



Purchasing Department

140 Stonewall Avenue West, Ste 204
Fayetteville, GA 30214
Phone: 770-305-5420
www.fayettecountyga.gov

February 10, 2020

**Subject: Invitation to Bid #1768-B: Instrumentation & Control for Process System
South Fayette Water Treatment Plant**

Gentlemen/Ladies:

Fayette County, Georgia invites qualified contractors to submit a bid to replace legacy Modicon 984 Programmable Logic Controllers. You are invited to submit a bid in accordance with the information contained herein.

A mandatory pre-bid conference will be held at 2pm, Thursday, February 20, 2020 at South Fayette Water Treatment Plant at 880 Antioch Road, Fayetteville, GA 30215 to provide an opportunity for you to become more familiar with the project, and to ask questions. Companies that attend will be invited to submit bids.

Questions concerning this invitation to bid should be addressed to Natasha Duggan in writing via email to nduggan@fayettecountyga.gov or fax to (770) 719-5534. Questions will be accepted until 3pm, Friday, February 28, 2020.

Purchasing Department office hours are Monday through Friday 8:00 a.m. to 5:00 p.m. The office telephone number is (770) 305-5420.

Please return your response to the following address:

Fayette County Purchasing Department
140 Stonewall Avenue West, Suite 204
Fayetteville, Georgia 30214

Bid Number: 1768-B

Bid Name: Instrumentation & Control for Process Systems

Your envelope *must* be sealed, and should show your company's name and address.

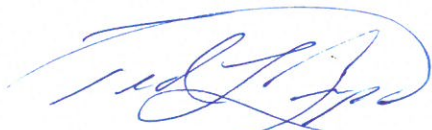
Bids will be received at the above address until 3pm, Friday, March 6, 2020 in the Purchasing Department, Suite 204. Bids will be opened at that time.

Bids must be signed to be considered. Late bids cannot be considered. Faxed bids or emailed bids cannot be considered.

If you download this invitation to bid from the county's web site, it will be your responsibility to check the web site for any addenda that might be issued for this solicitation. The county cannot not be responsible for a vendor not receiving information provided in any addendum.

Thank you for participating in the solicitation process.

Sincerely,

A handwritten signature in blue ink, appearing to read "Ted L. Burgess", enclosed within a blue oval scribble.

Ted L. Burgess
Director of Purchasing

GENERAL TERMS AND CONDITIONS

Invitation to Bid #1768-B: Instrumentation & Control for Process System South Fayette Water Treatment Plant

1. **Definitions:** The term “contractor” as used herein and elsewhere in these Terms and Conditions shall be used synonymously with the term “successful bidder.” The term “county” shall mean Fayette County, Georgia.
2. **Bid is Offer to Contract:** Each bid constitutes an offer to become legally bound to a contract with the county, incorporating the invitation to bid and the bidder’s bid. The binding offer includes compliance with all terms, conditions, special conditions, specifications, and requirements stated in the invitation to bid, except to the extent that a bidder takes written exception to such provisions. All such terms, conditions, special conditions, specifications, and requirements will form the basis of the contract. The bidder should take care to answer all questions and provide all requested information, and to note any exceptions in the bid submission. Failure to observe any of the instructions or conditions in this invitation to bid may result in rejection of the bid.
3. **Binding Offer:** Each bid shall constitute a firm offer that is binding for ninety (90) days from the date of the bid opening, unless the bidder takes exception to this provision in writing.
4. **Bidder’s Questions:** The Fayette County Purchasing Department must receive questions about this invitation to bid in writing at least six days before the scheduled bid opening, excluding Saturdays, Sundays, and holidays. The county will post answers to questions and/or other information concerning the invitation to bid in the form of an addendum on the county’s website at www.fayettecountyga.gov. It is the responsibility of the prospective bidder to check the website for any addenda issued for this invitation to bid.
5. **References:** Include with your bid a list of three (3) jobs that your company has done that are of the same or similar nature to the work described in this invitation to bid, on the form provided. Include all information as requested on the form.
6. **Bid Submission:** Submit your bid, along with any addenda issued by the county, in a sealed opaque envelope with the following information written on the outside of the envelope:
 - a. The bidder’s company name,
 - b. The bid number, which is #1763-B, and
 - c. The bid name, which is Instrumentation & Control for Process Systems.

Mail or deliver one (1) original, unbound bid, signed in ink by a company official authorized to make a legal and binding offer, and one copy on a USB, to:

Fayette County Purchasing Department
140 Stonewall Avenue West, Suite 204
Fayetteville, Georgia 30214

Bid Number: 1768-B
Bid Name: Instrumentation & Control for Process Systems

You may submit bids in person, by U.S. mail, or by a commercial carrier. Do not submit bids by facsimile, e-mail, or other electronic means. Once submitted, all bids become the property of Fayette County.

7. **Bid Preparation Costs:** The bidder shall bear all costs associated with preparing the bid.
8. **Late Bids:** Bids not received by the time and date of the scheduled bid opening will not be considered, unless the delay is a result of action or inaction by the county.
9. **More than One Bid:** Do not submit alternate bids or options, unless requested or authorized by the county in the Invitation to Bid. If a responder submits more than one bid without being requested or authorized to do so, the county may disqualify the bids from that responder, at the county's option.
10. **Bid Corrections or Withdrawals:** The bidder may correct a mistake, or withdraw a bid, before the bid opening by sending written notification to the Director of Purchasing. Bids may be withdrawn after the bid opening only with written authorization from the Director of Purchasing.
11. **Defects or Irregularities in Bids:** The county reserves the right to waive any defect or irregularity in any bid received. In case of an error in extension of prices or totals in the bid, the unit prices shall govern.
12. **Prices Held Firm:** Prices quoted shall be firm for the period of the contract, unless otherwise specified in the bid. All prices for commodities, supplies, equipment, or other products shall be quoted FOB Destination, Fayette County or job site.
13. **Quantities are Estimates:** Quantities listed herein are estimates for the period specified. This will be an indefinite-quantity type contract, with county requirements fulfilled on an "as ordered" basis. No guarantee to purchase the amounts shown is intended or implied. The county reserves the right to order larger or smaller quantities at the prices stated in the bid of the successful bidder.
14. **Brand Name:** If items in this invitation for bid have been identified, described or referenced by a brand name or trade name description, such identification is intended to be descriptive, but not restrictive and is to indicate the quality and characteristics of products that may be offered. Alternative products may be considered for award if clearly identified in the bid. Items offered must meet required specifications and must be of a quality which will adequately serve the use and purpose for which intended.
15. **Bidder Substitutions:** Bidders offering substitutions or deviations from specifications stated in the invitation to bid, shall list such substitutions or deviations on the "Exceptions to Specifications" sheet provided, or on a separate sheet to be submitted with the bid. The absence of such list shall indicate that the bidder has taken no exception to the specifications. The evaluation of bids and the determination as to equality and acceptability of products or services offered shall be the responsibility of the county.
16. **Non-Collusion:** By responding to this invitation to bid, the bidder represents that the bid is not made in connection with any competing bidder, supplier, or service provider submitting a separate response to this invitation to bid, and is in all respects fair and without collusion or fraud.
17. **Bid Evaluation:** Award will be made to the lowest responsive, responsible bidder, taking into consideration payment terms, vendor qualifications and experience, quality, references, any exceptions listed, and/or other factors deemed relevant in making the award. The county may make such investigation as it deems necessary to determine the ability of the bidder to perform, and the bidder shall furnish to the county all information and data for this purpose as the county may request. The county reserves the right to reject any bid item, any bid, or all bids, and to re-advertise for bids.
18. **Secondary Contracts:** The County may award a secondary contract to the responsive, responsible bidder making the second lowest bid. Considerations in selecting a secondary contract will be the same as for the primary contract.

19. **Payment Terms and Discounts:** The County's standard payment terms are Net 30. Any deviation from standard payment terms must be specified in the resulting contract, and both parties must agree on such deviation. Cash discounts offered will be a consideration in awarding the bid, but only if they give the county at least 15 days from receipt of invoice to pay. For taking discounts, time will be computed from the date of invoice acceptance by the County, or the date a correct invoice is received, whichever is the later date. Payment is deemed made, for the purpose of earning the discount, on the date of the check.
20. **Trade Secrets – Confidentiality:** If any person or entity submits a bid or proposal that contains trade secrets, an affidavit shall be included with the bid or proposal. The affidavit shall declare the specific included information which constitutes trade secrets. Any trade secrets must be either (1) placed in a separate envelope, clearly identified and marked as such, or (2) at a minimum, marked in the affidavit or an attached document explaining exactly where such information is, and otherwise marked, highlighted, or made plainly visible. See O.C.G.A. § 50-18-72 (A)(34).
21. **Trade Secrets – Internal Use:** In submitting a bid, the bidder agrees that the county may reveal any trade secret materials contained in the bid to all county staff and officials involved in the selection process, and to any outside consultant or other third parties who may assist in the selection process. The bidder agrees to hold harmless the county and each of its officers, employees, and agents from all costs, damages, and expenses incurred in connection with refusing to disclose any material which the bidder has designated as a trade secret.
22. **Ethics – Disclosure of Relationships:** Before a proposed contract in excess of \$10,000.00 is recommended for award to the Board of Commissioners or the County Administrator, or before the County renews, extends, or otherwise modifies a contract after it has been awarded, the contractor must disclose certain relationships with any County Commissioner or County Official, or their spouse, mother, father, grandparent, brother, sister, son or daughter related by blood, adoption, or marriage (including in-laws). A relationship that must be reported exists if any of these individuals is a director, officer, partner, or employee, or has a substantial financial interest in the business, as described in Fayette County Ordinance Chapter 2, Article IV, Division 3 (Code of Ethics).

