MISSOURI

HIGHWAYS and TRANSPORTATION

COMMISSION

JEFFERSON CITY, MISSOURI

BID

OF

Name_____

_____

Address_____

FOR
CONSTRUCTING OR IMPROVING

District – 1
Temperature Control System
St. Joseph, Missouri

9-090813

MISSOURI

HIGHWAYS and TRANSPORTATION

COMMISSION

JEFFERSON CITY, MISSOURI

SPECIFICATIONS

FOR

CONSTRUCTING OR IMPROVING

District – 1
Temperature Control System
St. Joseph, Missouri

9-090813

MISSOURI

HIGHWAYS and TRANSPORTATION

COMMISSION

JEFFERSON CITY, MISSOURI

CONTRACT

AND

BOND

FOR

CONSTRUCTING OR IMPROVING

District – 1
Temperature Control System
St. Joseph, Missouri

9-090813

MISSOURI

HIGHWAYS and TRANSPORTATION

COMMISSION

JEFFERSON CITY, MISSOURI

CONTRACT

AND

BOND

FOR

CONSTRUCTING OR IMPROVING

District – 1
Temperature Control System
St. Joseph, Missouri

9-090813

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BIDDER CHECKLIST

FINAL CHECKLIST BEFORE SUBMITTING PROPOSAL

_____1. The orange bound Request for Proposal includes a complete set of bidding forms, specifications, and appendices which are made part of the proposal by reference. It is for the bidders information and convenience only and is not to be returned with the proposal.

_____2. The blue bound Proposal contains a complete set of bidding forms only. It is to be completed, executed and submitted in a sealed envelope marked **"Temperature Control System"**

_____ a. Complete the Bid Form by filling in the total dollar amount of the bid; listing any addenda which may have been issued; filling in the dollar amount of the bidder's check or Bid Bond, sign the proper signature line, and supply the required information in connection with the signature for the individual bidder, joint adventurer, or corporation.

_____ b. Submit Bid Bond executed by the bidder and surety. The bidder may use the Bid Bond furnished by the Commission or AIA Document A310 or approved equivalent or attach cashier's check to Bid Bond form. Personal checks are not accepted.

_____ c. Complete Subcontractor section by listing major subcontractor(s) and general supervisor(s), sign as required.

_____ d. Complete Certification Regarding Missouri Domestic Products Procurement Act section, if applicable.

_____3. If addenda are issued attach to the back of the blue bound Proposal. Copy addenda and add to the appropriate section of the orange bound Request for Proposal and retain for your records.

NEWSPAPER ADVERTISEMENT

Notice to Contractors

Bids for constructing **Computerized Temperature Control System**, District 1, St. Joseph, Mo. will be received by MoDOT at its Central Office, 1320 Creek Trail Drive, PO Box 270, Jefferson City, MO 65102 until 3:00 P.M., August 13, 2009. Contact Lynn Ferguson at 573-751-4879 or Lynn.Ferguson@modot.mo.gov to obtain plans, forms, and information, or download them at no charge from http://modot.org/business/contractor_resources/FacilitiesConstructionandMaintenance.htm. A pre-bid meeting is scheduled for August 6, 2009 at the District 1 Office located at 3602 North Belt Highway, St. Joseph, MO, at 11:00 A.M.

SECTION 00020

INVITATION TO BID

Notice is given hereby that the Missouri Department of Transportation will accept bids for construction of the proposal marked **"Proposal for Computerized Temperature Control System, District 1, Buchanan County, Missouri "**, according to Drawings and Specifications, and described in general as:

Furnish and install a microprocessor-based computerized temperature control system.

Sealed bids will be received by the Missouri Department of Transportation at its **Central Office, Creek Trail Drive, PO Box 270, Jefferson City, MO 65102-0270 until 3:00 P.M., August 13, 2009.**

Bids will be opened and read aloud at that time and that place. Bids received after that time will not be accepted.

Contact Lynn Ferguson at 573-751-4879 or Lynn.Ferguson@modot.mo.gov to obtain plans, forms, and information, or download them at no charge from http://modot.org/business/contractor_resources/FacilitiesConstructionandMaintenance.htm.

Prevailing wages as established by the Missouri Department of Labor and Industrial Relations, for **Buchanan County**, as shown in the Proposal, will apply.

Bid securities in the amount of 5% of the bid will be required to accompany bids.

Proposals must be made on forms provided by the Commission. The Commission reserves the right to reject any or all bids and to waive irregularity in the bids and the bidding. **No bid may be amended or withdrawn after the bid is opened.**

A pre-bid meeting is scheduled for August 6, 2009 at the District 1 Office located at 3602 North Belt Highway, St. Joseph, MO, at 11:00 A.M.

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

_____

Building Design Supervisor

SECTION 00100

INSTRUCTIONS TO BIDDER

1. SCOPE OF WORK

Furnish and install a microprocessor-based computerized temperature control system.

2. BID FORM

In order to receive consideration, bids must be made in strict accordance with the following.

A. Make bids, upon the forms provided herein, properly signed and with all items filled out. Do not change the wording of the bid form and do not add words to the bid form. Unauthorized conditions, limitations or provisions attached to the bid will be cause for rejection of the bid.

B. No telegraphic bid or telegraphic modification of a bid will be considered. No bids received after the time fixed for receiving them will be considered. Late bids will be returned to the bidder unopened.

C. Address bids to the Missouri Department of Transportation, and deliver to the address given in the Invitation to Bid, on or before the day and hour set for opening the bids. Enclose each bid in a sealed envelope bearing the title of the Work, the name of the bidder, and the date and hour of the bid opening. Submit only the original signed copy of the bid. It is the sole responsibility of the bidder to see that the bid is received on time.

3. BONDS

A. Bid securities, a cashiers check, a Bank Money Order, or a Certified Check made payable to "Director of Revenue, Credit Road Fund", in the amount stated in the invitation to bid must accompany each bid. The successful bidder's security will be retained until he has signed the Contract and has furnished the required Certificates of Insurance.

B. The Owner reserves the right to retain the security of all bidders until the successful bidder enters into the Contract. Other bid securities will be returned as soon as practical. If any bidder refuses to enter into a Contract, the Owner may retain his bid security as liquidated damages but not as a penalty.

C. Prior to signing the Contract, the successful bidder will secure a Performance Bond in the amount of 100% of the Contract Sum. Surety, acceptable to the Owner, shall issue the bond. Costs of such bonds will be the responsibility of the bidder.

4. EXAMINATION OF DOCUMENTS AND SITE OF WORK

A. Before submitting a bid, each bidder shall examine the Drawings carefully, read the Specifications and all other proposed Contract Documents, and visit the site of the work. Each bidder shall fully inform himself, prior to bidding, as to existing conditions and limitations under which the Work is to be performed and shall include in his bid a sum to cover the cost of items necessary to perform the Work, as set forth in the proposed Contract Documents. No allowance will be made to a bidder because of lack of such examination or knowledge. The submission of a bid will be considered conclusive evidence that the bidder has made such examination.

B. Bidder agrees that the specifications are performance-based specifications related to all of the mechanical equipment and the type of control to be applied to the mechanical equipment. Although a general list of mechanical equipment is provided as a part of the specifications, this list is to be used as a guide for the Bidder. All of the heating and air conditioning equipment is to be controlled in the base bid and three alternates. Bidder agrees that it is the Bidders responsibility to inspect and audit the facility to determine the exact number and type of mechanical equipment present. Should the general list of mechanical equipment omit some of the mechanical equipment or the Bidder not discover some of the mechanical equipment before submitting his bid, the Bidder shall be required to control this equipment complying with the spirit and intent of the specifications for the base and appropriate alternate price as shown in this PROPOSAL FOR LUMP SUM CONTRACT. The Bidder agrees the spirit and intent of these specifications is solely determined by Malicoat-Winslow Engineers, P.C. Bidder agrees that no adjustment in pricing or change orders affecting pricing will be presented to or accepted by the owner for additional equipment, hardware changes or software changes to properly comply with the intent and spirit of the specifications.

C. The Bidder acknowledges Wide Area Temperature Based Aggregated Demand Limiting and Temperature Based Electric Demand Limiting as defined patents, copyrights and in the specifications is the property of E.P.M., Inc., 2105 Power Lane, Fulton, Missouri 65251. The Bidder and manufacturer of the CTC system shall provide an executed AGREEMENT TO LICENSE between the Bidder and E.P.M., Inc. to implement, install and use both wide area temperature based aggregated electric demand limiting and temperature based demand limiting. Such AGREEMENT TO LICENSE shall be attached to the proposal.

D. The Bidder shall provide a list by quantity, type and model number of each major piece of computerized temperature control system equipment and the respective type of mechanical equipment controlled by each piece of computerized temperature control system equipment.

E. The Bidder shall provide a complete copy of the manual of the proposed computerized temperature control/system. Said manual shall contain samples of all of the required programming and system operator menus for the complete system.

F. The Bidder shall provide a complete copy of the manual of the proposed computerized temperature control/system. Said manual shall contain samples of all of the required programming and system operator menus for the complete system.

G. The Bidder shall provide a representative list of a minimum of one hundred similar computerized temperature control system installations made by the installing contractor in similar size facilities. Such installations shall be of computerized temperature control systems that control all the heating and air conditioning equipment and control any central mechanical equipment based on the real time operation of the individual heating and air conditioning equipment individual needs with such installations maintained by the Owner. Such list shall include the institution name, address, telephone number, contact person and date of the installation.

H. The Bidder agrees to provide personnel on the job site at the time of notice of award to assist the department's personnel in manual operation of the heating/cooling system during the installation of the Computerized Temperature Control system.

I. Accompanying the proposal is the Bidder's Statement of Qualifications. Failure of bidder to submit the Bidder's Statement of Qualifications with the bid will void the bid. The owner does not maintain Bidder's Statement of Qualifications on file.

5. INTERPRETATION

No oral interpretations will be made to any bidder as to the meaning of the plans and specifications or the acceptability of alternate products, materials, form or type of construction. Every request for interpretation shall be made in writing and submitted with all supporting documents not less than ten (10) calendar days before opening of bids. The request shall be sent directly to the project Designer. Every interpretation made to a bidder will be in the form of an addendum and will be sent as promptly as is practicable to all persons to whom plans and specifications have been issued. All such addenda shall become part of the contract documents.

6. PROOF OF COMPETENCY OF BIDDER

A bidder may be required to furnish evidence, satisfactory to the Commission, that he and his proposed subcontractor(s) have sufficient means and experience in the types of work called for to assure completion of the Contract in a satisfactory manner.

7. WITHDRAWAL OF BIDS

A. A bidder may withdraw his bid, either personally or by written request, at any time prior to the scheduled time for opening bids.
B. No bid may be amended or withdrawn after the bid is opened.

8. AWARD OR REJECTION OF BIDS

A. The Contract, if awarded, will be awarded to the responsible bidder who has proposed the lowest Contract Sum, subject to the Commission's right to reject any or all bids and to waive informality and irregularity in the bids and in the bidding.

B. Award of alternates, if any, will be made in numerical order to result in the maximum amount of work being accepted within available construction funds.

C. MoDOT is exempt from paying Missouri Sales Tax, Missouri Use Tax and Federal Excise Tax. An Exemption From Missouri Sales and Use Tax on Purchases letter and a Project Exemption Certificate (Form 5060 Rev. 10-2006) for tax-exempt purchases at retail of tangible personal property and materials for the purpose of constructing, repairing or remodeling facilities for the Missouri Highways and Transportation Commission, only if such purchases will "are related to the Commission's exempt functions and activities be furnished to the successful Bidder upon request.

9. EXECUTION OF CONTRACT

A. The Contract, which the successful bidder will be required to execute, will be included in the Contract Documents.

B. The bidder to whom the Contract is awarded shall, within fourteen calendar days after notice of award and receipt of Contract Documents from the Commission, sign and deliver required copies to the Commission.

C. Upon delivery of the signed Contract, the bidder to whom the Contract is awarded shall deliver to the Commission those Certificates of Insurance required by the Contract Documents and Performance Bond, as required by the Commission.

D. Execution of the Contract by the Commission must be done before the successful bidder may proceed with the work.

10. CONSTRUCTION TIME AND LIQUIDATED DAMAGES

A. Time of Completion - If this proposal is accepted, it is hereby agreed that work will begin not later than the date specified in the "Notice to Proceed" and will diligently be prosecuted in order to complete the work and billing within 30-working days from the date specified. Completion of work will be based on FINAL ACCEPTANCE of the building; "SUBSTANTIAL COMPLETION" will not be accepted as basis for completion.

B. Liquidated Damages - It is agreed that time is of the essence. Because failure to complete the contract within the time fixed herein will cause serious inconvenience, loss, and damage to the state, liquidated damages will be assessed in the amount of $100.00 per working day, for each working day after the agreed completion date that the Work is not fully completed.

11. NONDISCRIMINATION

A. The Bidder/Offeror understands that this project involves state funds and the Bidder/Offeror awarded the contract will be required to comply with the Executive Order 05-30 of the Governor of the State of Missouri dated September 8, 2005. This order stipulates that there shall be no discriminatory employment practices by the Contractor or his subcontractors, if any, based on race, sex, religion, national origin, age, color, disability, or veteran status. The undersigned Contractor or his subcontractors, if any, shall give written notice of their commitments under this clause to any labor union with which they have bargaining or other agreements.

B. The Contractor shall comply with the Regulations relative to nondiscrimination in federally-assisted programs of the Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

C. All solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or leases of the Contractor's obligations under this contract and the Regulations, will be relative to nondiscrimination on the grounds of race, color, or national origin.

D. Sanctions for Noncompliance: In the event of the Contractor's noncompliance with the nondiscrimination provisions of this contract, MoDOT shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to: (i) withholding of payments to the Contractor under the contract until the Contractor complies, and/or, (ii) cancellation, termination or suspension of the contract, in whole or in part.

12. EXECUTIVE ORDER

A. The Contractor shall comply with all the provisions of Executive Order 07-13, issued by the Honorable Matt Blunt, Governor of Missouri, on the sixth (6^{th}) day of March, 2007. This Executive Order, which promulgates the State of Missouri's position to not tolerate persons who contract with the state engaging in or supporting illegal activities of employing individuals who are not eligible to work in the United States, is incorporated herein by reference and made a part of this Agreement.

B. "By signing this Agreement, the Contractor hereby certifies that any employee of the Contractor assigned to perform services under the contract is eligible and authorized to work in the United States in compliance with federal law."

C. In the event the Contractor fails to comply with the provisions of the Executive Order 07-13, or in the event the Commission has reasonable cause to believe that the contractor has knowingly employed individuals who are not eligible to work in the United States in violation of federal law, the Commission reserves the right to impose such contract sanctions as it may determine to be appropriate, including but not limited to contract cancellation, termination or suspension in whole or in part or both.

D. The Contractor shall include the provisions of this paragraph in every subcontract. The Contractor shall take such action with respect to any subcontract as the Commission may direct as a means of enforcing such provisions, including sanctions for noncompliance.

13. EMPLOYMENT OF UNAUTHORIZED ALIENS

A. Pursuant to 285.530 RSMo, the bidder/offeror must affirm its enrollment and participation in a federal work authorization program with respect to the employees proposed to work in connection with the services requested herein by

- submitting a completed, notarized copy of the AFFIDAVIT OF WORK AUTHORIZATION and
- providing documentation affirming the bidder's/offeror's enrollment and participation in a federal work authorization program (see below) with respect to the employees proposed to work in connection with the services requested herein.

B. E-Verify is an example of a federal work authorization program. Acceptable enrollment and participation documentation consists of completed copy of the E-Verify Memorandum of Understanding (MOU). For vendors that are not already enrolled and participating in a federal work authorization program, E-Verify is available at http://www.dhs.gov/xprevprot/programs/gc_1185221678150.shtm.

C. The contractor understands and agrees that by signing the (IFB/RFP/RFQ/SFS document or contract), they certify the following:

a. The contractor shall only utilize personnel authorized to work in the United States in accordance with applicable federal and state laws. This includes but is not limited to the Illegal Immigration Reform and Immigrant Responsibility Act (IIRIRA) and INA Section 274A.

b. If the contractor is found to be in violation of this requirement or the applicable state, federal and local laws and regulations, and if the State of Missouri has reasonable cause to believe that the contractor has knowingly employed individuals who are not eligible to work in the United States, the state shall have the right to cancel the contract immediately without penalty or recourse and suspend or debar the contractor from doing business with the state.

c. The contractor agrees to fully cooperate with any audit or investigation from federal, state or local law enforcement agencies.

d. In addition, the contractor shall maintain enrollment and participation in a federal work authorization program with respect to the employees working in connection with the contracted services included herein.

14. PREFERENCES

A. In the evaluation of bids/quotes/proposals, preferences shall be applied in accordance with Chapter 34 RSMo. Contractors should apply the same preferences in selecting subcontractors.

B. By virtue of statutory authority, RSMo. 34.076 and 34.350 to 34.359, a preference will be given to materials, products, supplies, provisions and all other articles produced, manufactured, made or grown within the State of Missouri. Such preference shall be given when quality is equal or better and delivered price is the same or less.

1) If attached, the document entitled "PREFERENCE IN PURCHASING PRODUCTS" should be completed and returned with the solicitation documents.

2) If attached, the document entitled "MISSOURI DOMESTIC PRODUCTS PROCUREMENT ACT" should be completed and returned with the solicitation documents. Applies if bid is Twenty-Five Thousand Dollars ($25,000.00) or more.

C. By virtue of statutory authority, RSMo 34.074, a preference will be given all contracts for the performance of any job or service to service-disabled veteran business either doing business as Missouri firms, corporations, or individuals; or which maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less or whenever competing bids, in their entirety, are comparable.

1) If attached, the document entitled "MISSOURI SERVICE-DISABLED VETERAN PREFERENCE" should be completed and returned with the solicitation documents.

D. In the event of a tie of low bids, the MHTC reserves the right to establish the method to be used in determining the award.

PREFERENCES IN PURCHASING PRODUCTS

DATE: _____

The bidders attention is directed to Section 34.076 RSMo 2000 which gives preference to Missouri corporations, firms, and individuals when letting contracts or purchasing products.

Bids/Quotations received will be evaluated on the basis of this legislation.

All vendors submitting a bid/quotation must furnish ALL information requested below.

FOR CORPORATIONS:

State in which incorporated: _____

FOR OTHERS:

State of domicile: _____

FOR ALL VENDORS:

List address of Missouri offices or places of business:

_____

_____

_____

_____

_____

_____

_____

THIS SECTION MUST BE COMPLETED AND SIGNED:

FIRM NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

BY (signature required): _____

Federal Tax I.D. #: _____ if no Federal Tax I.D. # - list Social Security #: _____

NOTE: For bid/quotation to be considered, the "Preference in Purchasing Products" form must be on file in the General Services (Procurement) Division and must be dated in the current calendar year.

MISSOURI DOMESTIC PRODUCTS PROCUREMENT ACT

The bidder's attention is directed to the Missouri Domestic Products Procurement Act, Sections 34.350 to 34/359, RsMO, which requires all manufactured goods or commodities used or supplied in the performance of this contract or any subcontract to be manufactured or produced in the United States.

Section 34.355, RsMO, requires the vendor or contractor to certify his compliance with Section 34.353 and, if applicable, Section 34.359, RsMO, at the time of bidding and prior to payment. Failure to comply with Section 34.353, RsMO, during the performance of the contract and to provide certification of compliance prior to payment will result in nonpayment for those goods or commodities.

Section 34.353.2, RsMO, specifies that it does not apply where the total contract is less than Twenty-Five Thousand Dollars ($25,000.00). If your total bid is Twenty-Five Thousand Dollars ($25,000.00) or more, you must complete this form as directed below.

Failure to complete and return this document with this bid will cause the State to presume the manufactured goods or products listed in the bid are not manufactured or produced in the United States, and the bid will be evaluated on that basis. Please read the certification appearing below on this form.

[ ] If all the goods or products specified in the attached bid which the bidder proposes to supply to the State shall be manufactured or produced in the "United States" as defined in Section 34.350, RsMO, check the box at left.

[ ] If only one item of any particular goods or products specified in the attached bid is manufactured or produced in the "United States" as defined in Section 34.350, RsMO, check the box at left and list the items (or item number) here:
_____
_____

[ ] If any or all of the goods or products specified in the attached bid which the bidder proposes to supply to the State are not manufactured or produced in the "United States" as defined in Section 34.350, RsMO, then: (a) check the box at left; (b) list below, by item (or item number), the country other than the United States where each good or product is manufactured or produced; and (c) check the boxes to the left of the paragraphs below if applicable and list the corresponding items (or item numbers) in the spaces provided.

Item (or item number)	Location Where Item Manufactured or Produced

(attach an additional sheet if necessary)

[ ] The following specified goods or products cannot be manufactured or produced in the United States in sufficient quantities or in time to me the contract specifications. Items (or item numbers): _____
_____

[ ] The following specified goods or products must be treated as manufactured or produced in the United States, in accordance with an existing treaty, law, agreement, or regulation of the United States, including a treaty between the United States and any foreign country regarding export-import restrictions or international trade. Items (or item numbers): _____
_____

CERTIFICATION

By submitting this document, completed as directed above, with a bid, the bidder certifies under penalty of making false declaration (Section 575.060, RsMO) that the information contained in this document if true, correct and complete, and may be relied upon by the State in determining the bidders qualifications under and in compliance with the Missouri Domestic Products Procurement Act.

The bidder's failure to complete and return this document with the bid as directed above will cause the State to presume the manufactured goods or products listed in the bid are not manufactured or produced in the United States, and the bid will be evaluated on that basis pursuant to Section 34.353.3(2), RsMO.

MISSOURI SERVICE-DISABLED VETERAN BUSINESS PREFERENCE

By virtue of statutory authority, RSMo 34.074, a preference will be given all contracts for the performance of any job or service to service-disabled veteran business either doing business as Missouri firms, corporations, or individuals; or which maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less or whenever competing bids, in their entirety, are comparable.

Definitions:

Service-Disabled Veteran is defined as any individual who is disabled as certified by the appropriate federal agency responsible for the administration of veterans' affairs.

Service-Disabled Veteran Business is defined as a business concern:

a. Not less than fifty-one (51) percent of which is owned by one or more service-disabled veterans or, in the case of any publicly owned business, not less than fifty-one (51) percent of the stock of which is owned by one or more service-disabled veterans; and
b. The management and daily business operations of which are controlled by one or more service-disabled veterans.

If an offeror meets the definitions of a service-disabled veteran and a service-disabled veteran business as defined in 34.074 RSMo and is either doing business as a Missouri firm, corporation, or individual; or maintains a Missouri office or place of business, the offeror must provide the following with the proposal in order to receive the Missouri service-disabled veteran business preference over a non-Missouri service-disabled veteran business when the quality of performance promised is equal or better and the price quoted is the same or less or whenever competing proposals, in their entirety, are comparable:

a. A copy of a letter from the Department of Veterans Affairs (VA), or a copy of the offeror's discharge paper (DD Form 214, Certificate of Release or Discharge from Active Duty) from the branch of service the offeror was in, stating that the offeror has a service-connected disability rating ranging from 0 to 100% disability; and
b. A completed copy of this exhibit

(NOTE: For ease of evaluation, please attach copy of the above-referenced letter from the VA or a copy of the offeror's discharge paper to this Exhibit.)

By signing below, I certify that I meet the definitions of a service-disabled veteran and a service-disabled veteran business as defined in 34.074 RSMo and that I am either doing business as a Missouri firm, corporation, or individual; or maintain Missouri offices or places of business at the location(s) listed below.

Veteran Information	Business Information
Service-Disabled Veteran's Name, (Please Print)	Service-Disabled Veteran Business Name
Service-Disabled Veteran's Signature	Missouri Address of Service-Disabled Veteran Business

SECTION 00301

BID FORM

To: The Missouri Highway and Transportation Commission, Jefferson City, Missouri

1. The undersigned, having examined the proposed Contract Documents titled: **"Computerized Temperature Control System"** and having visited the site and examined the conditions affecting the Work, hereby proposes and agrees to furnish all labor, materials, equipment and everything which may be necessary or incidental thereto, as proposed by said Contract Documents, all to the satisfaction of the Chief Engineer of the Missouri Department of Transportation and the Missouri Highway and Transportation Commission, for the stipulated sum of:

Total Base Bid - Furnish all labor, equipment and materials for the installation of Base Computerized Temperature Control System as described in the Specifications.

_____ Dollars $_____)

Total Additive Alternative No. 1 - Furnish all labor, equipment and materials for the installation of the optional voltage protection for the induction motors as described in the Computerized Temperature Control System Specifications.

_____ Dollars $_____)

Total Additive Alternative No. 2 - Furnish all labor, equipment and materials for the installation of the optional equipment performance monitoring as described in the attached Computerized Temperature Control System Specifications.

_____ Dollars $_____)

Total Additive Alternative No. 3 - Furnish all labor, equipment and materials for the five-year extended full maintenance contract as described in the Computerized Temperature Control System specifications. Five Year Total:

_____ Dollars $_____)

2. The undersigned, acknowledges having examined and being familiar with the contract documents including the drawings, the Instructions to Bidders, General Conditions, Supplementary Conditions and the body of technical specifications.
3. The undersigned acknowledges receipt of Addenda number _____ through _____ inclusive.

4. Enclosed with this bid is bid security in the amount of not less than 5% of the bidder's proposed Contract Sum, the amount being _____ DOLLARS ($_____).

IF AN INDIVIDUAL

_____

_____ _____

Name of individual Residence address

_____ _____

Social Security Number Telephone Number

_____

Firm Name, If Any

_____

_____ _____

Address for communications Signature

IF A PARTNERSHIP

_____
Name of Partnership

_____
Partner

_____
Partner

_____

_____
Address for Communications

_____
Telephone Number

(State Name and Residence Address of All Partners)

_____

_____
Residence Address

_____

_____
Residence Address

_____
Federal Tax I.D. Number

_____
Signature of Either Partner

IF A CORPORATION

_____
Name of Corporation

_____
Name and Title of Officer

_____
Signature of officer

_____

_____
Address for Communications

_____
Telephone Number

Incorporated under the laws of the
State of_____

Corporate License No. _____
(If a corporation organized in a state other than Missouri, attach Certificate of Authority to do business in the State of Missouri.)

_____
Federal Tax I.D. Number

(ATTEST)

_____
(SEAL) Secretary

(Each bidder must complete the Bid Form by signing in the proper signature line above and by supplying the required information called for in connection with the signature. The information called for is necessary in the proper preparation of the contract and performance bond.)

SECTION 00430

SUBCONTRACTOR LISTING

1. For portions of Work equaling or exceeding 1% of the total proposed Contract Sum, the undersigned proposes to use the following subcontractors. Except as otherwise approved by the Owner, the undersigned proposes to perform all other portions of the Work with his own forces.

2.

Portion of the Work:	Subcontractor name and address:
_____	_____
	_____
	_____
_____	_____
	_____
	_____
_____	_____
	_____
	_____
_____	_____
	_____
	_____

USE ADDITIONAL SHEETS IF REQUIRED

PROVIDE SIGNATURE IDENTICAL TO THAT SHOWN ON THE BID FORM

BIDDER:

_____

by_____

SECTION 00600

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____ ,

as Principal, and _____ ,

as Surety, are held firmly bound unto the State of Missouri (acting by and through the Missouri Highway and Transportation Commission) in the penal sum of

_____ Dollars

($_____), to be paid to the State of Missouri, or the Missouri Highway and Transportation Commission, to be credited to the State Road Fund and Principal and Surety binding themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20_____

THE CONDITION OF THIS OBLIGATION is such that:
WHEREAS, the Principal is submitting herewith a bid to the Missouri Highway and Transportation Commission on

Route(s) _____,

in _____ County(ies), Project(s) _____,

for construction or improvement as set out in said proposal.

NOW THEREFORE, if the Missouri Highway and Transportation Commission shall accept the bid of the Principal, and if said Principal shall properly execute and deliver to the Missouri Highway and Transportation Commission the Contract, Contract Bond, Specifications and evidence of insurance coverage in compliance with the requirements of the Proposal, to the satisfaction of the Missouri Highway and Transportation Commission, then this obligation shall be void and of no effect, otherwise to remain in full force and effect.

