SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM SPECIFICATIONS AND SPECIAL CONDITIONS

10. GENERAL

10.1. The following specifications are given to the Contractor as guidance as to the Owner's minimum requirements for a complete SCADA system to control and/or monitor 35 remote/local sites in and around Anniston including pumping stations, wastewater lift stations, water tanks, treatment process devices, pressure monitoring stations, etc. as specified herein. A master site shall be established at the Owner's headquarters at 931 Noble Street, Anniston (11-story building). A VPN shall be available to the Contractor to establish control and monitoring to five (5) other sites including: Krebs WTP (245 Tom Burkhart Drive AKA 1326 Coldwater Road), Knowlton WTP (150 Jennifer Lane), Choccolocco WWTP (35 Friendship Road), McClellan WWTP (6112 McClellan Boulevard), and Op Center (217 W 13th Street).

10.2. Scope of Work

10.2.1. Contractor shall furnish all labor, materials and equipment necessary to design, furnish, install, calibrate, test, start-up, and place in satisfactory operation a complete SCADA system.

10.2.1.1. SCADA system shall be designed to remotely control, monitor, store, display and log process and equipment operating information.

10.2.2. Work shall be performed so as to minimize interruption of existing SCADA system operation.

10.2.3. The scope includes, but is not limited to the following elements:

10.2.3.1. Provide site survey analysis as necessary for the SCADA system to ensure reliable communication to sites and include radio link and path warranty for any proposed radio system.

10.2.3.2. Provide installation of RTU at remote tanks, pumping stations, lift stations, treatment plants, and other sites as specified herein.

10.2.3.3. Provide installation of MTU at headquarters as specified herein.

10.2.3.4. Provide installation of a HMI central host computer/server at the headquarters as specified herein.

10.2.3.5. Provide installation of one (1) workstation computer at each of the five (5) monitoring and control sites as specified herein.

10.2.3.6. Provide installation of any necessary communication components included in the SCADA system including but not limited to antennae, modems, radios, wiring, and cable as specified herein.

10.2.3.7. Provide all SCADA software necessary for operation of the system including but not limited to central host computer/server software, MTU application software, RTU application software, operator terminal application, and drivers as specified herein.

10.2.3.8. Provide all software installation or programming of each HMI, RTU, or MTU for complete functioning of system as specified herein.

10.2.3.9. Provide screen designs and programming of SCADA software to produce user friendly interface as specified herein.

10.2.3.10. Provide all licensing for software, hardware, communication, radio, and SCADA system as specified herein.

10.2.3.11. Provide SCADA system free of and absent of any mandatory recurring fees or charges for maintenance, communication, proprietary licensing, hosting, etc. for the useful life as specified herein.

10.3. Items Available to Contractor

10.3.1. VPN between 6 monitoring and control sites (2 water treatment plants, 2 wastewater treatment plants, operation center and headquarters (main office))

10.3.2. 120V AC power services at RTU and MTU sites.

10.3.3. Use of FCC licensed frequency as specified herein.

10.4. Items NOT in Scope of Work

10.4.1. Installation of field data monitoring/control devices (level indicators, pressure transmitters, pump control relays, etc).

10.4.2. Installation of electrical wiring loops to field data monitoring/control devices except alteration of existing circuits as necessary for disconnection from existing RTU and termination to new RTU.

11. EXISTING SCADA SYSTEM

11.1. There are currently two separate SCADA systems being utilized. The existing *system-wide* SCADA system uses various configurations of Moscad RTU's for monitoring, control, and alarms of the remote sites. The FEP and centralized computer are located at the Paul B. Krebs WTP. The communication between the remote RTU's and the FEP is performed via Motorola VHF radio from the remote sites to the 10th Street Tank Site and repeated to the North Hills Tank Site. Communication is then transmitted via UHF radio from the North Hills Tank Site to the WTP. An *in-plant* SCADA system also exists at the Paul B. Krebs WTP. It is a combination of a Bailey Fischer and Porter/ABB RTU receiving wired communication from field data/control devices and relaying to centralized computer and local Moscad RTU. Both the system-wide and in-plant SCADA system use Wonderware InTouch software.