If such relationship exists between your company and any individual mentioned above, relevant information must be presented in the form of a written letter to the Director of Purchasing. You must include the letter with any bid, proposal, or price quote you submit to the Purchasing Department.

In the event that a contractor fails to comply with this requirement, the County will take action as appropriate to the situation, which may include actions up to and including rejection of the bid or offer, cancellation of the contract in question, or debarment or suspension from award of a County contract for a period of up to three years.

23. **Contract Execution & Notice to Proceed:** After the Board of Commissioners makes an award, all required documents are received by the county, and the contract is fully executed with signature of both parties, the county will issue a written Notice to Proceed. The county shall not be liable for payment of any work done or any costs incurred by any bidder prior to the county issuing the Notice to Proceed.
24. **Unavailability of Funds:** This contract will terminate immediately and absolutely at such time as appropriated and otherwise unobligated funds are no longer available to satisfy the obligations of the county under the contract.

25. **Insurance:** The successful bidder shall procure and maintain the following insurance, to be in effect throughout the term of the contract, in at least the amounts and limits as follows:
- a. **General Liability Insurance:** \$1,000,000 combined single limit per occurrence, including bodily and personal injury, destruction of property, and contractual liability.
 - b. **Automobile Liability Insurance:** \$1,000,000 combined single limit each occurrence, including bodily injury and property damage liability.
 - c. **Worker's Compensation & Employer's Liability Insurance:** Workers Compensation as required by Georgia statute.

Before a contract with the successful bidder is executed, the successful bidder shall provide Certificates of Insurance for all required coverage. The successful offeror can provide the Certificate of Insurance after award of the contract, but must be provided prior to execution of the contract document by both parties. The certificate shall list an additional insured as follows:

Fayette County, Georgia
140 Stonewall Avenue West
Fayetteville, GA 30214

26. **Bid Bond:** You must include a bid bond with your bid, equal to five percent (5%) of the total amount bid. Bid bonds shall be provided by a surety which appears on Georgia's list of approved sureties administered by the State Insurance Commissioner, or the U.S. Treasury's list of approved bond sureties (Circular 570).
27. **Performance and Payment Bonds:** Prior to execution of a contract, the successful bidder shall submit performance and payment bonds each equal to 100 percent of the contract value, provided by a surety which appears on Georgia's list of approved sureties administered by the State Insurance Commissioner, or the U.S. Treasury's list of approved bond sureties (Circular 570).
28. **Building Permits:** Work performed for the county requiring building permits by licensed contractors will not have permit fees assessed, although any re-inspection fees for disapproved inspections will be the responsibility of the contractor prior to final inspections and the Certificate of Occupancy or Certificate of Completion being issued.
29. **Unauthorized Performance:** The county will not compensate the contractor for work performed unless the work is authorized under the contract, as initially executed or as amended.
30. **Assignment of Contract:** Assignment of any contract resulting from this invitation to bid will not be authorized, except with express written authorization from the county.
31. **Indemnification:** The contractor shall defend, indemnify and save the county and all its officers, agents and employees harmless from all suits, actions, or other claims of any character, name and description brought for or on account of any damages, losses, or expenses to the extent caused by or resulting from the negligence, recklessness, or intentionally wrongful conduct of the contractor or other persons employed or utilized by the contractor in the performance of the contract. The contractor shall pay any judgment with cost which may be obtained against the county growing out of such damages, losses, or expenses.

32. **Severability:** The invalidity of one or more of the phrases, sentences, clauses or sections contained in the contract shall not affect the validity of the remaining portion of the contract. If any provision of the contract is held to be unenforceable, then both parties shall be relieved of all obligations arising under such provision to the extent that the provision is unenforceable. In such case, the contract shall be deemed amended to the extent necessary to make it enforceable while preserving its intent.
33. **Termination for Cause:** The county may terminate the contract for cause by sending written notice to the contractor of the contractor's default in the performance of any term of this agreement. Termination shall be without prejudice to any of the county's rights or remedies by law.
34. **Termination for Convenience:** The county may terminate the contract for its convenience at any time with 10 days' written notice to the contractor. In the event of termination for convenience, the county will pay the contractor for services performed. The county will compensate partially completed performance based upon a signed statement of completion submitted by the contractor, which shall itemize each element of performance completed.
35. **Force Majeure:** Neither party shall be deemed to be in breach of the contract to the extent that performance of its obligations is delayed, restricted, or prevented by reason of any act of God, natural disaster, act of government, or any other act or condition beyond the reasonable control of the party in question.
36. **Governing Law:** This agreement shall be governed in accordance with the laws of the State of Georgia. The parties agree to submit to the jurisdiction in Georgia, and further agree that any cause of action arising under this agreement shall be required to be brought in the appropriate venue in Fayette County, Georgia.

Checklist of Required Documents

*(Be Sure to Return This Checklist and
the Required Documents in the order listed below)*

**ITB #1768-B: Instrumentation & Control for Process System
South Fayette Water Treatment Plant**

Company information – on the form provided _____

Contractor Affidavit under O.C.G.A. § 13-10-91(b)(1) _____

Pricing sheet _____

Bid Bond _____

List of exceptions, if any – on the form provided _____

References – on form provided _____

Addenda, if Any _____

COMPANY NAME: _____

SCOPE & SPECIFICATION
ITB #1768-B: Instrumentation & Control for Process System
South Fayette Water Treatment Plant

SECTION 40 90 01
INSTRUMENTATION AND CONTROL FOR PROCESS SYSTEMS

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
 - a. A182, Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service.
 - b. A276, Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
 - c. A312, Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipes.
 - d. B32, Standard Specification for Solder Metal.
 - e. B88, Standard Specification for Seamless Copper Water Tube.
 2. International Society of Automation (ISA):
 - a. S5.1, Instrumentation Symbols and Identification (NRC ADOPTED).
 - b. PR12.6, Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations.
 - c. S5.4, Standard Instrument Loop Diagrams.
 - d. S20, Specification Forms for Process Measurement and Control Instruments, Primary Elements and Control Valves.
 - e. S50.1, Compatibility of Analog Signals for Electronic Industrial Process Instruments.
 3. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1,000 Volts Maximum).
 - b. ICS 1, General Standards for Industrial Control and Systems.
 4. National Institute of Standards and Technology (NIST).
 5. NSF International (NSF):
 - a. NSF/ANSI 61, Drinking Water System Components - Health Effects.
 - b. NSF/ANSI 372, Drinking Water System Components - Lead Content.
 6. Underwriters Laboratory, Inc. (UL): 508A, Standard for Safety, Industrial Control Panels.

1.02 SUMMARY

- A. The South Fayette Water Treatment Plant TP has (6) Leopold Filter Consoles with legacy Modicon 984 Programmable Logic Controllers which are no longer supported by the manufacturer and must be replaced.
- B. Work Includes
1. Design, document, purchase, install, test, and provide services and product support to upgrade the existing (6) Leopold Filter Consoles to Schneider Electric / Modicon M340 Series PLCs and add Schneider 12-inch Color Touchscreen Local Operator Interfaces as follows:

- a. Provide Project Management and administration required to execute this project.
- b. Perform (1) site visit to secure existing PLC programs and confirm design/implementation plan for this project.
- c. Provide systems engineering design of hardware, software, installation and cut-over plan for upgrade of PLC and OIT hardware and software in existing (6) Leopold Filter Consoles.
- d. Provide systems engineering design of PLC Network changes required for new PLC hardware including new CAT5 cable between each Filter Console and Consoles to existing network switch.
- e. Provide the following Schneider / Modicon Programmable Logic Controller, Operator Interface, and ancillary hardware to replace existing legacy PLCs.
 - 1) Qty 6: Schneider Part # BMXP341000 M340 CPU Level 1, 2MB RAM, USB Port, 1 RS232/485 Modbus RTU
 - 2) Qty 6: Schneider Part # BMXCPS2000 Power Supply, 115/240 Vac Input, 20W Output
 - 3) Qty 6: Schneider Part # BMXXBP1200 12-Slot Backplane - One slot for Power Supply + 12 slots. NOT DIN Rail
 - 4) Qty 6: Schneider Part # BMXNOE0100 M340 Ethernet Network Module, (1) RJ45 10/100 Modbus Ethernet port
 - 5) Qty 12: Schneider Part # BMXDAI1604 Digital AC Input Module, (16) 120 Vac, requires 20-point term block
 - 6) Qty 12: Schneider Part # BMXDRA1605 Digital AC/DC Output Module, (16) Relays, 3Amp, requires 20-point terminal
 - 7) Qty 12: Schneider Part # BMXAMI0410 Analog Input Module, (4) Input Channels (+10v, 0-10v, 0-5v/0-20ma
 - 8) Qty 6: Schneider Part # BMXAMO0410 Analog Output Module, 4 multi-range (U&I) channels, High speed
 - 9) Qty 6: Schneider Part # BMXAMO0410 12.1in Color TFT Touchscreen, 2USB, 96MB, One Ethernet Port
 - 10) Qty 6: TRENDnet Part # TI-G50 TRENDnet 5-Port Hardened Industrial Gigabit DIN-Rail Switch
 - 11) Qty As Required: CAT5 cable
- f. Provide for Ethernet network interface to allow all legacy PLCs / Modbus network to continue to operate while each Filter Console PLCs is upgraded. Provide for only (1) Filter to be out of service at a time.
- g. Provide PLC programming services to convert existing legacy PLC program as required to run on new M340 PLCs.
- h. Provide OIT/HMI programming services to implement functionality of existing console keypad on (6) new Schneider / Modicon 12.1-inch color industrial operator interfaces.
- i. Provide Field Services Technician onsite to install new Schneider / Modicon M340 PLC hardware and new Schneider / Modicon 12.1-inch color industrial operator interfaces in (6) existing Leopold Filter Consoles.
- j. Provide System Engineering onsite to commission new PLC programs, new color operator Interface, and configure & commission new Filter PLC communications network.