In the event the said Principal shall, in the judgment of the Missouri Highway and Transportation Commission, fail to comply with any requirement as set forth in the preceding paragraph, then the State of Missouri, acting through the Missouri Highway and Transportation Commission, shall immediately and forthwith be entitled to recover the fees, and any other expense of recovery.

_____ _____
Principal Surety

By_____ _____
Attorney in Fact (SEAL)

Attest: (CORPORATE SEAL)

_____
Corporate Secretary

Note: This bond must be executed by the Principal and by a Corporate Surety authorized to conduct surety business in the State of Missouri.

WORKER ELIGIBILITY VERIFICATION AFFIDAVIT FOR ALL MHTC/MODOT CONTRACT AGREEMENTS IN EXCESS OF $5,000

(for joint ventures, a separate affidavit is required for each business entity)

STATE OF _____)
) ss
COUNTY OF _____)

On this _____ day of _____, 20_____, before me appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be a person whose name is subscribed to this affidavit, who being by me duly sworn, deposed as follows:

My name is _____, and I am of sound mind, capable of making this affidavit, and personally certify the facts herein stated, as required by Section 285.530, RSMo, to enter into any contract agreement with the state to perform any job, task, employment, labor, personal services, or any other activity for which compensation is provided, expected, or due, including but not limited to all activities conducted by business entities:

I am the _____ of _____, and I am duly authorized, directed, and/or empowered to act officially and properly on behalf of this business entity.
(title) (business name)

I hereby affirm and warrant that the aforementioned business entity is enrolled in a federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employees, and the aforementioned business entity shall participate in said program with respect to all employees working in connection to work under the within state contract agreement with the Missouri Highways and Transportation Commission (MHTC). I have attached documentation to this affidavit to evidence enrollment/participation by the aforementioned business entity in a federal work authorization program, as required by Section 285.530, RSMo.

In addition, I hereby affirm and warrant that the aforementioned business entity does not and shall not knowingly employ, in connection to work under the within state contract agreement with MHTC, any alien who does not have the legal right or authorization under federal law to work in the United States, as defined in 8 U.S.C. § 1324a(h)(3).

I am aware and recognize that, unless certain contract and affidavit conditions are satisfied pursuant to Section 285.530, RSMo, the aforementioned business entity may be held liable under Sections 285.525 though 285.550, RSMo, for subcontractors that knowingly employ or continue to employ any unauthorized alien to work within the state of Missouri.

I acknowledge that I am signing this affidavit as a free act and deed of the aforementioned business entity and not under duress.

_____
Affiant Signature

Subscribed and sworn to before me this _____ day of _____, 20_____.

_____
Notary Public

My commission expires:

[documentation of enrollment/participation in a federal work authorization program attached]

SECTION 01010

GENERAL CONDITIONS

1. General. The contractor shall do all things necessary to the performance of the contract in a substantial and acceptable manner in accordance with the specifications and plans.

2. Employer's Liability. Contractor shall furnish evidence to the Commission that with respect to the operations it performs, it either carries employers' liability or worker's compensation insurance or is qualified as self-insured under the provisions of law of the state relating to worker's compensation.

3. The Contractor shall purchase and maintain such insurance as will protect him from claims under workmen's compensation acts and other employee benefit acts, from claims for damages because of bodily injury, including death, and from claims for damages to property which may arise out of or result from the Contractor's operations under this Contract, whether such operations be by himself or by any Subcontractor or anyone directly or indirectly employed by any of them.

4. This insurance shall be written for not less than any limits of liability specified as part of this contract, or required by law, whichever is the greater, and shall include contractual liability insurance as applicable to the Contractor's obligations under this contract. Unless otherwise specified, insurance limits shall be as follows:

   A. Workmen's Compensation: Workers Compensation Insurance, including "Occupational Disease Act" requirements, must be maintained if required by law.

   B. Public Liability (includes property damage and personal injury):

      i Not less than $500,000 for any one person in a single accident or occurrence.

      ii. Not less than $3,000,000 for all claims arising out of a single occurrence.

5. Duration of Insurance. The evidence of insurance required by sections 2, 3, and 4 above shall be furnished to the Commission prior to the effective date of the Notice to Proceed. All insurance herein before specified shall be carried until all work required to be performed under the terms of the contract is satisfactorily completed as evidenced by the formal acceptance by the Commission and in the event that the limits of coverage for property damage are depleted or decreased by the payment of claims, the contractor shall procure a reinstatement of the limits. The cost of all insurance required to be carried by the contractor shall be considered as completely covered by the contract price.

6. Inspection of Work. Commission's engineer shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials and other data and records relating to the work. If requested by Commission's engineer, the contractor shall at any time before final acceptance of the work uncovers any portion of the finished work as directed for inspection. After examination, the contractor shall restore said portions of the work to the standards required by the contract. Should the work thus exposed and examined prove acceptable, the actual cost of uncovering, removing and replacing shall be paid by the Commission. Should the work so exposed and examined prove unacceptable, the uncovering, removing and replacing shall be at the expense of the contractor.

7. Change Orders. All departures from the plans and specifications will be considered unauthorized unless, before proceeding with the work, the contractor has had delivered to it a change order, signed by the Commission's engineer, authorizing and directing such changes or departures. All unauthorized work shall be at the contractor's expense and the engineer may order such unauthorized work removed and replaced at the contractor's expense.

8. Defective Work. All work which has been rejected shall be remedied, or if necessary, removed and replaced in an acceptable manner by the contractor at its expense. If the contractor fails to remedy or replace such defective work immediately after receiving written notice from the Commission's engineer, Commission may employ labor to correct the defective work, and the cost incurred in making such corrections shall be deducted from the payment due or to become due the contractor under this contract.

9. Contractor's Responsibility for Work. Until Commission's engineer accepts the work, it shall be in the custody and under the charge and care of the contractor. Contractor shall rebuild, repair, restore or make good at its own expense any lost or stolen Commission-owned material and all injuries or damages to any portion of the work caused by action of the elements or from any other reason before its completion and final acceptance. Issuance of a payment estimate on any part

of the work done will not be considered as final acceptance of any work completed up to that time.

10. Preservation of Utilities and Monuments. The contractor shall be responsible for the preservation of all public and private utilities, wires, lines, pipes, poles, cables, and conduit at the site of the work and shall use every precaution necessary to prevent damage or injury thereto. The contractor shall not disturb or damage any land monument or property landmark until an authorized agent has witnessed or otherwise referenced, their location and shall not remove them until directed by Commission's engineer.

11. Cooperation with Other Contractors. The contractor shall arrange its work so as not to interfere with the operations of other contractors of the Commission which might be engaged in performing adjacent or nearby work. Whenever work being done by other contractors is contiguous or related to the work involved in this contract, the respective rights of the various contractors will be determined by the Commission's engineer in order to secure the completion of the work under all contracts in general harmony.

12. Temporary Suspension of Work. Commission's engineer shall have authority to suspend work, wholly orin part, for such period or periods of time as he may deem necessary when weather or other conditions are such that in the opinion of the engineer the work may be done at a later time with advantage to the Commission or for failure on the part of the contractor to comply with any of the provisions of the contract. The contractor may suspend work for reasonable cause with written approval of the engineer. Liquidated damages shall not accrue during the period in which work is suspended with the approval of the engineer, however, if the suspension is because of the contractor's failure to comply to any of the provisions of the contract, the contractor shall not be entitled to an extension of completion time nor to a waiver of liquidated damages. In the event work is suspended, the contractor shall store all materials in a manner that will protect them from damage, and shall take every precaution to prevent damage or deterioration of, the portions of the work completed. If work has been discontinued for any reason, the contractor shall give Commission's engineer written notice at least forty-eight (48) hours before resuming operations.

13. Contractor's Procedure for Claims. If the contractor considers additional compensation may be due for work or material not clearly covered in the contract or ordered in writing by the engineer as extra work, or if additional compensation may be requested beyond the scope of such provisions, the contractor shall notify the engineer in writing of the intention to make a claim before beginning the work in question. If notification is not given and the engineer is not afforded proper facilities by contractor to provide necessary inspection and for keeping strict account of actual cost, the contractor agrees to waive any claims for additional compensation. Notice by the contractor, and the fact that the engineer has kept account of the cost shall not be construed as substantiating the validity of the claim. The contractor shall file a written notice of claim for additional compensation in triplicate within 60 days after completing the work in question.

    If the claim is against the Commission, the notice of claim shall be personally delivered, or sent by certified mail to the office of the Secretary of the Commission in Jefferson City, Missouri. All notices of claims shall contain an itemized statement showing completely and fully the items and amounts forming the basis of the claim.

    Any claim or an item of any claim, not included in the notice and statement, or any claim included but not clearly defined and specifically set out and itemized or any claim not filed within the time and in the manner provided, shall be forever waived and shall neither constitute the basis of nor be included in any legal action, counterclaim, set-off, or arbitration.

    All claims filed with Missouri Highway and Transportation Commission's Secretary will be forwarded to the Missouri Department of Transportation's Claims Committee.

14. Overhead and Profit on Change Orders. The percentages for overhead and profit charged on Change Orders and Field Work Authorizations shall be negotiated and may vary according to the nature, extent and complexity of the work involved. However, the overhead and profit for the contractor or subcontractor actually performing the work shall not exceed 15%. When one or more tiers of subcontractors are used, in no event shall any contractor or subcontractor receive as overhead and profit more than 7% of the cost of the work performed by any of his subcontractors. In no case shall the total overhead and profit paid by the owner on any change order exceed twenty five percent (25%) of the cost of materials, labor and equipment necessary to put the change order work in place.

15. Review of Submittals. The architect’s review of submittals is only for the limited purpose of checking for conformance with information given and seeing if they conform to design intent. The architect is not responsible for determining the accuracy of measurements and completeness of details, for verifying quantities, or for checking fabrication or installation procedures. The architect’s review does not relieve the contractor of his or her responsibilities under the contract documents.

16. A working day. Is defined as any day when, soil and weather conditions would permit the major operation of the project for six hours or more unless other unavoidable conditions prevent the contractor's operation. If conditions require the contractor to stop work in less than six hours, the day will not be counted as a working day. Working days will begin as soon as notice to proceed is issued. In order for MoDOT not to change a workday due to unavoidable conditions, the contractor must have enough forces, equipment, and materials on site to begin the project. The contractor must notify MoDOT inspector before 12:00 noon of said working day if forces will not be present.

END OF SECTION

SECTION 01011

SUPPLEMENTARY CONDITIONS

A. The following supplements modify, change, delete from or add to the "General Conditions."

1. The proposed work includes the furnishing of all materials, equipment and labor for the work as set forth in the plans, proposal and specifications.

2. The contractor will be required to remove from the Highway and Transportation Commission's property all debris.

3. The contract price shall include any necessary permits and licenses required by law incidental to the work. Local ordinances requiring building permits are not applicable to the state. Contractor will comply with local laws involving safety in the prosecution of the work.

4. Contractor will provide a one-year warranty for parts and labor on all building material, and equipment or a standard manufacturer's warranty which ever is greater. All warranties, including extended service agreements shall begin on the date of Final Acceptance of this project.

5. The plans holders list may be obtained from the One Stop Facility located at 1320 Creek Trail Dr., Jefferson City, Mo 65102 , by calling 573/751-4879 or electronically down-loaded from http://www.modot.org/business/contractor_resources/FacilitiesConstructionandMaintenance.htm

END OF SECTION

SECTION **01019**

CONTRACT CONSIDERATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Schedule of values.
B. Application for payment.
C. Change procedures.
D. Alternatives.

1.2 RELATED SECTIONS

A. Section 01600 - Material and Equipment: Product substitutions.

1.3 SCHEDULE OF VALUES

A. Submit a printed schedule on Contractor's standard form. Electronic media printout will be considered.

B. Submit Schedule of Values in duplicate within 20 days after date of Owner-Contractor Agreement.

C. Revise schedule to list approved Change Orders, with each Application For Payment.

1.4 APPLICATIONS FOR PAYMENT

A. Submit four copies of each application on Contractor's electronic media driven form.
B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
C. Payment Period: 30 days.
D. Submit waiver of liens from vendors.
E. Include an updated construction progress schedule.
F. Certified payroll records.

1.5 CHANGE PROCEDURES

A. The Architect/Engineer may issue a Notice of Change that includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required.

B. The Contractor may propose changes by submitting a request for change to the Architect/Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, the effect on the Contract Sum/Price and Contract Time, and a statement describing the effect on Work by the MoDOT District or other Contractors.

C. Stipulated Sum/Price Change Order: Based on Notice of Change and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Architect/Engineer.

D. Construction Change Directive: Architect/Engineer may issue a directive instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute the change.

E. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Architect/Engineer will determine the change allowable in Contract Sum/Price and Contract Time as provided in the Contract Documents.

F. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

G. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

1.6 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specify requirements.
B. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the Work, the Architect/Engineer will direct an appropriate remedy or adjust payment.

1.7 ALTERNATIVES

A. Accepted Alternatives will be identified in Owner-Contractor Agreement.

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.
B. Field engineering.
C. Preconstruction meeting.
D. Site mobilization meeting.
E. Progress meetings.
F. Preinstallation meetings.
G. Equipment electrical characteristics and components.
H. Examination.
I. Preparation.
J. Cutting and Patching.
K. Alteration project procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to and placing in service, such equipment.

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work, which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. In finished areas, except as otherwise indicated, conceal pipes, ducts and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.

E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.

F. After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

1.3 FIELD ENGINEERING

A. NA - blank
B. Owner will locate and protect survey control and reference points.
C. Control datum for survey is that established by Owner provided survey.
D. Verify setbacks and easements; confirm drawing dimensions and elevations.

1.4 PRECONSTRUCTION MEETING

A. Architect/Engineer will schedule a meeting after Notice of Award.
B. Attendance Required: District engineer or representative, Architect/Engineer and Contractor.

C. Record minutes and distribute copies within 5 days after meeting to participants, with two copies to District Engineer, Architect/Engineer, participants and those affected by decisions made.

1.5 SITE MOBILIZATION MEETING

A. Architect/Engineer will schedule a meeting at the Project site prior to Contractor occupancy.

B. Architect/Engineer will record minutes and distributes copies within 5 days after meeting to participants, with two copies to Architect/Engineer, participants and those affected by decisions made.

1.6 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at when arranged by architect/engineer.

B. Architect/Engineer will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.

C. Attendance Required: Job superintendent, major Subcontractors and suppliers, District engineer representative, Architect/Engineer, as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review of Work progress.
2. Field observations, problems, and decisions.
3. Identification of problems, which impede planned progress.
4. Maintenance of progress schedule.
5. Corrective measures to regain projected schedules.
6. Coordination of projected progress.
7. Effect of proposed changes on progress schedule and coordination.

E. Record minutes and distributes copies within 5 days after meeting to participants and those affected by decisions made.

1.7 PREINSTALLATION MEETING

A. When required in individual specification sections, convene a pre-installation meeting at the site prior to commencing work of the section.
B. Notify Architect/Engineer seven days in advance of meeting date.
C. Prepare agenda and preside at meeting:
1. Review conditions of installation, preparation and installation procedures.
2. Review coordination with related work.
D. Record minutes and distributes copies within 5 days after meeting to participants and those affected by decisions made.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements, which affect:

1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching to complete Work, and to:
1. Uncover Work to install or correct ill-timed Work.
2. Remove and replace defective and non-conforming Work.
3. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Cut masonry and concrete materials using masonry saw or core drill.

E. Fit Work tight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

F. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

G. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

H. Identify hazardous substances or conditions exposed during the Work to the Architect/Engineer for decision or remedy.

3.2 ALTERATION PROJECT PROCEDURES

A. Materials: As specified in Product sections; match existing Products and work for patching and extending work.

B. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.

C. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Architect/Engineer for review.

D. Patch or replace portions of existing surfaces that are damaged, lifted, discolored or showing other imperfections.

E. Finish surfaces as specified in individual Product sections.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.
B. Construction progress schedules.
C. Proposed Products list.
D. Product Data.
E. Shop Drawings.
F. Samples.
G. Design data.
H. Test reports.
I. Certificates.
J. Manufacturer's instructions.
K. Manufacturer's field reports.
L. Erection drawings.
M. Construction photographs.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals
B. Section 01400 - Quality Control: Manufacturers' field services and reports.
C. Section 01700 - Contract Closeout: Contract warranties, bonds, manufacturers' certificates and closeout submittals.

1.3 REFERENCES

A. AGC Associated General Contractors of America publication "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry".

1.4 SUBMITTAL PROCEDURES

A. Transmit each submittal with Architect/Engineer accepted form.

B. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number and specification section number, as appropriate.

C. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work and coordination of information is in accordance with the requirements of the Work and Contract Documents.

D. Schedule submittals to expedite the Project, and deliver to Architect/Engineer at business address. Coordinate submission of related items.

E. For each submittal for review, allow 15 days excluding delivery time to and from the contractor.

F. Identify variations from Contract Documents and Product or system limitations, which may be detrimental to successful performance of the completed Work.

G. Submittals not requested will not be recognized or processed.

1.5 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedule in duplicate within 15 days after date established in Notice to Proceed.
B. Revise and resubmit as required.
C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
D. Submit a horizontal bar chart with separate line for each major portion of Work or operation, identifying first workday of each week.

1.6 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name and model number of each product.
B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation and reference standards.

1.7 PRODUCT DATA

A. Product Data For Review:
   1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
   2. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.

B. Product Data For Information:
   1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

C. Product Data For Project Closeout:
   1. Submitted for the Owner's benefit during and after project completion.

D. Submit the number of copies, which the Contractor requires, plus two copies that will be retained by the Architect/Engineer.

E. Mark each copy to identify applicable products, models, options and other data. Supplement manufacturers' standard data to provide information specific to this Project.

F. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700 - CONTRACT CLOSEOUT.

1.8 SHOP DRAWINGS

A. Shop Drawings For Review:
   1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
   2. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.

B. Shop Drawings For Information:
   1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

C. Shop Drawings For Project Closeout:
   1. Submitted for the Owner's benefit during and after project completion.

D. Indicate special utility and electrical characteristics, utility connection requirements and location of utility outlets for service for functional equipment and appliances.

E. Submit in the form of one reproducible transparency and one opaque reproduction.

1.9 SAMPLES

A. Samples For Review:
   1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
   2. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.

B. Samples For Information:
   1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.

C. Samples For Selection:
   1. Submitted to Architect/Engineer for aesthetic, color, or finish selection.
   2. Submit samples of finishes for Architect/Engineer selection.
   3. After review, produce duplicates and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.

1.10 DESIGN DATA

A. Submit for the Architect/Engineer's knowledge as contract administrator or for the Owner.
B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.11 TEST REPORTS

A. Submit for the Architect/Engineer's knowledge as contract administrator or for the Owner.
B. Submit test reports for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.12 CERTIFICATES

A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Architect/Engineer, in quantities specified for Product Data.
B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits and certifications as appropriate.
C. Certificates may be recent or previous test results on material or Product but must be acceptable to Architect/Engineer.

1.13 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, and start-up, adjusting and finishing, to Architect/Engineer for delivery to owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention and special environmental criteria required for application or installation.
C. Refer to Section 01400 - Quality Control, Manufacturers' Field Services article.

1.14 MANUFACTURER'S FIELD REPORTS

A. Submit reports for the Architect/Engineer's benefit as contract administrator or for the Owner.
B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

1.15 ERECTION DRAWINGS

A. Submit drawings for the Architect/Engineer's benefit as contract administrator or for the Owner.
B. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
C. Data indicating inappropriate or unacceptable Work may be subject to action by the Architect/Engineer or Owner.

END OF SECTION

SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality assurance - control of installation.
B. Tolerances
C. References and standards.
D. Mock-up.
E. Inspecting and testing laboratory services.
F. Manufacturers' field services.

1.2 RELATED SECTIONS

A. Section 01300 - Submittals: Submission of manufacturers' instructions and certificates.
B. Section 01600 - Material and Equipment: Requirements for material and product quality.
C. Section 01650 - Starting of Systems.

1.3 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.4 TOLERANCES

A. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.
B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.5 REFERENCES AND STANDARDS

A. For Products or workmanship specified by association, trade or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date for receiving bids or date specified in the individual specification sections, except where a specific date is established by code.
C. Neither the contractual relationships, duties or responsibilities of the parties in Contract nor those of the Architect/Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.6 TESTING SERVICES

A. Contractor to provide all testing services as called out in these specifications.
B. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Architect/Engineer or the Owner.
C. Testing does not relieve Contractor to perform Work to contract requirements.
D. Re-testing required because of non-conformance to specified requirements shall be performed by the same MoDOT personnel on instructions by the Architect/Engineer.

1.7 INSPECTION SERVICES

A. Owner will employ MoDOT Personnel to perform inspection.
B. Inspecting may occur on or off the project site. Perform off-site inspecting as required by the Architect/Engineer or the Owner.
C. Inspecting does not relieve Contractor to perform Work to contract requirements.

1.8 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and the balancing of equipment as applicable and to initiate instructions when necessary.
B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
C. Refer to Section 01300 - SUBMITTALS, MANUFACTURERS' FIELD REPORTS article.

PART 2 EXECUTION

2.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

2.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.
B. Seal cracks or openings of substrate prior to applying next material or substance.
C. Apply manufacturer required or recommended substrate primer, sealer or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.
B. Final cleaning.
C. Adjusting.
D. Project record documents.
E. Operation and maintenance data.
F. Spare parts and maintenance Products.
G. Warranties.

1.2 RELATED SECTIONS

A. Section 01500 - Construction Facilities and Temporary Controls: Progress cleaning.
B. Section 01650 - Starting of Systems: System start-up, testing, adjusting and balancing.

1.3 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.
B. Provide submittals to Owner that is required by governing or other authorities.
C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments and sum remaining due.
D. Owner will occupy portions of the building as specified in Section 01010.

1.4 FINAL CLEANING

A. Execute final cleaning prior to final project assessment. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

B. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

C. Clean or replace filters of operating equipment used during construction and/or adjustment.

D. Clean debris from roofs, gutters, downspouts and drainage systems.

E. Clean site; sweep paved areas, rake clean landscaped surfaces.

F. Remove waste and surplus materials, rubbish and construction facilities from the site.

1.5 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

A. Store record documents separate from documents used for construction.

B. Record information concurrent with construction progress.

C. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

D. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish main floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

E. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Submit 1 draft copy of completed volumes 15 days prior to final inspection. This copy will be reviewed and returned with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.

E. Submit two sets of revised final volumes, within 10 days after final inspection.

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified individual specification sections.
B. Deliver to Project site; obtain receipt prior to final payment.
C. Examine system components at a frequency consistent with reliable operation. Clean, adjust and lubricate as required.
D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
E. Maintenance service shall not be assigned or transferred to any agent or Subcontractor without prior written consent of the Owner.

1.9 WARRANTIES

A. Execute and assemble transferable warranty documents from Subcontractors, suppliers and manufacturers.
B. Submit prior to final Application for Payment.
C. For items of Work delayed beyond date of Final Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of the warranty period.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

MISSOURI DEPARTMENT OF TRANSPORTATION ST. JOSEPH FACILITIES INSTALLATION OF COMPUTERIZED TEMPERATURE CONTROL SYSTEM SPECIFICATIONS AND BID DOCUMENTS

July 9, 2009

Prepared By:

Malicoat - Winslow Engineers, P.C.
5649 N. Clearview Road
Columbia, Missouri 65202
Tel. 573-875-1300
FAX 573-875-1305
Freddie Malicoat, P.E.

Certificate Of Authority 000421

7-16-09

MISSOURI DEPARTMENT OF TRANSPORTATION
ST. JOSEPH FACILITY

1.0 GENERAL REQUIREMENTS

1.1 Furnish a microprocessor-based computerized temperature control system hereafter referred to as "CTC" that unless otherwise stated in these specifications replaces the existing temperature control system with the exception of actuators, high voltage contactors or relays and equipment safeties for controlling and monitoring of mechanical and electrical equipment described and designated in these specifications. The CTC system shall be furnished as a stand-alone computerized temperature control system with connection to mechanical equipment, sensors, control devices, software and other equipment required for full operation of the CTC system in each facility.

1.2 The system shall be modular, both hardware and software, and the system components shall be packaged with the provision for field expansion of the basic system and function and capability of expansion to 100% more addressable modules than required in these specifications for installation.

1.3 The system shall have the capability to control buildings remote from the buildings, which are the subject of these specifications. Said control shall be accomplished through the use of dedicated computer lines isolated at all termination points. Said isolation shall be optic based with a minimum voltage isolation of 1,000,000 volts RMS and Underwriters Laboratory recognized. The CTC system shall have the capability of expanding to other buildings and the total number of serial-base modules increased 100%.

Each serial module shall have the capability of quantitatively sensing temperature, pressure, light level, humidity, voltage, current, or other value that may be necessary for successful expansion of the system. Serial modules, used to control equipment, shall control no less than four control points per serial module.

1.4 All CTC system operating parameters, temperatures, time schedules and other system operator setpoints shall be adjustable at the CTC system central computer.

1.5 References to entry at the CTC system also allows entry from and display at remote digital stations through the facility computer system, computer network LAN/WAN, Internet and direct connected laptop computer using common web browsers.

1.6 All pneumatic, electronic and electric components of the existing temperature control system, except as noted in these specifications, shall be removed and replaced by components of the new CTC system as described in these specifications.

1.7 The Owner shall provide and install conventional low voltage control modules and/or low voltage contactors on mechanical equipment, domestic water heaters to be controlled and lighting circuits to be controlled in new construction or added by the Owner with such control modules and contactors approved by the Bidder.

2.0 HARDWARE

The CTC system shall be provided as a stand-alone system. The system shall consist of a central server at each facility for data entry, retrieval and recording with control computers and serial slave control boards for actual equipment control. The CTC system central server, control computers and serial slave control boards shall have sufficient memory storage to perform all functions required to meet these specifications.

The central computer shall have a x86 class 500Mhz or greater fan-less computer capable of running a Linux operation system software, two Ethernet ports, two serial ports, two USB ports and minimum nonvolatile storage, including flash memory or other nonvolatile storage. The CTC system central server shall be accessible by facility computers with a web browser on the facility LAN/WAN or remotely with Internet access. The central server shall be located as directed by the engineer.

2.2 The control computer shall perform the actual mechanical equipment control and data collection. Should the

central server fail, the control computer shall continue to perform the control of the mechanical equipment based on the last set of program parameters settings. Should a control computer fail, serial slave control boards will provide basic control of the mechanical equipment to maintain the facility. Should an serial slave control board fail, only the mechanical equipment connected to the defective serial slave control board shall be affected.

2.3 The CTC system computer shall be field programmable and shall contain self-prompting format to minimize operator training and mistakes. The CTC system shall have the ability of interrogating any of the serial modules and display the operating status of all the serial modules and connected mechanical equipment.

2.4 The CTC system shall include a twenty-four hour time-of-day clock with Julian calendar and full battery back up maintaining the clock and memory for a minimum of one year.

2.5 The CTC shall be provided with full temperature control, energy management and graphical interface programs. The programs shall be stored in read only memory in the central and each slave computer. The system operator shall only be required to enter setpoints such as operating times and temperatures. No programming experience shall be necessary for operation of the system. Use of the computer to poll various functions of the CTC system shall not interrupt the control of the mechanical equipment by the CTC system.

2.6 The CTC system shall automatically recover after any power interruption, reloading programs, setpoints, and operating time into the system from the nonvolatile read only memory sources. Once the data is reloaded, the computer shall automatically control all the mechanical equipment as listed in these specifications.

2.7 The CTC system shall be equipped with abnormal alarm programs, which will sound on, and/or off site alarms and notify the owner or owner representative over the facility LAN/WAN or Internet should unusual or abnormal conditions be detected.

2.8 The CTC system shall be furnished with programs capable of Wide Area Temperature Based Aggregate Electrical Demand Limiting, time programs, computerized temperature control, anticipatory start-up, holiday scheduling, time-of-day scheduling, optional equipment monitoring and optional mechanical equipment abnormal voltage protection. The CTC system shall perform actual temperature control of the connected equipment twenty-four hours a day, with all temperatures, pressures and operating conditions set and supervised at and by the CTC system computer.

2.9 The CTC system shall contain memory programs to automatically remember one minute histories for seven days, and ten minute and hourly trends for thirty days, including but not limited to all temperatures, pressures, light levels, voltages, currents, electrical demand and other sensed values, conditions or parameters called out or controlled by these specifications. Such data shall be presented both numerically and graphically. The above items remembered by the CTC system shall not require preselection.