12. SCADA SYSTEM COMPONENTS

12.1. Remote Terminal Unit (RTU)

12.1.1. General

12.1.1.1. The RTU shall be a highly adaptable, high performance unit designed for scalability, modularity and can be configurable to maximize performance in a wide range of monitor, control and automation applications.

12.1.1.2. The RTU shall have front access to all controls, indicators, and communication ports.

12.1.1.3. The RTU shall be capable of automatically and temporarily storing data between polling and during communication failure to prevent gaps in data.

12.1.1.4. The RTU shall incorporate separate modules for different functions. Each module shall remove and install without tools are connection/disconnection of wires.

12.1.1.5. The RTU shall be capable of operating on standard 115V AC power.

12.1.1.6. The RTU shall be capable of operating in temperatures ranging from -20 to 70 degrees Celsius with a relative humidity of 5% to 95%.

12.1.1.7. The RTU and related components shall be designed for installation in humid and corrosive service conditions.

12.1.1.8. The RTU shall incorporate I/O module(s) necessary to control or monitor using inputs/outputs from field devices at each site as specified herein.

12.1.2. Enclosure

12.1.2.1. The RTU shall be fully enclosed and sealed in a NEMA 4X enclosure.

12.1.2.2. All mounting hardware utilized shall be stainless steel.

12.1.2.3. The enclosure shall be capable of being locked.

12.1.3. Service Port

12.1.3.1. The RTU shall support a local serial interface providing local access to all the functions of the RTU.

12.1.4. Power Supply Module

12.1.4.1. The power supply module shall supply 12V DC power to the RTU and shall be capable of providing 24V DC output power to field data monitoring/control device loops.

12.1.4.2. The power supply shall be surge protected.

12.1.4.3. The power supply module shall have a circuit breaker.

12.1.4.4. The power supply shall operate the RTU with backup battery removed.

12.1.4.5. Backup

12.1.4.5.1. The power supply module shall incorporate a 12V backup battery power supply that shall be float charged by the power supply module.

12.1.5. Surge Protection

12.1.5.1. Surge protection shall be provided for all power supply and power monitoring circuits to prevent equipment damage by transients in excess of 6,500 volts, 3,250 amps.

12.1.6. Communication Interface Module

12.1.6.1. The RTU shall include a module that is structured for the type communication proposed for the RTU.

12.1.6.1.1. Radio Interface Module (Where Applicable)

12.1.6.1.1.1. The radio interface module shall have LED’s for TX, RX, Power, and CPU fault.

12.1.6.1.1.2. The radio interface module shall be interchangeable with the radio interface modules at other RTU sites.

12.1.6.1.1.3. Replacement of radio interface module shall trigger automatic configuration of new module to accommodate site address and function.

12.1.6.1.2. Network Interface Module (Where Applicable)

12.1.6.1.2.1. The RTU may use a network interface module having an Ethernet port instead of, or in conjunction with, a radio interface module where applicable.

12.1.6.1.2.2. The network interface module shall have fiber optic media converter where necessary and support serial tunneling to pass data between the network and the I/O function modules.

12.1.6.1.2.3. The network interface module shall have a USB service port.

12.1.6.1.2.4. Replacement of network interface module shall trigger automatic configuration of new module to accommodate site address and function.

12.1.7. I/O Function Modules

12.1.7.1. The I/O function modules shall be designed with surge suppression on all inputs and outputs.

12.1.7.2. Each RTU shall contain the I/O function modules necessary to perform the monitoring and control tasks at each site as specified herein.

12.1.7.2.1. In addition to current I/O function requirements, each RTU shall be capable of I/O module expansion to add at minimum 8 digital inputs, 8 digital outputs, 4 analog inputs, and 4 analog outputs.