- k. Provide System Engineering onsite to modify existing Wonderware HMI SCADA application to recognize new Filters PLC hardware and IO addressing.
- l. Provide System Engineering onsite to test PLC and OIT changes with Plant Operations personnel, and train on use and maintenance of upgraded PLC and OIT hardware on (6) Filter Consoles.
- m. Provide new AutoCAD drawings showing “As-Installed” status of existing (6) Filter Consoles.

C. PIC System Integrator shall be selected from the following list:

- 1. Kapsch TrafficCom, Inc., Duluth, GA.
- 2. M/R Systems, Norcross, GA.
- 3. Revere Control Systems, Birmingham, AL.
- 4. J.K. Duren Company, Roswell, GA.

1.03 DEFINITIONS

A. Abbreviations:

- 1. CP: Control Panel.
- 2. FP: Field Panel.
- 3. HMI: Human Machine Interface.
- 4. LCP: Local Control Panel.
- 5. MCC: Motor Control Center.
- 6. PAT: Performance Acceptance Test.
- 7. PIC: Process Instrumentation and Control.
- 8. PLC: Programmable Logic Controller.
- 9. RIO: Remote Input/Output.
- 10. RTU: Remote Telemetry Unit.

B. Rising/Falling: Terms used to define actions of discrete devices about their setpoints.

- 1. Rising: Contacts close when an increasing process variable rises through setpoint.
- 2. Falling: Contacts close when a decreasing process variable falls through setpoint.

C. Signal Types:

- 1. Analog Signals, Current Type:
 - a. 4 mA to 20 mA dc signals conforming to ISA S50.1.
 - b. Unless otherwise indicated for specific PIC Subsystem components, use the following ISA 50.1 options:
 - 1) Transmitter Type: Number 2, two-wire.

- 2) Transmitter Load Resistance Capacity: Class L.
- 3) Fully isolated transmitters and receivers.
2. Analog Signals, Voltage Type: 1 to 5 volts dc within panels where a common high precision dropping resistor is used.
3. Discrete signals, two-state logic signals using dc or 120V ac sources as indicated.
4. Pulse Frequency Signals:
 - a. Direct current pulses whose repetition rate is linearly proportional to process variable.
 - b. Pulses generated by contact closures or solid state switches as indicated.
 - c. Power source less than 30V dc.
5. Special Signals: Other types of signals used to transmit analog and digital information between field elements, transmitters, receivers, controllers, and digital devices.

1.04 SUBMITTALS

A. Action Submittals:

1. General:
 - a. Shop Drawings, full-scaled details, wiring diagrams, catalog cuts, and descriptive literature.
 - b. Identify proposed items and options. Identify installed spares and other provisions for future work (for example, reserved panel space; unused components, wiring, and terminals).
 - c. Legends and Abbreviation Lists: Complete definition of symbols and abbreviations used on this Project (for example, engineering units, flow streams, instruments, structures, and other process items used in nameplates, legends, and data sheets).
2. Bill of Materials: List of required equipment.
 - a. Group equipment items as follows:
 - 1) I&C Components: By component identification code.
 - 2) Other Equipment: By equipment type.
 - b. Data Included:
 - 1) Equipment tag number.
 - 2) Description.
 - 3) Manufacturer, complete model number, and all options not defined by model number.
 - 4) Quantity supplied.
 - 5) Component identification code where applicable.
3. Catalog Cuts: I&C Components, Electrical Devices, and Mechanical Devices:
 - a. Catalog information, mark to identify proposed items and options.

- b. Descriptive literature.
 - c. External power and signal connections.
 - d. Scaled drawings showing exterior dimensions and locations of electrical and mechanical interfaces.
4. Component Data Sheets: Data sheets for I&C components.
- a. Format and Level of Detail: In accordance with ISA-S20.
 - b. Include component type identification code and tag number on data sheet.
 - c. Specific features and configuration data for each component:
 - 1) Location or service.
 - 2) Manufacturer and complete model number.
 - 3) Size and scale range.
 - 4) Setpoints.
 - 5) Materials of construction.
 - 6) Options included.
 - d. Name, address, and telephone number of manufacturer's local office, representative, distributor, or service facility.
5. Sizing and Selection Calculations:
- a. Primary Elements: Complete calculations plus process data used. Example, for flow elements, minimum and maximum values, permanent head loss, and assumptions made.
 - b. Controlling, Computing and Function Generating Modules: Actual scaling factors with units and how they were computed.
6. Panel Construction Drawings:
- a. Scale Drawings: Show dimensions and location of panel mounted devices, doors, louvers, and subpanels, internal and external.
 - b. Panel Legend: List front of panel devices by tag numbers, nameplate inscriptions, service legends, and annunciator inscriptions.
 - c. Bill of Materials: List devices mounted within panel that are not listed in panel legend. Include tag number, description, manufacturer, and model number.
 - d. Construction Details: NEMA rating, materials, material thickness, structural stiffeners and brackets, lifting lugs, mounting brackets and tabs, door hinges and latches, and welding and other connection callouts and details.
 - e. Construction Notes: Finishes, wire color schemes, wire ratings, wire and terminal block, numbering and labeling scheme.
7. Panel Control Diagrams: For discrete control and power circuits.
- a. Diagram Type: Ladder diagrams. Include devices, related to discrete functions, that are mounted in or on the panel and that require electrical connections. Show unique rung numbers on left side of each rung.
 - b. Item Identification: Identify each item with attributes listed.
 - 1) Wires: Wire number and color. Cable number if part of multiconductor cable.

- 2) Terminals: Location (enclosure number, terminal junction box number, or MCC number), terminal strip number, and terminal block number.
- 3) Discrete Components:
 - a) Tag number, terminal numbers, and location (“FIELD”, enclosure number, or MCC number).
 - b) Switching action (open or close on rising or falling process variable), setpoint value and units, and process variable description (for example, Sump Level High).
- 4) Relay Coils:
 - a) Tag number and its function.
 - b) On right side of run where coil is located, list contact location by ladder number and sheet number. Underline normally closed contacts.
- 5) Relay Contacts: Coil tag number, function, and coil location (ladder rung number and sheet number).
- c. Show each circuit individually. No “typical” diagrams or “typical” wire lists will be permitted.
- d. Ground wires, surge protectors, and connections.
- e. Circuit Names: Show names corresponding to Circuit and Raceway Schedule for circuits entering and leaving a panel. Refer to Division 26, Electrical.
8. Panel Wiring Diagrams: Show point-to-point and terminal-to-terminal wiring within panel.
9. Loop Diagrams: Individual wiring diagram for each analog or pulse frequency loop.
 - a. Conform to the minimum requirements of ISA S5.4.
 - b. Under Paragraph 5.3 of ISA S5.4, include the information listed under subparagraphs 2 and 6.
 - c. Drawing Size: Individual 11-inch by 17-inch sheet for each loop.
 - d. Divide each loop diagram into areas for panel face, back-of-panel, and field.
 - e. Show:
 - 1) Terminal numbers, location of dc power supply, and location of common dropping resistors.
 - 2) Switching contacts in analog loops and output contacts of analog devices. Reference specific control diagrams where functions of these contacts are shown.
 - 3) Tabular summary on each diagram:
 - a) Transmitting Instruments: Output capability.
 - b) Receiving Instruments: Input impedance.
 - c) Loop Wiring Impedance: Estimate based on wire sizes and lengths shown.
 - d) Total loop impedance.

- e) Reserve output capacity.
- 4) Circuit and raceway schedule names.
- 10. Interconnecting Wiring Diagrams:
 - a. Diagrams, device designations, and symbols in accordance with NEMA ICS 1.
 - b. Diagrams shall bear electrical Subcontractor's signature attesting diagrams have been coordinated with Division 26, Electrical.
 - c. Show:
 - 1) Electrical connections between equipment, consoles, panels, terminal junction boxes, and field mounted components.
 - 2) Component and panel terminal board identification numbers, and external wire and cable numbers.
 - 3) Circuit names matching Circuit and Raceway Schedule.
 - 4) Intermediate terminations between field elements and panels (for example, to terminal junction boxes and pull boxes).
 - 5) Pull boxes.
- 11. Installation Details: Include modifications or further details required to adequately define installation of I&C components.
- 12. List of spares, expendables, test equipment and tools.
- 13. Additional Equipment Recommended: List of, and descriptive literature for, additional spares, expendables, test equipment and tools recommended. Include unit prices and total costs as specified in Section 01 29 00, Payment Procedures.

B. Informational Submittals: For PIC equipment, provide Manufacturer's Certificate of Proper Installation and readiness for operation.

