to shipment to the project site for installation. If requested by the owner, the contractor shall demonstrate the programming operates as it is intended prior to shipment.

E. Contractor to ensure scheduling is confirmed no less than 4 weeks prior to the arrival of contractor’s personnel on site.

F. Contractor to provide Caterpillar certified technicians for assistance with the component retrofit, engine startup, alarming, shutdowns, tuning and testing for the duration of the system upgrade

G. The Switchgear in the Hess Generator building and at Sub-Station #1 and Sub-Station #2 will be provided with new station batteries as part of this project.

H. Contractor to provide load bank for engine tuning and load share validation. In addition to load bank availability for testing of the new control system, each generator shall be load bank tested for 2 hours to confirm proper operation and output characteristics at 100 percent of nameplate rating. The load bank shall be accomplished with a 2MW resistive load bank.

I. Field Tests After Controls Installation:

J. The complete installation shall be initially started and checked out for operational compliance by factory trained representative(s) of the manufacturer of the generator sets, paralleling equipment, and the automatic transfer switches. The engine lubrication oil and antifreeze, as recommended by the manufacturer for operation under environmental conditions specified, shall be checked by the supplier of the generator sets.

K. After the controls for each generator and generator breaker are installed, each unit shall be tested to ensure it is performing as intended prior to beginning work on the next generator.

L. Upon completion of initial startup and system checkout, the supplier of the generator sets shall perform a field test, with the Engineer notified in advance, to demonstrate load carrying capability, stability, voltage, and frequency response.

M. Simulated power failure test generator sets shall be made ready for automatic operation and started by means of the test transfer controls system. Units shall run for the duration of all time delays and then automatically shut down.

N. Each generator shall be operated for two hours continuously at the maximum rated load level; Records shall be maintained throughout this period to record water temperature, oil pressure, ambient air temperature, voltage, current, frequency and kilowatts. The above data shall be recorded at 15-minute intervals throughout the test. There shall be a 10-minute unloaded run at the conclusion of the test to allow engine to cool before shutdown. Three copies of the field test data shall be furnished to the Engineer. The contractor shall provide necessary cable and make all necessary hook ups to accomplish field tests. Owner will furnish all fuel necessary for field test and refill all tanks after testing with winterized fuel. The remote radiators shall be inspected during the load bank procedure to verify that they are operating properly and are free from leaks. If any items are identified during the test, they shall be brought to the attention of the engineer.

O. Unimpeded access to the system is required. All removal and replacement of any obstructions that may interfere with access to the existing equipment is the responsibility of owner.

P. Contractor is responsible for having all parts and components, tested and ready for use on the job site the day contractor arrives on location. If parts are shipped to a local dealer

or distributor, the contractor shall arrive early to verify all components are available and ready for installation and start-up. Project may not commence until all items and staff necessary are on site and available.

Q. No site safety training beyond that provided by the MOP developed by the contractor, background checks or drug screens are required.

R. No provisions for independent or third-party testing will be required. Should this be required or requested by the City of Wichita, it will be quoted separately at the standard field time and material rate to be included in the bid package.

S. Contractor to dispose of all wastes generated at the job site. Owner will be responsible for environmental conditions and will keep the equipment free of contaminants that would be detrimental to the performance of the equipment.

T. End User shall identify someone with site authority to allow the following:

1. Switching and outages as required with safe lock out and tag out of equipment being worked upon.

2. Access and egress to the worksite.

3. Provide communication and sanitation facilities.

4. Identify someone from maintenance to be able to control and shift loads and have that individual available to contractor during testing and commissioning.

U. Daily On-site Project Management and safety meetings that include updates to daily schedule are to be included in the proposal.

V. This proposal shall include formal submittals for review. Submittals shall include G series and F series drawings and manufacturer data sheets related to the new components, and a project schedule/workplan shall be provided. The City of Wichita is performing a PM project in the month of November and any updates to labeling will be identified and as part of this project all updates to the HMI to match the findings of the PM project shall be updated in the programming.

W. Owner will assist with coordinating with the local utility for switching orders, scheduling outages and to de-energize the electrical apparatus involved in this project, if required. This includes any utility fees associated with the service disconnection and reconnection. The owner may utilize an on-call contractor that is familiar with the site to assists with these duties.

X. (3) Generators can support the site required needs. During commencement of this modernization contractor may have (1) generator out of service at a time while installing the new controls for each generator. The Process is to have 3 generators available at all times during the modernization. There may be short periods of time where more than one

generator is out of service, and during those times technicians must be on site and available to ensure operation if an emergency arises.

Y. Outages will be required during testing of Sequence of Operation and shall be coordinated with the owner prior to initialization. Contractor will require a full SOO teste prior to commencement of modernization. There may be SOO testing throughout the modernization and all testing shall be closely coordinated with City Staff.

Z. Prior to the start of work, owner shall familiarize contractor personnel with their safety practices, regulations in effect at the jobsite, and any chemical and physical hazards, including process safety issues associated with the work environment. As a safety precaution, prior to the commencement of work owner to provide telephone numbers for local emergency services.