12.1.7.3. Custom configuration of the I/O function modules shall not require any software or firmware changes at the RTU. It shall be possible to perform custom configuration through the MTU.

12.1.7.4. I/O function modules shall have LED's to indicate power status, receive/transmit communication, CPU fault, and point status.

12.1.7.5. Digital Monitor I/O (Where Applicable)

12.1.7.5.1. The I/O function module shall accept discrete inputs of 11 to 30V AC or DC; dry contact; or as specified herein.

12.1.7.5.2. Digital input changes shall be time-stamped to at least 200mS accuracy.

12.1.7.6. Digital Control I/O (Where Applicable)

12.1.7.6.1. The I/O function module shall provide discrete outputs capable of supplying a 3.6A load @ 24V DC or as specified herein.

12.1.7.7. Analog Monitor I/O (Where Applicable)

12.1.7.7.1. The I/O function module shall monitor analog inputs each capable of accepting 4-20mA or as specified herein.

12.1.7.7.2. Analog inputs shall have 16-bit accuracy.

12.1.7.7.3. Analog inputs shall be time-stamped to at least 200mS accuracy.

12.1.7.8. Analog Control I/O (Where Applicable)

12.1.7.8.1. The I/O function module shall provide analog outputs capable of producing 4-20mA or as specified herein.

12.2. Radio System (Where Applicable)

12.2.1. Compliance

12.2.1.1. The radio system shall meet all federal, state, and local law.

12.2.1.2. FCC Licensing

12.2.1.2.1. The Contractor shall supply to the Owner any FCC license necessary to operate the SCADA system. The equipment shall meet all FCC rules including 2013 narrow-banding requirement to 12.5 kHz channel efficiency.

12.2.2. RF links shall be designed for at least 20db fade margin.

12.2.3. The system shall be digital and have a minimum data transmission speed of 9600 bps at 12.5 kHz channel width.

12.2.4. The radio system shall be designed for high speed polling using efficient status change validation capability.

12.2.5. Radio

12.2.5.1. The radio shall be mounted to a radio interface module.

12.2.5.2. The radio shall be a synthesized programmable FM transceiver.

12.2.6. Antennae

12.2.6.1. The antennae for each site shall be designed and selected by the Contractor.

12.2.6.2. The Contractor shall determine the optimum antenna height, pattern, gain, and azimuth required at each site. Radio links to and from each location shall be independently analyzed and designed for maximum communications efficiency.

12.2.6.3. Antenna elements shall be lightning protected, shall be coated to resist water and ice and provide protection from corrosion, UV radiation, salt spray, acid rain, and windblown abrasives.

12.2.6.4. Antennae shall have a wind rating of 175 MPH.

12.2.6.5. Antennae shall be field adjustable for pattern and gain allowing accommodation of future coverage requirements.

12.2.7. Coaxial Cable

12.2.7.1. RTU and MTU shall be protected from electrical surge or transients entering through the coaxial cable.

12.2.7.2. The cable shall be attached to mast or pole with stainless steel cable ties.

12.2.7.3. The cable shall be minimum RG-8, foam filled with 3-inch tube-sealed Type N connectors.

12.3. Master Terminal Unit (MTU)

12.3.1. General

12.3.1.1. The MTU shall be a self-contained data collection and information computer. It shall contain dual CPU's for Hot-Standby Redundancy, network switchgear, fiber optic conversion, power supply units, backup batteries, and surge protection.

12.3.1.2. The MTU shall connect to the central host computer/server via a direct Ethernet connection.

12.3.1.3. The MTU shall be a highly adaptable, high performance unit designed for scalability, modularity and can be configurable to maximize performance in a wide range of monitor, control and automation applications.

12.3.1.4. The MTU shall have front access to all controls, indicators, and communication ports.

12.3.1.5. The MTU shall incorporate separate modules for different functions. Each module shall remove and install without tools are connection/disconnection of wires.