- 1. Owner Training Plan. Reference Section 01 43 33, Manufacturers' Field Services.
- 2. Operation and Maintenance (O&M) Manuals: In accordance with Section 01 78 23, Operation and Maintenance Data, unless otherwise specified in this section.
 - a. Content and Format:
 - 1) Complete sets O&M manuals.
 - 2) Sufficient detail to allow operation, removal, installation, adjustment, calibration, maintenance and purchasing replacements for each PIC component.
 - 3) Final versions of Legend and Abbreviation Lists.
 - 4) Manual format in accordance with Section 01 78 23, Operation and Maintenance Data.
 - b. Include:
 - 1) Process and Instrumentation Diagrams: One reproducible copy of revised P&ID to reflect as-built PIC design.
 - 2) Refer to paragraph Shop Drawings for the following items:
 - a) Bill of Materials.
 - b) Catalog Cuts.

- c) Component Data Sheets.
 - d) Panel Control Diagrams.
 - e) Panel Wiring Diagrams, one reproducible copy.
 - f) Panel Plumbing Diagrams, one reproducible copy.
 - g) Loop Diagrams, one reproducible copy.
 - h) Interconnecting Wiring Diagrams, one reproducible copy.
 - i) Application Software Documentation.
- 3) Device O&M manuals for components, electrical devices, and mechanical devices include:
 - a) Operations procedures.
 - b) Installation requirements and procedures.
 - c) Maintenance requirements and procedures.
 - d) Troubleshooting procedures.
 - e) Calibration procedures.
 - f) Internal schematic and wiring diagrams.
 - g) Component Calibration Sheets from field quality control calibrations.
 - 4) List of spares, expendables, test equipment and tools provided.
 - 5) List of additional spares, expendables, test equipment and tools recommended.
- 3. Performance Acceptance Tests (PAT) Submittals:
 - a. Preliminary Test Procedures: Outlines of proposed tests, forms, and checklists.
 - b. Final Test Procedures: Proposed test procedures, forms, and checklists.
 - c. Test Documentation: Copy of signed off test procedures when tests are completed.
 - 4. Operation and Maintenance Data.

1.05 QUALITY ASSURANCE

- A. Calibration Instruments: Each instrument used for calibrating PIC equipment shall bear the seal of a reputable laboratory certifying that instrument has been calibrated within the previous 12 months to a standard endorsed by the NIST.
- B. Coordination Meetings:
 - 1. Location: Owner's Site.
 - 2. Attended By: Engineer, Owner, and Contractor.
 - 3. Minimum of one is required. Specific dates will be established in Progress Schedule.
 - 4. First Meeting: Within 36 days after Notice to Proceed.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Provide Site and warehouse storage facilities for PIC equipment.
- B. Prior to shipment, include corrosive-inhibitive vapor capsules in shipping containers, and related equipment as recommended by the capsule manufacturer.
- C. Prior to installation, store items in dry indoor locations. Provide heating in storage areas for items subject to corrosion under damp conditions.
- D. Cover panels and other elements that are exposed to dusty construction environments.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Standard Environmental Requirements: Unless otherwise noted, design equipment for continuous operation in these environments:
 - 1. Freestanding Panel and Consoles:
 - a. Inside, Air Conditioned: NEMA 1.
 - b. Inside: NEMA 12.
 - c. Outside: NEMA 4X.
 - 2. Smaller Panels and Assemblies (that are not Freestanding):
 - a. Inside, Air Conditioned: NEMA 12.
 - b. All Other Locations: NEMA 4X.
 - 3. Field Elements: Outside.
- B. Environmental Design Requirements: Following defines the types of environments referred to in the above.
 - 1. Inside, Air Conditioned:
 - a. Temperature:
 - 1) Normal: 60 to 80 degrees F.
 - 2) With Up to 4-Hour HVAC System Interruptions: 40 to 105 degrees F.
 - b. Relative Humidity:
 - 1) Normal: 10 percent (winter) to 70 percent (summer).
 - 2) With Up to 4-Hour HVAC System Interruption: 10 to 100 percent.
 - c. NEC Classification: Nonhazardous.
 - 2. Inside:
 - a. Temperature: 20 to 104 degrees F.
 - b. Relative Humidity: 10 to 95 percent noncondensing.
 - c. NEC Classification: Nonhazardous.
 - 3. Inside, Corrosive:
 - a. Temperature: Minus 20 to 104 degrees F.

- b. Relative Humidity: 10 to 95 percent noncondensing.
 - c. Corrosive Environment: Chlorine gas.
 - d. NEC Classification: Nonhazardous.
4. Outside:
- a. Temperature: Minus 20 to 104 degrees F.
 - b. Relative Humidity: 10 to 95 percent noncondensing, freezing rain.
 - c. NEC Classification: Nonhazardous.
5. Outside, Corrosive:
- a. Temperature: Minus 20 to 104 degrees F.
 - b. Relative Humidity: 10 to 95 percent noncondensing, freezing rain.
 - c. Corrosive Environment: Chlorine gas.
 - d. NEC Classification: Nonhazardous.

C. Optical Fiber Cable and Cable Splice Centers:

- 1. Outside, Underground/Submerged: Minus 20 degrees C to 40 degrees C.
- 2. Outside, Overhead: Minus 40 degrees C to 80 degrees C.
- 3. Outside, Aboveground in Conduit: Minus 40 degrees C to 80 degrees C.
- 4. Inside: 0 degree C to 40 degrees C.

1.08 SEQUENCING AND SCHEDULING

A. Activity Completion: The following is a list of key activities and their completion criteria:

- 1. Shop Drawings: Reviewed and approved.
- 2. Quality Control Submittals: Reviewed and accepted.
- 3. Hardware Delivery: Hardware delivered to Site and inventoried by Contractor.
- 4. PAT: Completed and required test documentation accepted.

B. PIC Substantial Completion: When Engineer issues Certificate of Substantial Completion.

- 1. Prerequisites:
 - a. All PIC Submittals have been completed.
 - b. PIC has successfully completed PAT.
 - c. Owner training plan is on schedule.
 - d. All spares, expendables, and test equipment have been delivered to Owner.

C. PIC Acceptance: When Engineer issues a written notice of Final Payment and Acceptance.

- 1. Prerequisites:
 - a. Certificate of Substantial Completion issued for PIC.

- b. Punch-list items completed.
 - c. Final revisions to O&M manuals accepted.
 - d. Maintenance service agreements for PIC accepted by Owner.
- D. Prerequisite Activities and Lead Times: Do not start the following key Project activities until the prerequisite activities and lead times listed below have been completed and satisfied:

<u>Activity</u>	<u>Prerequisites and Lead Times</u>
Submittal reviews by Engineer	Engineer acceptance of Submittal breakdown and schedule.
Hardware purchasing, fabrication, and assembly	Associated Shop Drawing Submittals completed.
Shipment	Completion of PIC Shop Drawing Submittals and preliminary O&M manuals.
Owner Training	Owner training plan completed.
PAT	Startup, Owner training, and PAT procedures completed; notice 4 weeks prior to start.

PART 2 PRODUCTS

2.01 GENERAL

- A. PIC functions as shown on Drawings and as required for each loop. Furnish equipment items as required. Furnish all materials, equipment, and software, necessary to effect required system and loop performance.
- B. First Named Manufacturer: PIC design is based on first named manufacturers of equipment and materials.
 - 1. If an item is proposed from other than first named manufacturer, obtain approval from Engineer for such changes in accordance with Article Submittals.
 - 2. If using proposed item requires other changes, provide work and equipment to implement these changes. Changes that may be required include, but are not limited to: different installation, wiring, raceway, enclosures, connections, isolators, intrinsically safe barriers, software, and accessories.
- C. Like Equipment Items:

1. Use products of one manufacturer and of the same series or family of models to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's services.
 2. Implement all same or similar functions in same or similar manner. For example, control logic, sequence controls, and display layouts.
- D. Components and Materials in Contact with Water for Human Consumption: Comply with the requirements of the Safe Drinking Water Act and other applicable federal, state, and local requirements. Provide certification by manufacturer or an accredited certification organization recognized by the Authority Having Jurisdiction that components and materials comply with the maximum lead content standard in accordance with NSF/ANSI 61 and NSF/ANSI 372.
1. Use or reuse of components and materials without a traceable certification is prohibited.

2.02 LOOP SPECIFICATIONS

- A. Location: Article Supplements.
- B. Organization: By unit process and loop number.
- C. Functional Requirements for Control Loops:
 1. Shown on Drawings, in Panel Control Diagrams, and Process and Instrumentation Diagrams (P&ID). P&ID format and symbols are in accordance with ISA S5.1, except as specified or shown on Drawings.
 2. Supplemented by Loop Specifications.
- D. Subheadings for Each Loop:
 1. Functions: Clarifies functional performance of loop, including abstract of interlocks.
 - a. Components: Lists major components for each loop. Information listed includes tag numbers.
 - b. Component Identification Codes: Alphanumeric codes of required components. Refer to Component Specification referenced in Article Supplements.
 - c. Component Names and Options: Required to tailor general Component Specifications to specific application. For example, special materials, mounting, size, unit range, scale, setpoints, and controller options.

