



Goodwyn Mills Cawood
11 North Water Street
Suite 15250
Mobile, Alabama 36602
T 251.460.4006
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FASCIMILE TRANSMITTAL COVER SHEET

DATE: April 22, 2024
TO: Doris Furr
FROM: Planholder
PROJECT: POARCH BAND OF CREEK INDIANS
THC LAB RELOCATION AND RENOVATIONS
GMC PROJECT NO. AMOB230151
RE: ADDENDUM NO. 2 AND ACKNOWLEDGEMENT OF RECEIPT OF ADDENDUM NO. 2

ACKNOWLEDGEMENT OF RECEIPT:

PLEASE PRINT RECIPIENT'S NAME, FIRM, AND DATE RECEIVED.

THEN FAX BACK TO (251) 460-4423 or EMAIL doris.furr@gmcnetwork.com
FOR OUR RECORDS AND TO ACKNOWLEDGE YOUR RECEIPT OF THIS ADDENDUM.

NAME (PLEASE PRINT)

FIRM (PLEASE PRINT)

DATE RECEIVED (PLEASE PRINT)

ADDENDUM NUMBER 2

April 22, 2024

**PROJECT:
POARCH BAND OF CREEK INDIANS
THC LAB RELOCATION AND RENOVATIONS
GMC PROJECT NO. AMOB230151**

AD2-1 CLARIFICATIONS / RFI RESPONSES / ADDITIONS / ETC.:

- A. Bidders shall acknowledge receipt of the Addendum in writing, as provided on the Acknowledgment Receipt.
- B. A copy of the pre-bid agenda and meeting minutes as well as the sign in sheet are attached.
- C. Replace specification 230900 INSTRUMENTATION AND CONTROLS in its entirety. This specification was updated to have contractor provide siemens controls for new equipment to match and integrate into the existing system in the building.

AD2-2 ISSUED SPECIFICATIONS:

- A. Replace specification 230900 INSTRUMENTATION AND CONTROLS in its entirety.

AD2-3 ISSUED DRAWINGS:

- A. None

AD2-4 ATTACHMENTS:

- A. Pre-Bid Meeting Agenda/Minutes
- B. Pre-Bid Sign In Sheet
- C. 230900 INSTRUMENTATION AND CONTROLS

END OF ADDENDUM

PREPARED BY

Goodwyn Mills Cawood, LLC
11 North Water Street, Suite 15250
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**PRE-BID CONFERENCE AGENDA
THC LAB RELOCATION AND RENOVATIONS
For POARCH BAND OF CREEK INDIANS
GMC PROJECT NO. AMOB230151
Tuesday, April 16, 2024, 2:00 PM LOCAL TIME**

Note: *This Agenda is complimentary, for general use as an outline and for discussion during this meeting. Any errors, omissions, or clarifications shall be communicated to the Architect for distribution. This Agenda does not attempt to be, nor represent, any recapitulation of Project requirements, and does not change or alter same in any respect; Changes, if any, will only be made by written Addendum.*

Introductions and opening remarks and reminder to sign-in on sheet being circulated.

1. Names and relationship to Project of local Owner personnel:

- Owner – Poarch Band of Creek Indians
- Owner’s Representatives – Lawrence Wilson, P.E. – Director of Public Works, Josh Burkett - PCI Construction Coordinator

2. Names of Architect personnel involved – Goodwyn Mills Cawood, LLC

- Project Architect/Manager – Jim Walker, AIA
- Project Designer – Sarah Downs
- Administrative Assistant – Doris Furr

3. Bid Time, Date, Place – indicated in Advertisement for Bids:

- Bids will be received and clocked in at 2:00 p.m. local time on May 9, 2024 at 466 Martin Road in Atmore, Alabama 36502, **Facilities Building. Bid Opening will be at 2:30.**
- Contractor’s responsibility to make sure Bid is received prior to bid time or they will not be accepted.

4. General Contractor’s State Licensing Requirements/ Qualifications:

- When the amount bid for a contract exceeds \$50,000, the bidder must be licensed by the State of Alabama Licensing Board for General Contractors and must show the Architect evidence of license before bidding or the bid will not be received by the Architect or considered by the Awarding Authority.

5. Bid Preparation / Bid Guaranty / Delivery of Bids:

- Bids shall be prepared pursuant to the Contract Documents, including but not limited to Bidding Requirements, Contract Forms, General Conditions, Special Conditions, Technical Specifications, Construction Drawings, and all Addenda.
- ALL information requested of the bidder on the Proposal form, including alternate bid prices and unit prices for separate items of Work, must be filled in. The form must be completed by typewriter or hand-printed ink.
- No alterations shall be made to the bid proposal unless modified by Addendum.

- Bids must be submitted on the Proposal Form as contained in the Bid Documents; only one copy is required to be submitted.
- Where indicated by the format of the Proposal Form, the bidder must specify lump sum prices in both words and figures. In case of discrepancy between the prices shown in words and in figures, the words shall govern.
- The Proposal Form must be accompanied by a cashier's check, or a Bid Bond.
- If a Bid Bond is provided, the bond shall be on the Bid Bond form as stipulated in the Bid Documents; executed by a surety company duly authorized and qualified to make such bonds in the State of Alabama, payable to the awarding authority.
- Cashier's check must be drawn on an Alabama bank, 5% of bid amount, not to exceed \$10,000.
- Each proposal and accompanying data must be enclosed in a sealed opaque envelope addressed to Poarch Band of Creek Indians, 466 Martin Road, Atmore, Alabama 36502, and identified on the outside with the Bidder's name, the Bidder's license number, and with the words "**Bid for the THC Lab Relocation and Renovations Project**". If the Bid is sent by mail, the sealed envelope must be enclosed in a separate mailing envelope with the notation "BID ENCLOSED" on the face thereof.
- A bid which has been sealed in its delivery envelope may be revised by writing the change in price on the outside of the delivery envelope over the signature and date of the bidder or the bidder's "authorized representative". Authorized Representative is defined as a person to whom the bidder has granted written authority to conduct business in the bidder's behalf by signing and/or modifying the bid. Such written authority shall be signed by the bidder and shall be attached to the Proposal Form.
- A bid that is not accompanied by data required by the Bid Documents, or a bid which is in any way incomplete, may be rejected. Any bid which contains any un-initialed alterations or erasures, or any bid which contains any additions, alternate bids, or conditions not called for, or any other irregularities of any kind, will be subject to rejection. Any Bids received after the time and date for receipt of bids will be returned unopened.

6. Performance and Payment Bonds:

- As per Requirements of Project Manual

7. Sales, Use, and Severance Tax Savings:

- All taxes, excise, duties, and assessments are the obligation of the Contractor concerning the Work, tangible personal property purchased for installation on the Tribe's federal trust land is exempt from sales tax provided certain criteria are met and the materials are delivered to the Tribe's Reservation; **Exception:** *Sales tax should not to be included in the proposal (bid) for qualifying materials delivered to and incorporated into the work on the Tribe's federal trust land.*

8. Addenda:

- Addenda No. 1 will include meeting minutes of Pre-Bid Meeting, the sign in sheet, and any pertinent discussion items.
- Any further addenda necessary after the Pre-Bid Meeting will be issued to all General Contractors which have picked up a set of contract documents.

9. Project NTP/Mobilization:

- The Official Notice to Proceed will be issued with the fully executed Contract.
- **NO WORK SHALL BEGIN ON PROJECT UNTIL INSURANCE CERTIFICATES ARE RECEIVED AND APPROVED BY PBCI.**

10. Project Observation & Site Visits:

- Conducted on average of once per week or as needed by the progress of construction.

11. Safety:

- The Contractor shall be responsible for all project safety. Neither the Architect, nor the Owner will be responsible for the Contractor's safety precautions, means, methods, techniques, sequences, or procedures. Contractor's personnel responsible for safety shall be OSHA certified.
- Safety fencing (as described in the contract documents) for project, including equipment and storage areas, shall be part of contractors means, methods, techniques, sequences, procedures; cost of any type fencing, barricades, construction tunnels, etc. necessary shall be incidental to project.

12. Existing Conditions / Constraints:

- As per Contract Documents.

13. Child Labor Law:

- All Contractors shall adhere to the federal child labor provisions, authorized by the Fair Labor Standards Act (FLSA) of 1938, also known as the child labor laws.

14. Explanations and Interpretations:

- Every General Contractor and every Subcontractor should read and be familiar with all the "front-end" documents and all of Division 1 of the Project Manual, in addition to the work they are bidding and must coordinate with.
- Before submitting a bid for the Work, the bidders shall carefully examine the Bid Documents, visit the site, and satisfy themselves as to the nature and location of the Work, and the general and local conditions, including weather, the general character of the site or building, the character and extent of existing work within or adjacent to the site and any other work being performed thereon at the time of submission of their bids.
- The Contract Documents shall be interpreted collectively, each part complementing the others and consistent with the Intent of the Contract Documents.
- If there is a conflict, discrepancy, or confusion between the plans and specifications for work, materials or equipment and the Contractor does not receive written clarification from the Architect prior to the opening of bids the Contractor shall include the better quality or greater quantity of Work in his/her bid.
- Written formal questions regarding the work shall be directed to the Architect in the form of an (RFI), Request for Information. All RFI's are to be sent to the architect thru the General Contractor.
- Communications by and with the Architect's consultants shall be through the Architect ONLY.

- Questions and clarification from prospective bidders will be made only by written Addenda sent to all prospective bidders. Questions and clarifications must be submitted in writing a minimum of 48 hours prior to bid.
- When the Bid Documents identify three or more sources and the list of sources is not followed by “or approved equal” or similar wording, the bidder’s proposal shall be based upon one of the identified sources, unless the bidder obtains “Pre-bid Approval” of another source. Acceptance of additional suppliers, manufacturers, and/or products in such instances shall be limited to those named, unless others are properly submitted at least 7-days prior to the Bid Date and subsequently accepted. Contractor should review the Contract Documents for proper submittal for consideration and review for pre-approvals.
- Acceptance will only be acknowledged by Addendum
- Submittals during construction other than those pre-qualified or pre-accepted will not be reviewed, but instead, returned for re-submittal, without exception.
- Each Bidder shall determine the number of sets of Contract Documents required for the construction of the specified work.

15. Insurance Requirements:

- Insurance requirements are included in the AIA Document A201 – 2017 Article 11. P and should be provided to each General Contractor’s and Subcontractor’s insurance carrier for review. Additional requirements are indicated in Section 01015 - SPECIAL CONDITIONS and should also be carefully reviewed and sent to insurance carriers for review.

PROJECT SPECIFIC REQUIREMENTS

16. Unit Prices (Specification Section 01026 for additional information):

- See Construction Documents, Description of Unit Prices, and Bid Form.
- Unit prices shall include all charges for labor and materials, fee, layout, supervision (field and office), general expenses, taxes, insurance, overhead and profit, for Unit Item of Work in place and complete.
- Bidders are requested to bid on all Unit Price Items indicated. Where a Unit Price does not involve a change in price, insert the words “No Change.” Bidders not desiring to bid a certain Unit Price should so indicate by the words “No Bid”. Bidders failing to bid all Unit Prices risk disqualification of their bid.

17. List of Subcontractors and Suppliers:

- Each bid shall have attached a list of major subcontractors and suppliers proposed for the principal parts of the work which is to be turned in with a copy of the Proposal Form on Bid Date, or at Contractor’s option, turned in to the Architect and Owner within 24-hours after receipt of Bids, with a copy to the Architect. Bidders failing to submit such list, as indicted, will be considered non-responsive and will be rejected; Bidder failing to submit a complete list may be rejected.
- Subcontractors listed and thereafter approved may not be changed without prior approval of the Owner and Architect.

18. Modification and Withdrawal:

- No bid may be withdrawn for a period of thirty (30) days after the submission of bids without the written consent of the Owner. The Owner reserves the right to reject any or all bids, or to waive any informality, and to award the contract to the lowest, responsible, responsive bidder.

19. Warranty:

- General Contractor one (1) year warranty for general construction
- Manufacturer's standard warranty per project specifications.

20. Permits, Licenses and Fees:

- A building permit will not be required for work performed on the Tribe's federal trust land.

21. Supervision:

- General Contractor shall provide a **FULL-TIME** Project Manager and Construction Superintendent for the duration of the Contract; the Project Manager/Superintendent shall have minimum of 10 years' experience specific to the work in this scope. Project and Owner references shall be provided prior to preconstruction meeting. Refer to General and Special Conditions for additional information and requirements, and minimum experience requirements.

22. Completion Time for Project:

- Base Bid Completion Time: **Each General Contractor shall provide the project completion time as part of their Bid and include where required on the Owner-provided Proposal Form.**

23. Detailed Construction Schedule/Extensions of Time Due to Weather:

- At the time the Contractor receives the signed Contract and the Notice to Proceed, he shall submit a Schedule of Work Progress to the Design Consultant which reflects the amount of time required for the Work and the deadline by which it can be expected to be completed. The Schedule must accurately reflect the date for Substantial Completion, and take into consideration any reasonable contingencies.

24. Liquidated Damages:

- Per General & Special Conditions of the Contract - \$250.00 per day for the first 10 calendar days that delivery is delayed beyond the Substantial Completion Date, and then an additional \$250.00 per day until such time the Contractor delivers the Project to the Owner in accordance with the Contract Documents, except for Minor Items.

25. Goodwyn Mills & Cawood, Inc. (Architect)

11 North Water Street, Suite 15250, Battle House Tower, Mobile, AL 36602

Phone: (251) 460-4006, Fax (251) 460-4423.

jim.walker@gmcnetwork.com

sarah.downs@gmcnetwork.com

doris.furr@gmcnetwork.com

26. OWNER COMMENTS:

27. QUESTIONS / COMMENTS:

28. NOTES:

END OF MEETING



Poarch Creek Indians Facilities Department
466 Martin Road *Atmore, Alabama 36502
(251) 368-9136



LAB PRE- BID MEETING

Bid Opening

Sign-in Sheet

APRIL 16, 2024

2:00pm

	<u>Name</u>	<u>Company & Title</u>
1.	Cady Bloch	Triptek
2.	Mark Pridges	Triptek
3.	David Chopman	Rolin
4.	Bill Davis	Pegs & William
5.	Jim Walker	GMC
6.	[Signature]	PCI - Food Actg
7.	Jashua Burkett	Facilities
8.	Nenjata Smith	GMC
9.	ANDY MAURIN	DELL CONSULTING
10.	Jack M. Davis	GMC

SECTION 230900

INSTRUMENTATION AND CONTROLS

PART 1 - GENERAL

1.1 Related Documents:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to this section.
- B. Division 23 Common Work Results for HVAC sections apply to work of this section.
- C. Extent of Energy Management Control and DDC Systems (EMCS/DDC) work required by this section is indicated on drawings and by requirements of this section. The EMCS/DDC shall consist of all thermostats, control sensors, controllers, software, relays, transformers, automatic valves, actuators, switches, panels, and necessary equipment and wiring to provide a complete and fully-functional system. Control sequences are specified on drawings.
- D. Refer to other Division 23 sections for installation of instrument wells and valve bodies in mechanical systems (not work of this section).
- E. Refer to Division 26 sections for power supply wiring from power source to power connection on controls and/or EMCS panels. Include starters, disconnects, and required electrical devices, except where specified as furnished, or factory-installed, by manufacturer.
- F. Provide the following electrical work as work of this section, complying with requirements of Division 26 sections: control wiring between field-installed controls, equipment, indicating devices, and EMCS/DDC panels.

1.2 Codes and Standards:

- A. Electrical Standards: Provide electrical products which have been tested, listed and labeled by UL and comply with NEMA standards.
- B. NEMA Compliance: Comply with NEMA standards pertaining to components and devices for electric control systems.
- C. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" where applicable to controls and control

sequences.

- D. FCC Compliance: Comply with Federal Communication Commission (FCC) as required.
- E. ASHRAE Standards: Comply with ASHRAE Standard 135-2016 “BACnet® - A Data Communication Protocol for Building Automation and Control Networks”.

1.3 Approval Submittals:

- A. Product Data: Submit manufacturer's technical product data for each EMCS/DDC panel and control device furnished, indicating dimensions, capacities, performance characteristics, electrical characteristics, finishes of materials. Include installation instructions and startup instructions. Provide technical specification data for each component and software module.
- B. Shop Drawings: Submit shop drawings for the EMCS/DDC containing the following information:
 - 1. Schematic flow diagram of system showing fans, coils, valves, and control devices.
 - 2. Indicate all required electrical wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed. The point-to-point wiring diagram shall show all interconnections.
 - 3. Provide details of faces of EMCS/DDC panels, including controls instruments and labeling.
 - 4. Include written description of sequence of operation.

1.4 Test Reports and Verification Submittals: Submit system verification letter from manufacturer's representative stating that all HVAC controls have been checked, calibrated, started up, and verified for proper operation. State that the Owner training has been completed and provide a roster of attendees.

1.5 O&M Data Submittals:

- A. Maintenance Data: Submit maintenance instructions and spare parts lists for each type of control device. Include that type data, and a copy of all approval submittals, in O&M Manual.
- B. Software: Submit a copy of all software.
- C. Service: Submit name, address, and telephone number of company that will provide service and training for the system.

PART 2 - PRODUCTS

- 2.1 Acceptable Manufacturers: Subject to compliance with requirements, provide EMCS/DDC control systems by: Siemens to match existing system.
- 2.2 General:
- A. Provide EMCS/DDC control products in sizes and capacities indicated, consisting of valves, sensors, controllers, and other components as required for complete installation. Except as otherwise indicated, provide manufacturer's standard control system components as indicated by published product information, designed and constructed as recommended by manufacturer. Provide an EMCS/DDC controls system with the following functional and construction features as indicated.
 - B. The control system specified is based on an electric/electronic design of direct digital control (DDC) and based on LonWorks or BACnet architecture. It is the intent of this specification to describe the basic architecture and performance requirements of the EMCS. All control components shall be new and the latest products of the manufacturer.
- 2.3 Quality Assurance:
- A. Provide equipment of firms regularly engaged in manufacture of EMCS/DDC equipment, of types required, whose products have been in satisfactory use in similar service for not less than three years. Provide evidence that software has been in use satisfactorily for at least one year.
 - B. Contractor shall have at least three years of experience in the installation and servicing of EMCS/DDC equipment similar to that being installed. Contractor shall have an office within 100 miles of the project and shall maintain a remote terminal capable of communication with the EMCS/DDC during the year warranty period. The local office shall have certified technicians capable of working on the installed system in order to service and warranty the installation. The local office shall also maintain a supply of spare parts.
- 2.4 EMCS/DDC Associated Components:
- A. Provide field-programmable microprocessor-based, stand-alone EMCS/DDC panels as specified herein. The EMCS/DDC panel manufacturer shall be responsible for the complete engineering of the panel. The panel shall be UL listed and housed in a key locked metal cabinet. Parts shall be plug in (modular) for easy repair or expansion. Power input shall be 24V or 120 V. Relays and contacts shall be rated at 24 VA at 24 VAC or 125 VA at 120 and 230 VAC, as required.

- B. The panels shall have the capability to be upgraded through modules.
- C. Coordinate with the EMCS/DDC manufacturer and ensure that all wire and conduit (type and size) is suitable for the equipment being installed.
- D. Each EMCS/DDC panel shall have at least the minimum number of output and input channels for controlling loads as shown on the drawings.
- E. Associated Hardware: Provide actuators, relays, and other interface devices as required to execute the indicated control functions. Coordinate with HVAC control sequences and input/output schedules on the drawings.
- F. Graphics: Provide an overall building graphical user interface with navigation buttons for each major piece of controlled equipment (coils, air terminals, sensors).

2.5 EMCS/DDC Functions:

- A. Control Functions: Provide for closed-loop control by proportional, proportional-integral (PI), proportional-integral derivative (PID), incremental, and/or floating modes. Control accuracy: plus or minus 0.5°F of set point for all steady state load conditions. Provide specific control functions described in sequence of operation.
- B. Timed Override: Remote override timers (where indicated on the drawings and input/output schedule) shall enable after hour or off-schedule use of the controlled equipment.
- C. Temperature Indication: The EMCS shall monitor remote temperatures where indicated on the drawings and input/output schedule.
- D. Alarms: Provide alarms for control points out of range (adjustable) and provide alarm summary capability.

2.6 EMCS/DDC Input Devices:

- A. Temperature Sensors: Provide resistance temperature detector (RTD) or thermistor type sensors for duct, well, or room mounting as required by duty indicated. Duct-mounted sensors having greater than 20 sq. ft. cross section shall be serpentine averaging type. Accuracy: $\pm 0.5^{\circ}\text{F}$.
- B. DDC Thermostat: Provide for all space control locations. Thermostat shall have an integral temperature sensor, setpoint adjustment, and tenant override pushbutton.

- 2.7 Control Valves: Provide factory-fabricated electronic control valves of type, body material and pressure class indicated. Where type or body material is not indicated, provided selection as determined by manufacturer for installation requirements and

pressure class, based on maximum pressure and temperature rating of piping system. Provide valve size in accordance with scheduled or specified maximum pressure drop across control valve. Except as otherwise indicated, provide valves which mate and match material of connecting piping. Equip control valves actuators with proper shutoff ratings for each individual application.

- A. Water Service Valves: Equal percentage characteristics with rangeability of 50 to 1, and maximum full flow pressure drop of 10 feet head unless otherwise indicated. Two-way valves shall be suitable for dead-end service.
- B. Valve Trim and Stems: Polished stainless steel.
- C. Packing: Spring-loaded Teflon, self-adjusting.
- D. Terminal Unit Control Devices: Provide compact electronic control valves for control of terminal units including, but not necessarily limited to reheat coils that are of integral motor type. Provide modulating type valves. Valve actuators shall be 24 volts unless otherwise indicated.

2.8 Actuator Motors: Size each actuator to operate valves with sufficient reserve power to provide smooth modulating action.

2.9 Guarantee:

- A. All components, parts, and assemblies shall be guaranteed against defects in material and workmanship for a period of one year after acceptance. Expressed warranties are conditionally based on the requirement that the items covered within the guarantee are used and maintained in accordance with the manufacturer's recommendations. Guarantee commences at time of acceptance and continues for one year. Acceptance shall not occur until the Owner's operators are able to use the EMCS/DDC and receive reliable information from inputs and outputs.
- B. The first year guarantee shall, as part of the base bid for the EMCS/DDC, include full service and maintenance of the EMCS/DDC. This service and maintenance shall include all necessary repair, reprogramming, calibration, cleaning, minimum (4) quarterly inspections, call back service, etc. This first year service, maintenance and guarantee shall be included in the base bid of the EMCS/DDC.

PART 3 - EXECUTION

3.1 Examine areas and conditions under which EMCS/DDC work is to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 Installation of EMCS/DDC:

- A. General: Install systems and materials in accordance with manufacturer's instructions, shop drawings, and details on drawings. Install electrical components and use electrical products complying with requirements of applicable Division 26 sections of these specifications. Mount panels at convenient locations and heights.
- B. Control Wiring: The term "control wiring" is defined to include wire, conduit and miscellaneous materials as required for mounting and connecting electric control devices. All low voltage control wiring, except wiring located above accessible ceilings, shall be installed in conduit. Low voltage control wiring above accessible ceilings may be installed without conduit, provided it is run at right angles to the building structure and is tie-wrapped and supported per Division 26 and code requirements.
- C. Wiring System: Install complete control wiring system for the EMCS/DDC. Conceal wiring, except in mechanical rooms and areas where other conduit and piping are exposed. Provide multi-conductor instrument harness (bundle) in place of single conductors where number of conductors can be run along common path. Fasten flexible conductors bridging cabinets and doors, neatly along hinge side, and protect against abrasion. Tie and support conductors neatly.
- D. Install control wiring in accordance with the National Electric Code and Division 26 requirements.
- E. Identification: Number-code or color-code conductors, excluding those used for local individual room controls, appropriately for future identification and servicing of control system. Tag all sensor wiring to identify zone number and room number where sensor is located.
- F. Labeling: Label all sensors, valves, and controllers with engraved tags matching the shop drawings. Label all thermostats and similar zone-level sensors by equipment being controlled (e.g. AHU-1, VAV-101). Label wiring in control panels in coordination with University of South Alabama controls standards and facilities personnel.

3.3 Programming of EMCS/DDC:

- A. The Contractor shall obtain operational schedules for the controlled equipment from the

Engineer. Submittal data relevant to operational schedules shall be forwarded from the Contractor to the Engineer. Upon receipt of approval, the Contractor shall proceed with installation, setup, calibration, and check out of the various control and monitoring systems.

Having completed component and system installation, the Contractor shall submit a written request to the Engineer to inspect and approve their satisfactory operation.

- B. The EMCS/DDC shall perform all functions on the equipment as described in HVAC sequence of operation and input/output schedules specified on the drawings. This defines the scope and extent of the project with regard to the required number of panels, control point relays, and devices. Field verify voltages at point-of-interface and provide relays as required.
- C. Model numbers, horsepower, voltages, and other information equipment where listed on the drawings are for Contractor's convenience. Verify all information in the field as necessary for preparation of shop drawings.

3.4 Functional Requirements of EMCS/DDC:

- A. Provide all necessary relays, sensors, wiring and contacts to achieve proper operation.
- B. Connect EMCS/DDC panels to remote panels where shown.

3.5 Startup: Startup, test, and adjust the EMCS/DDC systems in presence of manufacturer's authorized representative. Demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

3.6 Adjusting and Cleaning:

- A. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.
- B. Final Adjustment: After completion of installation, adjust the program, relays, interface devices, and similar equipment provided as work of this section for optimum operation.

3.7 Owner's Instructions:

- A. During system startup, and at such time acceptable performance of the EMCS/DDC hardware and software has been established, the Contractor shall provide on-site operator instruction. This instruction shall be performed during normal working hours and shall be conducted by a competent representative of the Contractor familiar with the system's software, hardware, and accessories. The Contractor shall maintain a roster

of all attendees at all training sessions.

- B. At a time mutually agreed upon during system training as stated above, the Contractor shall give up to hours (as needed) of instruction to the Owner's designated personnel on the operation of all equipment within the EMCS/DDC and describe its intended use with respect to the programmed functions specified.
 - C. Operator orientation of the EMCS/DDC shall include, but not be limited to, the overall operational program, equipment functions both individually and as part of the total integrated system, commands, advisories, and appropriate operator intervention required in responding to the EMCS/DDC operation.
 - D. Provide at least 14-day notice to Owner and Engineer of training dates.
- 3.8 System Verification: The manufacturer's authorized representative shall state in writing to the Engineer that the EMCS/DDC system is operating properly, final adjustments and calibrations are complete, and Owner training has been accomplished.

END OF SECTION