AA. Shipping and freight shall be included with this proposal.

BB. This proposal should not include any time or cost for quarantine restrictions or requirements due to the Covid-19 virus. A separate work plan and proposal will be required should it be necessary.

CC. This proposal should assume that the existing switchgear is fully operational. Should components be found inoperable during testing, contractor shall present an additional proposal to correct the discovered failures and obtain written approval prior to commencement of the work.

DD. It is not recommended that any software be added to the new touchscreen processors or Remote PC's. This contractor will not be responsible for any third-party software added. Third party software may conflict with HMI server and client programs. If unapproved software is added, contractor will not be held responsible for system performance. It's critical that the TSP & Remote PC are not connected to the Site domain or internet. The interaction between the server and the client software is extremely sensitive.

EE. Additional Fiber Optics may need to be installed by owner from MSWG-2 to MSWG-0 boards to support ring topology. There are existing vaults which may be utilized for cable installation. Existing fiber is already present and may be available. Contractor to field verify prior to team visiting site and if additional fiber optical cable is needed, notify owner to have it installed prior to installation of all new equipment.

FF. Currently the system has GE750 Utility Feeder Relays, GEMIFII Feeder Relays, and GE489 Gen Relays which are all discontinued as of 2018. Replacements are not available at this time from reliable sources for these unites. This contract shall replace with the newest and updated versions of the GE850 Utility, GE889 Gen, and GE350 Feeder relays. These relays have enhanced ability to communicate faster, more communication options, easier programmability, easier diagnostic options, etc.

GG This proposal to include extra days by two (2) engineers onsite for installation of pre-programed Protective relays. Proposal shall include a unit price for providing, installing, and programming additional relays.

HH Contractor to obtain current settings files of all protective relays during Pre-installation site visit.

II. Price to include estimated sales taxes.

JJ Price to include temporary generator is not required as part of this contract unless a temporary generator and connection to the system is necessary to meet the 100% operational needs of the facility throughout the construction duration.

KK. There is a 480V. connection cabinet located on site that can be used for connection of a temporary generator to the system if needed. As noted above, three (3) of the existing generators shall remain available for operation throughout the construction duration. If owner requires a back-up generator this will be contracted separately.

Owner Responsibilities:

A. Supply up-to-date single-line diagram of the electrical system.

B. Provide services of an electrician to:

1. Assist in switching processes that may be necessary to identify and de-energize equipment for inspection and safety.

2. Connect all power cables (Foley supplied) from the tap box to the resistive load bank (Foley supplied).

3. Disconnect and roll up and place in tote all supplied power cables from the tap box to the resistive load bank.

4. Clean and torque the following devices for the load bank system. Check for deficiencies of any type which would degrade the performance of the assembly (if any discovered inform Foley and Engineer for next actions to take:

    - Generator Connection Cabinet South of the Hess Generator Building
    - MCB -3 south of the Hess Generator Building
    - TS-MCB south of the Hess Generator Building
    - Sectionalizer cabinet south of the Hess Generator Building
    - Remove old and install new station batteries (Foley provided) for the following (approx. 70 batteries):
    - Cat Switchgear
    - Sub #1
    - Sub #2
    - Pickup new station batteries from Foley Parts Dept.

- Return old station battery cores to Foley Parts Dept.

C. Provide 120/240-480 volts power for test equipment and storage for this equipment.

D. Ensure necessary racking tools, manual charging handle, and testing cabinet are on-site and in good operating condition prior to Contractor mobilization. If necessary, equipment is absent, contractor will need to be notified prior to on-site mobilization. Items not in contractor stock, will be purchased and invoiced in addition to contract amount or quoted separately.

Modernization Clarifications:

Modbus to Ethernet:

This conversion shall include the communication platform change from the outdated Mobus to the current platform of Ethernet. This has opened opportunity for greater gains in communications speeds. The current Ethernet communications will be the platform for decades to come.

Obsolescent Items:

PLC: The PLC is a “Programmable Logic Controller”. There are 4 parts to a PLC: Inputs, Outputs, Logic, and Communication. The Inputs and Outputs are either digital data (Circuit Breaker Status) or analog data (Voltage, Current, etc.). The Logic is the software created by CAT Switchgear to control the system. Communication is used to quickly send information amongst peer PLCs or other devices. As a system, the PLCs control the switchgear to provide robust and reliable emergency power.

Momentum “Concept” PLC (current device) is not available, the new Modicon M1E “Unity” PLC is the current version of Schneider in production

Transducer: The current obsolete Power Lynx Transducer monitors the Voltage, Frequency, and Current for all three phases and sends this information to the PLC for processing and display on the touchscreen. There is generally one Transducer for every source and tie in the system.

Window 7 Operating System: the current operation software platform is Windows 7. The newest Microsoft 10 would the newest software platform.

Protective Relays: Protective relays can detect that a problem is developing by identifying slight deviations in current, voltage, resistance, or temperature. Due to the small magnitude in change, only a sophisticated device such as a sensitive protection relay or a monitor can detect these conditions and indicate that a problem may be developing, before any further damage has occurred.

END OF SECTION