2.03 NAMEPLATES AND TAGS

- A. Panel Nameplates: Enclosure identification located on the enclosure face.
 - 1. Location and Inscription: As shown.
 - 2. Materials: Laminated plastic attached to panel with stainless steel screws.
 - 3. Letters: 1/2-inch white on black background, unless otherwise noted.
- B. Component Nameplates—Panel Face: Component identification located on panel face under or near component.
 - 1. Location and Inscription: As shown.
 - 2. Materials: Laminated plastic attached to panel with stainless steel screws.
 - 3. Letters: 3/16-inch white on black background, unless otherwise noted.
- C. Component Nameplates—Back of Panel: Component identification located on or near component inside of enclosure.
 - 1. Inscription: Component tag number.
 - 2. Materials: Adhesive backed, laminated plastic.
 - 3. Letters: 3/16-inch white on black background, unless otherwise noted.
- D. Legend Plates for Panel Mounted Pushbuttons, Lights, and Switches:
 - 1. Inscription: Refer to:
 - a. Table under paragraph Standard Pushbutton Colors and Inscriptions.
 - b. Table under paragraph Standard Light Colors and Inscriptions.
 - c. P&IDs in Drawings.
 - 2. Materials: Stainless steel, keyed legend plates. Secured to panel by mounting nut for pushbutton, light, or switch.
 - 3. Letters: Black on gray or white background.
- E. Service Legends: Component identification nameplate located on face of component.
 - 1. Inscription: As shown.
 - 2. Materials: Adhesive backed, laminated plastic.
 - 3. Letters: 3/16-inch white on black background, unless otherwise noted.
- F. Nametags: Component identification for field devices.
 - 1. Inscription: Component tag number.
 - 2. Materials: 16-gauge, Type 304 stainless steel.
 - 3. Letters: 3/16-inch imposed.

4. Mounting: Affix to component with 16- or 18-gauge stainless steel wire or stainless steel screws.

2.04 ELECTRICAL REQUIREMENTS

- A. In accordance with Division 26, Electrical.
- B. I&C and electrical components, terminals, wires, and enclosures: UL recognized or UL listed.
- C. Wires Within Enclosures:
 1. ac Circuits:
 - a. Type: 300-volt, Type MTW stranded copper.
 - b. Size: For current to be carried, but not less than 18 AWG.
 2. Analog Signal Circuits:
 - a. Type: 300-volt stranded copper, twisted shielded pairs.
 - b. Size: 18 AWG, minimum.
 3. Other dc Circuits.
 - a. Type: 300-volt, Type MTW stranded copper.
 - b. Size: For current carried, but not less than 18 AWG.
 4. Special Signal Circuits: Use manufacturer's standard cables.
 5. Wire Identification: Numbered and tagged at each termination.
 - a. Wire Tags: Machine printed, heat shrink.
 - b. Manufacturers:
 - 1) Brady PermaSleeve.
 - 2) Tyco Electronics.
- D. Wires entering or leaving enclosures, terminate and identify as follows:
 1. Analog and discrete signal, terminate at numbered terminal blocks.
 2. Special signals, terminated using manufacturer's standard connectors.
 3. Identify wiring in accordance with Division 26, Electrical.
- E. Terminal Blocks for Enclosures:
 1. Quantity:
 - a. Accommodate present and spare indicated needs.
 - b. Wire spare PLC and RTU I/O points to terminal blocks.
 - c. One wire per terminal for field wires entering enclosures.
 - d. Maximum of two wires per terminal for 18-WG wire for internal enclosure wiring.
 - e. Spare Terminals: 20 percent of all connected terminals, but not less than 5 per terminal block.
 2. General:
 - a. Connection Type: Screw compression clamp.

- b. Compression Clamp:
 - 1) Complies with DIN-VDE 0611.
 - 2) Hardened steel clamp with transversal groves that penetrate wire strands providing a vibration-proof connection.
 - 3) Guides strands of wire into terminal.
 - c. Screws: Hardened steel, captive and self-locking.
 - d. Current Bar: Copper or treated brass.
 - e. Insulation:
 - 1) Thermoplastic rated for minus 55 to plus 110 degree C.
 - 2) Two funneled shaped inputs to facilitate wire entry.
 - f. Mounting:
 - 1) Standard DIN rail.
 - 2) Terminal block can be extracted from an assembly without displacing adjacent blocks.
 - 3) End Stops: Minimum of one at each end of rail.
 - g. Wire preparation: Stripping only permitted.
 - h. Jumpers: Allow jumper installation without loss of space on terminal or rail.
 - i. Marking System:
 - 1) Terminal number shown on both sides of terminal block
 - 2) Allow use of preprinted and field marked tags.
 - 3) Terminal strip numbers shown on end stops.
 - 4) Mark terminal block and terminal strip numbers as shown on Panel Control Diagrams and Loop Diagrams.
 - 5) Fuse Marking for Fused Terminal Blocks: Fuse voltage and amperage rating shown on top of terminal block.
3. Terminal Block, General-Purpose:
- a. Rated Voltage: 600V ac.
 - b. Rated Current: 30 amp.
 - c. Wire Size: 22 AWG to 10 AWG.
 - d. Rated Wire Size: 10 AWG.
 - e. Color: Grey body.
 - f. Spacing: 0.25 inch, maximum.
 - g. Test Sockets: One screw test socket 0.079-inch diameter.
 - h. Manufacturer and Product: Entrelec; Type M4/6.T.
4. Terminal Block, Ground:
- a. Wire Size: 22 AWG to 12 AWG.
 - b. Rated Wire Size: 12 AWG.
 - c. Color: Green and yellow body.
 - d. Spacing: 0.25 inch, maximum.
 - e. Grounding: Ground terminal blocks electrically grounded to the mounting rail.
 - f. Manufacturer and Product: Entrelec; Type M4/6.P.
5. Terminal Block, Fused, 24V dc:
- a. Rated Voltage: 600V dc.
 - b. Rated Current: 16-amp.

- c. Wire Size: 22 AWG to 10 AWG.
 - d. Rated Wire Size: 10 AWG.
 - e. Color: Grey body.
 - f. Fuse: 0.25 inch by 1.25 inches.
 - g. Indication: LED diode 24V dc.
 - h. Spacing: 0.512 inch, maximum.
 - i. Manufacturer and Product: Entrelec; Type M10/13T.SFL.
6. Terminal Block, Fused, 120V ac:
- a. Rated Voltage: 600V ac.
 - b. Rated Current: 16-amp.
 - c. Wire Size: 22 AWG to 10 AWG.
 - d. Rated Wire Size: 10 AWG.
 - e. Color: Grey body.
 - f. Fuse: 0.25 inch by 1.25 inches.
 - g. Indication: Neon Lamp 110V ac.
 - h. Leakage Current: 1.8 mA, maximum.
 - i. Spacing: 0.512 inch, maximum
 - j. Manufacturer and Product: Entrelec; Type M10/13T.SFL.

F. Grounding of Enclosures:

- 1. Furnish isolated copper grounding bus for signal and shield ground connections.
- 2. Ground bus grounded at a common signal ground point in accordance with National Electrical Code requirements.
- 3. Single Point Ground for Each Analog Loop:
 - a. Locate at dc power supply for loop.
 - b. Use to ground wire shields for loop.
- 4. Ground terminal block rails to ground bus.

G. Analog Signal Isolators: Furnish signal isolation for analog signals that are sent from one enclosure to another. Do not wire in series instruments on different panels, cabinets, or enclosures.

H. Power Distribution Within Panels:

- 1. Feeder Circuits:
 - a. One or more 120V ac, 60-Hz feeder circuits as shown on Drawings.
 - b. Make provisions for feeder circuit conduit entry.
 - c. Furnish terminal board for termination of wires.
- 2. Power Panel: Furnish main circuit breaker and a circuit breaker on each individual branch circuit distributed from power panel.
 - a. Locate to provide clear view of and access to breakers when door is open.

- b. Breaker Sizes: Coordinate such that fault in branch circuit will blow only branch breaker but not trip the main breaker.
 - 1) Branch Circuit Breaker: 15 amps at 250V ac.
 - c. Breaker Manufacturers and Products: Refer to Division 26, Electrical.
 - 3. Circuit Wiring: P&IDs and Control Diagrams on Drawings show function only. Use following rules for actual circuit wiring:
 - a. Devices on Single Circuit: 20, maximum.
 - b. Multiple Units Performing Parallel Operations: To prevent failure of any single branch circuit from shutting down entire operation, do not group all units on same branch circuit.
 - c. Branch Circuit Loading: 12 amperes continuous, maximum.
 - d. Panel Lighting and Service Outlets: Put on separate 15-amp, 120V ac branch circuit.
 - e. Provide 120V ac plugmold for panel components with line cords.
- I. Signal Distribution:
 - 1. Within Panels: 4 mA to 20 mA dc signals may be distributed as 1 to 5V dc.
 - 2. Outside Panels: Isolated 4 mA to 20 mA dc only.
 - 3. All signal wiring twisted in shielded pairs.
- J. Relays:
 - 1. General:
 - a. Relay Mounting: Plug-in type socket.
 - b. Relay Enclosure: Furnish dust cover.
 - c. Socket Type: Screw terminal interface with wiring.
 - d. Socket Mounting: Rail.
 - e. Provide holddown clips.
 - 2. Signal Switching Relay:
 - a. Type: Dry circuit.
 - b. Contact Arrangement: 2 Form C contacts.
 - c. Contact Rating: 0 to 5 amps at 28V dc or 120V ac.
 - d. Contact Material: Gold or silver.
 - e. Coil Voltage: As noted or shown.
 - f. Coil Power: 0.9 watts (dc), 1.2VA (ac).
 - g. Expected Mechanical Life: 10,000,000 operations.
 - h. Expected Electrical Life at Rated Load: 100,000 operations.
 - i. Indication Type: Neon or LED indicator lamp.
 - j. Seal Type: Hermetically sealed case.
 - k. Manufacturer and Product: Potter and Brumfield; Series KH/KHA.
 - 3. Control Circuit Switching Relay, Nonlatching:
 - a. Type: Compact general-purpose plug-in.