12.3.1.6. The MTU shall be capable of operating on standard 115V AC power.

12.3.1.7. The MTU shall be capable of operating in temperatures ranging from -20 to 70 degrees Celsius with a relative humidity of 5% to 95%.

12.3.1.8. The MTU and related components shall be designed for installation in humid and corrosive service conditions.

12.3.2. Enclosure

12.3.2.1. The MTU shall be fully enclosed and sealed in a NEMA 4 enclosure.

12.3.2.2. All mounting hardware utilized shall be stainless steel.

12.3.2.3. The enclosure shall be capable of being locked.

12.3.3. Power Supply Module

12.3.3.1. The power supply module shall supply 12V DC power to the MTU.

12.3.3.2. The power supply shall be surge protected.

12.3.3.3. The power supply module shall have a circuit breaker.

12.3.3.4. The power supply shall operate the MTU with backup battery removed.

12.3.3.5. Backup

12.3.3.5.1. The power supply module shall incorporate a 12V backup battery power supply that shall be float charged by the power supply module.

12.3.4. Surge Protection

12.3.4.1. Surge protection shall be provided for all power supply and power monitoring circuits to prevent equipment damage by transients in excess of 6,500 volts, 3,250 amps.

12.3.5. Communication Interface Module

12.3.5.1. The MTU shall include a module that is structured for the type communication proposed for the MTU.

12.3.5.1.1. Radio Interface Module (Where Applicable)

12.3.5.1.1.1. The radio interface module shall have LED's for TX, RX, Power, and CPU fault.

12.3.5.1.2. Network Interface Module (Where Applicable)

12.3.5.1.2.1. The MTU may use a network interface module having an Ethernet port instead of, or in conjunction with, a radio interface module where applicable.

12.3.5.1.2.2. The network interface module shall have fiber optic media converter where necessary and support serial tunneling to pass data between the network and the I/O function modules.

12.3.5.1.2.3. The network interface module shall have a USB service port.

12.3.5.1.2.4. Replacement of network interface module shall trigger automatic configuration of new module to accommodate site address and function.

12.4. Communication Generally

12.4.1. Flexibility

12.4.1.1. The RTU shall have the capability of being used as a repeater and shall be able to transmit and receive information from the MTU or another RTU and retransmit without requiring an additional frequency (store and forward).

12.4.1.2. The MTU shall be capable of simultaneously polling multiple communications links.

12.4.2. MTU asynchronous polling speed shall be 9600 bps minimum.

12.4.3. The SCADA system may support one or more of the following non-proprietary, open industry standard communication protocols. All applicable SCADA system components shall support all protocols necessary to adapt to any other SCADA system component.

12.4.3.1. Network IP

12.4.3.2. Serial Radio

12.4.3.3. Network Radio

12.4.3.4. MODBUS ASCII

12.4.3.5. MODBUS RTU

12.4.3.6. MODBUS TCP

12.4.3.7. DNP3

12.4.3.8. IEC60870

12.4.3.9. DF1

12.4.3.10. Other non-proprietary, open industry standard communication protocols may be considered.

12.4.4. The preferred methods of RTU communication shall be wired or radio. Other methods such as cellular, satellite, and microwave may be considered.

12.5. Central Host Computer/Server

12.5.1. The central host computer/server shall be the HMI for the MTU.

12.5.2. The central host computer/server shall be a data backup location for the MTU.

12.5.3. Minimum Requirements

12.5.3.1. Chassis w/ up to 6 Cabled HDs, Quad-Pack LED Diagnostics

12.5.3.2. 12GB Memory (6x2GB), 1333MHz Single Rank LVRDIMMs for 2 Processors, Optimized

12.5.3.3. 500GB 7.2K RPM SATA 3.5in Cabled Hard Drive

12.5.3.4. Hard Drive Configuration-RAID 10 for PERC S100 Controller, 4HDDs

12.5.3.5. 2 Processors - Intel® Xeon® E5620 (2.4GHz, 12M Cache, Turbo, HT, 1066MHz Max Mem)

12.5.3.6. DVD-ROM, SATA, Internal

12.5.3.7. Broadcom 5709 Dual Port 1 GbE NIC w/ TOE iSCSI, PCLe-4 Network Adapter

12.5.3.8. Redundant Power Supply

12.6. Workstation Computers

12.6.1. The workstation computers shall be Windows-based and shall provide monitoring and control capabilities using the SCADA software functions.