2.10 The system operator data entered into the system shall be entered either as a temporary setpoint or a permanent setpoint. All setpoints shall be saved to the CTC system memory to insure restoration after power failures. Through the CTC System the system operator entered data shall be restricted to reasonable values and unreasonable values shall be rejected. Unless otherwise defined in these specifications the reasonable values shall be as follows:

1. Hot deck and furnace discharge temperature between 90° and 160° with a default value of 120°;

2. Cold deck and air conditioner discharge temperature between 50° and 60° with a default value of 55°;

3. Chiller chilled water return temperature between 40° and 50° with a default value of 45°.

4. Heating occupied temperature between 65° and 72° with a default value of 70°;

5. Heating unoccupied temperature between 45° and 55° with a default value of 55°;

6. Cooling occupied temperature between 70° and 80° with a default value of 74°;

7. Cooling unoccupied temperature between 85° and 95° with a default value of 90°;

8. Economizer mixed air temperature between 50° and 60° with a default value of 55°;

9. Unit heater outside air lockout temperature between 45° and 65° with a default value of 60°;

10. Heating and duct heating outside air lockout temperature between 45° and 65° with a default value of 60°;

11. Cooling outside lockout temperature between 30° and 70° with a default value of 45°;

12. The CTC system shall not allow the occupied heating and cooling temperatures to be set closer than 2° and the cooling temperature shall not be adjustable below the heating temperature. To establish the spread relationship the CTC system shall use the last temperature set as the priority temperature and automatically adjust the other temperature to maintain this relationship;

13. The CTC system shall not allow the unoccupied heating and cooling temperatures to be set closer than 15° and the cooling temperature shall not be adjustable below the heating temperature. To establish the spread relationship the CTC system shall use the last temperature set as the priority temperature and automatically adjust the other temperature to maintain this relationship.

14. Adjustable temperature sensor transmitters shall have a range of 65° to 80°. Said range shall be clearly marked on the sensor adjustment. From the central computer the system operator shall have the capability to restrict the effective range of the adjustable temperature transmitter or ignoring the transmitter and using the four system operator zone temperatures as defined in these specifications.

15. Medium temperature refrigeration units between 35° and 45° with a default value of 40°;

16. Low temperature refrigeration units between −10° and 30° with a default value of 10°;

17. Refrigeration defrost times between 10 minutes and 60 minutes with a default value of 30 minutes;

18. Refrigeration defrost coil temperatures between 32° and 45° with a default value of 35°;

19. Air to air heat pump heating lockout temperatures requiring use of the back-up gas or electric resistive heat between 0° and 30° with a default value of 15°;

20. Boiler and steam to hot water converter supply water temperature between 90° and 180° with a default value of 160° or as defined in these specifications;

21. Low pressure steam boiler pressure between 2 psig and 7 psig with a default value of 3 psig.

22. Circulating systems with multiple circulating pumps shall be controlled by the CTC system with the CTC system operator selecting the number of pumps required. The CTC system operator may manually select the pump operation order and manual or automatic rotation of pump operation. If automatic pump operation is selected, the CTC system shall rotate the pumps based on time of operation. The operation rotation runtime shall be between 50 and 1000 hours with a default of 100 hours.

2.11 The CTC system computer shall be capable of communicating with other computers by the using the facility LAN/WAN and dedicated Internet Protocol (IP) address. Through remote computers it shall be possible to change CTC system operator setpoints, change all levels of programming including the machine language control programs, interrogate building performance information, and troubleshoot the CTC system. Such access shall be restricted by no less than five levels of password protection. Each level of password protection shall allow greater access to the CTC system and its software.

2.12 The CTC system outboard hardware shall be addressable serial-based. The serial data buss connecting all the outboard hardware shall have an isolated data ground and data out and data back to and from the outboard modules and shall be installed in EMT or ridged conduit bonded to the facility earth ground. Wireless or power line carrier methods of communication systems are unacceptable. The outboard modules shall be addressable and shall all be connected to this common serial data buss. In the future, should expansion of the system be necessary within the building that is the subject of this specification then serial modules may be connected to the nearest serial buss with the appropriate address placed on the serial modules.

The computer shall poll the outboard hardware for proper operation. Said polling shall include hardware verification of the proper operation of the output relays. Should improper operation be detected, the computer shall set an alarm flag, sounding the alarm and notifying the system operator, both locally and remotely, of the status and location of the malfunctioning device. Systems that do not positively verify the operation of the outboard control relays are unacceptable and shall be rejected.

2.13 The CTC system shall use solid-state sensors to sense all conditions of the outboard equipment with the exception of back-up mechanical sensors. The CTC system computer shall poll said solid-state sensors. When polled the sensor shall transmit its quantitative value to the CTC system computer. Said quantitative values shall be at the CTC system computer for CTC system computer software use and video display. The CTC system computer on command shall be able to directly poll each sensor and the sensor value shall be quantitatively displayed as follows:

1. Temperature in degrees Fahrenheit;

2. Pressure above 1 PSIG in PSIG;

3. Pressure below 1 PSIG in inches of water column;

4. Power in watts;

5. Voltage in volts;

6. Current in amperes;

7. Sensor raw data shall be a minimum of 8 bits with raw value in units from 0 to 255. Systems that use raw analogue data for either sensed conditions or control are unacceptable and shall be rejected;

8. CO_2 levels in parts per million.

The CTC system shall poll all outboard hardware for proper operation. The polling shall determine if the outboard sensors have been shorted or opened either by equipment failure or system abuse. The CTC system shall determine if the serial command modules execute the proper instruction. If the instruction is not executed properly after the first serial command, the CTC system shall increment an internal error counter for that serial module and again command the serial module to execute the proper instruction.

If the CTC system determines that a sensor has opened or shorted or if a command module fails to execute the proper instruction for two consecutive instruction cycles, the CTC system shall execute an alarm condition. Said alarm condition shall sound an alarm at the CTC system computer, external building alarm, LAN/WAN network computers, cellular telephone, electronic pager and remotely located computers using the Internet.

The system operator shall be able to interrogate the CTC system computer over the LAN/WAN or over the Internet, to determine the type, nature and time of occurrence of any and all alarms. The alarm reporting through the Internet or LAN/WAN interface shall send alarms to predetermined e-mail addresses, as entered by the system operator. The computer shall send alarms to each Internet address in the order as designated by the system operator. If the computer reaches the last address without receiving an acknowledgment, then the computer shall reset to the beginning of the order and continue sending until the alarm condition has been acknowledged by the e-mailed partly. The address of the acknowledging server shall retain with the time of acknowledgment.

2.15 The CTC system shall have the capability of reading directly and/or interfacing directly with pulse

generating demand-metering equipment installed by the utility company. At the owner's expense, the utility company shall provide the demand metering and multiplier to convert the pulses from the demand metering equipment to kilowatts of demand and kilowatt-hours of consumption. Should pulse demand metering be unavailable, the CTC system shall interface with current transformers on each leg of the incoming electric power. Such current transformers are to be provided and installed by the Bidder. The CTC system shall calculate the required electric demand using real time current, voltage and power factor readings necessary to implement these specifications.

2.16 The CTC system shall have the capability of connecting with other CTC system using the facility LAN/WAN and Internet to perform Wide Area Temperature Based Aggregated Demand Limiting as defined by these specifications.

2.17 If the optional equipment monitoring is installed, the equipment monitoring sensors shall be connected to serial modules that are separate from the sensors controlling the mechanical equipment. Therefore, if the sensor controlling the mechanical equipment fails, the serial computer module monitoring the mechanical equipment and other monitoring sensors shall not be affected by said failure.

The CTC system shall be equipped with a backup fail-safe control that will automatically assume control if the central computerized CTC control system fails. Such failure shall include catastrophic failure of the CTC control system hardware or software. Should such failure occur the mechanical equipment shall revert to the occupied mode in the high electrical demand mode. This ensures that a new electric demand shall not be set with the failure of the central control system. Should a serial control computer fail only the specific mechanical equipment controlled by the specific module fail to operate.

When the failure of the computerized CTC control system is corrected the CTC system shall automatically reestablish control of the equipment and the backup fail-safe control system shall revert to the standby mode.

3.0 SOFTWARE

3.1 The CTC system shall have the capability of performing the following functions:

1. Anticipatory Start-Up Program;

   The anticipatory start-up time of assigned equipment shall be determined based on a software calculation that takes into consideration outdoor air conditions, space conditions and building R factor. All zones and their associated control shall be capable of being controlled by their own unique anticipatory start up program.

   The software program shall be capable of precisely determining the ideal start-up time in the heating and cooling season. Each zone being controlled shall have its own unique set of variables, such as temperature, occupancy time and actual start time.

   The anticipatory start-up program shall control the start-up of the cooling and heating equipment to achieve the individual zone's target occupancy space temperature at the precise time of building occupancy, plus or minus fifteen minutes.

   Using the CTC system the system operator shall have the ability to program the occupancy time and temperature for each zone to be controlled.

   A unique built-in "learning" technique shall allow the CTC system to automatically adjust itself to the most efficient time to start equipment in order to achieve the desired occupancy target temperature at the programmed time. Each temperature control zone being controlled shall have its own "smart" start-up table.

   Programs that do not have unique individual temperature control zone anticipatory capability are unacceptable and shall be rejected. The CTC system shall also have the capability of using the average recovery time. This option shall be system operator selected for each unit.

The system operator shall be able to establish a maximum recovery time for either individual temperature control zones or the entire facility. Should a zone fail to recover the CTC system shall enter the alarm status and inform the system operator of the failure of the zone to recover and save all applicable zone data related to recovery.

2. Time Control Program;

The CTC system shall provide automatic start-up and/or shutdown of selected remote equipment designated by the Owner and automatic adjustment of the setpoint data according to preset schedules stored in the computer. The CTC system shall have the capability of having each control point have its own unique start-up and/or shutdown program.

The timing program shall operate in accordance with a seven-day calendar and a yearly calendar with automatic adjustment for daylight savings time and leap year.

The time control program shall incorporate holiday scheduling capability with holiday scheduling with up to twelve months in advance and shall be capable of a minimum of twenty-five holidays per year.

The time control program shall have the capability of changing all condition setpoints, temperatures, pressures, light levels, etc., based upon time and have minimums of two setpoint temperatures for each control point. The scheduling for the setpoint shall be unique for each day of the week.

The system operator shall be capable of reading and/or changing all stored setpoints pertaining to time-of-day, day-of-the-week, on/off time, setpoint values and holiday scheduling.

3. Electrical Demand Limiting;

The CTC system shall contain a sliding window program to perform Wide Area Temperature Based Aggregated Demand Limiting to anticipate the peak demand for each demand meter. The sliding window shall be accumulated in one-minute increments

whereas each additional minute of window is accumulated, the minute that occurred five minutes previously, shall be dropped off. This five-minute sliding window shall be used to project the peak demand that will occur within the time base period of the electrical demand period as defined by the utility company. Once the computer determines that if the present rate of demand rise, as determined by the five-minute sliding window, were to continue for a time equal to the utility company's demand time-base it would exceed the demand setpoint, then the CTC system shall initiate Wide Area Temperature Based Aggregated Demand Limiting.

The CTC system shall determine the number of zones related to each demand meter that must be shed to reduce the projected electrical demand below the meter's demand setpoint. The CTC system shall subtract the demand setpoint from the five minute projected electrical demand window to obtain the amount of electric demand that must be shed. The CTC system shall compare the actual zone temperatures to the setpoint temperatures for each zone. Demand limiting shall then be initiated on the peaking demand meter's equipment that services zones that are closest to their setpoints. The electrical demand of the zones selected for demand limiting shall be equal to the difference between the five-minute demand window and the demand setpoint. Every minute after demand limiting is initiated, the electrical demand that must be reduced and the actual zones to be limited based on the separation of the zone temperature and setpoint, shall be evaluated and the number of zones and the actual zones limited shall be reset.

When a demand condition occurs, the CTC system shall reduce the electric demand by optimizing the operation of the mechanical equipment. The CTC system shall limit the operation of equipment closest to their setpoints utilizing limiting and stage reduction techniques. The equipment furthest away from their setpoints is exempt from the intelligent demand reduction techniques in order to provide the highest comfort. This shall be a dynamic process, evaluated every minute based upon

the present demand relative to the monthly demand setpoint.

When the measured demand is less then 70% of the monthly target setpoint, no demand reduction techniques are employed.

When the measured demand is between 70% and 80% of the monthly target setpoint, the CTC system shall limit the operation of the equipment running at that time by shedding the equipment closest to its temperature setpoint at 50%. The percentage of operating zones shed shall be system operator set between 20% and 39% with default of 33%.

When the measured demand is greater than 80% of the target, the CTC system shall limit the operation of 50% of the equipment running at that time by shedding the equipment closest to its temperature setpoint at 50%. The percentage of zones shed shall be system operator set between 40% and 70%.

The system operator shall have the capability of setting environmental demand shedding setpoint limits. If during demand shedding, zones exceed the limits set for demand shedding, then demand shedding shall cease on those zones and shall be increased proportionally on all of the other demand shedding zones. This program shall be a dynamic program whereby the computer, without any system operator input, shall adjust demand shedding priorities based on the separation of each zone's setpoint and actual temperature and the environmental demand shedding setpoint limit temperatures.

Once the computer has determined that the projected demand will fall below the peak demand setpoint, demand limiting on the connected equipment shall be terminated. However, termination of demand shedding shall observe minimum short-cycle time as contained in the computer's non-volatile memory. Said minimum short-cycle times shall be adjustable for each piece of mechanical equipment.

Demand target limits for each demand meter shall be system operator defined using the central computer keyboard entry and reviewed using the video display

of the computer. Demand target limits shall be adjustable for the time of day and for each month in order to achieve maximum demand savings based upon the previous twelve-month demand history of the building.

Only the function of the mechanical equipment that contributes to the excess electric demand shall be shed. This shall include, but not be limited to, electric heat and electric compressors, both air conditioning and heat pump. Air handler, fan coil and unit heater fans shall not be shed.

A demand log for each demand meter shall be maintained and reviewed by the system operator through the keyboard and numeric display system to provide the following demand values:

1. Current electrical demand;

2. Ten minute electrical demand histories for seven calendar days;

3. One hour electrical demand histories for thirty calendar days;

4. Previous daily peak demand for the past ninety days with day and time-of-day;

5. Previous peak demand for each of the past twelve months with day and time-of-day.

Systems that use demand triggered conventional "duty cycling", "Temperature Reset" or "Temperature Based Duty Cycling" are unacceptable and shall be rejected. Systems that reset occupied zone temperatures upward or downward to terminate operation of the mechanical equipment contributing to the electric demand peak shall be rejected.

The CTC systems in buildings with separate electric demand meters shall be aggregated together using the facility LAN/WAN or Internet. The aggregation shall treat all temperature control and temperature based demand limiting zones as if they were in a common building. The Wide Area Temperature Based Aggregated Demand Limiting program shall provide

aggregated demand histories as specified in subparagraphs #1 through #5 above.

A CTC system computer shall be designated as the Wide Area Temperature Based Aggregated Demand Limiting computer. This computer shall contain the programs necessary for the aggregation of the electric demand and coordination with other CTC systems from other unrelated facilities. The Wide Area Temperature Based Aggregated Demand Limiting computer shall have the capability to communicate with other remote CTC systems of other Owners to perform Wide Area Temperature Based Aggregated Demand Limiting based on electric demand purchase cooperatives. When Wide Area Temperature Based Aggregated Demand Limiting with unrelated facilities is initiated, the temperature control and temperature based aggregated demand limiting zones of all facilities shall be controlled as if they were in a common facility with the aggregated demand of all facilities summed together on a real time basis using the Internet as the aggregated electric demand of common facility model.

Wide Area Temperature Based Aggregated Demand Limiting and Temperature Based Demand Limiting is the patented property (US 7,249,043) of E.P.M., Inc.,2105 Power Lane, Fulton, Missouri 65251. The manufacturer of the CTC system shall provide an executed license from E.P.M., Inc. to implement, install and use both Wide Area Temperature Based Aggregated Demand Limiting and Temperature Based Demand Limiting.

4. Temperature Control;

The CTC systems shall perform temperature control on the specified building mechanical equipment based upon the adjustable temperature setpoint transmitter located on each zone temperature sensor or four system operator programmable temperatures.

The temperature setpoint transmitter shall be adjustable by the zone occupant and calibrated in degrees Fahrenheit from 65° to 80°. This temperature setpoint will only be used during the occupied period of the zone. Should a temperature control

zone serve two or more areas or rooms, each area or room shall have one temperature sensor and setpoint transmitter. Each temperature control zone with more than one setpoint transmitter shall be averaged with the other setpoint transmitter in the common temperature control zone. The averaging shall be performed on a weighted averaging basis. The system operator shall have the capability through the CTC system of assigning a weight from zero to five to each zone setpoint transmitter to be averaged. If the system operator assigns no weight to a setpoint transmitter, the CTC system shall default the weight assigned to the setpoint transmitter to one. The CTC system software shall multiply each setpoint by its assigned weight. The product of each setpoint's weight and temperature shall be summed and divided by the sum of the setpoint's weights to obtain an equivalent weighted average setpoint temperature. These averaged temperatures shall be used by the CTC system as the temperature and setpoint temperature for the entire zone for control purposes.

Using the CTC system the system operator shall have the capability to restricting the setting of the temperature setpoint transmitter to a limited range. Two sets of range limiting shall be available, limited range during normal operation and limited range during demand periods. The CTC systems participating in Wide Area Temperature Based Aggregated Demand Limiting shall have the limited range established by the aggregation contract. The CTC system operator shall also have the ability to override the setpoint to a fixed value within the adjustable range or ignore the single temperature setpoint and use the four system operator programmable temperatures as follows:

1. Cooling occupied temperatures;

2. Cooling unoccupied temperatures;

3. Heating unoccupied temperatures;

4. Heating occupied temperatures.

Each temperature control zone shall have its own discrete set of occupied and unoccupied temperatures

separate and distinct from all other zones. The CTC system shall not allow inversion of the heating and cooling temperatures. The CTC system shall restrict the value of the four temperatures that the system operator may set to occupied between 65° and 78° and unoccupied between 50° and 90°, with default values of occupied cooling temperature to 74°, unoccupied cooling to 90°, unoccupied heat to 55° and occupied heat to 72°. The CTC system shall not allow the system operator to set the cooling occupied and heating occupied temperature closer than 2° of each other and the cooling unoccupied and heating unoccupied temperatures closer than 15° of each other.

The CTC system shall sense the zone temperatures using the serial data buss hardware system and compare the zone temperatures with the current target temperature located in the CTC system software. Based upon the target temperature and the actual zone temperature, the CTC system shall command the heating and air-conditioning equipment to satisfy the target temperature. The commands shall be sent over the CTC system serial data buss to the serial hardware module connected to the mechanical heating and air conditioning equipment. The current zone temperature, target temperatures and mechanical equipment status and parameters related to the zone shall be displayed on the CTC system. Said display shall be automatically updated to indicate the correct status of all real time zone temperatures, conditions and parameters of the equipment.

The CTC system shall establish a priority heating zone for any boiler heat and system control and operation as referred to in these specifications as follows:

1. Any heat zone during night setback that will not maintain the night setback setpoint within a system operator settable temperature above or below the night setback temperature of between 5° and 10° with a default difference of 8° for at least a system operator settable time of ten to thirty minutes with a default time of thirty minutes;

2. Any heat zone during occupied time that will not maintain the occupied setpoint within a system operator settable temperature below the occupied temperature of between 4° and 8° with a default difference of 6° and at least below 68° for the heating temperature for at least a system operator settable time of ten to thirty minutes with a default time of fifteen minutes;

3. Specific or groups temperature control zones for night setback override purposes as set at the CTC system computer by the system operator.

5. Holiday Scheduling.

The CTC system shall be capable of modifying programming schedules, pressures, temperature, protocols and parameters necessary for maximum energy use and cost reduction based upon holidays throughout the year. The CTC system shall be capable of observing a minimum of twenty-five holidays each year. The holidays shall be of two types. The first is a temporary holiday and when this holiday has been passed the computer will automatically delete the holiday from the holiday scheduling. The second is a permanent holiday and the holiday will always be remembered by the CTC system until such time as the system operator deletes the holiday.

6. Alarm Report;

The CTC system shall be capable of sensing and reporting various alarms as defined by these specifications. The alarms shall be any combination of high/low temperature, high/low pressure, protocol failure, unauthorized intrusion, equipment failure, and other alarm conditions that maybe designated appropriate by the engineer. Said alarm shall be visually prompted at the CTC system, sound an on/off-site audio alarms, communicating with a remote computer through the facility LAN/WAN and Internet.

The system operator shall set the type, category and class of the alarm that can initiate the remote

call. Based on these settings the CTC system shall notify off site either 24-7 or during normal business hours as defined by the system operator. The system operator shall be able to interrogate the CTC system computer through the facility LAN/WAN and Internet to determine the type, nature and time of occurrence of any and all alarms. Once the system operator has recognized the alarm, the system operator may terminate the alarm condition and the video indication of the alarm condition shall remain. The termination of the alarm condition shall not disable the automatic reporting of any new alarm condition.

The alarm reporting through the LAN/WAN and Internet interface shall be capable of e-mailing up to ten predetermined emergency addresses, as entered by the system operator. The CTC system computer shall e-mail each address in the order as designated by the system operator. If the CTC system is successful in connecting with the remote server, the CTC system shall communicate the category, class and time of occurrence of the alarm. If communication cannot be established with the remote server, the CTC system shall e-mail the next party on the call list and repeat the above sequence. If the computer reaches the last number to be without receiving an acknowledgment, then the computer shall reset to the beginning of the order and continue e-mailing until the called party has acknowledged the alarm condition. The password assigned to the acknowledging party and the time of acknowledgment shall be retained.

The Bidder shall maintain a twenty-four hour a day and seven day of the week engineer on duty program. Such program shall include the capability to receive emergency calls from installed CTC systems. Should the Owner's CTC system detect an alarm and be unable to contact designated Owner's representatives, the CTC system shall notify the Bidders engineer-on-duty. Such notification shall include the location, time, date and nature of the alarm responsible for the notification. The Bidder shall not charge an access fee for the engineer-on-duty services, but will charge his normal hourly service fee with billing in 15-minute increments and minimum fee of 15 minutes. Bidders without such preexisting engineer on duty program shall be disqualified.

7. CTC System;

The CTC system shall perform all direct temperature control functions as contained in these specifications. The existing temperature control system shall be removed and replace with the CTC system described in these specifications. Unless otherwise defined in these specifications, the only existing temperature control equipment that shall remain shall be equipment safeties, high voltage contactors, valves, dampers and actuators. Should the equipment safeties, high voltage contactors, valves, dampers and actuators be incompatible with the bidders CTC system these shall be replaced by the bidder and included in the bidders base bid price.

New mechanical equipment installed by the Owner shall be equipped by the mechanical equipment manufacturer with standard low voltage control interfaces. The Owner shall provide and install high voltage power contactors for mechanical equipment and lighting requiring such power contactors to be controlled by the CTC system. Such low voltage interfaces and contactors shall be approved by the Bidder.

8. Optional Voltage Protection of the Controlled Equipment;

The CTC system shall monitor the level of the voltage to the mechanical equipment. Should the voltage become nonstandard, the CTC system will immediately turn “off” all controlled induction motors and prevent them from restarting until power has been restored within standard parameters and the short-cycle period of the controlled equipment has elapsed. Solid-state serial computer modules shall sense these voltages and the voltage limits shall be system operator adjustable through CTC system. The system operator shall have the capability to override this program for specific equipment and allow the equipment to operate regardless of the equipment voltages.

When the mechanical equipment is turned “off” to protect it from non-standard voltage, the video monitor shall show the equipment “off” because of improper voltage and the time. Once the proper voltage is restored the mechanical equipment will be turned back “on”. With the Monitoring option the CTC system shall log the event for future recall.

9. Optional Mechanical Equipment Monitoring;

The CTC system shall monitor the operation of the controlled mechanical equipment.

The CTC system shall monitor the operation of the circulating pumps. Should a circulating pump fail to turn “on” and deliver product, if equipped with a second circulating pump, the CTC system shall turn “on” the second circulating pump. Regardless, the CTC system shall enter the alarm mode and providing notification of such alarm and the nature and location of the alarming problem.

The CTC system shall monitor the supply air discharged from the air handler and variable volume units. If a call for supply air exist and the supply air volume is not within a settable 20% to 50% of the a system operator adjustable value, with a default value of 30%, after a system operator settable time of between one minutes and twenty minutes with a default time of five minutes, the CTC system shall notifying the system operator of the nature and location of the problem. The CTC system shall have the option of notifying the system operator of the alarm condition only or both notifying the system operator and terminating unit or zone airflow. If the CTC system has terminated the operation, by clearing the alarm condition the CTC system shall enable the airflow.

The CTC system shall monitor the supply air discharged from the air handler and variable volume units. If a call for cooling exist and the supply air temperature is not within 5° of a system operator adjustable value between 50° and 60°, with a default value of 55° and the temperature drop across the evaporator is below a adjustable value between

10° and 30°, with a default value of 15°, after a system operator settable time of between one minutes and sixty minutes with a default time of five minutes, the CTC system shall notifying the system operator of the nature and location of the problem. The CTC system shall have the option of notifying the system operator of the alarm condition only or both notifying the system operator and terminating cooling. If the CTC system has terminated the operation of the cooling, by clearing the alarm condition the CTC system shall enable the cooling. Zones with zone setpoint temperatures set less than the zone limit temperatures shall be excluded from the zone temperature alarm checking.

If a call for heating exist and the heat exchanger/furnace supply air temperature is less than 10° below system operator adjustable value between 80° and 120°, with a default value of 100° and the temperature gain across the heat exchanger/furnace is below an adjustable value between 10° and 50°, with a default value of 20°, after a system operator settable time of between five minutes and sixty minutes with a default time of five minutes, the CTC system shall notify the system operator of the nature and location of the problem. The CTC system shall have the option of notifying the system operator of the alarm condition only or both notifying the system operator and terminating heating. If the CTC system has terminated the operation of the heating, by clearing the alarm condition the CTC system shall enable heating. Zones with zone setpoint temperatures set greater than the zone limit temperatures shall be excluded from the zone temperature alarm checking.

The CTC system shall monitor the temperatures in each of the temperature control zones. During the cooling mode if the zone temperature raises an adjustable value of 4° to 10°, with a default value of 6°, above the desired setpoint, the CTC system shall enter the alarm mode, notifying the system operator of the nature and location of the problem. During the heating mode if the zone temperature falls below an adjustable value of 4° to 10°, with a default value of 6°, below the desired setpoint, the CTC system shall enter the alarm mode, notifying the

system operator of the nature and nature and location of the problem.

The CTC system shall monitor the free air and evaporator discharge air temperature of the walk-in refrigeration units controlled by the CTC system. If the free air temperature of the refrigeration units rises an adjustable temperature of between 5° to 25° with a default value of 10° above the CTC system setpoint temperature for a continuous adjustable period of ten to sixty minutes with a default value of thirty minutes and/or the air temperature drop across the operating evaporator is less than an adjustable temperature of between 5° to 25° with a default value of 10° for a continuous adjustable period of five to fifteen minutes with a default value of ten minutes, the CTC system shall enter the alarm mode, notifying the system operator of the nature and location of the problem.

Should the refrigeration defrost be terminated by the expiration of the maximum defrost time, the CTC system shall enter the alarm mode, notifying the system operator of the nature and location of the problem.

Additional monitoring requirements are contained in the specifications related to specific mechanical systems.

Should any mechanical equipment fail to properly respond to the CTC system commands, the CTC system shall enter the alarm mode and notify the system operator of the failure of the mechanical equipment to properly perform.

4.0 VARIABLE AIR VOLUME HOT WATER HEATING BOILER, BOILER CIRCULATING PUMP, LOOP VALVING AND PUMP CONTROL

4.1 The CTC system shall sense the boiler's vessel temperature.

4.2 The CTC system shall provide both numerical and graphical histories of the temperatures and conditions described in these specifications.