- b. Contact Arrangement: 3 Form C contacts.
- c. Contact Rating: 10A at 28V dc or 240V ac.
- d. Contact Material: Silver cadmium oxide alloy.
- e. Coil Voltage: As noted or shown.
- f. Coil Power: 1.8 watts (dc), 2.7VA (ac).
- g. Expected Mechanical Life: 10,000,000 operations.
- h. Expected Electrical Life at Rated Load: 100,000 operations.
- i. Indication Type: Neon or LED indicator lamp.
- j. Push to test button.
- k. Manufacturer and Product: Potter and Brumfield; Series KUP.

K. Power Supplies:

- 1. Furnish to power instruments requiring external dc power, including two-wire transmitters and dc relays.
- 2. Convert 120V ac, 60-Hz power to dc power of appropriate voltage(s) with sufficient voltage regulation and ripple control to assure that instruments being supplied can operate within their required tolerances.
- 3. Provide output over voltage and over current protective devices to:
 - a. Protect instruments from damage due to power supply failure.
 - b. Protect power supply from damage due to external failure.
- 4. Enclosures: NEMA 1 in accordance with NEMA 250.
- 5. Mount such that dissipated heat does not adversely affect other components.
- 6. Fuses: For each dc supply line to each individual two-wire transmitter.
 - a. Type: Indicating.
 - b. Mount so fuses can be easily seen and replaced.

L. Internal Panel Lights for Freestanding Panels:

- 1. Type: Switched 100-watt incandescent back-of-panel lights.
- 2. Quantity: One light for every 4 feet of panel width.
- 3. Mounting: Inside and in the top of back-of-panel area.
- 4. Protective metal shield for lights.

M. Service Outlets for Freestanding Panels:

- 1. Type: Three-wire, 120-volt, 15-ampere, GFCI duplex receptacles.
- 2. Quantity:
 - a. For panels 4 feet wide and smaller: One.
 - b. For panels wider than 4 feet: One for every 4 feet of panel width, two minimum per panel.
- 3. Mounting: Evenly spaced along back-of-panel area.

N. Internal Panel Lights and Service Outlets for Smaller Panels:

1. Internal Panel Light: Switched 100-watt incandescent light.
2. Service Outlet: Breaker protected 120-volt, 15-amp, GFCI duplex receptacle:
3. Required for all following panels.

O. Standard Pushbutton Colors and Inscriptions: Use following color code and inscriptions for pushbuttons, unless otherwise noted on Drawings.

Tag Function	Inscription(s)	Color
OO	ON OFF	Black Black
OC	OPEN CLOSE	Black Black
OCA	OPEN CLOSE AUTO	Black Black Black
OOA	ON OFF AUTO	Black Black Black
MA	MANUAL AUTO	Black Black
SS	START STOP	Black Black
RESET	RESET	Black
EMERGENCY STOP	EMERGENCY STOP	Red

1. Lettering Color:
 - a. Black on white and yellow buttons.
 - b. White on black, red, and green buttons.

P. Standard Light Colors and Inscriptions: Use following color code and inscriptions for service legends and lens colors for indicating lights, unless otherwise noted on Drawings.

Tag Function	Inscription(s)	Color
ON	ON	Red
OFF	OFF	Green
OPEN	OPEN	Red
CLOSED	CLOSED	Green
LOW	LOW	Green

Tag Function	Inscription(s)	Color
FAIL	FAIL	Amber
HIGH	HIGH	Red
AUTO	AUTO	White
MANUAL	MANUAL	Yellow
LOCAL	LOCAL	White
REMOTE	REMOTE	Yellow

1. Lettering Color:
 - a. Black on white and amber lenses.
 - b. White on red and green lenses.

2.05 MULTIMODE FIBER OPTIC CABLE

- A. General 62.5-micron, graded-index for use in backbone and horizontal distribution subsystems, meets or exceeds the requirements of TIA 568-C.3, including the following specifications:
 1. Maximum Mean Fiber Loss:
 - a. 3.5 dB per km at 850 nm.
 - b. 1.5 dB per km at 1,300 nm.
 2. Minimum OFL Bandwidth:
 - a. OM1-200 MHz•km minimum at 850 nm; TIA 492AAAB.
 - b. 500 MHz•km minimum at 1,300 nm.
 3. Distance Capacity per IEEE 802.3:
 - a. 100Mbit Ethernet: OM2300m at 850 nm and 2000m at 1,310 nm.
 - b. 1 gbit Ethernet:
 - 1) OM1: 300m at 850 nm and 550 at 1,310 nm.
 - c. 10 gbit Ethernet—10km at 850 nm and 40km at 1,310 nm:
 - 1) OM1: 33m at 850 nm and 300 at 1,310 nm.
- B. Type 62.5 OM1, Indoor/Outdoor Cable, requirements in addition to general requirements above:
 1. Individual Fibers: 62.5/125/250/900 microns.
 2. Assembly:
 - a. Distribution Style with core of individually tight-buffered fibers surrounded by nonmetallic sheath.
 - b. Cable: Comply with ICEA S-83-596.
 3. Protective Covering: Flame retardant, oil resistant, chemical resistant, and water resistant fluoropolymer outer jacket.
 4. NEC/UL Listing: OFNP.

5. Manufacturers and Products:
 - a. Corning Freedm One Riser Cables.
 - b. Corning Freedm One Plenum Cables.
 - c. No substitutes.

2.06 FIBER OPTIC CONNECTORS

A. General:

1. Connect all fibers and terminate at equipment and patch panels.
2. Comply with TIA/EIA 604-2, TIA/EIA 604-3, TIA/EIA 604-12, and TIA 568-C.3.
3. SC connectors or as required for proper mating connection.
4. Pull Strength: 0.2 N minimum.
5. Durability: Sustain minimum 500 mating cycles without violating other requirements.
 - a. Ferrules: Free-floating low loss ceramic.
 - b. Polarizing key on duplex connector systems.
6. Attenuation:
 - a. In accordance with TIA 568-C.3.
 - b. Maximum of 0.5 dB per connector pair.
7. Manufacturers:
 - a. Corning.
 - b. Ortronics.
 - c. AMP Netconnect.

2.07 SPARE PARTS

Description	Percent of Each Type and Size Used	No Less Than
dc power supplies	20	2
Fuses	20	5
Indicating light bulb	20	10
Relays	20	3
Terminal Blocks	10	10
Hand Switches	10	5

2.08 FABRICATION

A. General:

1. Panels with external dimensions and instruments arrangement as shown on Drawings.

2. Panel Construction and Interior Wiring: In accordance with the National Electrical Code, state and local codes, NEMA, ANSI, UL, and ICECA.
 3. Fabricate panels, install instruments, wire, and plumb, at the PIC factory.
 4. Electrical Work: In accordance with Division 26, Electrical.
- B. Factory Assembly: Assemble panels at the manufacturer's factory. No fabrication other than correction of minor defects or minor transit damage shall be done on panels at Site.
- C. UL Listing Mark for Enclosures: Mark stating "Listed Enclosed Industrial Control Panel" per UL 508A.
- D. Wiring Within PIC Panels:
1. Restrain by plastic ties or ducts or metal raceways.
 2. Hinge Wiring: Secure at each end so that bending or twisting will be around longitudinal axis of wire. Protect bend area with sleeve.
 3. Arrange wiring neatly, cut to proper length, and remove surplus wire.
 4. Abrasion protection for wire bundles which pass through holes or across edges of sheet metal.
 5. Connections to Screw Type Terminals:
 - a. Locking-fork-tongue or ring-tongue lugs.
 - b. Use manufacturer's recommended tool with required sized anvil to make crimp lug terminations.
 - c. Wires terminated in a crimp lug, maximum of one.
 - d. Lugs installed on a screw terminal, maximum of two.
 6. Connections to Compression Clamp Type Terminals:
 - a. Strip, prepare, and install wires in accordance with terminal manufacturer's recommendations.
 - b. Wires installed in a compression screw and clamp, maximum of one for field wires entering enclosure, otherwise maximum of two.
 7. Splicing and tapping of wires, allowed only at device terminals or terminal blocks.
 8. Terminate 24V dc and analog signal circuits on separate terminal block from ac circuit terminal blocks.
 9. Separate analog and dc circuits by at least 6 inches from ac power and control wiring, except at unavoidable crossover points and at device terminations.
 10. Arrange wiring to allow access for testing, removal, and maintenance of circuits and components.
 11. Plastic Wire Ducts Fill: Do not exceed manufacturer's recommendation.

E. Temperature Control:

1. Freestanding Panels:
 - a. Non-ventilated Panels: Size to adequately dissipate heat from equipment mounted inside panel or on panel.
 - b. Ventilated Panels:
 - 1) Furnish with louvers and forced ventilation as required to prevent temperature buildup from equipment mounted inside panel or on panel.
 - 2) For panels with backs against wall, furnish louvers on top and bottom of panel sides.
 - 3) For panels without backs against wall, furnish louvers on top and bottom of panel back.
 - 4) Louver Construction: Stamped sheet metal.
 - 5) Ventilation Fans:
 - a) Furnish where required to provide adequate cooling.
 - b) Create positive internal pressure within panel.
 - c) Fan Motor Power: 120V ac, 60-Hz, thermostatically controlled.
 - 6) Air Filters: Washable aluminum, Hoffman Series A-FLT.
2. Refrigerated System: Furnish where heat dissipation cannot be adequately accomplished with natural convection or forced ventilation. Smaller Panels (that are not freestanding): Size to adequately dissipate heat from equipment mounted inside panel or in panel face.
3. Space Heaters:
 - a. Thermostatically controlled to maintain internal panel temperatures above dew point.
 - b. Required for following panels: All.