12.6.2. The workstation computers shall not require customized hardware or specialized software.

12.6.3. The workstation computers shall simply utilize an internet browser for interface with SCADA system.

12.6.4. The workstation computers shall access the SCADA system via VPN over Ethernet TCP/IP.

12.6.5. Minimum Requirements

12.6.5.1. 4GB DDR3, Non-ECC, 1333MHz Dual Channel, SDRAM, 2X2GB

12.6.5.2. 500GB 7,200 RPM 3.5” SATA, 6.0Gb/s Hard Drive with 16MB Cache

12.6.5.3. Intel™ Core; i7 2600 (3.4GHz, 8M)

12.6.5.4. 16X DVD-ROM SATA, Data Only

12.6.5.5. 512MB AMD RADEON HD 6350 (2DVI), Full Height Video Card

12.6.5.6. Windows® 7 Professional, No Media, 64-bit, English

12.7. SCADA Software Package

12.7.1. General

12.7.1.1. The software package shall be a web-based HMI server/client architecture to allow for HMI deployment on the central host computer/server and on any networked computer device utilizing standard web browser.

12.7.1.1.1. Unlimited number of networked web clients shall be able to perform all monitoring and control functions using a standard web browser.

12.7.1.2. The software shall be manufacturer’s latest version.

12.7.1.3. The software shall allow for user-friendly configuration of RTU’s through the central host computer/server.

12.7.1.4. The software shall feature an automated backup routine to protect system from loss of critical data.

12.7.1.5. The SCADA software shall be user friendly and allow for basic knowledge to create customized programs, reports, and graphs as well as develop HMI graphical screens.

12.7.2. Software Licensing

12.7.2.1. The software shall include all licensing necessary for operation of the SCADA system in consideration of one (1) central host computer/server and unlimited number of web clients.

12.7.2.2. The licensing shall provide for unlimited points/tags and screens.

12.7.3. System Security and Access

12.7.3.1. The software shall provide a high level of inherent security.

12.7.3.2. The software shall allow multiple level user permissions with password protection for monitoring/control functions, acknowledgement functions, shutdown functions, and configuration functions.

12.7.3.3. The software shall provide security access down to data point level and support individual users and user groups.

12.7.4. Database

12.7.4.1. The SCADA software database shall be of true relational database design and optimized for real-time SCADA operation.

12.7.4.2. The software shall be capable of exporting all database tables to a *.csv or other readily interchangeable file type.

12.7.5. Alarm Management

12.7.5.1. The software shall allow users to create alarms for all system I/O points with the capability of notifying locally or remotely such as announcing via workstation speakers, call phone number, send SMS or send email.

12.7.5.2. The software shall track alarm activation including point name, state, timestamp, and priority.

12.7.5.3. The software shall track alarm acceptance including time, user, and optional comment.

12.7.5.4. Alarm tracking shall be stored in a relational database with query and filter capability.

12.7.5.5. Custom screens shall be capable of displaying alarms via objects that change color, flash, change image, or similar notification.

12.7.5.6. The software shall be capable of delaying remote notification to allow time for acknowledgement locally.

12.7.6. Automatic Controls

12.7.6.1. The software shall allow users to create scheduled controls and automatic controls in response to date, time, value, or event.

12.7.7. Event Journal

12.7.7.1. The software shall provide event logging that is stored in a relational database with query and filter capability.

12.7.7.2. Event records shall include timestamp, user, point name, message, and reason for event log.

12.7.7.3. Users shall be able to manually record notes on system operation and other significant events.

12.7.8. Viewers

12.7.8.1. Graphic Viewer

12.7.8.1.1. Default

12.7.8.1.1.1. The software shall automatically generate default viewing screens for each RTU when the site is configured. These screens shall display all configured monitor and control points for an RTU in a real-time tabular and graphical format. The default viewing screens shall have:

12.7.8.1.1.1.1. Digital input status.

12.7.8.1.1.1.2. Analog input status in text and bar graph format

12.7.8.1.1.1.3. Digital and analog control.

12.7.8.1.2. Custom

12.7.8.1.2.1. The software shall be capable of building and viewing custom-designed screens that provide the same monitoring and control capabilities as the default viewer.

12.7.8.1.2.2. Custom screens shall be capable of displaying data from different RTU sites on the same screen.

12.7.8.1.2.3. Graphic Builder

12.7.8.1.2.3.1. The software shall include a graphic builder necessary to generate application-specific displays for the custom viewer.

12.7.8.1.2.3.2. The builder shall include a comprehensive selection of menus and tools for display building.

12.7.8.1.2.3.3. Objects shall include line, connector, rectangle, ellipse, text, and picture. Each object shall have a set of properties such as fill, color, edge color, position, height, and width. The properties of objects can be linked to signal values so to become dynamic.

12.7.8.1.2.3.4. The builder shall be capable of importing objects from other files.

12.7.8.1.2.3.5. The builder shall include an expandable library including a collection of individual objects and collections of objects that can be easily reused during subsequent display creation.

12.7.8.1.2.3.6. The builder shall include pre-defined program “wizards” that eliminate the need for complex drawing activity and that save development time. The wizards shall allow for quickly dropping and arranging components and quickly configuring and linking to signal values.

12.7.8.1.2.3.7. The builder shall be capable of running concurrently with graphic viewers so that displays can be modified and new ones generated simultaneous with data acquisition and logging.

12.7.9. Function Builder

12.7.9.1. The software shall include a function builder that performs logical and mathematical operation on data acquired. The function builder shall contain a library of functions.

12.7.9.2. History Viewers

12.7.9.2.1. The software shall provide viewing and printing capability of logged data in the following forms:

12.7.9.2.1.1. Trends

12.7.9.2.1.1.1. The software shall be capable of viewing logged analog values graphically or in a table format over a specified time frame. Multiple trend graphs shall be capable of being viewed simultaneously.

12.7.9.2.1.2. Alarms

12.7.9.2.1.2.1. Alarm log shall be viewed over a specified time frame in tabular format.

12.7.9.2.1.3. Snapshot

12.7.9.2.1.3.1. Snapshot log of analog and digital values for an RTU site shall be viewed in tabular for format for specified time.

12.7.9.2.1.4. Events

12.7.9.2.1.4.1. Event log shall be viewed over a specified time frame in tabular format.

12.7.9.2.1.5. System Diagnostic

12.7.9.2.1.5.1. System diagnostic log shall be viewed over a specified time frame in tabular format.

12.7.10. Reports

12.7.10.1. The software shall allow user to generate, customize, view, and print, or print to file the following reports:

12.7.10.1.1. Detail Report

12.7.10.1.1.1. For the period specified by the user, the report shall display a list of all activity at a given RTU site or group of RTU sites.

12.7.10.1.2. Pump Flow Report

12.7.10.1.2.1. For the period specified by the user, the report shall display the total time the pump was enabled, the average, maximum, and minimum flow, and the totalized flow.

12.7.10.1.3. Station Configuration Report

12.7.10.1.3.1. The report shall display a table listing all currently configured RTU sites with configuration information.

12.7.10.1.4. Snapshot

12.7.10.1.4.1. For the period specified by the user, the report shall display a list of daily digital and analog data.

12.7.11. The software shall allow the user to multitask by viewing and interacting with multiple screens (windows) simultaneously.

12.7.12. Mobile Interface

12.7.12.1. The SCADA software shall offer a mobile interface for internet enabled smart phones. The mobile interface shall have similar security features as the workstation interface and shall not require special software on smart phone, but shall be performed using standard web browser. The interface shall allow the user to view status, perform control, and view/acknowledge alarms.

12.7.13. Screen Design for Owner

12.7.13.1. The Contractor shall design and build custom screens for the Owner. The custom screens shall incorporate necessary hierarchies to allow easy navigation

to each component. The Contractor shall configure all RTU sites and include custom objects for monitoring and control of each point/tag. The screens shall include custom objects, dynamics, and animation that are specific to the Owner's system. Mimics shall be proportional, comparative, and relative in size to each other. Colors and pictures shall be used to further customize to Owner.

13. GENERAL SCADA SYSTEM REQUIREMENTS

13.1. Useful Life

13.1.1. The SCADA system shall be designed and installed; and have components that generally provide ten (10) years (not a warranty period, see Sec. 15) from the date of acceptance of reasonably reliable service. Components that have rapid obsolescence, that require immediate upgrade; or hardware/software that become unsupported during the useful life are unacceptable.

13.2. Forward Compatibility

13.2.1. The SCADA system shall be designed with components that will be compatible with future additions to the SCADA system during its useful life.

13.3. No Mandatory *Recurring* Fees

13.3.1. The SCADA system shall be supplied to the Owner free of any mandatory *recurring* fees, charges, royalties, etc for the duration of the useful life as defined herein. Any required *recurring* fees, charges, royalties, etc. for maintenance, communication, proprietary licensing, or hosting that is inherent to the designed SCADA system shall be included in the Lump Sum Contract Price.

13.4. Single Source

13.4.1. The SCADA system shall be furnished by the Contractor who shall assume responsibility for providing a complete and integrated system. The Contractor shall assume responsibility for adequacy and performance of all equipment, components, and materials.

14. QUALITY ASSURANCE

14.1. Contractor Qualifications

14.1.1. The Contractor must be a financially sound firm having at least five years continuous experience in designing, implementing, supplying, and supporting SCADA systems.

14.2. Technical Proposal

14.2.1. The Contractor shall submit to the owner a technical proposal within 30 days after the Notice to Proceed.

14.2.2. The proposal shall:

14.2.2.1. Provide a proposed SCADA system configuration drawing and plan that includes designation and types of the proposed components and how they will interact including all proposed communication methods.

14.2.2.2. Include all SCADA component manufacturer literature.

14.2.2.3. Include SCADA software literature.

15. WARRANTY

15.1. Hardware

15.1.1. All hardware products included in the SCADA system shall carry a three (3) year warranty from date of acceptance against defects in material, workmanship,

lightning, and surge. The warranty shall cover all costs of replacement and repair including parts and labor.

15.2. Software and Firmware

15.2.1. The SCADA software and firmware shall be warranted for the entire useful life as defined herein. All SCADA software and firmware upgrades shall be provided to the owner free of charge for the useful life

15.3. Performance Guarantee

15.3.1. The Contractor shall guarantee the performance of the SCADA design including communication methods used. If corrections become necessary during the useful life of the SCADA system as a result of the Contractors design, the corrections shall be executed at the Contractor's expense.

16. SUPPORT

16.1. Technical support via telephone will be provided to the owner free of charge during normal business hours, for the life of the system.

17. TRAINING

17.1. Eight (8) hours of training on the SCADA software and eight (8) hours of training on the SCADA hardware shall be provided to the Owner.

18. SITE INSPECTION MEETING

18.1. There will be a site inspection meeting held before the bid opening date. The date, time, and place of the site inspection meeting shall be given by Addendum. Potential bidders that are interested in viewing sites before bidding should attend the meeting. Sites will be visited as-requested collectively by the attendee group as time allows.