4.3 The CTC system shall directly control the boilers, appropriate two and three way supply hot water valves to provide the proper water temperature control to the mechanical equipment served by the hot water loop as provided for in these specifications. The boiler burner shall only be turned "on" and staged/modulated maintaining proper hot water temperature when there is a call for heat from the heating units served by the boiler system. Should the boiler be equipped with individual circulating pumps designed to prevent boiler water temperature stratification, the individual boiler circulating pump shall lead the firing of the boiler by one to ten minutes, with a default of five minutes and after firing termination continue to operate until the average boiler temperature has dropped between 25° and 50°, with a default of 40°, below the high temperature safety limit of the boiler.

4.4 The CTC shall directly control the supply and isolation water valves and circulating pumps to provide the proper water temperature control to the mechanical equipment served by the hot water loops as provided for in these specifications. The boiler systems and hot water circulating pump systems shall only be turned "on" when there is a call for heat from the heating units served by the boilers and circulating pumps. If equipped with two or more pumps serving the same loop, the CTC system shall set one of hot water loop circulating pumps as the primary loop circulating pump. The CTC system shall have the ability to alternate the primary and secondary pump, every time there is a call for hot water, daily, weekly or monthly.

Should the primary circulating pump fail to provide sufficient hot water loop flow, the boiler system shall be cycled “off”, the secondary circulating pump turned “on”. Once proper flow has been established, the boiler systems shall cycle “on”. Failure of the primary circulating pump shall cause the CTC system to enter the alarm mode with appropriate notifications as defined in these specifications.

4.5 If there is no call for heat and all other conditions required in these specifications are met, the CTC system shall revert the boiler system to the appropriate standby condition or turn it "off" as defined by these specifications.

4.6 The CTC system shall determine if there is a call for heat from the heating equipment served by the hot water boilers. If a call for heat exist, the boiler systems shall be staged to maintain the operating hot water temperature. None of the hot water heating equipment, including fans, shall be turned "on" until the minimum number of zones necessary to establish a call for heat, call for heat. When the call for heat is terminated, the boiler system shall revert to the appropriate standby program. If a dedicated boiler vessel circulating pump is not installed the loop circulating pump system shall remain "on" circulating water until the boiler vessel temperature falls between has dropped between 10° and 20°, with a default of 10°.

If a call for heat is not present, has not been present for 24 hours and the outside air temperature is above a preprogrammed level, then the boiler shall be turned "off". If a call for heat is not present and has been present within the past 24 hours or the outside air temperature is not above a preprogrammed level, the boiler vessel shall be maintained at a minimum temperature adjustable by the system operator between 90° and 140°, with a default value of 100°, to avoid thermal expansion and contraction of the vessel.

The convectors, unit ventilators, air handlers or fan coil units equipped with hot water heat exchangers shall initiate a call for heat from the hot water system. This call for heat will activate the boiler program as described in this section. Once active, the boiler system shall satisfy the minimum calls for heat from each of the individual zones as described in each applicable section of these specification.

4.7 The system operator shall enter in the CTC system central computer the hot water boiler supply hot water reset curve. The maximum water temperature shall be adjustable between 150° and 200°, with a default of 180° occurring at an adjustable outside temperature between -10° and 20°, with a default temperature of 10°. The minimum water

temperature shall be adjustable between 90° and 130°, with a default of 110° occurring at an adjustable outside temperature between 50° and 70°, with a default temperature of 60°. If more than a adjustable number of temperature control zones between 3 and 8, with a default of 5, fail to reach their heating set points within one hour from the system operator entered occupied time of the zone or if a priority heating zone is set as defined by these specifications, the CTC shall increase the hot water reset curve maximum temperature to the maximum allowable heating hot water temperature and increase the minimum outside temperature for maximum hot water temperature to the maximum allowable outside temperature. The CTC shall notify the system operator that it has modified the boiler reset curve. However, during morning warm up on a call for the hot water heating system, the CTC system shall set the reset curve to the maximum until morning warm up is accomplished. Should morning warm up reset the boiler temperature, the CTC system shall notify the system operation.

4.8 The CTC system shall allow the hot water boiler system to operate according to these specifications if the outside air temperature is at or below the temperature for heating of the individual units and the minimum number of heating zones are calling for hot water heating heat or a heating priority zone is set as described in these specifications. If the outside air temperature is above this temperature, the CTC shall ignore calls for heating from the heat zones.

4.9 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the boiler heating system and all its related equipment.

5.0 VARIABLE AIR VOLUME CENTRAL AIR HANDLING SYSTEM CONTROL

5.1 The CTC system shall sense the following items, conditions, temperatures and pressures:

1. Common return air temperature;
2. Common mixed air temperature;
3. Economizer mixed air temperature;
4. Common discharge temperatures;

5. Differential pressure difference between each supply air system and average interior zone static pressure;
6. Differential pressure difference between average interior zone static pressure and average outside air pressure.

5.2 The air handler shall have the capability of running continuously during the occupied period or being turned "on" only when a call for heating or cooling exists. This is selectable at the CTC system. If intermittent or automatic operation is selected, the air handler fan shall lag the call for heating or cooling by one minute. Should the system operator select the continuous operation of the fans, the fan shall run continuously during the occupied period.

5.3 The CTC system shall directly control the supply fan, supply fan variable frequency drive or supply air bypass damper, relief air damper actuator, return air damper actuator, economizer and compressor/condenser unit staging. The CTC system shall measure the difference between the static supply air pressure and the average interior zone pressure. The CTC system shall control the supply fan variable frequency drive or bypass damper to maintain the differential pressure between 0.5 psid and 2.5 psid with a default of 1.5 psid.

Air handlers with supply air bypass dampers used to maintain supply air static pressure shall maintain minimum supply air temperature at a user settable temperature between 45° and 55°, with a default of 50°. If after reducing the compressor staging the minimum supply air temperature cannot be maintained, those zones not calling for cooling, but above their heating setpoints shall be commanded to cool. If the supply air temperature continues to fall below the minimum supply air temperature, the compressor shall be turned off for the minimum off time.

The CTC system shall measure the differential pressure between the facility average interior and average exterior pressure. The CTC system shall control the relief air actuator and economizer actuator to maintain the differential pressure between 0.005 inches of water column and 0.02 inches of water column with a default of 0.01 inches of water column.

5.4 A call for cooling shall be established when a user settable number of variable air volume boxes and fan terminal zones between 2 and 6 with a default of 4 call for cooing or a single temperature control zone deviates from its setpoint by a user settable temperature between 4° and 8° with a default of 5°. Should less than the user settable number of zones calling for cooling establish the call for cooling due to either unoccupied override request or a zone exceeding the user settable maximum excessive temperature differential, the CTC system shall revert to the occupied cooling mode sufficient zones in the area of the original calls for cooling to equal the user settable number of zones required for a normal air handler minimum cooling load.

5.5 On a call for cool, the unit fan and compressor/condenser shall be turned "on". If the air conditioner contains more than one stage, each stage shall be progressively be turned "on" as the supply air temperature rises above the setpoint in 2° increments. Once turned "on" the stage shall remain "on" until the temperature falls to the cool supply air setpoint temperature unless turned "off" subject to the temperature based aggregated demand limiting program. Air conditioning compressors shall be unloaded and turned off maintaining the cooling supply air temperature as individual variable volume cooling zones revert to minimum airflows complying with temperature based demand limiting. When the call for cooling is satisfied, the compressor/ condenser shall be turned "off" and if automatic operation has been selected for the fan, the fan shall be turned "off" one minute later. The CTC system shall operate the air conditioning units to satisfy the zone cooling requirements if the outside air temperature is at or above a user entered temperature. If the outside air temperature is below this temperature the CTC system shall ignore calls for cooling from the air conditioning zones. The outside air temperature range shall be between 25° and 45° with a default temperature of 35°.

5.6 The fresh air economizers and fresh air dampers shall be used to supplement mechanical cooling and under the below conditions the fresh air economizers shall be used to provide the cooling. When the mechanical cooling is used, the CTC system shall compare the outside air temperature, outside dew point, air conditioner unit

inside air temperature and inside air dew point. If the energy level of the outside air is less than the energy level of the return air, than the CTC system shall fully open the economizer and use the outside air to supply the air conditioning evaporator and vent the return air while maintaining correct building static pressure.

When the outside air temperature and dew point falls below a user setpoint value and a call for cooling exist the CTC system shall disable the mechanical cooling and enable the economizer to modulate the fresh air intake damper and return air damper to maintain a user setpoint mixed air temperature.

The return area shall have CO_2 level sensors. Such sensors shall read CO_2 levels in parts per million. Should the CO_2 level exceed a settable level between 500 and 1,500 with a default of 1,000 parts per million ventilation of the area shall begin. Ventilation of the area shall be proportional to the excessive CO_2 levels. Initial ventilation shall start at 25% opening of fresh air dampers. If the CO_2 levels do not start dropping the opening shall be increased 10% every ten minutes until the CO_2 levels begin to drop. As the CO_2 levels approach the CO_2 level setpoint the economizer or fresh air dampers shall be incremented closed, closing 10% every five minutes until the CO_2 level stabilizes within 25% of the setpoint. If CO_2 levels change the economizer or fresh air damper shall modulate to maintain the changing CO_2 level.

5.7 The user settable minimum run time for the compressors shall be between 5 minutes and 8 minutes with a default of 7 minutes. The minimum between a compressor starts shall be a user settable time between 2 minutes and 10 minutes with a default of 5 minutes.

5.8 During recovery from night setback if the variable volume and fan terminal zones require heat the hot water system shall maintain the appropriate temperature as indicated in the boiler specifications. During morning warm-up fresh air shall be off until the actual occupied time and then only turned on maintaining the user set CO_2 levels set in the CTC system. Above this user settable maximum outside air temperature, morning warm-up shall be disabled and the air handler fan shall be turned on to redistribute air with varied temperatures within zones.

5.9 The CTC system hardware and software shall replace the complete air handler, compressor/condenser and morning warm-up control systems, except internal solid state devices required by the equipment manufacturer, high voltage contactors, dampers and equipment safeties.

5.10 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the variable air volume central air handler systems and all their related equipment.

6.0 FAN TERMINAL UNIT CONTROL

6.1 The CTC system shall sense the temperature in each of the fan terminal unit zones with at least one sensor for every 1000 square feet of zone floor area. Each zone with more than one zone sensor shall be averaged with the other sensors in the common zone. The averaging shall be performed on a weighted averaging basis. The system operator shall have the capability at the CTC system computer of assigning a weight from zero to five to each zone sensor to be averaged. Said averaging shall be done as a weighted average as described in subsection 3.1.4 of these specifications. This temperature shall be used by the CTC system as the existing temperature for the entire zone for control purposes.

Each zone temperature sensor shall be equipped with an adjustable temperature transmitter. The CTC system shall read the temperature set on the transmitter. The system operator shall have the ability to restrict the temperature range of the temperature transmitter or ignore it completely and use the four temperatures set at the CTC system central computer as provided for in these specifications.

6.2 The CTC system shall replace temperature and air flow sensors directly control the variable volume box damper actuators, fan motor contactor and hot water valve to provide the necessary heating or cooling to each of the temperature control zones. The CTC system shall directly control the volume of air provided by each variable volume box and such volume shall be settable at the CTC system terminal, including minimum and maximum air volume.

6.3 With the optional monitoring the CTC system shall sense the fan terminal discharge air temperature, air volume and provide both numerical and graphical histories of the temperatures described in these specifications.

6.4 Each fan terminal zone shall have a discrete anticipatory recovery table and capable of independent recovery. Said recovery shall be for both heating and cooling.

6.5 During morning warm-up the CTC system shall control the fan terminal damper, fan and hot water valve to provide the zone temperature set for the discrete zone occupied temperature. After the morning warm-up is terminated the CTC system shall control the fan terminal box as a heating or cooling box observing design minimum airflows for ventilation.

6.6 Upon a call for cooling from the fan terminal zone and with sufficient variable air volume boxes and fan terminal units calling for cooling to enable the central air handler cooling, the CTC system shall open the variable volume damper to satisfy the call for cooling unless interrupted by the temperature based demand limiting program.

6.7 Upon a call for heat the CTC system shall close the variable volume damper to the minimum position. If the difference between the setpoint is at least 2° and no more than 3° the CTC system shall turn "on" the fan mixing air from the ceiling and the minimum position cooling air to provide the necessary heating. If the difference between the setpoint exceeds 3°, the CTC system shall also sequence on the fan terminal heaters. When the temperature rises to the setpoint, the CTC system shall turn "off" the fan and the heat.

6.8 If the CTC system projects a temperature based aggregated electric demand peak requiring initiation of the temperature based aggregated electric demand limiting program, the CTC system shall terminate the variable air volume zone cooling based on each units spread of the zone temperature from its setpoints as defined in the demand limiting section of these specifications. Temperature based aggregated electric demand limiting shall be applied to those units whose sum of the spreads is least. This process shall be dynamic and shall

continue without the aid or intervention of the system operator.

6.9 The CTC system hardware and software shall replace the complete fan terminal unit control systems, temperature sensors, air volume sensors, except internal solid state devices required by the equipment manufacturer, high voltage contactors, dampers and equipment safeties.

6.10 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the fan terminal unit systems and all their related equipment.

7.0 CONVENTIONAL ROOFTOP AND HEATING AND AIR CONDITIONING SYSTEM CONTROL

7.1 The CTC system shall sense the temperature in each of the heating and air conditioner zones with at least one sensor for every 1000 square feet of zone floor area. Each zone with more than one zone sensor shall be averaged with the other sensors in the common zone. The averaging shall be performed on a weighted averaging basis. The system operator shall have the capability at the CTC system computer of assigning a weight from zero to five to each zone sensor to be averaged. Said averaging shall be done as a weighted average as described in subsection 3.1.4 of these specifications. This temperature shall be used by the CTC system as the existing temperature for the entire zone for control purposes. With optional monitoring the supply and return air temperature of all units shall be sensed.

Each zone temperature sensor shall be equipped with an adjustable temperature transmitter. The CTC system shall read the temperature set on the transmitter. The system operator shall have the ability to restrict the temperature range of the temperature transmitter or ignore it completely and use the four temperatures set at the CTC system central computer as provided for in these specifications. With the optional monitoring the supply and return temperatures of all units shall be sensed.

7.2 With the optional monitoring the CTC system shall provide both numerical and graphical histories of the temperatures described in these specifications.

7.3 The air handler shall have the capability of running continuously during the occupied period or being turned "on" only when a call for heating or cooling exists. This is selectable at the CTC system central computer only. If intermittent or automatic operation is selected, the air handler fan shall lag the call for heating or cooling by one minute. Should the system operator select the continuous operation of the fans, the fan shall run continuously during the occupied period. During the occupied mode, if the override button on the zone temperature sensor is pressed, the fan shall toggle to and from the continuous mode of operation.

7.4 The CTC system shall directly control the heating and air conditioning unit to provide the proper temperature control to the zone as provided for in these specifications. On a call for heat, the fan and furnace/heat exchanger shall be turned "on". If the furnace/heat exchanger contains more than one stage, each stage shall progressively be turned "on" as the zone temperature falls below the setpoint temperature in 2° increments. Once turned "on" the stage shall remain "on" until the setpoint temperature is reached unless interrupted by the temperature based aggregated demand limiting program. With the heat "on" and the zone temperature not falling, should the zone temperature not reach its setpoint within a ten-minute time from the initiation of heat, the CTC system shall turn "on" an additional stage of heat. Once a stage is turned "on" it shall remain "on" until the heating setpoint is achieved, unless interrupted by temperature based aggregated demand limiting. Proportional staging shall be controlled to provide a linier progression of the proportional control to provide the control described in this section.

Should the Monitoring Option be purchased and a stage of heat in a multi stage furnace/heat exchanger fail to heat, the CTC system shall turn "on" the next appropriate stage of heat to provide the necessary heat until the system can be repaired. Should this occur, the CTC system shall alarm the event, informing the system operator that a heating stage failure has occurred. The furnace/heat exchanger shall observe minimum "off" times of 5 minutes, minimum staging times of 2 minutes and minimum "on" times of 2 minutes. Said times shall be contained in the memory of the CTC system central

computer and shall be changeable with the entry of a special password. When the call for heat is satisfied, the furnace/heat exchanger shall be turned "off" and if automatic operation has been selected for the fan, the fan shall be turned "off" one minute later.

The CTC system shall operate the fan and furnace/heat exchanger to satisfy the zone heating requirements if the outside air temperature is at or below a user entered temperature. If the outside air temperature is above this temperature the CTC system shall ignore calls for heat. The outside air temperature range shall be between 45° and 70° with a default temperature of 60°.

7.5 On a call for cool, the unit fan and compressor/condenser shall be turned "on". If the air conditioner contains more than one stage, each stage shall be progressively be turned "on" as the zone temperature rises above the setpoint in 2° increments. Once turned "on" the stage shall remain "on" until the zone temperature falls to the cool setpoint temperature unless turned "off" subject to the temperature based aggregated demand limiting program. When the call for cool is satisfied, the compressor/condenser shall be turned "off" and if automatic operation has been selected for the fan, the fan shall be turned "off" one minute later. The CTC system shall operate the air conditioning units to satisfy the zone cooling requirements if the outside air temperature is at or above a user entered temperature. If the outside air temperature is below this temperature the CTC system shall ignore calls for cooling from the air conditioning zones. The outside air temperature range shall be between 40° and 65° with a default temperature of 55°.

If the air conditioning units are equipped with fresh air economizers or fresh air dampers, the fresh air economizers and fresh air dampers shall be used to supplement mechanical cooling and under the below conditions the fresh air economizers shall be used to provide the cooling. When the mechanical cooling is used, the CTC system shall compare the outside air temperature, outside dew point, air conditioner unit inside air temperature and inside air dew point. If the energy level of the outside air is less than the energy level of the return air, than the CTC system shall fully open the economizer or fresh air damper and use the

outside air to supply the air conditioning evaporator and vent the return air.

When the outside air temperature and dew point falls below a user setpoint value and a call for cooling exist the CTC system shall disable the mechanical cooling and enable the economizer to modulate the fresh air intake damper and exhaust air damper to maintain a user setpoint mixed air temperature. If the economizer is equipped with an exhaust air fan, the CTC system shall turn "on" the exhaust air fan when the economizer is active.

The return area shall have CO_2 level sensors. Such sensors shall read CO_2 levels in parts per million. Should the CO_2 level exceed a settable level between 500 and 1,500 with a default of 1,000 parts per million ventilation of the area shall begin. Ventilation of the area shall be proportional to the excessive CO_2 levels. Initial ventilation shall start at 25% opening of fresh air dampers. If the CO_2 levels do not start dropping the opening shall be increased 10% every ten minutes until the CO_2 levels begin to drop. As the CO_2 levels approach the CO_2 level setpoint the economizer or fresh air dampers shall be incremented closed, closing 10% every five minutes until the CO_2 level stabilizes within 25% of the setpoint. If CO_2 levels change the economizer or fresh air damper shall modulate to maintain the changing CO_2 level.

7.6 The multiple heating, air conditioning and/or ventilating units serving a common area shall not provide both heated and cooled air to the area simultaneously. The CTC system shall weight the calls for heating and cooling to determine which has the highest priority. The CTC system shall set the priority by summing the difference from the set points and the actual zone temperatures. If the sum of the difference for the zones calling for heating is greater than the sum of the difference for the zones calling for cooling, than a heating priority shall be set. If the sum of the difference for the zones call for cooling is greater than the sum of the difference for the zones calling for heating, than a cooling priority shall be set. If the sum of the difference for the heating and cooling set points is equal than a heating priority shall be set. The CTC system shall cycle the units in the area calling for heating or cooling to satisfy the call for heating or cooling. If both exist and a heating priority

as described above exist, the unit in the area calling for heat will heat while the other unit handlers are turned "on" to circulate the air. When the call for heat is satisfied, the units in the areas calling for cooling will be turned "on" to satisfy the call for cooling while the other unit air handlers are turned "on" to circulate the air. This process of alternately satisfying heating and cooling request shall continue until no request exists.

7.7 Rooms served by multiple heating, air conditioning and/or ventilating units shall have the units controlled as a single unit. The fans, furnaces, heat exchangers, air conditioners and economizer/fresh air dampers, if applicable, shall be controlled and cycled as a single unit.

7.8 The CTC system shall operate conventional heating and air conditioning units equipped with outside air heat recovery devices by enabling the heat recovery device whenever the fan is operating, except when the economizer mode is enabled for the conventional heating and air conditioning unit by the CTC system. When the economizer mode and economizer cooling assist mode is enabled by the CTC system, the conventional heating and air conditioning unit shall operate as described in the economizer mode and economizer cooling assist mode subsection of this section of the specifications.

7.9 If the CTC system projects a temperature based aggregated demand peak requiring initiation of the temperature based aggregated demand limiting program, the CTC system shall terminate the zone electrical air conditioning or heating based on each units spread of the zone temperature from its setpoint as defined in the demand limiting section of these specifications. Temperature based aggregated demand limiting shall be applied to those units whose sum of the spreads is least. This process shall be dynamic and shall continue without the aid or intervention of the system operator.

7.10 The CTC system hardware and software shall replace the complete fan, furnace, heat exchanger and air conditioner unit control systems, except internal solid state devices required by the equipment manufacturer, high voltage contactors, dampers and equipment safeties.

7.11 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the heating and air conditioning systems and all their related equipment.

8.0 RADIANT HEAT HOT WATER HEATING BOILER, BOILER CIRCULATING PUMP, AIR CONDITIONING AND CAR WASHER CONTROL

8.1 The CTC system shall sense the boiler's vessel temperature, supply water temperature, return water temperature, representative floor slab temperature wash building work room temperature, washroom temperature.

8.2 The CTC system shall provide both numerical and graphical histories of the temperatures and conditions described in these specifications.

8.3 The CTC system shall directly control the boiler, heating hot water supply circulating pump, window air conditioner and supervise the vehicle wash system. The wash building vehicle wash area shall have a fixed temperature sensors. Temperatures shall be settable at the **CTC** system central computer only. The vehicle wash area shall have only a heating setpoint settable between 35° and 50°. On a call for heat from either the wash building workroom or vehicle wash area the boiler and circulating pump shall turn on and the water temperature shall be maintained to provide the proper water temperature to heat the radiant slab. The boiler burner shall only be turned "on" maintaining proper hot water temperature when there is a call for heat.

8.4 If there is no call for heat and all other conditions required in these specifications are met, the CTC system shall revert the boiler system to the appropriate standby condition or turn it "off".

8.5 The system operator shall enter in the CTC system central computer the hot water boiler supply hot water reset curve. The maximum water temperature shall be adjustable between 150° and 1800°, with a default of 150° occurring at an adjustable outside temperature between -10° and 20°, with a default temperature of 10°. The minimum water temperature shall be adjustable between 90° and 130°, with

a default of 110° occurring at an adjustable outside temperature between 40° and 55°, with a default temperature of 40°. If the workroom fails to reach its heating setpoint within one hour from the system operator entered occupied time of the zone the CTC shall increase the hot water reset curve maximum temperature to the maximum allowable heating hot water temperature and increase the minimum outside temperature for maximum hot water temperature to the maximum allowable outside temperature. The CTC shall notify the system operator that it has modified the boiler reset curve.

8.6 The CTC system shall allow the hot water boiler system to operate according to these specifications if the outside air temperature is at or below the temperature for heating and a heating zones is calling for hot water heating heat as described in these specifications. If the outside air temperature is above this temperature, the CTC shall ignore calls for heating from the heat zones.

8.7 The CTC system shall directly control the power to the window air conditioner to provide the proper temperature control to the zone as provided for in these specifications.

8.8 On a call for cool, the window air conditioner power shall be turned "on" 2° above the cool setpoint temperature and remain "on" until the zone temperature falls to the cool setpoint temperature unless turned "off" subject to the temperature based aggregate demand limiting program. When the call for cool is satisfied, the power to the window air conditioner shall be turned "off". The CTC system shall operate the window air conditioner units to satisfy the zone cooling requirements if the outside air temperature is at or above a user entered temperature. If the outside air temperature is below this temperature the CTC system shall ignore calls for cooling from the direct expansion unit air conditioning zones. The outside air temperature range shall be between 55° and 70° with a default temperature of 70°. If both a call for cool and heat are present, the call for heat shall have priority. The window unit shall be turned “off” during a call for heat.

8.9 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply

to the boiler heating system and all its related equipment.

9.0 UNIT HEATERS AND RADIANT/CONVECTOR HEATERS

9.1 Each heater shall have a discrete temperature sensor located in the zone. Zone temperature sensors in common areas accessible to the public shall not be adjustable. Other temperature sensors shall be equipped with an adjustable temperature transmitter. The system operator shall have the ability to restrict the temperature range of the temperature transmitter or ignore it completely and use the four temperatures set at the CTC system central computer as provided for in these specifications. The CTC system shall also have the capability of combining the temperatures and temperature setpoints from each heater sensor in areas served by more then one heater using the weighted averaging described in section 3.1.4. The resultant averaged zone temperature and setpoint temperature shall be used to control all heaters serving the common zone. This feature is selectable by the system operator at the keyboard terminal. The sensors shall be used by the CTC system to perform the following control of the heaters. Unless otherwise set by the system operator the unoccupied temperature of all supplemental heaters shall be set by the CTC system at 50° and the occupied temperature at 60°.

9.2 With the optional monitoring the CTC system shall provide both numerical and graphical histories of the temperatures, operations and the status of the associated mechanical equipment described in these specifications. Said histories shall be every ten minutes for the past seven days, hourly for the past thirty days and on a four-hour basis for the past ninety days.

9.3 On a call for heat, the heaters shall be turned "on" 2° below the heat setpoint temperature and remain "on" until the zone temperature rises to the heat setpoint temperature, unless electric heaters are turned "off" by the CTC system demand limiting programs. The heaters shall be staged by the CTC system. As the zone temperature falls below the zone setpoint multistage heat elements shall be sequenced "on" and "off" to maintain the setpoint.

9.4 If the CTC system projects a temperature based aggregated electric demand peak requiring initiation of the temperature based aggregated electric demand limiting program, the CTC system shall terminate the zone electrical air conditioning or heating based on each units spread of the zone temperature from its setpoints as defined in the demand limiting section of these specifications. Temperature based aggregated electric demand limiting shall be applied to those units whose sum of the spreads is least. This process shall be dynamic and shall continue without the aid or intervention of the system operator.

9.5 The CTC system shall operate the heaters to satisfy the zone heating requirements if the outside air temperature is at or below a system operator entered temperature. If the outside air temperature is above this temperature the CTC system shall ignore calls for heating in the heater zones. The outside air temperature range shall be between 40° and 60° with a default temperature of 50°.

9.6 The CTC system hardware and software shall replace the complete heater control systems, except high voltage contactors, damper actuators and equipment safeties. New equipment shall be provided by the Owner with conventional thermostat interface approved by the Bidder.

9.7 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the heaters.

10.0 SELF-CONTAINED HEATING AND AIR CONDITIONING UNITS

10.1 The CTC system shall apply a time of day and holiday schedule to the self-contained heating and air conditioning units with nonvolatile operational memories. The system operator at the central computer shall enter this.

10.2 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the self-contained heating and air conditioning units and their heating and cooling zones.

11.0 DIRECT EXPANSION AIR CONDITIONERS ONLY UNITS, WINDOW AIR CONDITIONERS WITH UNIT VENTILATORS, FAN COIL/FIN TUBE AND TERMINAL REHEAT ONLY UNITS.

11.1 The CTC system shall individually sense the temperature in each of the combined air conditioner and heat zones with at least one sensor for every 1000 square feet of zone floor area. Each zone with more than one zone sensor shall be averaged with the other sensors in the common zone. The averaging shall be performed on a weighted averaging basis. The system operator shall have the capability at the CTC system computer of assigning a weight from zero to five to each zone sensor to be averaged. Said averaging shall be done as a weighted average as described in subsection 3.1.4 of these specifications. This temperature shall be used by the CTC system as the existing temperature for the entire zone for control purposes.

Each zone temperature sensor shall be equipped with an adjustable temperature transmitter. The CTC system shall read the temperature set on the transmitter. The system operator shall have the ability to restrict the temperature range of the temperature transmitter or ignore it completely and use the four temperatures set at the central computer as provided for in these specifications. In common temperature control zones with more than one heat unit, the CTC system shall control the individual heat unit as a common unit.

If a common air conditioning air handler unit serves more than one area, each area shall be equipped with a temperature sensor. In an air conditioning zone that has more than one area, the temperature sensors and temperature setpoint transmitters shall be averaged with all the common air conditioning zones. Said averaging shall be done as a weighted average as described in subsection 3.1.4 of these specifications and shall be both the zone temperature and setpoint temperature for the air conditioning zone. Said weighted average temperature shall be used for control purpose by the CTC system to control the operation of the air conditioning system. The sensors shall be used by the CTC system to perform the following control of the air conditioner.

If a separate heating unit serves each area, the area shall be a separate heating zone with a separate heating temperature. The CTC system shall alternate the calls for heat and cooling to satisfy the calls for heat and cooling without operating the heat and cooling in any zone at the same time. This shall be done as described in subsection 3.1.4. The heating or cooling priority shall be determined by the algebraic spread of the sum of the heating and cooling setpoint and zone temperatures. The highest sum sets the heating or cooling priority. When the highest priority is satisfied, the lowest priority shall be satisfied. An air handler with multiple heating zones shall not enter the heating mode unless the number of heating zones exceed the minimum number of zones exceed a user settable number between 2 and 4 zones with a default of 2 zones call for heat. The number of air handler units calling for heat shall be added to the number calling for heat in other sections to determine if the boiler shall respond to the calls for heat.

11.2 The CTC system shall provide both numerical and graphical histories of the temperatures described in these specifications. Said histories shall be every ten minutes for the past seven days, hourly for the past thirty days and on a four-hour basis for the past ninety days.

11.3 The air handler for the heating units shall have the capability of running continuously during the occupied period or being turned "on" only when a call for heating exists. This is selectable at the CTC system central computer. If intermittent or automatic operation is selected, the air handler fan shall lag the call for heating by one minute. Should the system operator select the continuous operation of the fans, the air handler fan shall run continuously if the outside air temperature is above a selected value between 45° and 70°, with a default value of 60°. If below the temperature the air handlers for the unit ventilator/fan coil units shall only operate on a call for heat. This shall be settable by individual zone at the CTC system computer. The air handlers for the heating unit shall not run at the same time as the air conditioner unless the outside air temperature is below the setpoint described above in this paragraph.

The system operator shall enter in the CTC system central computer the air handler heating supply air reset curve. Such heating supply air reset curve shall apply to those air handlers that have multiple heating coils. The maximum supply air temperature shall be adjustable between 90° and 140°, with a default of 120° occurring at a adjustable outside temperature between –10° and 20°, with a default temperature of 10°. The minimum supply air temperature shall be adjustable between 90° and 120°, with a default of 90° occurring at an adjustable outside temperature between 50° and 70°, with a default temperature of 60°. If more than a adjustable number of temperature control zones between 2 and 5, with a default of 3, fail to reach their heating set points within one hour from the system operator entered occupied time of the zone, the CTC shall increase the heating supply air reset curve maximum temperature to the maximum allowable heating supply air temperature and increase the minimum outside temperature for maximum heating supply air temperature to the maximum allowable outside temperature. The CTC shall notify the system operator that it has modified the heating supply air reset curve.

When the outside air temperature falls below a user setpoint value between 40° and 70°, with a default value of 60° and a call for cooling exist the CTC system shall disable mechanical cooling and enable the economizer to modulate the fresh air intake damper and exhaust air damper to maintain a user setpoint mixed air temperature between 45° and 60°, with a default value of 55°. If the economizer or area is equipped with an exhaust air fan, the CTC system shall turn “on” the exhaust air fan when the economizer is active.

The CTC system shall prevent the window air conditioners from operating when the zone temperature is below the setpoint temperature of each room. If the room temperature is 2° above the room setpoint temperature, the CTC system shall allow the window air conditioner to operate unless turned “off” subject to the temperature based aggregate demand limiting programs. When the room temperature falls to the setpoint temperature or when the outside air temperature falls below a system operator settable value of 45° and 70° with a default temperature of 70°, the window air conditioners shall be turned "off".

11.4 The air handler for the unit ventilator heating units shall have the capability of running continuously during the occupied period or being turned "on" only when a call for heating exists. This is selectable at the CTC system central computer. If intermittent or automatic operation is selected, the air handler fan shall lag the call for heating by one minute. Should the system operator select the continuous operation of the fans, the air handler fan shall run continuously if the outside air temperature is between a selected value between 45° and 70°, with a default value of 55°. This shall be settable by individual zone at the CTC system computer. The air conditioner and unit ventilator/fan coil units shall not run at the same time. During the occupied mode, if the override button on the zone temperature sensor is pressed, the fan shall toggle to and from the continuous mode of operation setting.

11.5 The CTC system shall directly control the power to the window air conditioner to provide the proper temperature control to the zone as provided for in these specifications. The CTC system shall directly control the unit ventilator/fan coil/fin tube unit as described in applicable sections of these specifications.

11.6 On a call for cool, the window air conditioner power shall be turned "on" 2° above the cool setpoint temperature and remain "on" until the zone temperature falls to the cool setpoint temperature unless turned "off" subject to the temperature based aggregate demand limiting program. When the call for cool is satisfied, the power to the window air conditioner shall be turned "off". The CTC system shall operate the window air conditioner units to satisfy the zone cooling requirements if the outside air temperature is at or above a user entered temperature. If the outside air temperature is below this temperature the CTC system shall ignore calls for cooling from the direct expansion unit air conditioning zones. The outside air temperature range shall be between 55° and 70° with a default temperature of 60°.

11.7 If the CTC system projects a temperature based aggregated demand peak requiring initiation of the temperature based aggregated demand limiting program, the CTC system shall terminate the zone chilled water or electrical air conditioning or heating based on each units spread of the

zone temperature from its setpoints as defined in the demand limiting section of these specifications. Temperature based aggregated electric demand limiting shall be applied to those units whose sum of the setpoint and zone temperature spread is least. This process shall be dynamic and shall continue without the aid or intervention of the system operator.

11.8 The CTC system hardware and software shall replace the complete unit ventilator/fan coil/air handler and direct expansion unit control systems, except high voltage controls and contactors, valve and valve actuators, economizer controls and equipment safeties except window air conditioner controls. The owner shall insure that the unit ventilator/fan coil/fin tube units shall be equipped with fan speed selection switch, fan control contactor, fresh air damper, actuator, hot water control valves and other power contactors necessary for proper operation as required by these specifications and if missing shall provide same.

11.9 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the air conditioner and unit ventilator/fan coil/fin tube units and all their related equipment.

12.0 UNIT HEATERS AND RADIANT/CONVECTOR HEATERS

12.1 Each heater shall have a discrete temperature sensor located in the zone. Zone temperature sensors in common areas accessible to the public shall not be adjustable. Other temperature sensors shall be equipped with an adjustable temperature transmitter. The system operator shall have the ability to restrict the temperature range of the temperature transmitter or ignore it completely and use the four temperatures set at the CTC system central computer as provided for in these specifications. The CTC system shall also have the capability of combining the temperatures and temperature setpoints from each heater sensor in areas served by more then one heater using the weighted averaging described in section 3.1.4. The resultant averaged zone temperature and setpoint temperature shall be used to control all heaters serving the common zone. This feature is selectable by the system operator at the keyboard terminal. The sensors shall be used by the CTC system to perform the

following control of the heaters. Unless otherwise set by the system operator the unoccupied temperature of all supplemental heaters shall be set by the CTC system at 50° and the occupied temperature at 60°.

12.2 With the optional monitoring the CTC system shall provide both numerical and graphical histories of the temperatures, operations and the status of the associated mechanical equipment described in these specifications. Said histories shall be every ten minutes for the past seven days, hourly for the past thirty days and on a four-hour basis for the past ninety days.

12.3 On a call for heat, the heaters shall be turned "on" 2° below the heat setpoint temperature and remain "on" until the zone temperature rises to the heat setpoint temperature, unless electric heaters are turned "off" by the CTC system temperature based aggregate demand limiting programs. The heaters shall be staged by the CTC system. As the zone temperature falls below the zone setpoint multistage heat elements shall be sequenced "on" and "off" to maintain the setpoint.

12.4 If the CTC system projects a temperature based aggregated electric demand peak requiring initiation of the temperature based aggregated demand limiting program, the CTC system shall terminate the zone electrical air conditioning or heating based on each units spread of the zone temperature from its setpoints as defined in the demand limiting section of these specifications. Temperature based aggregated electric demand limiting shall be applied to those units whose sum of the spreads is least. This process shall be dynamic and shall continue without the aid or intervention of the system operator.

12.5 The CTC system shall operate the heaters to satisfy the zone heating requirements if the outside air temperature is at or below a system operator entered temperature. If the outside air temperature is above this temperature the CTC system shall ignore calls for heating in the heater zones. The outside air temperature range shall be between 40° and 60° with a default temperature of 50°.

12.6 The CTC system hardware and software shall replace the complete heater control systems, except high voltage contactors, damper actuators and equipment safeties. New

equipment shall be provided by the Owner with conventional thermostat interface approved by the Bidder.

12.7 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the heaters.

13.0 FUEL ISLAND EQUIPMENT

13.1 The CTC system shall apply a time of day and holiday schedule to the fuel island equipment. The system operator at the central computer shall enter this.

13.2 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the fuel island equipment.

14.0 AIR COMPRESSOR

14.1 The **CTC** system shall apply a time of day and holiday schedule to the air compressor. The system operator at the central computer shall enter this.

14.2 The pressure of the compressed air system shall be monitored. The alarm pressure shall be set at the **CTC** system central computer.

14.3 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the air compressor and their systems.

15.0 DOMESTIC HOT WATER

15.1 Each electrical controlled gas and electric domestic water heater with deep well access shall have a discrete temperature sensor. The system operator shall set the temperature of the domestic hot water systems at the CTC system central computer. Except for the kitchen domestic water heater system, the domestic water heater temperature shall be settable from 120° to 140° with default of 120° should the system operator fail to set the domestic water heater temperature. The kitchen domestic water heater system shall be settable from 140°

to 180° with default of 160° should the system operator fail to set the domestic water heater temperature.

15.2 With the optional monitoring the CTC system shall provide both numerical and graphical histories of the temperatures and conditions described in these specifications. Said histories shall be every ten minutes for the past seven days, hourly for the past thirty days and on a four-hour basis for the past ninety days.

15.3 Except for the kitchen domestic water heater, the electric domestic water heaters shall be controlled by the CTC system to only allow their operation at 25% demand limiting and the circulation pump shall be turned "Off" when the facility is experiencing a temperature based aggregate demand peak.

15.4 The CTC system operator shall be able to program an override on the night setback of the domestic hot water system based on an outside air temperature. Should the outside air temperature fall between a settable value of 10° and 35° with a default of 25°, the CTC system operator may program the domestic hot water system to turn on both heating the water and operating the circulating pumps.

15.5 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the electric domestic water heaters and electric domestic hot water circulation pumps.

16.0 OUTSIDE LIGHTING

16.1 The existing outside lighting circuits controlled by time clocks shall be controlled by the CTC system to eliminate operation of the lights when they are not needed. Each lighting circuit shall have its own separate and discrete control circuit and program. New lighting circuits shall be provided by the Owner with low voltage controllable contactors approved by the Bidder.

16.2 With the optional monitoring the CTC system shall provide both numerical and graphical histories of the temperatures and conditions described in these specifications. Said histories shall be every ten minutes for the past seven days, hourly for the past

thirty days and on a four-hour basis for the past ninety days.

16.3 The system operator shall be able to set the actual outside light level at the CTC system that the outside lights will be allowed to operate if the time schedule allows for their operation. If the system operator fails to set a outside light level the CTC system shall default the outside light level to approximately dusk light levels. The time schedule for each of the outside lighting circuits shall be separate and unique. If the system operator fails to enter a time schedule for the different lighting circuits, those circuits without time schedules shall be turned "On" during all times when the outside light level falls below the light level set in the CTC system computer.

16.4 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the outside lights.

17.0 EXHAUST FANS

17.1 The CTC system shall apply a time of day and holiday schedule to the exhaust fans. The system operator at the central computer shall enter this.

During the occupied mode, the system operator shall be able to set the percent of "on" operation during a fifteen-minute period.

17.2 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to the exhaust fans.

18.0 ADJUSTMENT/REPAIR OF EXISTING CONTROLS

18.1 The Bidder shall remove any existing energy management system or equipment. Said removal shall include removing all energy management system control wiring, relays, enclosures and related equipment. The Bidder shall exercise as much care as possible in the removal of the energy management systems to minimize required patching. Patching holes left by the removal of the equipment

and/or installation of the new CTC system shall be the owner's responsibility. Removal of the energy management system shall not affect the normal operation of the heating and air conditioning equipment or the comfort of the facility. The removed energy management system becomes the property of the Bidder.

18.2 The Bidder shall reestablish the original control sequences and verification of all the mechanical equipment. The Owner is responsible for repairs to the equipment necessary for the proper operation of the CTC system.

18.3 The Bidder shall provide all labor to reconnect, adjust and insure proper operation of all mechanical actuators, dampers, valves and equipment interlocks. Actuators are responsibility of the Bidder.

18.4 Should controls that must remain require replacement because they are missing or defective, the Bidder agrees to a 25% markup of the replacement parts. Said markup shall be applied to the paid invoice of the replacement part provided by the Bidder to the owner. The Bidder shall include the labor to supervise the owner's contractor or maintenance personnel to perform the above repairs at no additional cost to the owner.

18.5 The Bidder shall not be allowed to make any repairs to the actual mechanical equipment except for adjustment actuators, controls and linkages, except by agreement with the owner. The Bidder shall provide coordination of all other needed mechanical repairs with the Owner's mechanical personnel or contractor and certify the proper operation of all mechanical equipment. The charges for the above services shall be included at no additional cost to the owner.

19.0 INSTALLATION REQUIREMENTS

19.1 The power for all outboard serial modules shall be low voltage with a maximum voltage of 24 volts or obtained from the power supplied to the controlled units. The 24 volt power shall be provided by a centrally located power supply that shall have the capability of selecting the primary power from at least two incoming power sources. The module shall automatically select the incoming power

source that maintains the voltage within 10% of the nominal rated input voltage.

19.2 All computer equipment and serial modules, except sensors, shall be installed in earth grounded metallic enclosures. EMT or rigid conduit shall connect said enclosures to each other and the central computer. No plastic conduit or tubing shall be used. The serial data lines and power from the central CTC system computer and between the slave computers shall be installed in electrical metallic conduit. The wiring from the serial modules to the sensors shall be shielded cable. The sensor wiring shall be installed in EMT or rigid conduit in all mechanical rooms, in other areas where it would be exposed or as directed by the owner. The entire installation shall conform to the National Electrical Code as amended.

19.3 The CTC system shall be equipped with mechanical equipment simulator control boxes. The simulator control boxes will simulate the control signals from the CTC system to the controlled mechanical equipment. When the mechanical equipment is to be serviced, the CTC system shall be "unplugged" from the mechanical equipment control wiring pigtail in the mechanical equipment enclosure. The simulator control box shall than plug into the control wiring pigtail from the mechanical equipment. The simulator control box will exercise all functions of the mechanical equipment. Two simulator control boxes shall be provided for each type of mechanical equipment controlled. "Hand-Off-Automatic" switches are unacceptable and will result in the rejection of the Bid.

19.4 The Bidder shall exercise as much care as possible to minimize patching and painting related to the completion of the installation of the CTC system and the Owner shall be responsible for all patching and painting after the completion of the installation. If the facility contains asbestos, the Bidder shall avoid all asbestos and penetrate or disturbing it only with permission of the Owner.

19.5 Any trenching required for the installation of the CTC system shall be done by the Owner/General Contractor.

20.0 MISCELLANEOUS

20.1 All electronic sensors in the air handler and zones with the exception of the hot deck, boiler, hot water piping and outside air temperature sensors shall serve as fire sensors. Should an abnormally high temperature be sensed by any of the sensors the CTC system shall initiate a high temperature alarm. During a high temperature alarm the heating and air conditioning equipment shall be turned "Off", the economizer closed and the CTC system computer shall enter the alarm mode notifying building and off site personnel that a high temperature condition exist. This requirement is not to replace conventional fire alarm equipment but is intended only to supplement said equipment. The CTC system equipment shall have the capability of accepting a signal from separate fire alarm equipment and shall treat any external alarm as a high temperature alarm. The system operator shall have the capability of setting the high temperature alarm temperature between 125° and 180°. If the system operator fails to set the high temperature alarm temperature the CTC system shall default the temperature to 125° except zone discharge sensors shall default to 160°.

20.2 All electronic sensors in the air handler and zones, except chiller, chilled water or outside air temperature sensors, shall serve as freeze sensors. Should an abnormally low temperature be sensed by any of the sensors the CTC system shall initiate a low temperature alarm. During a low temperature alarm the heating and air conditioning equipment shall be turned "On", the economizer closed, all facility temperatures shall be reset to the occupied mode and the CTC system computer shall enter the alarm mode notifying building and off site personnel that a low temperature condition exist. The system operator shall have the capability of setting the low temperature alarm between 35° and 45°. If the system operator fails to set the low temperature alarm the CTC system shall default the temperature to 40°.

20.3 The requirements in the **GENERAL REQUIREMENTS, HARDWARE AND SOFTWARE** sections of these specifications shall apply to all the sensors throughout the CTC system.

21.0 INSTALLATION AND SERVICE BY BIDDER AND QUALIFICATIONS OF THE BIDDER

21.1 The Bidder shall provide all installation assistance, labor and material necessary for the installation of the CTC system as set forth in these specifications for the BASE BID and the respective alternates.

22.2 The Bidder shall show the Owner or a representative designated by the Owner, that each and every control function of the CTC system properly controls and senses all of the equipment and conditions as described in these specifications. This shall be done by physically turning "on" and "off" each and every piece of mechanical equipment using the central computer and physically measuring each and every temperature, pressure, light level, humidity or other sensed condition and correlating this to the computer reading with said reading being within plus or minus 2 units of measurement or 2% which ever is less. These tests must be conducted in the presence of the Owner or his representative.

22.3 The Bidder shall provide operation, programming and repair training to the facility personnel at no cost to the Owner for as long as the Owner has the CTC system. Training shall include operation, maintenance and repair of the CTC system. Training shall be without limit at the sole discretion of the owner. Refresher operation, programming and repair training shall be conducted at no cost to the owner and done at the sole discretion of the owner. The Bidder agrees such training shall be done at the Owner's location.

22.4 The Bidder shall be required to show a minimum of ten years successful experience in the manufacture, programming, installation and service of computerized temperature control systems. A minimum of one hundred manufactured, programmed, installed and actively serviced systems by the Bidder shall be required to qualify to bid on this contract. The Bidder shall have demonstrated the capability of field repairing all components of the CTC system.

23.0 SPARES, TEST EQUIPMENT AND MAINTENANCE CONTRACTS

23.1 The Bidder shall provide the following spare components:

1. One spare stand-alone control unit or computer for every ten control units used in the installation, with one of each type being the minimum;

2. One serial control and/or sensing modules for every ten of each type used, with one of each type being the minimum;

3. One temperature, humidity, light level and pressure sensor for every twenty of each type used, with one of each type being the minimum;

4. One serial communication interface board for every four used, with two of each type being a minimum.

23.2 The Bidder shall provide the owner the necessary test equipment to maintain the CTC system, including but not limited to computers, board testing devices and the training to use such equipment.

23.3 The Bidder shall provide an optional full maintenance contract for the maintenance of the system for five full years after the expiration of the five-year equipment warranty. Said contract shall include all labor and parts necessary for the maintenance of the CTC system in first class operating condition. The maintenance contract shall include a minimum of four on-site visits on a quarterly basis. Visits to make non-scheduled repairs shall not be counted as quarterly visits. The only exclusions from the contract are acts of God and damage to the system caused by vandalism. The spare parts provided to the owner are not a part of the maintenance contract. If used during the execution of the terms of the maintenance contract, they are to be replace with new parts in first class condition. The total five year cost of this contract shall be shown in the contract. The cost of this maintenance contract shall be submitted as an option to the CTC system.

Should the owner accept an additional maintenance contract, after the initial five year maintenance contract, the Bidder agrees that subsequent annualized maintenance contract cost cannot increase in cost at a rate greater then the previous years maintenance contract

term national consumer price index for housing maintenance and repair as published in the Chicago edition of the Wall Street Journal. A copy of the proposed maintenance contract shall be included in the bid submission by the Bidder for approval by the owner. The owner may or may not elect to execute the contract.

24.0 EQUIPMENT OR PROGRAMMING SUBSTITUTIONS OR ALTERNATES

24.1 Precise compliance with all equipment, performance and programming specifications are required. All equipment, performance and programming specifications must be precisely met and the only alterations that are acceptable are additional equipment, performance or programming above and beyond the requirements as laid out in these specifications. Any bid not precisely meeting or exceeding these basic specifications is unacceptable and shall be rejected.

25.0 SYSTEM DOCUMENTATION AND WARRANTY

25.1 The Bidder shall provide five copies of installation drawings and operating instructions.

25.2 Should within five years after the completion of the installation of the CTC system, the owner determine the control program and/or software is not providing comfort and/or reduced energy cost, as represented at the time of contract award, within the capabilities of the mechanical equipment as determined by the owner, the Bidder agrees to rewrite all control programs and/or software to provide maximum comfort and/or savings within the limits of the mechanical equipment as determined by the Owner. There shall be no charge for said rewrites even if the rewrite is caused by an error in these specifications. This agreement to rewrite the control programs and/or software to maximize comfort and/or savings shall survive the expiration of the original one year warranty and any subsequent maintenance contracts between the Bidder and the Owner, unless the Owner has made a significant change in the mechanical equipment protocol, facility zone layout or facility basic use and then only the areas or equipment related to such changes are exempted.

25.3 The Bidder shall warranty the complete CTC system installation for a period of one year from the date of completion. The Bidder shall warranty the components (parts) for an additional four years for a total component warranty of five years. Said warranty shall be limited to replacement of any part or parts of the installation, which shall prove defective. The Bidder shall warranty the software package included in the CTC system necessary to perform the functions as specified in these specifications for as long as the CTC system is installed in each facility.

25.4 The Bidder/Manufacturer of the CTC system shall complete and execute the "Acknowledgment of Conformance to Specification" following these specifications, that the installation as proposed and subsequently installed, meets both the spirit and letter of these CTC system and mechanical equipment operation and installation specifications. If the Bidder is a corporation, the "Corporate Resolution" affirming the corporation officer has the authority to sign the "Acknowledgment of Conformance to Specification" shall also be properly executed and attested to by the corporation board of directors. Should during the ten year life of the CTC system, the owner determine that the installation does not meet these specifications or approved alternates, the CTC system Bidder/Manufacturer shall bring the installation into conformity with these specifications at no additional cost to the owner.

ACKNOWLEDGEMENT OF CONFORMANCE TO SPECIFICATIONS

MISSOURI DEPARTMENT OF TRANSPORTATION ST JOSEPH FACILITY INSTALLATION OF COMPUTERIZED TEMPERATURE CONTROL SYSTEM SPECIFICATIONS

(ADDITIONAL SHEETS SHOULD BE USED IF NECESSARY)

1.0 GENERAL REQUIREMENTS

1.1 (YES) _____

(NO WITH EXPLANATION _____
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1.2 (YES) _____

(NO WITH EXPLANATION) _____
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1.3 (YES) _____

(NO WITH EXPLANATION _____
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1.4 (YES) _____

(NO WITH EXPLANATION _____
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1.5 (YES) _____

(NO WITH EXPLANATION _____
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1.6 (YES) _____
(NO WITH EXPLANATION _____
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1.7 (YES) _____
(NO WITH EXPLANATION _____
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2.0 HARDWARE

2.1 (YES) _____

(NO WITH EXPLANATION _____
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2.2 (YES) _____

(NO WITH EXPLANATION _____
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2.3 (YES) _____

(NO WITH EXPLANATION _____
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2.4 (YES) _____

(NO WITH EXPLANATION _____
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2.5 (YES) _____

(NO WITH EXPLANATION _____
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2.6 (YES) _____

(NO WITH EXPLANATION _____
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2.7 (YES) _____

(NO WITH EXPLANATION _____

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2.8 (YES) _____

(NO WITH EXPLANATION _____
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2.9 (YES) _____

(NO WITH EXPLANATION _____
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2.10 (YES) _____

(NO WITH EXPLANATION _____
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2.11 (YES) _____

(NO WITH EXPLANATION _____
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2.12 (YES) _____

(NO WITH EXPLANATION _____
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2.13 (YES) _____

(NO WITH EXPLANATION _____
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2.14 (YES) _____

(NO WITH EXPLANATION _____
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2.15 (YES) _____

(NO WITH EXPLANATION _____
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2.16 (YES) _____

(NO WITH EXPLANATION _____
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2.17 (YES) _____

(NO WITH EXPLANATION _____
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3.0 SOFTWARE

3.1 The CTC shall have the capability of performing the following functions:

1. Anticipatory Start-Up Program;

((YES) _____

(NO WITH EXPLANATION _____
_____
_____
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_____
_____

2. Time Control Program;

(YES) _____

(NO WITH EXPLANATION _____
_____
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_____

3. Electrical Demand Limiting;

(YES) _____

(NO WITH EXPLANATION _____
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_____

4. Temperature Control;

(YES) _____

(NO WITH EXPLANATION _____

_____
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_____

5. Holiday Scheduling;

(YES) _____

(NO WITH EXPLANATION _____
_____
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_____

6. Alarm Report;

(YES) _____

(NO WITH EXPLANATION _____
_____
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_____

7. CTC System;

(YES) _____

(NO WITH EXPLANATION _____
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_____

8. Optional Voltage Protection of the Controlled Equipment:

(YES) _____

(NO WITH EXPLANATION _____
_____
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_____
_____

9. Optional Mechanical Equipment Monitoring;

(YES) _____

(NO WITH EXPLANATION _____
_____
_____
_____
_____
_____

4.0 VARIABLE AIR VOLUME HOT WATER HEATING BOILER, BOILER CIRCULATING PUMP, LOOP VALVING AND PUMP CONTROL

4.1 (YES) _____

(NO WITH EXPLANATION _____
_____
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4.2 (YES) _____

(NO WITH EXPLANATION _____
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4.3 (YES) _____

(NO WITH EXPLANATION _____
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4.4 (YES) _____

(NO WITH EXPLANATION _____
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4.5 (YES) _____

(NO WITH EXPLANATION _____
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4.6 (YES) _____

(NO WITH EXPLANATION _____
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4.7 (YES) _____

(NO WITH EXPLANATION _____
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4.8 (YES) _____

(NO WITH EXPLANATION _____
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4.9 (YES) _____

(NO WITH EXPLANATION _____
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5.0 VARIABLE AIR VOLUME CENTRAL AIR HANDLING SYSTEM CONTROL

5.1 (YES) _____

(NO WITH EXPLANATION _____
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5.2 (YES) _____

(NO WITH EXPLANATION _____
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5.3 (YES) _____

(NO WITH EXPLANATION _____
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5.4 (YES) _____

(NO WITH EXPLANATION _____
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5.5 (YES) _____

(NO WITH EXPLANATION _____
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5.6 (YES) _____

(NO WITH EXPLANATION _____
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5.7 (YES) _____

(NO WITH EXPLANATION _____
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5.8 (YES) _____

(NO WITH EXPLANATION _____
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5.9 (YES) _____

(NO WITH EXPLANATION _____
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5.10 (YES) _____

(NO WITH EXPLANATION _____
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6.0 FAN TERMINAL UNIT CONTROL

6.1 (YES) _____

(NO WITH EXPLANATION _____
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6.2 (YES) _____

(NO WITH EXPLANATION _____
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6.3 (YES) _____

(NO WITH EXPLANATION _____
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6.4 (YES) _____

(NO WITH EXPLANATION _____
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6.5 (YES) _____

(NO WITH EXPLANATION _____
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6.6 (YES) _____

(NO WITH EXPLANATION _____
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6.7 (YES) _____

(NO WITH EXPLANATION _____
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6.8 (YES) _____

(NO WITH EXPLANATION _____
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6.9 (YES) _____

(NO WITH EXPLANATION _____
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6.10 (YES) _____

(NO WITH EXPLANATION _____
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7.0 CONVENTIONAL ROOFTOP AND HEATING AND AIR CONDITIONING SYSTEM CONTROL

7.1 (YES) _____

(NO WITH EXPLANATION _____
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7.2 (YES) _____

(NO WITH EXPLANATION _____
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7.3 (YES) _____

(NO WITH EXPLANATION _____
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7.4 (YES) _____

(NO WITH EXPLANATION _____
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7.5 (YES) _____

(NO WITH EXPLANATION _____
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7.6 (YES) _____

(NO WITH EXPLANATION _____
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7.7 (YES) _____

(NO WITH EXPLANATION _____
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7.8 (YES) _____

(NO WITH EXPLANATION _____
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7.9 (YES) _____

(NO WITH EXPLANATION _____
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7.10 (YES) _____

(NO WITH EXPLANATION _____

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7.11 (YES) _____

(NO WITH EXPLANATION _____
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8.0 RADIANT HEAT HOT WATER HEATING BOILER, BOILER CIRCULATING PUMP, AIR CONDITIONING AND CAR WASHER CONTROL

8.1 (YES) _____

(NO WITH EXPLANATION _____
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8.2 (YES) _____

(NO WITH EXPLANATION _____
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8.3 (YES) _____

(NO WITH EXPLANATION _____
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8.4 (YES) _____

(NO WITH EXPLANATION _____
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8.5 (YES) _____

(NO WITH EXPLANATION _____
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8.6 (YES) _____

(NO WITH EXPLANATION _____
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8.7 (YES) _____

(NO WITH EXPLANATION _____
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8.8 (YES) _____

(NO WITH EXPLANATION _____

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8.9 (YES) _____

(NO WITH EXPLANATION _____
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9.0 UNIT HEATERS AND RADIANT/CONVECTOR HEATERS

9.1 (YES) _____

(NO WITH EXPLANATION _____
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9.2 (YES) _____

(NO WITH EXPLANATION _____
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9.3 (YES) _____

(NO WITH EXPLANATION _____
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9.4 (YES) _____

(NO WITH EXPLANATION _____
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9.5 (YES) _____

(NO WITH EXPLANATION _____
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9.6 (YES) _____

(NO WITH EXPLANATION _____
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9.7 (YES) _____

(NO WITH EXPLANATION _____
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10.0 SELF-CONTAINED HEATING AND AIR CONDITIONING UNITS

10.1 (YES) _____

(NO WITH EXPLANATION _____

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10.2 (YES) _____

(NO WITH EXPLANATION _____
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11.0 DIRECT EXPANSION AIR CONDITIONING ONLY UNITS, WINDOW AIR CONDITIONERS WITH UNIT VENTILATORS, FAN COIL/FIN TUBE AND TERMINAL REHEAT ONLY UNITS

11.1 (YES) _____

(NO WITH EXPLANATION _____
_____
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11.2 (YES) _____

(NO WITH EXPLANATION _____
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11.3 (YES) _____

(NO WITH EXPLANATION _____
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11.4 (YES) _____

(NO WITH EXPLANATION _____
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11.5 (YES) _____

(NO WITH EXPLANATION _____
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11.6 (YES) _____

(NO WITH EXPLANATION _____
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11.7 (YES) _____

(NO WITH EXPLANATION _____
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11.8 (YES) _____

(NO WITH EXPLANATION _____
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11.9 (YES) _____

(NO WITH EXPLANATION _____
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12.0 UNIT HEATERS AND RADIANT/CONVECTOR HEATERS

12.1 (YES) _____

(NO WITH EXPLANATION _____
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12.2 (YES) _____

(NO WITH EXPLANATION _____
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12.3 (YES) _____

(NO WITH EXPLANATION _____
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12.4 (YES) _____

(NO WITH EXPLANATION _____
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12.5 (YES) _____

(NO WITH EXPLANATION _____
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12.6 (YES) _____

(NO WITH EXPLANATION _____
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12.7 (YES) _____

(NO WITH EXPLANATION _____
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13.0 FUEL ISLAND EQUIPMENT

13.1 (YES) _____

(NO WITH EXPLANATION _____

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13.2 (YES) _____

(NO WITH EXPLANATION _____
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14.0 AIR COMPRESSOR

14.1 (YES) _____

(NO WITH EXPLANATION _____
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14.2 (YES) _____

(NO WITH EXPLANATION _____
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14.3 (YES) _____

(NO WITH EXPLANATION _____
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15.0 DOMESTIC HOT WATER

15.1 (YES) _____

(NO WITH EXPLANATION _____
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15.2 (YES) _____

(NO WITH EXPLANATION _____
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15.3 (YES) _____

(NO WITH EXPLANATION _____
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15.4 (YES) _____

(NO WITH EXPLANATION _____
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15.5 (YES) _____

(NO WITH EXPLANATION _____
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16.0 OUTSIDE LIGHTING

16.1 (YES) _____

(NO WITH EXPLANATION _____
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16.2 (YES) _____

(NO WITH EXPLANATION _____
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16.3 (YES) _____

(NO WITH EXPLANATION _____
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16.4 (YES) _____

(NO WITH EXPLANATION _____
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17.0 EXHAUST FANS

17.1 (YES) _____

(NO WITH EXPLANATION _____
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17.2 (YES) _____

(NO WITH EXPLANATION _____
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18.0 ADJUSTMENT/REPAIR OF EXISTING CONTROLS

18.1 (YES) _____

(NO WITH EXPLANATION _____
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18.2 (YES) _____

(NO WITH EXPLANATION _____
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18.3 (YES) _____

(NO WITH EXPLANATION _____

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18.4 (YES) _____

(NO WITH EXPLANATION _____
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18.5 (YES) _____

(NO WITH EXPLANATION _____
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19.0 INSTALLATION REQUIREMENTS

19.1 (YES) _____

(NO WITH EXPLANATION _____
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19.2 (YES) _____

(NO WITH EXPLANATION _____
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19.3 (YES) _____

(NO WITH EXPLANATION _____
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19.4 (YES) _____

(NO WITH EXPLANATION _____
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19.5 (YES) _____

(NO WITH EXPLANATION _____
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20.0 MISCELLANEOUS

20.1 (YES) _____

(NO WITH EXPLANATION _____
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20.2 (YES) _____

(NO WITH EXPLANATION _____
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20.3 (YES) _____

(NO WITH EXPLANATION _____
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21.0 INSTALLATION AND SERVICE BY BIDDER AND QUALIFICATIONS OF THE BIDDER

21.1 (YES) _____

(NO WITH EXPLANATION _____
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21.2 (YES) _____

(NO WITH EXPLANATION _____
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_____

21.3 (YES) _____

(NO WITH EXPLANATION _____
_____
_____

21.4 (YES) _____

(NO WITH EXPLANATION _____

23.0 SPARES AND MAINTENANCE CONTRACTS

23.1 (YES) _____

(NO WITH EXPLANATION _____

23.2 (YES) _____

(NO WITH EXPLANATION _____

23.3 (YES) _____

(NO WITH EXPLANATION _____

24.0 EQUIPMENT OR PROGRAMMING SUBSTITUTIONS OR ALTERNATES

24.1 (YES) _____

(NO WITH EXPLANATION _____
_____
_____
_____
_____
_____

25.0 SYSTEM DOCUMENTATION AND WARRANTY

19.1 (YES) _____

(NO WITH EXPLANATION _____
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_____
_____
_____
_____

25.2 (YES) _____

(NO WITH EXPLANATION _____
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25.3 (YES) _____

(NO WITH EXPLANATION _____
_____
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_____
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25.4 (YES) _____

(NO WITH EXPLANATION _____
_____
_____
_____
_____

Name of Control Contractor:_____

Trade Name of Control Equipment/Computer:_____
The above exceptions are the only exceptions from the approved specifications for the **MISSOURI DEPARTMENT OF TRANSPORTATION ST. JOSEPH FACILITIES INSTALLATION OF COMPUTERIZED TEMPERATURE CONTROL SYSTEM SPECIFICATIONS AND BID DOCUMENTS** dated July 9, 2009.

_____ _____
Signature Date

_____ _____
Name Title

_____
Company or Corporation Name

ATTACHMENT B: GENERAL DESCRIPTION OF CONTROLLED EQUIPMENT

INSTALLATION OF COMPUTERIZED TEMPERATURE CONTROL SYSTEM AT THE MISSOURI DEPARTMENT OF TRANSPORTATION ST. JOSEPH FACILITY

Below is listed the description of the controlled equipment on which individual temperature and Computerized Temperature Control is to be performed. This list is approximate and is only provided for the convenience of the Bidder. **The Bidder is required to verify and responsible for the exact quantity and type of equipment from building plans and at the site to be controlled. The MISSOURI DEPARTMENT OF TRANSPORTATION, Fred Malicoat PE is not responsible for any omissions or errors in the list.**

State of Missouri
Department of Transportation – St. Joseph
3602 North Belt Highway
St. Joseph, Missouri 64506

EQUIPMENT CONTROLLED LIST

MAIN BUILDING

BOILER ROOM

QUANTITY	DESCRIPTION	TYPE OF CONTROL
2	High/Low Fire Natural Gas fired H/W Boilers	TEMP,CR,IL,TS
2	Three phase h/w boiler circ pumps	TEMP,PRESS,CR,DR,
2	Three phase h/w loop pumps with vfd's	TEMP,CR,IL,TS
2	h/w boiler isolation valves	DEF,IL,TS
1	Single phase modulating electric bypass valve	TEMP,CR,DR,IL,TS
1	Single phase Fresh air damper	TEMP,CR,IL,TS
1	Single phase exhaust air fan	TEMP,CR,IL,TS

AHU-1

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase electric air handler with Variable Frequency Drive	TEMP,CR,IL,TS
2	Three phase electric compressor/ condenser unit	TEMP,CR,DR, IL,DEF,TS
1	Single phase electric return air damper	TEMP,CR,IL,TS
1	Single phase electric relief air damper	TEMP,CR,IL,TS
1	Single phase electric economizer	TEMP,CR,IL,TS,CO2
2	Three phase electric humidifier	TEMP,CR,IL,TS

AHU-1 FTU'S (13)

QUANTITY	DESCRIPTION	TYPE OF CONTROL
13	Single phase electric air handler motor	TEMP,CR,IL,TS
13	Single phase electric h/w valve	TEMP,CR,IL,TS
13	Single phase VAV damper	TEMP,CR,IL,DR,TS,CFM

AHU-2

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase electric air handler with Variable Frequency Drive	TEMP,CR,IL,TS
2	Three phase electric compressor/ condenser unit	TEMP,CR,DR, IL,DEF,TS
1	Single phase electric return air damper	TEMP,CR,IL,TS
1	Single phase electric relief air damper	TEMP,CR,IL,TS
1	Single phase electric economizer	TEMP,CR,IL,TS,CO2
1	Three phase electric humidifier	TEMP,CR,IL,TS

AHU-2 FTU'S (8)

QUANTITY	DESCRIPTION	TYPE OF CONTROL
8	Single phase electric air handler motor	TEMP,CR,IL,TS
8	Single phase electric h/w valve	TEMP,CR,IL,TS
8	Single phase VAV damper	TEMP,CR,IL,DR,TS,CFM

RTU-1

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase electric air handler fan	TEMP,CR,IL,TS
1	Multi stage natural gas fired furnace	TEMP,CR,IL,TS
2	Three phase electric compressor/ condenser unit	TEMP,CR,DR, IL,DEF,TS
1	Single phase electric return air damper	TEMP,CR,IL,TS
1	Single phase electric relief air damper	TEMP,CR,IL,TS
1	Single phase electric economizer	TEMP,CR,IL,TS,CO2
1	Single phase electric bypass damper	PRESS,CR,IL,TS

RTU-1 FTU'S (11)

QUANTITY	DESCRIPTION	TYPE OF CONTROL
11	Single phase electric air handler motor	TEMP,CR,IL,TS
11	Single phase electric h/w valve	TEMP,CR,IL,TS
11	Single phase VAV damper	TEMP,CR,IL,DR,TS,CFM

MISCELLANEOUS

QUANTITY	DESCRIPTION	TYPE OF CONTROL
2	Single phase electric exhaust fan motor	CR,DR,IL,TS
1	Single phase electric domestic hot water circulating pump	TEMP,CR,IL,TS
4	Single phase electric baseboard heaters	CR,DR,IL,TS
1	Single phase Leibert unit for Server Rm	MON
2	Freeze protect sensors for A/H Penthouses	MON

GENERAL SERVICES BUILDING

Front Offices RTU

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase electric air handler fan	TEMP,CR,IL,TS
1	Multi stage natural gas fired furnace	TEMP,CR,IL,TS
2	Three phase electric compressor/ condenser unit	TEMP,PRESS,CR,DR, IL,DEF,TS

Garage SUH's

QUANTITY	DESCRIPTION	TYPE OF CONTROL
5	Three phase electric air handler fan	TEMP,CR,IL,TS
5	Natural gas fired furnace	TEMP,CR,IL,TS

Stock Room SUH

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase electric air handler fan	TEMP,CR,IL,TS
1	Natural gas fired furnace	TEMP,CR,IL,TS

Operations-North HVAC

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase electric air handler fan	TEMP,CR,IL,TS
1	Natural gas fired furnace	TEMP,CR,IL,TS
1	Three phase electric compressor/ condenser unit	TEMP,CR,DR,IL, DEF,TS
1	Single phase electric fresh air damper	TEMP,CR,IL,TS,CO2

Operations-Middle HVAC

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase electric air handler fan	TEMP,CR,IL,TS
1	Natural gas fired furnace	TEMP,CR,IL,TS
1	Three phase electric compressor/ condenser unit	TEMP,CR,DR,IL, DEF,TS
1	Single phase electric fresh air damper	TEMP,CR,IL,TS,CO2

Operations-South HVAC

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase electric air handler fan	TEMP,CR,IL,TS
1	Natural gas fired furnace	TEMP,CR,IL,TS
1	Three phase electric compressor/ condenser unit	TEMP,CR,DR,IL, DEF,TS
1	Single phase electric fresh air damper	TEMP,CR,IL,TS,CO2

Kitchen

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase electric air handler fan	TEMP,CR,IL,TS
1	Natural gas fired furnace	TEMP,CR,IL,TS
1	Three phase electric compressor/ condenser unit	TEMP,CR,DR,IL, DEF,TS

Materials Office

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase electric air handler fan	TEMP,CR,IL,TS
1	Natural gas fired furnace	TEMP,CR,IL,TS
1	Three phase electric compressor/ condenser unit	TEMP,CR,DR,IL, DEF,TS

NW Operations

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase Carrier hotel style unit	MON,CR,IL,TS

Break Room

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase window air conditioner	TEMP,CR,IL,TS

Drafting Room

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Three phase LG hotel style unit	MON,CR,IL,TS
1	Three phase Carrier hotel style unit	MON,CR,IL,TS

Old Boiler Room SUH

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Single phase electric air handler fan	TEMP,CR,IL,TS
1	Single phase electric furnace	TEMP,CR,IL,TS

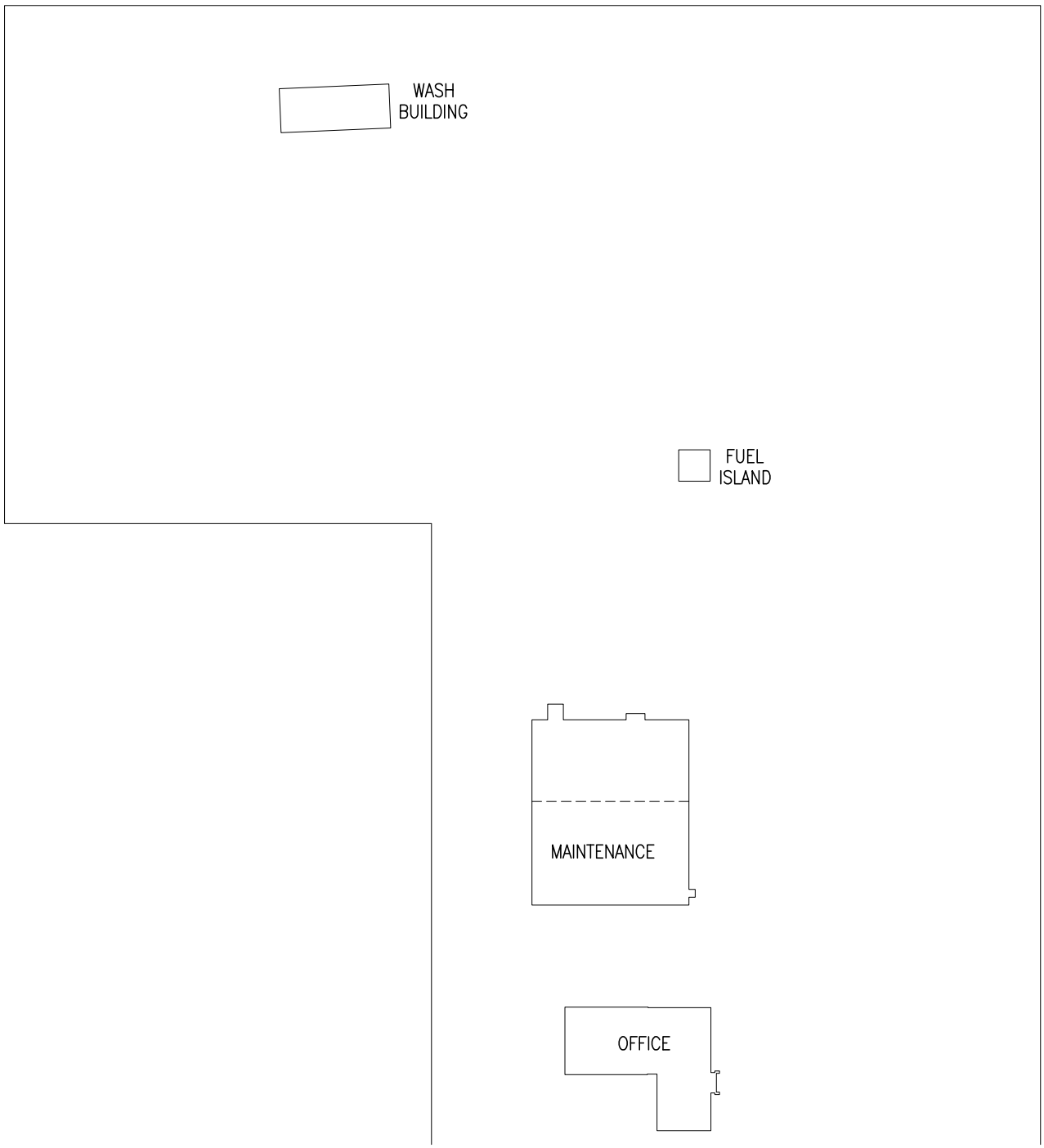
Miscellaneous

QUANTITY	DESCRIPTION	TYPE OF CONTROL
1	Electric fuel pump island	TS
1	Electric air compressor	MON,TS

TEMP = TEMPERATURE CONTROL
CR = CONSUMPTION REDUCTION
DR = DEMAND REDUCTION
ALL = AMBIENT LIGHT LEVEL
PRESS = PRESSURE MONITORING
IL = EQUIPMENT INTERLOCK
TS = TIME SCHEDULING
STAGING = EQUIPMENT STAGING
C02 = CARBON DIOXIDE CONTROL
MON = TEMPERATURE MONITORING

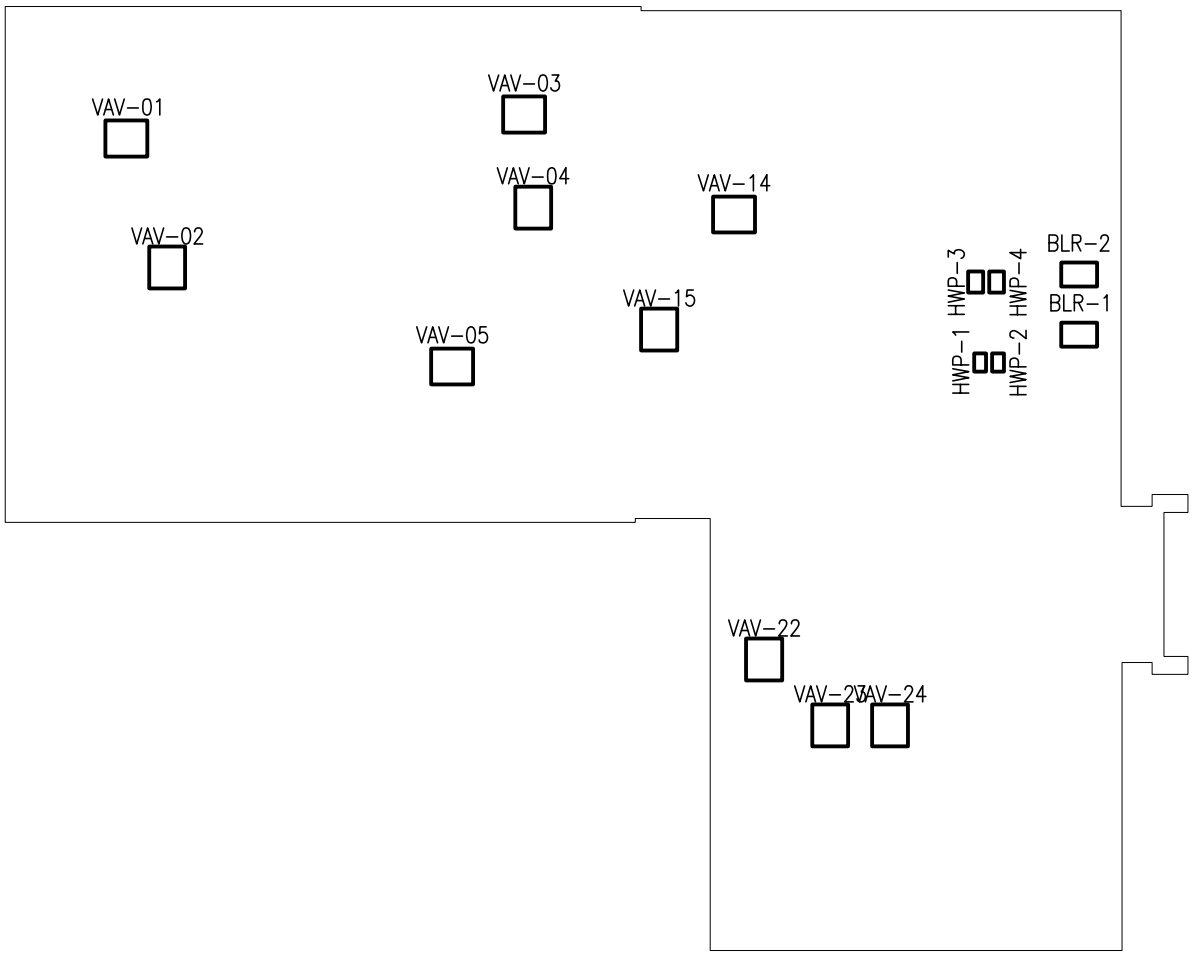
CONTROL POINT ANALYSIS

WITHOUT MONITORING		WITH MONITORING	
POINTS SENSED	194	POINTS SENSED	241
POINTS CONTROLLED	178	POINTS CONTROLLED	178
	362		419



SITE

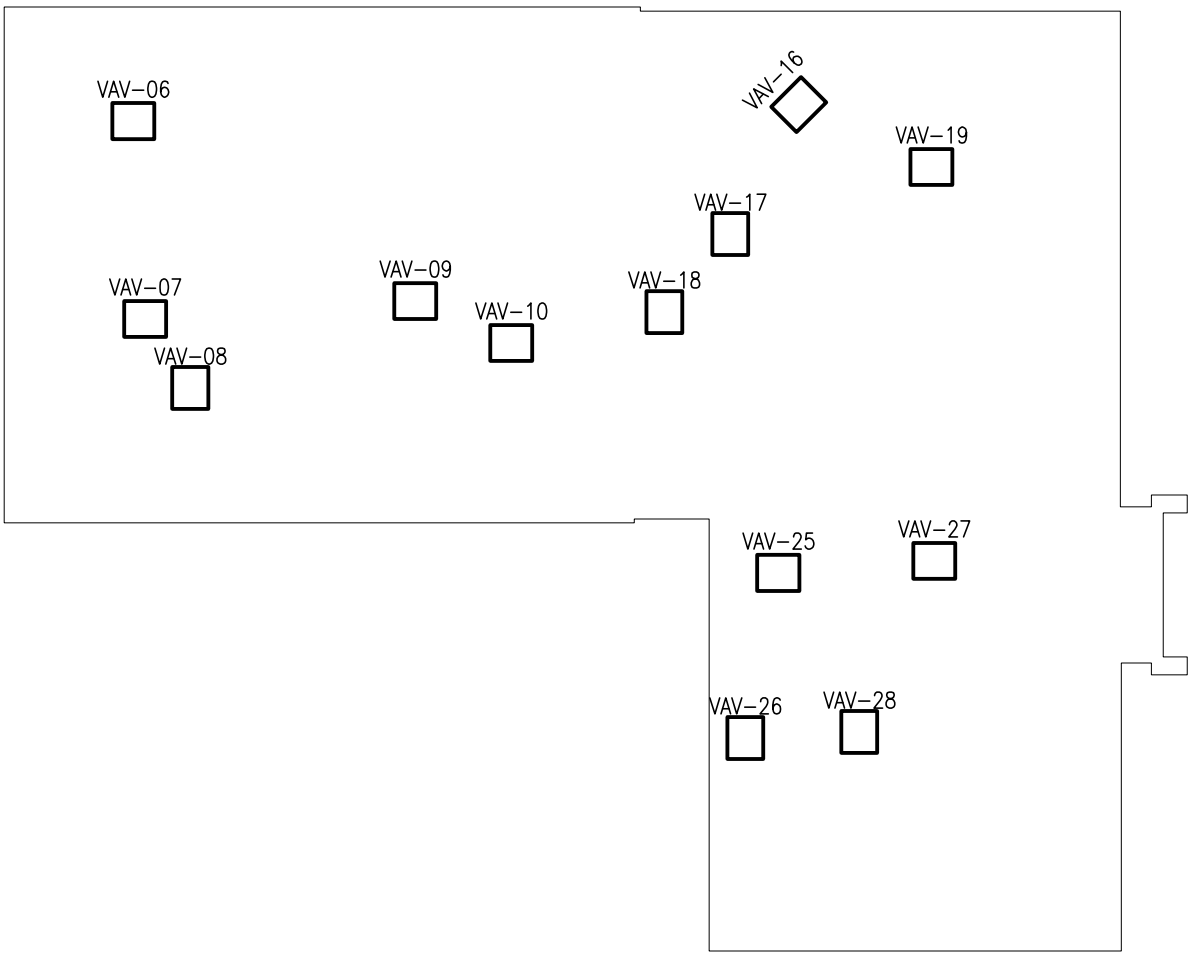
SCALE: 1" = 100'–0"



DISTRICT OFFICE - LOWER LEVEL

SCALE: 1/16" = 1'-0"

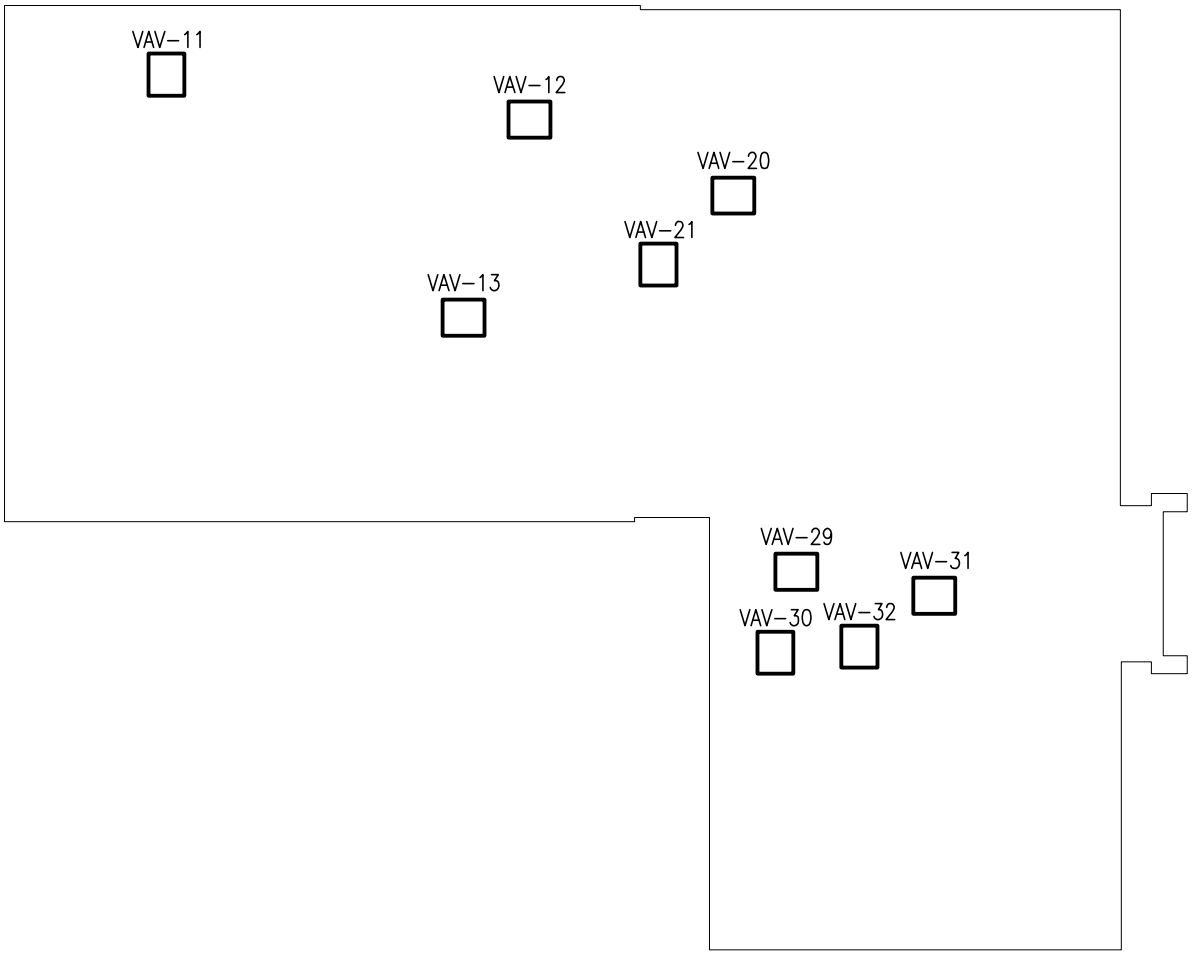
[EQUIPMENT LOCATION DRAWINGS]



DISTRICT OFFICE - MAIN LEVEL

SCALE: 1/16" = 1'-0"

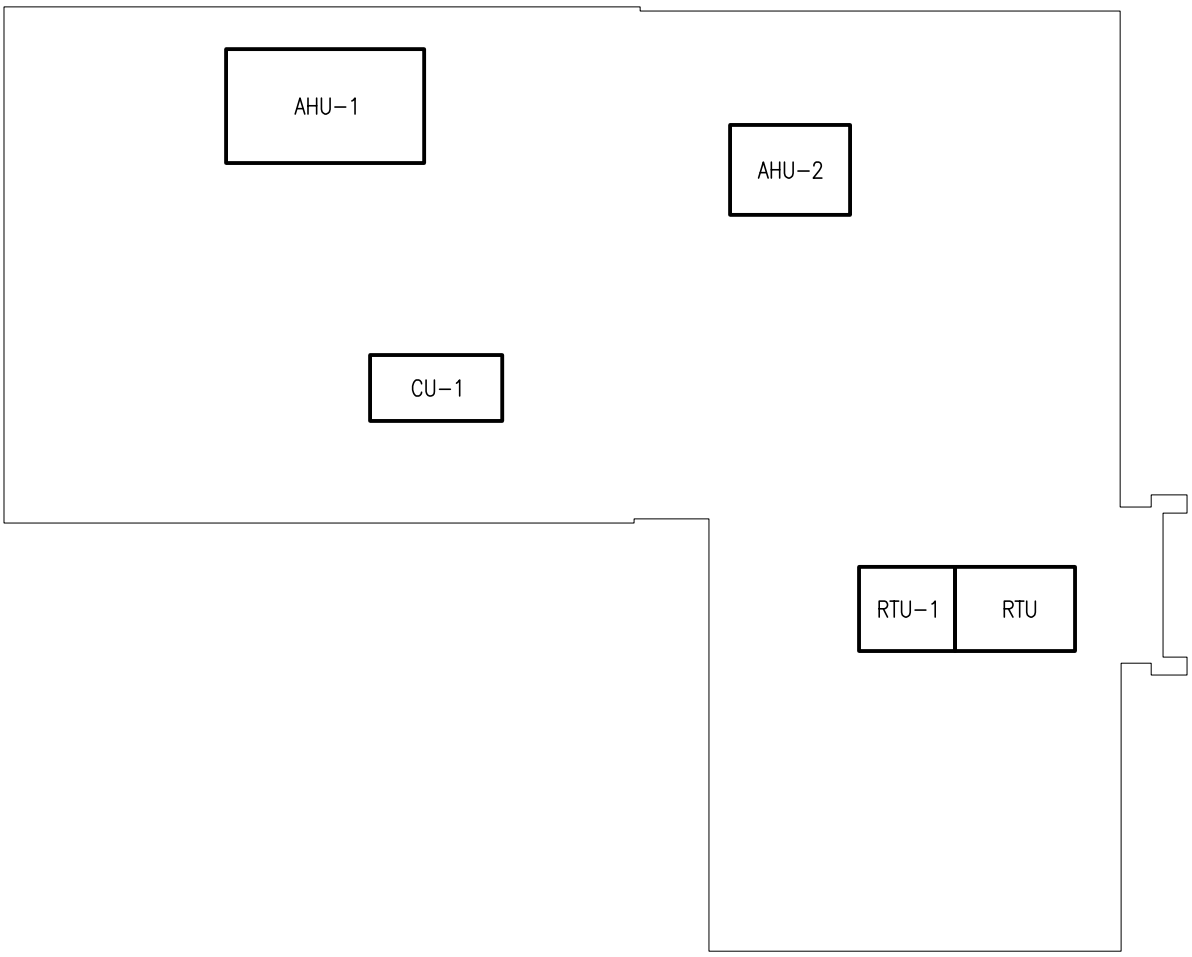
[EQUIPMENT LOCATION DRAWINGS]



DISTRICT OFFICE - UPPER LEVEL

SCALE: 1/16" = 1'–0"

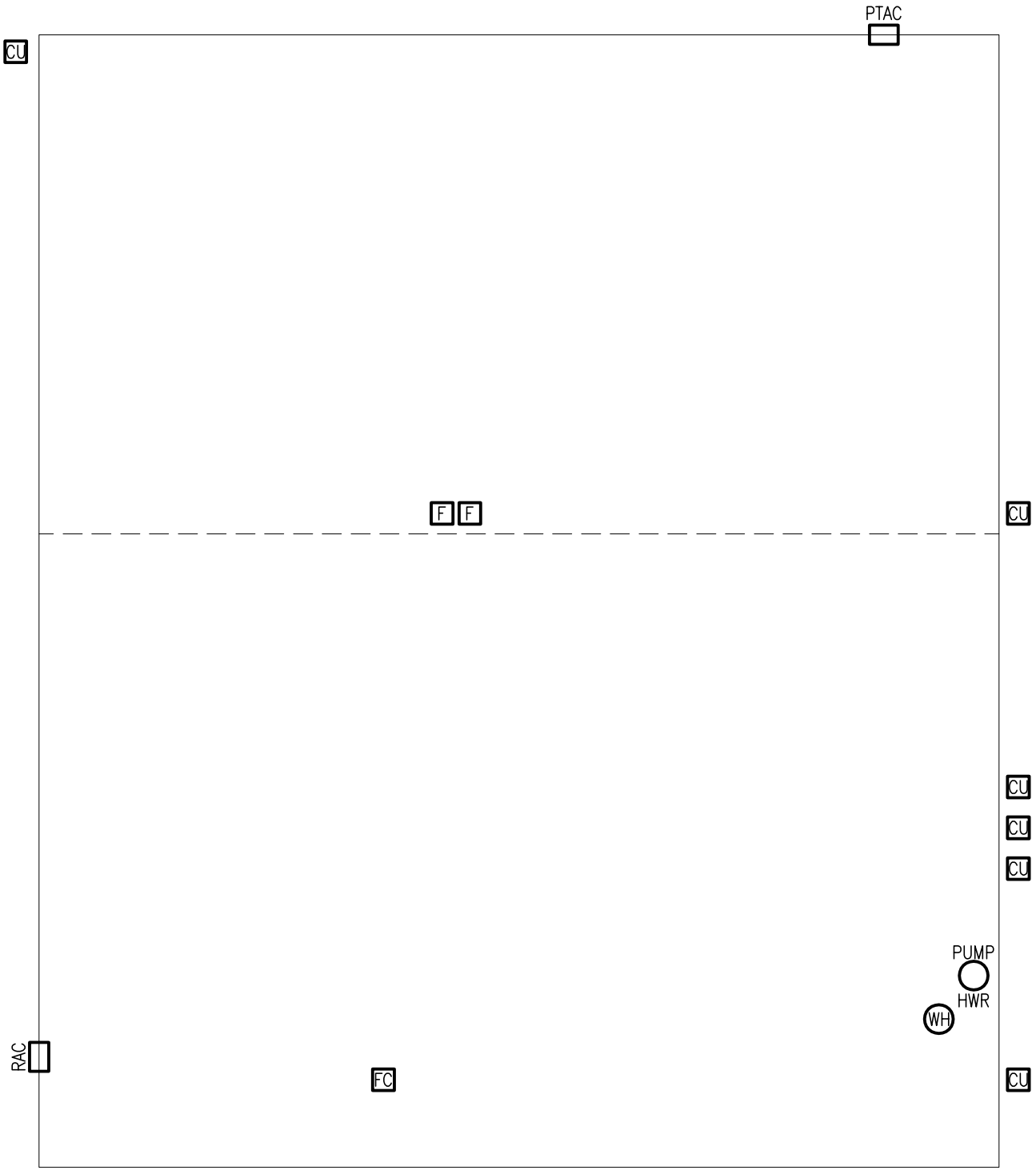
[EQUIPMENT LOCATION DRAWINGS]



DISTRICT OFFICE - ROOF PLAN

SCALE: 1/16" = 1'-0"

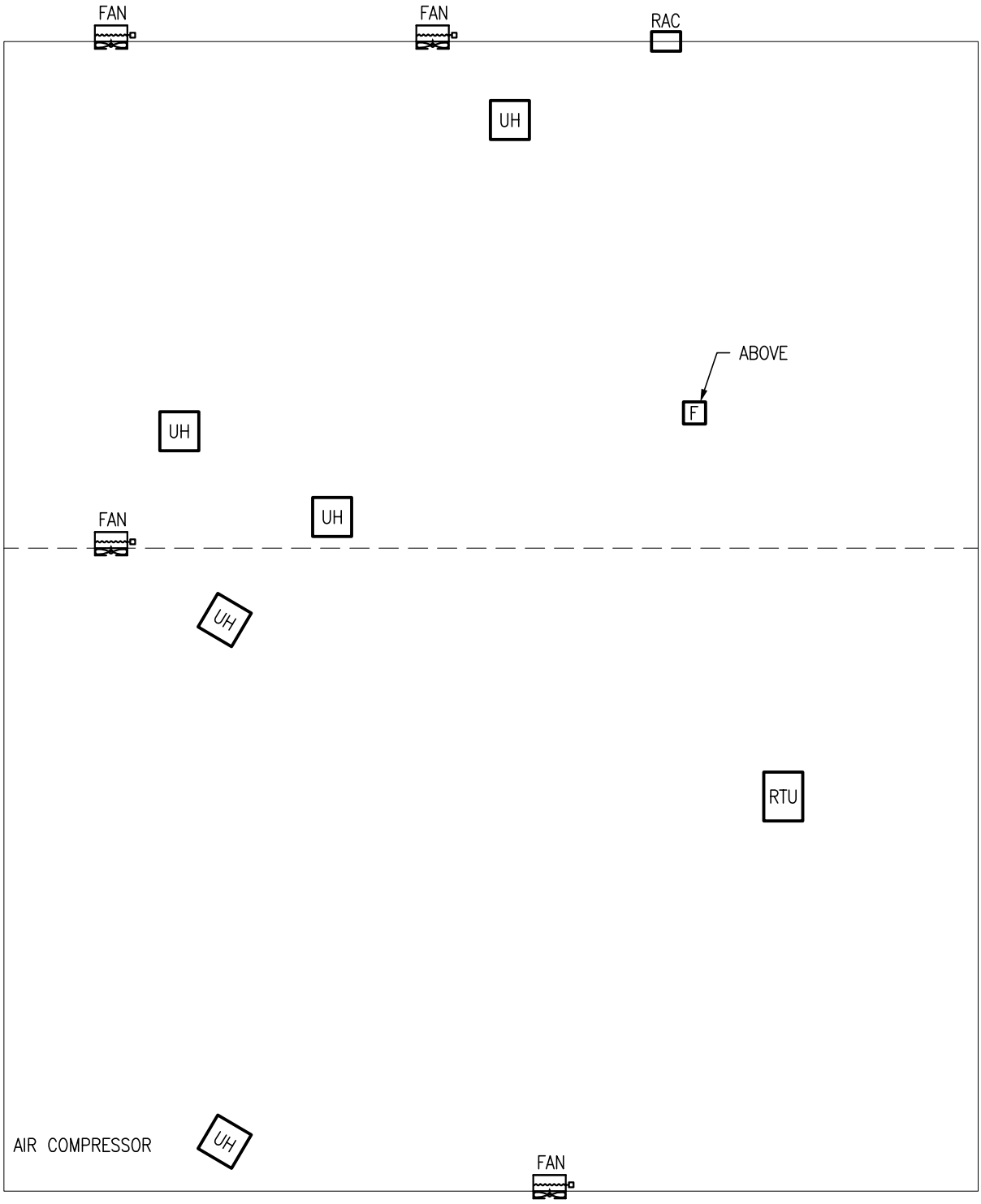
[EQUIPMENT LOCATION DRAWINGS]



GARAGE MID-LEVEL

SCALE: 1/16" = 1'-0"

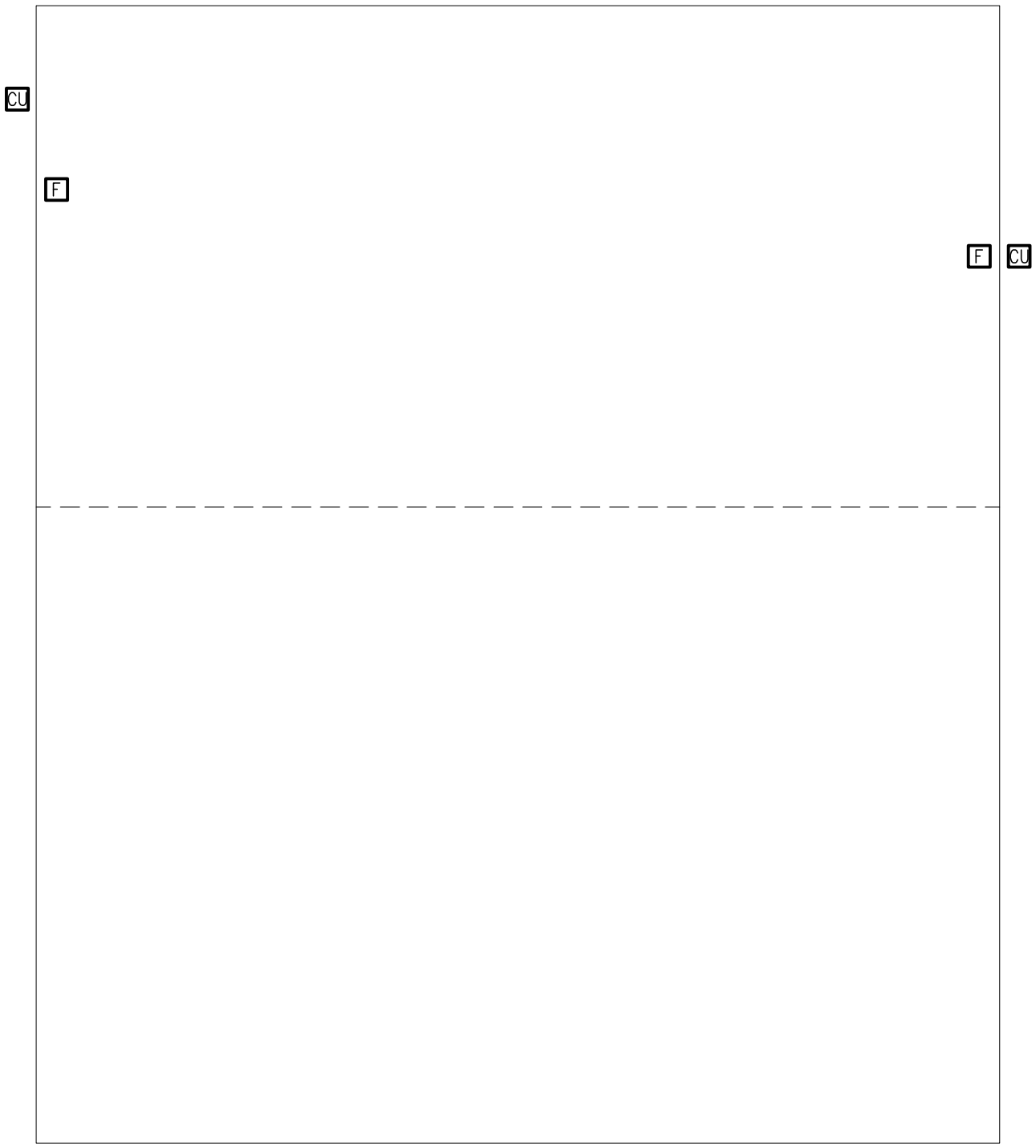
[EQUIPMENT LOCATION DRAWINGS]



GARAGE UPPER LEVEL

SCALE: 1/16" = 1'–0"

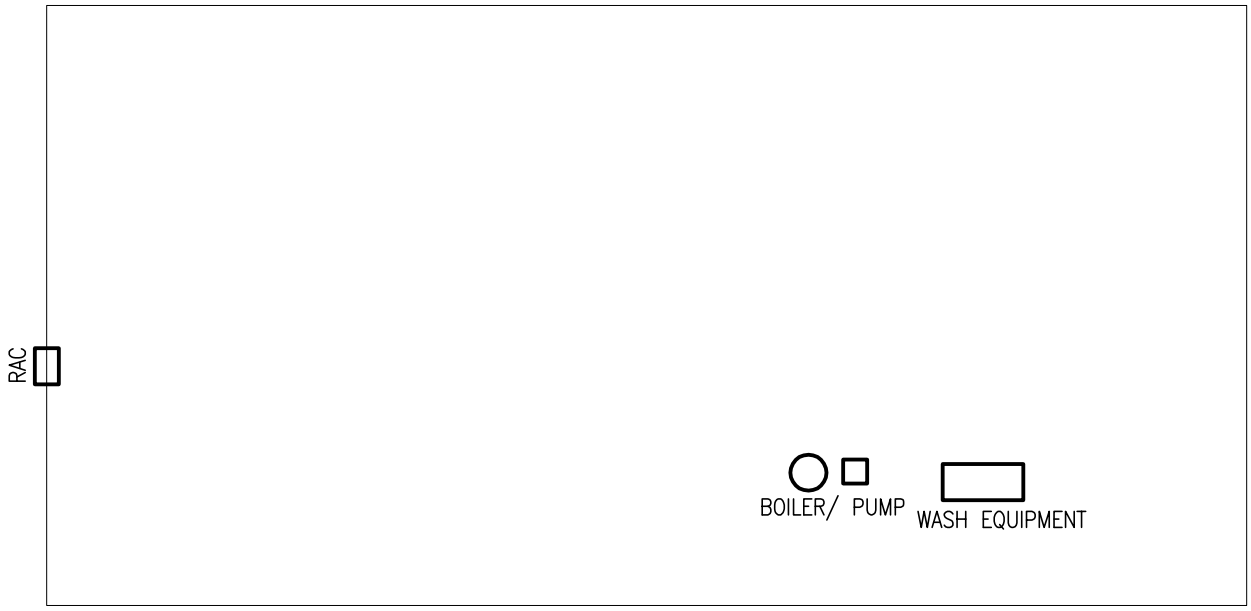
[EQUIPMENT LOCATION DRAWINGS]



GARAGE LOWER LEVEL

SCALE: 1/16" = 1'-0"

[EQUIPMENT LOCATION DRAWINGS]



WASH BUILDING

SCALE: 1/16" = 1'-0"

[EQUIPMENT LOCATION DRAWINGS]

Missouri
Division of Labor Standards

WAGE AND HOUR SECTION

JEREMIAH W. (JAY) NIXON, Governor

Annual Wage Order No. 16

Section 011
BUCHANAN COUNTY

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by
Carla Buschjost, Director
Division of Labor Standards

This Is A True And Accurate Copy Which Was Filed With The Secretary of State: **March 10, 2009**

Last Date Objections May Be Filed: **April 9, 2009**

Prepared by Missouri Department of Labor and Industrial Relations

OCCUPATIONAL TITLE	**Effective Date of Increase	*	Basic Hourly Rates	Over-Time Schedule	Holiday Schedule	Total Fringe Benefits
Asbestos Worker			$32.04	52	53	$20.48
Boilermaker			$32.10	57	7	$19.85
Bricklayers - Stone Mason	5/09		$29.57	54	1	$13.53
Carpenter	5/09		$28.15	8	1	$12.45
Cement Mason			$24.47	65	4	$17.06
Electrician (Inside Wireman)	6/09		$30.85	70	21	$5.40 + 22%
Communication Technician			$29.95	70	21	$5.25 + 22%
Elevator Constructor		a	$38.380	26	54	$19.635
Operating Engineer						
Group I	4/09		$33.11	85	4	$12.75
Group II	4/09		$32.30	85	4	$12.75
Group III	4/09		$26.75	85	4	$12.75
Group III-A	4/09		$30.96	85	4	$12.75
Group IV						
Group V	4/09		$28.35	85	4	$12.75
Pipe Fitter			$32.00	107	34	$15.25
Glazier			$27.61	88	32	$12.62
Laborer (Building):						
General	5/09		$22.91	115	1	$9.85
First Semi-Skilled	5/09		$23.11	115	1	$9.85
Second Semi-Skilled	5/09		$23.26	115	1	$9.85
Lather			USE CARPENTER RATE			
Linoleum Layer & Cutter	4/09		$31.22	46	67	$12.95
Marble Mason			$26.14	54	1	$9.98
Millwright			USE CARPENTER RATE			
Iron Worker	4/09		$27.50	50	4	$21.50
Painter	5/09		$24.43	34	13	$10.17
Plasterer			$24.00	68	4	$16.55
Plumber			$32.00	107	34	$15.25
Pile Driver			USE CARPENTER RATE			
Roofer	6/09		$26.50	96	4	$10.91
Sheet Metal Worker			$34.69	16	22	$14.77
Sprinkler Fitter			$34.10	14	4	$14.65
Terrazzo Worker			$26.14	54	1	$9.98
Tile Setter			$30.49	25	4	$11.60
Truck Driver - Teamster						
Group I			$20.03	99	59	$4.25
Group II						
Group III			$20.08	99	59	$4.25
Group IV						
Traffic Control Service Driver						
Welders - Acetylene & Electric		*				

Fringe Benefit Percentage is of the Basic Hourly Rate

Attention Workers: If you are not being paid the appropriate wage rate and fringe benefits contact the Division of Labor Standards at (573) 751-3403.

**Annual Incremental Increase

OCCUPATIONAL TITLE	Effective Date of Increase	Basic Hourly Rates	Over-Time Schedule	Holiday Schedule	Total Fringe Benefits

* Welders receive rate prescribed for the occupational title performing operation to which welding is incidental.

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

a - Vacation: Employees over 5 years - 8%; Employees under 5 years - 6%

REPLACEMENT PAGE
BUCHANAN COUNTY
OVERTIME SCHEDULE - BUILDING CONSTRUCTION

FED: Minimum requirement per Fair Labor Standards Act means time and one-half (1 ½) shall be paid for all work in excess of forty (40) hours per work week.

NO. 8: Means eight (8) hours shall constitute the regular workday from 8:00 a.m. to 4:30 p.m. with one-half (1/2) hour lunch break between 11:00 a.m. and 1:00 p.m. If an employee does not receive a lunch break between 11:00 a.m. and 1:00 p.m., the employee will be paid one-half (1/2) hour at the overtime rate. The starting time may be advanced or delayed by two (2) hours on either side of 8:00 a.m. The advanced or delayed starting time must run for a period of at least five (5) days. All work between 4:30 p.m. Saturday and 8:00 a.m. Monday and recognized holidays shall be paid for at double (2) time. All other overtime shall be at time and one-half (1½).

NO. 14: Means eight (8) hours per day shall constitute a day's work. The regular starting time shall be 8:00 a.m., and the regular quitting time shall be 4:30 p.m.; lunch time shall be twelve (12) o'clock noon to 12:30 p.m. The regular starting time may, by mutual consent of employees on the job site, and the employer, be between 7:00 a.m. and 9:00 a.m. with appropriate adjustments made to the regular quitting time and lunch time. All time worked before the regular starting time and after the regular quitting time, Monday through Friday, shall be paid at the rate of time and one-half (1½). All work commencing with the beginning of the established work day on Saturday shall be paid at the rate of time and one-half (1½). All work commencing with the beginning of the established work day on Sundays and/or Holidays shall be paid at the rate of double (2) time.

NO. 16: Means the regular working day shall consist of eight (8) hours of labor between 7:00 a.m. and 3:30 p.m. and the regular working week shall consist of five (5) consecutive eight (8) hour days of labor, beginning with Monday and ending with Friday of each week. Start time may be varied by two (2) hours. All full time or part time labor performed during such hours shall be recognized as regular working hours and paid for at the regular hourly rate. All work performed outside the regular working hours and performed during the regular work week, shall be at one and one-half (1½) times the regular rate. Two (2) times the regular rate shall be paid for all hours over twelve (12) consecutive hours. When circumstances warrant and when it is mutually beneficial and agreed to by interested parties, the Employer may institute a work week consisting of four (4) consecutive ten (10) hour days, between the hours of five (5) a.m. and six (6) p.m., Monday through Thursday, with one-half (1/2) hour allowed for a lunch period each day. Friday may be used as a make-up day. The make-up day will be voluntary, and a decision not to work may not be held against the employee. When working four (4) ten (10) hour days, overtime will be paid at the time and one-half (1½) rate for the eleventh (11^{th}) and twelfth (12^{th}) hour, all other hours worked over twelve (12) in one day will be paid at the double (2) time rate of pay. All work performed on Saturday for the first eight (8) hours will be paid at one and one-half (1½) times the regular rate. Two (2) times the regular rate shall be paid for all hours over eight (8) consecutive hours. All work performed on recognized holidays, or days locally observed as such, and Sundays shall be paid at the double (2) time rate of pay.

NO. 25: Means regular working hours of eight (8) hours shall constitute a working day between the hours of 8:00 a.m. to 4:30 p.m. in a forty (40) hour working week of Monday through Friday. Employment on Saturday, Sunday and legal holidays, and employment before or after the regular working hours shall be considered overtime. Employment on Saturday, Sunday and legal holidays shall be paid for at twice (2) the regular hourly rate. Employment from 4:30 p.m. to 12:00 midnight, Monday through Friday, shall be paid for at one and one-half (1½) times the regular hourly rate. From 12:00 midnight until 8:00 a.m. on any day shall be paid for at twice (2) the regular hourly rate.

NO. 26: Means that the regular working day shall consist of eight (8) hours worked between 6:00 a.m., and 5:00 p.m., five (5) days per week, Monday to Friday, inclusive. Hours of work at each jobsite shall be those established by the general contractor and worked by the majority of trades. (The above working hours may be changed by mutual agreement). Work performed on Construction Work on Saturdays, Sundays and before and after the regular working day on Monday to Friday, inclusive, shall be classified as overtime, and paid for at double (2) the rate of single time. The employer may establish hours worked on a jobsite for a four (4) ten (10) hour day work week at straight time pay for construction work; the regular working day shall consist of ten (10) hours worked consecutively, between 6:00 a.m. and 6:00 p.m., four (4) days per week, Monday to Thursday, inclusive. Any work performed on Friday, Saturday, Sunday and holidays, and before and after the regular working day on Monday to Thursday where a four (4) ten (10) hour day workweek has been established, will be paid at two times (2) the single time rate of pay. The rate of pay for all work performed on holidays shall be at two times (2) the single time rate of pay.

REPLACEMENT PAGE
BUCHANAN COUNTY
OVERTIME SCHEDULE - BUILDING CONSTRUCTION

NO. 34: Means the Employer may choose, at his discretion, to work five eight-hour days or four ten-hour days with a Friday make-up day. Overtime shall be paid after eight hours when working "five eights" and after ten hours when working "four tens", and Saturdays at time and one-half (1 ½) the base rates. Any hours worked on Sunday and recognized Holidays shall be paid at two (2) times the base rate.

NO. 46: Means the regular work day shall be eight (8) hours from 6:00 a.m. to 6: 30 p.m. Starting time may be between 6:00 a.m. and 10:00 a.m. The regular work week shall be forty (40) hours, beginning between 6:00 a.m. and 10:00 a.m. on Monday and ending between 2:30 p.m. and 6:30 p.m. on Friday. All hours in excess of the regular work day and work week shall be considered overtime. Overtime on days recognized as regular work days and on Saturday shall be paid for at the rate of time and one-half (1½) the regular rate. Sunday and recognized holidays shall be paid for at the rate of double time (2) for time worked. The Employer may establish a work week consisting of four (4) days, Monday through Thursday, each day consisting of ten (10) hours at straight time rate of pay. The 4-10's must run for a period of at least four (4) days.

NO. 50: Means eight (8) hours constitute a normal day's work Monday through Friday. Any time worked over eight (8) hours will normally be paid at time and one-half (1½) except for exclusions stated in some following additional sentences. The Employer, at his discretion, may start the work day between 6:00 a.m. and 9:00 a.m. Any schedule chosen shall be started at the beginning of the work week (Monday) and used for at least five days. Work may be scheduled on a four (4) days a week (Monday through Thursday) at ten (10) hours a day schedule. If such a schedule is employed, then Friday may be used as a make-up day when time is lost due to inclement weather. Time and one-half (1½) shall be paid for any work in excess of eight (8) hours in any regular work day Monday through Friday unless working 4-10's, then time and one-half (1½) after ten (10) hours. All work performed on Saturday will be time and one-half (1½). Double (2) time shall be paid for all work on Sundays and recognized holidays.

NO. 52: Means the regular workweek shall consist of five (5) eight (8) hour days, Monday through Friday. The regular workday shall consist of a eight (8) hour period, to be worked between the agreed upon starting time, and ending no later than 4:30 p.m. The agreed upon starting time shall be any time between the hours of 6:00 a.m. and 8:00 a.m. The option exists for the employer to use a four (4) day, ten (10) hour work week. Days worked shall be Monday through Thursday or Tuesday through Friday. If the job requires men on duty all five (5) days, then part of the crew may work the first four (4) days and the remainder of the crew may work the last four (4) days. Hours each day shall be from 7:00 a.m. to 5:30 p.m. Interested party's on the project must agree to this clause before it may be used. Once this clause has been put into effect, it shall remain as long as the majority of the Employees on the project and the Employer agree to keep it. The four (4) day clause shall not be used to circumvent a Holiday. Except as otherwise provided, all work performed outside the regular working hours and performed during the regular work week (Monday through Friday) shall be at the following rates of pay:

Holidays-New Year's Day, Memorial Day, Independence Day, Thanksgiving Day, Christmas Day (or days observed as such) shall be recognized as Holidays that shall be paid at two (2) times the regular rate of pay.

Labor Day-No work shall be performed on Labor Day except in special cases of emergency. Rate of pay shall be at three (3) times the regular rate of pay.

Overtime-Work performed outside of the regular work day (the regular work day shall consist of an eight (8) hour period, to be worked between the agreed upon starting time, and ending not later than 4:30 p.m. The agreed upon starting time shall be any time between the hours of 6:00 a.m. and 8:00 a.m., by mutual consent of the interested party's.), shall be:

A. Hours worked Monday through Friday, the first two (2) hours of overtime will be paid at time and one-half (1½). All other overtime will be paid at the double (2) time rate.
B. The first ten (10) hours worked on Saturday will be paid at time and one-half (1½), with all other hours to be paid at the double (2) time rate.
C. Sundays and Holidays (except Labor Day) shall be paid at the double (2) time rate.

NO. 54: Means overtime shall be time & one-half (1½) before 8:00 a.m. and after 4:30 p.m., Monday through Friday. Saturday shall be time & one-half (1½) unless this day is used as a make-up day. The option to use Saturday as a make-up day shall exist only from the 1st of November to the 31st of March and then used only as a make-up day for any time lost during the week due to inclement weather. Sundays and recognized holidays shall be paid at the double (2) time rate.

REPLACEMENT PAGE
BUCHANAN COUNTY
OVERTIME SCHEDULE - BUILDING CONSTRUCTION

NO. 57: Means eight (8) hours per day shall constitute a day's work and forty (40) hours per week, Monday through Friday, shall constitute a week's work. The regular starting time shall be 8:00 a.m. The above may be changed by mutual consent of authorized personnel. When circumstances warrant, the Employer may change the regular workweek to four (4) ten-hour days at the regular time rate of pay. It being understood that all other pertinent information must be adjusted accordingly. All time worked before and after the established workday of eight (8) hours, Monday through Friday, all time worked on Saturday, shall be paid at the rate of time and one-half (1½) except in cases where work is part of an employee's regular Friday shift. All time worked on Sunday and recognized holidays shall be paid at the double (2) time rate of pay.

NO. 65: Means Monday through Sunday shall constitute the work week. Regular starting time shall be 8:00 a.m., with one half hour for lunch between three and one-half (3½) and five (5) hours after starting time. The starting time may be advanced by two (2) hours or delayed one (1) hour by the employer from the regular starting time. All work performed before the advanced starting time and during the half hour lunch shall be paid at the overtime rate of time and one-half (1½). Work performed outside these hours shall be paid at the overtime rate of time and one-half (1½), except as provided otherwise below. All work performed on Sundays or recognized holidays shall be paid at the double (2) time rate. When the start time is delayed past 9:00 a.m., the employee's pay shall start at 9:00 a.m. and all time, after the normal quitting time (5:30 p.m.), shall be paid at the overtime rate. Eight (8) hours shall constitute the work day. All work performed prior to or after the regular eight (8) hour work day, as described above, and all work performed on Saturday shall be paid at time and one-half (1½) the regular rate. In the event that a scheduled eight (8) hour work day is missed (not including recognized holidays) because of inclement weather, then that missed work day may be made up at straight time on the following Saturday. It is recognized that not all employees working on a Saturday make-up day will have worked the same number of hours during the regular work week. It is further recognized that any work after forty (40) hours must be paid at time and one-half (1½). The employer may establish a 4-10's schedule on projects (4 days with 10 hours per day at straight time). In order to use the 4-10's schedule, the employer must schedule the 4-10's for a minimum of one (1) week. If using a 4-10's schedule, a Friday make-up day is allowed.

NO. 68: Means Monday through Sunday shall constitute the work week. Regular starting time shall be 8:00 a.m., with one half hour for lunch between three and one-half and five hours after starting time. The starting time may be advanced or delayed by the employer up to one hour from the regular starting time. All work performed before the advance starting time and during the half hour lunch shall be paid at the overtime rate of time and one-half (1½). Work performed outside these hours shall be paid at the overtime rate of time and one-half (1½), except as provided otherwise below. All work performed on Sundays or holidays shall be paid at the double (2) time rate. Eight (8) hours shall constitute the work day. All work performed prior to or after the regular eight (8) hour work day, as described above, and all work performed on Saturday shall be paid at time and one-half (1½) the regular rate, except as hereinafter described. In the event that a scheduled eight (8) hour work day is missed (not including recognized holidays) because of inclement weather, then that missed work day may be made up at straight time on the Saturday in the week of the pay period. It is recognized that not all employees working on a Saturday make-up day will have worked the same number of hours during the regular work week. It is further recognized that any work after forty (40) hours must be paid at time and one-half (1½). The employer may establish a 4-10's schedule on projects (4 days with 10 hours per day at straight time). In order to use the 4-10's schedule, the employer must schedule the 4-10's for a minimum of one (1) week. If using a 4-10's schedule, a Friday make-up day is allowed.

REPLACEMENT PAGE
BUCHANAN COUNTY
OVERTIME SCHEDULE - BUILDING CONSTRUCTION

NO. 70: Means eight (8) hours of work between the hours of 8:00 a.m. and 4:30 p.m. shall constitute a work day. Forty (40) hours within five (5) days, Monday through Friday inclusive, shall constitute a work week. The Employer may, at his discretion, vary the starting time by up to one (1) hour, either prior to or after the normal starting time. The Employer may work four (4) ten (10) hour days, either Monday through Thursday or Tuesday through Friday. Overtime will be paid for work outside of the established starting and quitting times. All overtime work between eight (8) hours and ten (10) hours on regular scheduled working days and the first ten (10) hours on Saturday, beginning at the regular starting time, will be paid at time and one-half (1½). All other overtime, on Saturday, Sunday and recognized holidays shall be paid for at double (2) the straight time rate of pay. If any of the recognized holidays fall on Friday, Saturday, Sunday or Monday, creating a three-day weekend, then the entire three (3) days (either Friday, Saturday and Sunday – if the holiday falls on Friday or Saturday; or Saturday, Sunday and Monday – if the holiday falls on Sunday or Monday) shall be paid for at double (2) the straight-time rate of pay. Shift work performed between the hours of 4:30 p.m. and 1:00 a.m. (second shift) shall receive eight (8) hours pay at the regular hourly rate of pay plus 17.3% for all hours worked. Shift work performed between the hours of 12:30 a.m. and 9:00 a.m. (third shift) shall receive eight (8) hours pay at the regular hourly rate of pay plus 31.4% for all hours worked. A lunch period of thirty (30) minutes shall be allowed on each shift. All overtime work required after the completion of a regular shift shall be paid at one and one-half (1½) times the shift hourly rate.

NO. 85: Means the work week shall be Monday through Sunday. Eight (8) hours shall constitute a day's work to begin between 6:00 a.m. and 9:00 a.m. and end between 2:30 p.m. to 5:30 p.m. Employees required to work during their lunch period shall receive the overtime rate. Employees shall receive time and one-half (1½) for all time they are required to work prior to their normal starting time or after eight (8) hours or normal quitting time Monday through Friday, or all day on Saturday. If an Employer has started the work week on a five day, eight hours a day schedule, and due to inclement weather misses any time, then he may switch to a nine or ten hours a day schedule, at straight time, for the remainder of that work week in order to make up for the lost time (10-hour make-up day). All work over ten (10) hours a day or over forty (40) hours a week must be paid at time & one-half (1½). Sundays and recognized holidays shall be paid at the double (2) time rate of pay. A contractor may alter the regular work week to four (4) ten (10) hour days at straight time rate of pay. To do this the scheduled 4-10's must be worked at least one full week and the regular workweek shall be Monday through Thursday with Friday being a make-up day at straight time for days missed in the regular workweek due to inclement weather. If 5-8's are being worked, Saturday may be used as a make-up day at straight time if inclement weather prevents work during the normal work week.

NO. 88: Means the regular work week shall consist of five (5) eight (8) hour days, 8:00 a.m. to 4:30 p.m., Monday through Friday, except when the work week is scheduled as a 4-10's week or as a week with start time advanced or delayed as described below. The starting time may be advanced or delayed by one hour on either side of 8:00 a.m. The advanced or delayed starting time must run for a period of at least five (5) days. The Employer may establish a work week consisting of four (4) days, during the regular work week, each day consisting of ten (10) hours at straight time. The 4-10's must run for a period of at least four (4) days. Time and one-half (1½) shall be paid for any work in excess of eight (8) hours in any regular work day Monday through Friday (or ten hours in a 4-10's week), the first eight (8) hours of a Saturday, and it shall be at time and one-half (1½) for the Friday and Saturday following Thanksgiving. Double (2) time shall be paid for the following time worked on Sunday, New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day, as well as any work in excess of eight (8) hours on a Saturday and the Saturday of a three-day weekend (except the Saturday following Thanksgiving).

NO. 96: A regular workday shall consist of eight (8) working hours. Any work performed over these eight (8) hours per day shall be paid at one and one-half (1½) time the straight time rate. A regular workday may be extended to ten (10) working hours. Any work performed over these ten (10) hours per day shall be paid at one and one-half (1½) times the straight time rate. The regular work week shall begin on Monday and shall continue through Friday. Saturday shall be considered as overtime, and shall be paid for at time and one-half; Sunday and Holidays shall be paid for at double (2) time.

NO. 99: Means the regular eight (8) hour work day shall be from 8:00 a.m. to 5:00 p.m., unless one-half (½) hour is taken for lunch, and in such case, the hours of work shall be from 8:00 a.m. to 4:30 p.m. The regular work days each week shall be from Monday through Friday. Time and one-half (1½) shall be paid for all work in excess of the regular eight (8) hour work day and regular forty (40) hour work week. Double (2) time shall be paid for all work performed on Sunday and recognized holidays.

REPLACEMENT PAGE
BUCHANAN COUNTY
OVERTIME SCHEDULE - BUILDING CONSTRUCTION

NO. 107: Means the regular work day shall be eight (8) hours from 8:00 a.m. to 4:30 p.m. with one-half (1/2) hour lunch Monday through Friday. Starting time may be adjusted by half-hour increments. Employees shall receive time and one-half (1½) for the first two (2) hours of overtime if they immediately follow or precede the normal work day, Monday through Friday, and the first ten (10) hours on Saturday. An Employee receiving the double (2) time rate of pay shall continue to do so for all consecutively worked hours on that specific job, even if these hours overlap into the following work day. All other overtime is double (2) time, including holidays and Sundays.

NO. 115: Means eight (8) hours shall constitute a normal day's work as follows: 7:00 – 8:00 a.m. to 12:00 noon and from 12:30 p.m. to 3:30 – 4:30 p.m. Monday through Friday. The lunch break may be of sixty (60) minutes duration and quitting time delayed accordingly. Employees working before or after these specified hours shall be paid at the rate of time and one-half (1½) the regular rate of pay. Sunday and Holiday work shall be double (2) time. Employees failing to work a regular forty (40) hour week due to inclement weather may work on Saturday at the regular rate of pay. During periods of intemperate summer weather, the working day may begin at 6:00 a.m. and straight time shall be paid for eight (8) hours of work.

REPLACEMENT PAGE
BUCHANAN COUNTY
HOLIDAY SCHEDULE – BUILDING CONSTRUCTION

NO. 1: All work done on New Year's Day, Decoration Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day shall be paid at the rate of double time. When one of the above holidays falls on Sunday, the following Monday shall be observed.

NO. 4: All work done on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas Day shall be paid at the double time rate of pay. If any of the above holidays fall on Sunday, Monday will be observed as the recognized holiday. If any of the above holidays fall on Saturday, Friday will be observed as the recognized holiday.

NO. 7: All work done on New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day shall be paid at the double time rate of pay. If a holiday falls on a Sunday, it shall be observed on the following Monday. If a holiday falls on a Saturday, it shall be observed on the preceding Friday.

NO. 13: Any hours worked on Sunday and on recognized holidays shall be paid at the rate of two (2) times the base rate. The recognized holidays are New Years Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. In the event any of the above holidays fall on Saturday, then that holiday shall be observed on Friday. In the event any of the above holidays fall on Sunday, then that holiday shall be observed on Monday.

NO. 21: All work performed on New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, and Christmas Day shall be paid for at double (2) the straight-time rate of pay. Any of the above listed holidays falling on Sunday, shall be observed on the following Monday and paid for at double (2) the straight-time rate of pay. Any of the above listed holidays falling on Saturday shall be observed on the previous Friday, and paid for at double (2) the straight-time rate of pay. If any of the above listed holidays fall on Friday, Saturday, Sunday, or Monday, creating a three-day weekend, then the entire three (3) days (either Friday, Saturday, and Sunday – if the holiday falls on Friday or Saturday; or Saturday, Sunday, and Monday – if the holiday falls on Sunday or Monday) shall be paid for at double (2) the straight-time rate of pay.

NO. 22: All work performed on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, or days locally observed as such, and Sunday shall be recognized as holidays. If a holiday falls on Saturday, Friday shall be observed; if it falls on Sunday, Monday shall be observed. All work performed on holidays shall be paid at the double (2) time rate of pay.

NO. 32: All work performed for the Friday and Saturday following Thanksgiving shall be paid at the time and one-half (1½) rate of pay. All work performed on Sundays, New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day shall be paid at the double (2) time rate of pay. When one of the above holidays falls on Sunday, the following Monday shall be observed and when one of the above holidays falls on Saturday, the preceding Friday shall be observed.

NO. 34: All work performed on Sundays and recognized holidays shall be paid at the double (2) time rate of pay. The recognized holidays are as follows: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day. The day separating one of the above holidays from the weekend, if worked, shall be paid double (2) time. Any holiday falling on Sunday, will be observed on the following Monday, and be paid accordingly. Any holiday falling on Saturday will be observed on the preceding Friday, and be paid accordingly. When one of the above holidays falls on Tuesday, the preceding Monday will be observed as a non-working holiday. When one of the above holidays falls on Thursday, such as Thanksgiving, the following Friday will be observed as a non-working holiday. When a holiday falls on Monday, Tuesday will be observed as a non-working holiday, and when a holiday falls on a Friday, then Thursday will be observed as a non-working holiday. No work will be allowed on Labor Day, except in case of an emergency.

REPLACEMENT PAGE
BUCHANAN COUNTY
HOLIDAY SCHEDULE – BUILDING CONSTRUCTION

NO. 53: All work done on New Year's Day, Memorial Day, Independence Day, Thanksgiving Day, Christmas Day or days observed as such for these holidays shall be paid at the double (2) time rate of pay. No work shall be performed on Labor Day except in special cases of emergency, and then the rate of pay shall be at three (3) times the regular rate of pay. When a holiday falls on a Sunday, the following Monday shall be observed as the holiday. When a holiday falls on Saturday, the preceding Friday shall be observed as the holiday.

NO. 54: All work performed on New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day shall be paid at the double (2) time rate of pay. When a holiday falls on Saturday, it shall be observed on Friday. When a holiday falls on Sunday, it shall be observed on Monday.

NO 59: All work performed on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day or any days celebrated in lieu thereof when such holidays fall on Sunday, shall be paid at the double (2) time rate of pay.

NO. 67: All work performed on New Year's Day, Memorial Day, Christmas Day, Fourth of July and Thanksgiving Day, from midnight to midnight, shall be paid for at the rate of double time (2) the basic rate of pay if required to work in addition to any other pay otherwise required hereunder as holiday pay. Positively no work shall be performed on Labor Day. Martin Luther King's Birthday, Veteran's Day, and the day after Thanksgiving Day shall be considered optional holidays, and if the Employer and employees agree that work will be performed on that day, no premium pay will be required. Should any of the above holidays fall on Saturday, the holiday will be observed on Friday. Should any of the above holidays fall on Sunday, the holiday will be observed on Monday.

OCCUPATIONAL TITLE	*Effective Date of Increase	Basic Hourly Rates	Over-Time Schedule	Holiday Schedule	Total Fringe Benefits
CARPENTER					
Journeymen	5/09	$28.32	7	16	$10.55
Millwright	5/09	$28.32	7	16	$10.55
Pile Driver Worker	5/09	$28.32	7	16	$10.55
OPERATING ENGINEER					
Group I	5/09	$28.90	5	15	$12.55
Group II	5/09	$28.50	5	15	$12.55
Group III	5/09	$28.50	5	15	$12.55
Group IV	5/09	$26.50	5	15	$12.55
Oiler-Driver	5/09	$26.50	5	15	$12.55
LABORER					
General Laborer	5/09	$23.09	4	18	$9.64
Skilled Laborer	5/09	$23.44	4	18	$9.64
TRUCK DRIVER - TEAMSTER					
Group I	5/09	$27.13	12	3	$9.40
Group II	5/09	$27.24	12	3	$9.40
Group III	5/09	$27.28	12	3	$9.40
Group IV	5/09	$27.35	12	3	$9.40

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title as shown on the Building Construction Rate sheet.

BUCHANAN COUNTY
OVERTIME SCHEDULE – HEAVY CONSTRUCTION

FED: Minimum requirement per Fair Labor Standards Act means time and one-half (1 ½) shall be paid for all work in excess of forty (40) hours per work week.

NO. 4: Means a regular work week shall consist of not more than forty (40) hours of work, Monday through Saturday, and all work performed over and above ten (10) hours per day and forty (40) hours per week shall be paid at the rate of time & one-half (1½). Workers shall receive time and one-half (1½) for all work performed on Sundays and holidays. A work day is to begin between 6:00 a.m. and 9:00 a.m. at the option of the Employer except when inclement weather or other conditions beyond the reasonable control of the Employer prevent work, in which event, the starting time may be delayed, but not later then 12:00 noon. When a holiday falls during the normal work week, Monday through Friday, it shall be counted as eight (8) hours toward a forty (40) hour week; however, no reimbursement for this eight (8) hours is to be paid to the worker(s) unless worked.

NO. 5: Means a regular work week shall consist of not more that forty (40) hours work, Monday through Saturday, and all work performed over and above ten (10) hours per day and forty (40) hours per week shall be paid at the rate of time & one-half (1½). Workmen shall receive time and one-half (1½) for all work performed on Sundays and recognized holidays or days observed as such. Double (2) time shall be paid for work on Sunday or recognized holidays when and only if any other craft employees of the same employer at work on that same job site are receiving double (2) time pay for that Sunday or holiday. If a job can't work forty (40) hours, Monday through Saturday, because of inclement weather or other conditions beyond the control of the Employer, Friday and Saturday may be worked as make up days at straight time (if working 4-10's). Saturday may be worked as a make up day at straight time (if working 5-8's). Make up days shall not be utilized for days lost to holidays. A work day is to begin between 6:00 a.m. and 9:00 a.m. at the option of the Employer except when inclement weather or other conditions beyond the reasonable control of the Employer, including requirements of the owner, prevent work. In such event the starting time may be delayed but not later than 12:00 noon. Where one of the holidays falls or is observed during the work week, then all work performed over and above thirty-two (32) hours shall be paid at time & one-half (1½).

NO. 7: Means the regular work week shall start on Monday and end on Friday, except where the Employer elects to work Monday through Thursday, ten (10) hours per day. All work over ten (10) hours in a day or forty (40) hours in a week shall be at the overtime rate of one and one-half (1½) times the regular hourly rate. The regular work day shall be either eight (8) or ten (10) hours. If a job can't work forty (40) hours Monday through Friday because of inclement weather or other conditions beyond the control of the Employer, Friday or Saturday may be worked as a make-up day at straight time (if working 4-10's). Saturday may be worked as a make-up day at straight time (if working 5-8's). Make-up days shall not be utilized for days lost due to holidays. A workday is to begin at the option of the Employer but not later than 11:00 a.m. except when inclement weather, requirements of the owner or other conditions beyond the reasonable control of the Employer prevent work. Except as worked as a make-up day, time on Saturday shall be worked at one and one-half (1½) times the regular rate. Work performed on Sunday shall be paid at two (2) times the regular rate. Work performed on recognized holidays or days observed as such, shall also be paid at the double (2) time rate of pay.

NO. 12: Means a regular work week shall consist of not more than forty (40) hours of work and all work performed over and above ten (10) hours per day and forty (40) hours per week shall be paid at the rate of time & one-half (1½). A workday is to begin between 6:00 a.m. and 9:00 a.m. at the option of the Employer except when inclement weather or other conditions beyond the reasonable control of the Employer, in which event, the starting time may be advanced or delayed. Workers shall receive time and one-half (1½) for all work performed on recognized holidays or days observed as such.

BUCHANAN COUNTY
HOLIDAY SCHEDULE – HEAVY CONSTRUCTION

NO. 3: The following days are recognized as holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. If a holiday falls on a Sunday, it shall be observed on the following Monday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This rule is applied to protect Labor Day. When a holiday falls during the normal work week, Monday through Friday, it shall be counted as eight (8) hours toward the forty (40) hour week; however, no reimbursement for this eight (8) hours is to be paid to the workmen unless worked. An Employer working a four (4) day, ten (10) hour schedule may use Friday as a make up day when an observed holiday occurs during the work week. Employees have the option to work that make up day. If workmen are required to work the above enumerated holidays, or days observed as such, they shall receive time & one-half (1½) the regular rate of pay for such work.

NO. 15: The following days are recognized as holidays: New Year's Day, Memorial Day, July Fourth, Labor Day, Thanksgiving Day and Christmas Day. If a holiday falls on Sunday, it shall be observed on the following Monday. If a holiday falls on Saturday, it shall be observed on the preceding Friday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This rule is applied to protect Labor Day. If workmen are required to work the above enumerated holidays or days observed as such, they shall receive time and one-half (1½) the regular rate of pay for such work. Where one of the holidays specified falls or is observed during the workweek, then all work performed over and above thirty-two (32) hours in that week shall be paid at the rate of time and one-half (1½). Workmen shall receive time and one-half (1 ½) for all work performed on Sundays. Double (2) time shall be paid for work on Sunday or recognized holidays when and only if any other craft employees of the same employer at work on that same job site are receiving double (2) time for that Sunday or holiday.

NO. 16: The following days are recognized as holidays: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day. If a holiday falls on Sunday, it shall be observed on the following Monday. If a holiday falls on Saturday, it shall be observed on the preceding Friday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This rule is applied to protect Labor Day. When a holiday falls during the normal work week, Monday through Friday, it shall be counted as eight (8) hours toward the forty (40) hour week; however, no reimbursement for this eight (8) hours is to be paid to the worker unless worked. If workers are required to work the above recognized holidays or days observed as such, they shall receive double (2) the regular rate of pay for such work.

NO. 18: All work performed on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day shall be paid at the time and one-half (1½) rate of pay. If a holiday falls on Sunday, it shall be observed on the following Monday. If a holiday falls on Saturday, it shall be observed on the preceding Friday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This rule is applied to protect Labor Day. When a holiday falls during the normal work week, Monday through Friday, it shall be counted as eight (8) hours toward a forty (40) hour week; however no reimbursement for this eight (8) hours is to be paid to the working person(s) unless the holiday is worked.

OUTSIDE ELECTRICIAN

These rates are to be used for the following counties:

Andrew, Atchison, Barry, Barton, Buchanan, Caldwell, Cedar, Christian, Clinton, Dade, Dallas, Daviess, DeKalb, Douglas, Gentry, Greene, Grundy, Harrison, Hickory, Holt, Jasper, Laclede, Lawrence, Livingston, McDonald, Mercer, Newton, Nodaway, Ozark, Polk, St. Clair, Stone, Taney, Vernon, Webster, Worth, and Wright

COMMERCIAL WORK

Occupational Title	Basic Hourly Rate	Total Fringe Benefits
Journeyman Lineman	$34.97	$4.75 + 34%
Lineman Operator	$33.11	$4.75 + 34%
Groundman	$22.60	$4.75 + 34%

UTILITY WORK

Occupational Title	Basic Hourly Rate	Total Fringe Benefits
Journeyman Lineman	$33.45	$4.75 + 34%
Lineman Operator	$30.92	$4.75 + 34%
Groundman	$21.56	$4.75 + 34%

OVERTIME RATE: Eight (8) hours of work between the hours of 8:00 a.m. and 4:30 p.m. shall constitute a work day. Forty (40) hours within the five (5) days, Monday through Friday inclusive, shall constitute the work week. Starting time may be adjusted not to exceed two (2) hours. Work performed outside of the aforementioned will be paid at the applicable overtime rate. When starting time has been adjusted, all other provisions concerning the work day shall be adjusted accordingly. The overtime rate of pay shall be one and one-half (1½) times the regular rate of wages, other than on Sundays, holidays and from Midnight until 6:00 a.m., which will be paid at double (2) the straight time rate.

HOLIDAY RATE: Work performed on New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day, Christmas Day, or days celebrated as such, shall be paid at the double time rate of pay. If the holiday falls on Saturday, it will be observed on Friday; if the holiday falls on Sunday, it will be observed on Monday, and shall be paid for at double (2) the regular straight time rate of pay.