F. Freestanding Panel Construction:

1. Materials: Sheet steel, unless otherwise shown on Drawings with minimum thickness of 10-gauge, unless otherwise noted.
2. Panel Fronts:
 - a. Fabricated from a single piece of sheet steel, unless otherwise shown on Drawings.
 - b. No seams or bolt heads visible when viewed from front.
 - c. Panel Cutouts: Smoothly finished with rounded edges.
 - d. Stiffeners: Steel angle or plate stiffeners or both on back of panel face to prevent panel deflection under instrument loading or operation.
3. Internal Framework:
 - a. Structural steel for instrument support and panel bracing.
 - b. Permit panel lifting without racking or distortion.
4. Lifting rings to allow simple, safe rigging and lifting of panel during installation.

5. Adjacent Panels: Securely bolted together so front faces are parallel.
6. Doors: Full height, fully gasketed access doors where shown on Drawings.
 - a. Latches: Three-point, Southco Type 44.
 - b. Handles: "D" ring, foldable type.
 - c. Hinges: Full length, continuous, piano type, steel hinges with stainless steel pins.
 - d. Rear Access Doors: Extend no further than 24 inches beyond panel when opened to 90-degree position.
 - e. Front and Side Access Doors: As shown on Drawings.

G. Non-freestanding Panel Construction:

1. Based on environmental design requirements required and referenced in Article Environmental Requirements, provide the following:
 - a. For panels listed as inside, air conditioned:
 - 1) Enclosure Type: NEMA 12 in accordance with NEMA 250.
 - 2) Materials: Steel.
 - b. For all other panels:
 - 1) Enclosure Type: NEMA 4X in accordance with NEMA 250.
 - 2) Materials: Type 316 stainless steel.
2. Metal Thickness: 14-gauge, minimum.
3. Doors:
 - a. Rubber-gasketed with continuous hinge.
 - b. Stainless steel lockable quick-release clamps.
4. Manufacturers:
 - a. Hoffman Engineering Co.
 - b. Rittal.

H. Factory Finishing:

1. Enclosures:
 - a. Stainless Steel and Aluminum: Not painted.
 - b. Nonmetallic Panels: Not painted.
 - c. Steel Panels:
 - 1) Sand panel and remove mill scale, rust, grease, and oil.
 - 2) Fill imperfections and sand smooth.
 - 3) Paint panel interior and exterior with one coat of epoxy coating metal primer, two finish coats of two-component type epoxy enamel.
 - 4) Sand surfaces lightly between coats.
 - 5) Dry Film Thickness: 3 mils, minimum.
2. Manufacturer's standard finish color, except where specific color is indicated. If manufacturer has no standard color, finish equipment with light gray color.

2.09 CORROSION PROTECTION

- A. Corrosion-Inhibiting Vapor Capsule Manufacturers:
 - 1. Northern Instruments; Model Zerust VC.
 - 2. Hoffmann Engineering Co; Model A-HCI.

2.10 SOURCE QUALITY CONTROL

- A. Scope: Inspect and test entire PIC to ensure it is ready for shipment, installation, and operation.
- B. Location: Manufacturer's factory or Engineer approved staging Site.
- C. Test: Exercise and test all functions.
- D. Temporary PLC software configuring to allow PLC testing.

2.11 ELECTRICAL TRANSIENT PROTECTION

- A. General:
 - 1. Function: Protect elements of PIC against damage due to electrical transients induced in interconnecting lines by lightning and nearby electrical systems.
 - 2. Implementation: Provide, install, coordinate, and inspect grounding of surge suppressors at:
 - a. Connection of ac power to PIC equipment including panels, consoles assemblies, and field mounted analog transmitters and receivers.
 - b. At the field and panel, console, or assembly connection of signal circuits that have portions of the circuit extending outside of a protective building.
 - 3. Construction: First-stage high energy metal oxide varistor and second-stage bipolar silicon avalanche device separated by series impedance. Includes grounding wire, stud, or terminal.
 - 4. Response: 5 nanoseconds maximum.
 - 5. Recovery: Automatic.
 - 6. Temperature Range: Minus 20 degrees C to plus 85 degrees C.
- B. Suppressors on 120V ac Power Supply Connections:
 - 1. Occurrences: Tested and rated for a minimum of 50 occurrences of IEEE 587 Category B test waveform.
 - 2. First-Stage Clamping Voltage: 350 volts or less.
 - 3. Second-Stage Clamping Voltage: 210 volts or less.

4. Continuous Operation: Power supplies for one four-wire transmitter or receiver: 5 amps minimum at 130V ac. All other applications: 30 amps minimum at 130V ac.

C. Suppressors on Analog Signal Lines:

1. Test Waveform: Linear 8 microsecond rise in current from 0 amps to a peak current value followed by an exponential decay of current reaching one half the peak value in 20 microseconds.
2. Surge Rating: Tested and rated for 50 occurrences of 2,000-amp peak test waveform.
 - a. dc Clamping Voltage: 20 to 40 percent above operating voltage for circuit.
 - b. dc Clamping Voltage Tolerance: Less than plus or minus 10 percent.
 - c. Maximum Loop Resistance: 18 ohms per conductor.

D. Physical Characteristics:

1. Mounted in Enclosures: Encapsulated in flame retardant epoxy.
2. For Analog Signals Lines: EDCO PC-642 or SRA-64 series.
3. For 120V ac Lines: EDCO HSP-121.
4. Field Mounted at Two-Wire Instruments: Encapsulated in stainless steel pipe nipples. EDCO SS64 series.
5. Field Mounted at Four-Wire Instruments: With 120V ac outlet, ac circuit breaker, and 10-ohm resistors on signal lines, all in enclosure.
 - a. Enclosure: NEMA 4X fiberglass or Type 316 stainless steel with door.
 - 1) Maximum Size: 12 inches by 12 inches by 8 inches deep.
 - b. Manufacturer and Product: EDCO; SLAC series.

- E. Installation and Grounding of Suppressors: As shown. See Surge Suppressor Installation Details. Grounding equipment, installation of grounding equipment, and terminations for field mounted devices are provided under Division 26, Electrical.

PART 3 EXECUTION

3.01 EXAMINATION

- A. For equipment not provided by PIC, but that directly interfaces with the PIC, verify the following conditions:
1. Proper installation.
 2. Calibration and adjustment of positioners and I/P transducers.
 3. Correct control action.

4. Switch settings and dead bands.
5. Opening and closing speeds and travel stops.
6. Input and output signals.

3.02 INSTALLATION

- A. Material and Equipment Installation: Retain a copy of manufacturers' instructions at Site, available for review at all times.
- B. Electrical Wiring: As specified in Division 26, Electrical.
- C. Mechanical Systems:
 1. Drawings for PIC Mechanical Systems are diagrammatic and not intended to specifically define element locations or piping and tubing run lengths. Base materials and installations on field measurements.
 2. Copper and Stainless Steel Tubing Support: Continuously supported by an aluminum tubing raceway system.
 3. Plastic Tubing Supports: Except as shown on Drawings, provide continuous support in conduits or by aluminum tubing raceway system.
 4. Install tubing conduit for plastic tubing and tubing raceways parallel with, or at right angles to, structural members of buildings. Make vertical runs straight and plumb.
 5. Tubing and Conduit Bends:
 - a. Tool-formed without flattening, and all of same radius.
 - b. Bend Radius: Equal to or larger than conduit and tubing manufacturer's recommended minimum bend radius.
 - c. Slope instrument connection tubing in accordance with installation details.
 - d. Do not run liquid filled instrument tubing immediately over or within a 3-foot plan view clearance of electrical panels, motor starters, or mechanical mounting panel without additional protection. Where tubing must be located in these zones, shield electrical device to prevent water access to electrical equipment.
 - e. Straighten coiled tubing by unrolling on flat surface. Do not pull to straighten.
 - f. Cut tubing square with sharp tubing cutter. Deburr cuts and remove chips. Do not gouge or scratch surface of tubing.
 - g. Blow debris from inside of tubing.
 - h. Make up and install fittings in accordance with manufacturer's recommendations. Verify makeup of tube fittings with manufacturer's inspection gauge.
 - i. Use lubricating compound or TFE tape on stainless steel threads to prevent seizing or galling.
 - j. Run tubing to allow, for example, clear access to doors, controls, and control panels; and to allow for easy removal of equipment.

- k. Provide separate support for components in tubing runs.
 - l. Supply expansion loops and use adapters at pipe, valve, or component connections for proper orientation of fitting.
 - m. Keep tubing and conduit runs at least 12 inches from hot pipes.
 - n. Locate and install tubing raceways in accordance with manufacturer's recommendations. Locate tubing to prevent spillage, overflow, or dirt from above.
 - o. Securely attach tubing raceways to building structural members.
6. Enclosure Lifting Rings: Remove rings following installation and plug holes.

D. Removal or Relocation of Materials and Equipment:

- 1. Remove from Site materials that were part of the existing facility but are no longer used, unless otherwise directed by Engineer to deliver to Owner.
- 2. Repair affected surfaces to conform to type, quality, and finish of surrounding surface.

3.03 FIELD QUALITY CONTROL

A. Startup and Testing Team:

- 1. Thoroughly inspect installation, termination, and adjustment for components and systems.
- 2. Complete onsite tests.
- 3. Complete onsite training.
- 4. Provide startup assistance.

B. Operational Readiness Inspections and Calibrations: Prior to startup, inspect and test to ensure that entire PIC is ready for operation.

- 1. Loop/Component Inspections and Calibrations:
 - a. Check PIC for proper installation, calibration, and adjustment on a loop-by-loop and component-by-component basis.
 - b. Prepare component calibration sheet for each active component (except simple hand switches, lights, gauges, and similar items).
 - 1) Project name.
 - 2) Loop number.
 - 3) Component tag number.
 - 4) Component code number.
 - 5) Manufacturer for elements.
 - 6) Model number/serial number.
 - 7) Summary of functional requirements, for example:
 - a) Indicators and recorders, scale and chart ranges.

- b) Transmitters/converters, input and output ranges.
 - c) Computing elements' function.
 - d) Controllers, action (direct/reverse) and control modes (PID).
 - e) Switching elements, unit range, differential (fixed/adjustable), reset (auto/manual).
- 8) Calibrations, for example:
- a) Analog Devices: Actual inputs and outputs at 0, 10, 50, and 100 percent of span, rising and falling.
 - b) Discrete Devices: Actual trip points and reset points.
 - c) Controllers: Mode settings (PID).
- 9) Space for comments.
- c. These inspections and calibrations will be spot checked by Engineer.

C. Performance Acceptance Tests (PAT):

1. General:
- a. Test all PIC elements to demonstrate that PIC satisfies all requirements.
 - b. Test Format: Cause and effect.
 - 1) Person conducting test initiates an input (cause).
 - 2) Specific test requirement is satisfied if correct result (effect) occurs.
 - c. Procedures, Forms, and Checklists:
 - 1) Conduct tests in accordance with, and documented on, Engineer accepted procedures, forms, and checklists.
 - 2) Describe each test item to be performed.
 - 3) Have space after each test item description for sign off by appropriate party after satisfactory completion.
 - d. Required Test Documentation: Test procedures, forms, and checklists. All signed by Engineer and Contractor.
 - e. Conducting Tests:
 - 1) Provide special testing materials, equipment, and software.
 - 2) Wherever possible, perform tests using actual process variables, equipment, and data.
 - 3) If it is not practical to test with real process variables, equipment, and data, provide suitable means of simulation.
 - 4) Define simulation techniques in test procedures.
 - f. Coordinate PIC testing with Owner and affected Subcontractors.
 - 1) Excessive Test Witnessing: Refer to Supplementary Conditions.
2. Test Requirements:
- a. Once facility has been started up and is operating, perform a witnessed PAT on complete PIC to demonstrate that it is

- operating as required. Demonstrate each required function on a paragraph-by-paragraph and loop-by-loop basis.
- b. Perform local and manual tests for each loop before proceeding to remote and automatic modes.
 - c. Where possible, verify test results using visual confirmation of process equipment and actual process variable. Unless otherwise directed, exercise and observe devices supplied by others, as needed to verify correct signals to and from such devices and to confirm overall system functionality. Test verification by means of disconnecting wires or measuring signal levels is acceptable only where direct operation of plant equipment is not possible.
 - d. Make updated versions of documentation required for PAT available to Engineer at Site, both before and during tests.
 - e. Make one copy of O&M manuals available to Engineer at the Site both before and during testing.
 - f. Refer to referenced examples of PAT procedures and forms in Article Supplements.

3.04 TRAINING

A. General:

1. Provide an integrated training program to meet specific needs of Owner's personnel.
2. Include training sessions, classroom and field, for managers, engineers, operators, and maintenance personnel.
3. Provide instruction on one working shift(s) as needed to accommodate the Owner's personnel schedule.
4. Owner reserves the right to make and reuse video tapes of training sessions.

B. Operations and Maintenance Training:

1. Include a review of O&M manuals and survey of spares, expendables, and test equipment.
2. Use equipment similar to that provided or currently owned by Owner.
3. Provide training suitable for instrument technicians with at least a 2-year associate engineering or technical degree, or equivalent education and experience in electronics or instrumentation.

C. Operations Training:

1. Training Session Duration: One 8-hour instructor days per site.
2. Number of Training Sessions: One per site.
3. Location: Sites.
4. Content: Conduct training on loop-by-loop basis.

- a. Loop Functions: Understanding of loop functions, including interlocks for each loop.
- b. Loop Operation: For example, adjusting process variable setpoints, AUTO/MANUAL control transfer, AUTO and MANUAL control, annunciator acknowledgement and resetting.
- c. Interfaces with other control systems.

D. Maintenance Training:

- 1. Training Session Duration: One 8-hour instructor days per site.
- 2. Number of Training Sessions: One per site.
- 3. Location: Project Sites.
- 4. Content: Provide training for each type of component and function provided.
 - a. Loop Functions: Understanding details of each loop and how they function.
 - b. Component calibration.
 - c. Adjustments: For example, controller tuning constants, current switch trip points, and similar items.
 - d. Troubleshooting and diagnosis for components.
 - e. Replacing lamps, chart paper, fuses.
 - f. Component removal and replacement.
 - g. Periodic maintenance.

3.05 CLEANING/ADJUSTING

- A. Repair affected surfaces to conform to type, quality, and finish of surrounding surface.
- B. Cleaning:
 - 1. Prior to closing system using tubing, clear tubing of interior moisture and debris.
 - 2. Upon completion of Work, remove materials, scraps, and debris from interior and exterior of equipment.

3.06 PROTECTION

- A. Protect enclosures and other equipment containing electrical, instrumentation and control devices, including spare parts, from corrosion through the use of corrosion-inhibiting vapor capsules.
- B. Periodically replace capsules in accordance with capsule manufacturer's recommendations. Replace capsules just prior to Final Payment and Acceptance.

3.07 SUPPLEMENTS

A. Supplements listed below, following “End of Section,” are part of this Specification.

1. Filter Backwash Sequence

END OF SECTSOUION

COMPANY INFORMATION
ITB #1768-B: Instrumentation & Control for Process System
South Fayette Water Treatment Plant

Company Name: _____

Physical Address: _____

Mailing Address (if different): _____

AUTHORIZED REPRESENTATIVE

Signature: _____

Printed or Typed Name: _____

Title: _____

Email Address: _____

Phone Number: _____ Fax Number: _____

PROJECT CONTACT PERSON

Name: _____

Title: _____

Office Number: _____ Cellular Number: _____

Email Address: _____

REFERENCES

**ITB #1768-B: Instrumentation & Control for Process System
South Fayette Water Treatment Plant**

Please list three (3) references for current or recent customers who can verify the quality of service your company provides. Projects of similar size and scope are preferable.

1. Government/Company Name _____

City & State _____

Work or Service Provided _____

Approximate Completion Date _____

Contact Person and Title _____

Phone _____ Email _____

2. Government/Company Name _____

City & State _____

Work or Service Provided _____

Approximate Completion Date _____

Contact Person and Title _____

Phone _____ Email _____

3. Government/Company Name _____

City & State _____

Work or Service Provided _____

Approximate Completion Date _____

Contact Person and Title _____

Phone _____ Email _____

COMPANY NAME _____

PRICING SHEET

ITB #1768-B: Instrumentation & Control for Process Systems

Responder agrees to perform all the work described in the Contract documents for the following prices:

Base Bid \$ _____

Allowance \$ 15,000

Total Bid \$ _____

NOTE:

All applicable charges shall be included in your quoted price. No additional charges will be allowed after the quote received by date and time.

Specify make of the PIC System Integrator (from list on page 49 90 01 _____)

State time needed to commence work after notice to proceed is issued _____ Days.

State time needed to complete work _____ Days.

State the warranty offered _____

COMPANY'S NAME _____

EXCEPTIONS TO SPECIFICATIONS
ITB #1768-B: Instrumentation & Control for Process System
South Fayette Water Treatment Plant

Please list below any exceptions or clarifications to the specifications of this bid. Explain any exceptions in full.

COMPANY NAME: _____

Contractor Affidavit under O.C.G.A. § 13-10-91(b)(1)

By executing this affidavit, the undersigned contractor verifies its compliance with O.C.G.A. § 13-10-91, stating affirmatively that the individual, firm or corporation which is engaged in the physical performance of services on behalf of Fayette County, Georgia has registered with, is authorized to use and uses the federal work authorization program commonly known as E-Verify, or any subsequent replacement program, in accordance with the applicable provisions and deadlines established in O.C.G.A. § 13-10-91. Furthermore, the undersigned contractor will continue to use the federal work authorization program throughout the contract period and the undersigned contractor will contract for the physical performance of services in satisfaction of such contract only with subcontractors who present an affidavit to the contractor with the information required by O.C.G.A. § 13-10-91(b). Contractor hereby attests that its federal work authorization user identification number and date of authorization are as follows:

Federal Work Authorization User Identification Number

Date of Authorization

Name of Contractor

#1768-B: Instrumentation & Controls for Process Systems

Name of Project

Fayette County Georgia

Name of Public Employer

I hereby declare under penalty of perjury that the foregoing is true and correct.

Executed on _____, _____, 2020 in (city) _____, (state) _____

Signature of Authorized Officer or Agent

Printed Name and Title of Authorized Officer or Agent

SUBSCRIBED AND SWORN BEFORE ME
ON THIS THE _____ DAY OF _____, 2020

NOTARY PUBLIC

My Commission Expires:
