Kentucky Educational Development Corporation
Green River Regional Educational Cooperative

Northern KY Cooperative for Educational Services
Southeast/South Central Educational Cooperative

KPC – KENTUCKY PURCHASING COOPERATIVES
KEDC – GRREC – NKCES – SE/SC
KENTUCKY EDUCATIONAL DEVELOPMENT CORPORATION (KEDC)
904 ROSE ROAD
ASHLAND, KY 41102-7104
Bidding Department (606) 928-0205
www.kedc.org or www.kedc.coop.k12.ky.us or www.kybuy.org

* * * INVITATION TO BID * * *

BID REFERENCE: **GSHP-2005-04**
BID POSTING DATE: **January 20, 2005**
BID OPENING DATE: **3:00 p.m., Tuesday, February 22, 2005**
CONTRACT START DATE: **April 1, 2005**

ITEMS: **Ground Source Heat Pump Design, Engineering, Commissioning, Maintenance, Energy Analysis and Performance Monitoring**

The Kentucky Educational Development Corporation Board of Directors (hereinafter referred to as KEDC) invites you to submit a sealed bid for Ground Source Heat Pump (GSHP) design, engineering, commissioning, maintenance, energy analysis, and performance monitoring for participating KEDC bidding consortium member school districts and KPC member school districts in accordance with the general conditions and detailed specifications of this bid. Bids must be received at the KEDC office at 904 Rose Road, Ashland, KY 41102-7104, not later than the specified bid opening date and time. The public notice for this invitation, the invitation itself, a file containing a Microsoft Excel spreadsheet, and any addendums can be viewed, downloaded, or printed from the Internet at KEDC's Internet site www.kedc.org or www.kybuy.org beginning on the bid posting date shown above until the bid opening date shown above.

TIME AND PLACE OF BID OPENING

Bids will be opened at the KEDC office at 904 Rose Road, Ashland, KY 41102-7104 at the Bid Opening Date specified above. All bids must be received by the date and time designated and none will be considered thereafter. Failure to have bid in prior to the date and time designated for the bid opening will automatically prevent the reading of your bid and such bids will be returned to the bidder. KEDC and the participating boards of education cannot assume the responsibility for any delay as a result of failure of the mails or delivery services to deliver bids on time. (Please note that FED EX does not guarantee delivery time to KEDC because they classify KEDC as being in a rural area.) At the specified time, all bids will be opened and the name of each bidder will be read aloud. Any interested parties may attend. No immediate decision will be rendered concerning the bids submitted.
Faxed submissions will NOT be accepted.

BID TABULATION

Tabulations will be made by KEDC staff and each responding bidder will be mailed a formal tabulation after the Board has taken official action.

CLARIFICATION

For clarification or additional information relative to this Invitation contact the **KEDC Bidding Department** at **bidding@kedc.coop.k12.ky.us** or phone **(606) 928-0205**. **PLEASE DO NOT CONTACT SCHOOL DISTRICTS.** For legal questions relative to this Invitation, contact **Timothy Crawford**, KEDC Board Attorney at **timcrawford@vol.com**.

SECTION 1 – General Bid Terms and Conditions

Bid Scope

Due to the nature and scope of the diverse Kentucky Education market and the increasing demand for Geo-Source Heat Pump systems (GSHP) The Kentucky Education Development Corporation (KEDC) through the Kentucky Purchasing Cooperative (KPC) is seeking a prime vendor that will design, install, repair maintain and restore GSHP systems for public education facilities in Kentucky.

It is the intent of KPC to find a qualified single source provider. The single source provider shall be able to complete the design, engineering, commissioning, maintenance, energy analysis, and performance monitoring on any system sold through KPC to it's members agencies.

Since many Kentucky Schools do not have facility managers on staff who are able to research and write a bid for a GSHP system KPC anticipates the prime vendor awarded the final contract will be able to adequately provide a trusted partner relationship with the educational entities choosing to purchase from this agreement.

While it is the opinion of KPC that GSHP technology is the wave of the future, it is not a new technology, for this reason KPC will set forth specifics guidelines for dealing with the Kentucky Schools who comprise its members. In light of recent energy cost increases and the instability of the energy market, it is also the intent of KPC to provide a system that insulates Kentucky schools from the complexities and volatility of the energy markets. Due to the educational mission of the educational cooperatives who are members of KPC the entire KPC family will expect strong ties to it's member school districts through ongoing educational and support programs for the schools where this technology is installed.

It is further the intent of KPC to insure that the successful bidder shall have a safety program in place. The prime contractor will be expected to follow strictly all OSHA/KY OSH guidelines and have a written and documented safety program in place that will insure Kentucky's most valuable resource, its children, will be protected as well as providing a comfortable work environment for the teachers, administrative staff and workers who so strongly define our schools.

All GSHP HVAC (Heating Ventilation Air Conditioning) systems must meet the regulatory requirements of the uniform building code, all applicable state and local codes for public buildings, as well as any standards set forth by the International Ground Source Heat Pump Association.

KPC is interested in only providing quality systems with a documented life cycle cost benefit when compared to standard HVAC system installations. Subcontractors working closely with the chosen Prime Vendor will be

expected to support the bidding efforts of the successful prime vendor by providing the very best solution to Kentucky Education market available.

GENERAL CONDITIONS AND INSTRUCTIONS FOR BIDDERS

These General Conditions and Instructions apply to all bids submitted, except to the extent they may be modified by the bid offered. Any deviations or exceptions are to be explained as a part of the bid offer.

AUTHENTICATION OF BID AND STATEMENT OF NON-COLLUSION AND NON-CONFLICT OF INTEREST

By my signature on the bid certification, I hereby swear or affirm under penalty of false swearing as provided by KRS 523.040:

That I am the bidder (if bidder is an individual), a partner in the bidder (if the bidder is a partnership), or an officer or employee of the bidding corporation having authority on its behalf (if the bidder is a corporation);

That the costs quoted in the attached bid or bids responding to the Kentucky Educational Development Corporation GSHP Invitation to Bid are correct and have been arrived at by the bidder independently and have been submitted without collusion and without agreement, understanding, or planned common course of action, with any vendor of materials, equipment, or services described in the invitation to bid, designed to limit independent bidding or competition;

That contents of the bid or bids have not been communicated by the bidder, or its employees or agents, to any person not an employee or agent of the bidder or its surety on any bond furnished with the bids and will not communicate to any such person prior to the official opening of the bid or bids; That the bidder is legally entitled to enter into contracts with agencies of the Commonwealth of Kentucky and is not in violation of any prohibited conflict of interest, gratuities and kickbacks including those prohibited by the provisions of the Model Procurement Code (KRS Chapter 45A);

That I understand the Kentucky Educational Development Corporation collective bidding process is conducted consistent with KRS Chapter 45A, the Model Procurement Code and that the contents of the bid proposal and the actions taken by the bidder in preparing and submitting the bid proposal are in compliance with KRS Chapter 45A, the Model Procurement Code.

CERTIFICATION CONCERNING DISBARMENT AND SUSPENSION

I certify on behalf of myself, the company and its key employees that neither myself, the company or its key employees have been proposed for debarment, debarred, or suspended by any Federal Agency.

TERMS AND CONDITIONS

1. ***Participating School Districts:*** Any School District that is a member of the KEDC Collective Bidding Consortium or the Kentucky Purchasing Cooperative (KPC) may utilize the GSHP Bid, however this does not mean that all member school districts will participate. This statement of intent does not obligate any district to utilize this bid. This is a prime vendor bid for KEDC/KPC participating districts only.

2. ***Bid Forms:*** Bidders must obtain the official bid documentation including the bid certification, bid form, and the Microsoft Excel spreadsheet for submitting their bid from the KEDC website. Bidder must show cost for each item on the provided bid form. The bidder must then enter the brand, vendor item number, and the cost per item in the Excel spreadsheet and save it to the computer diskette and print out a hard copy. Optional information is requested, but bid will not be rejected if these items are not supplied. The completed Bid Certification, narrative and CAD drawings outlined in Sections 2 through 6, computer diskette or CD, and printed hard copy from the Excel spreadsheet must be returned in your sealed bid packet. By executing the Bid Certification, the bidder acknowledges that he has read this invitation, understands it, and agrees to bind by its terms and conditions.

3. ***Correction of Mistakes:*** Bidders are cautioned to re-check their bid for possible errors. No bid can be corrected, altered, or signed after being opened. All prices and quotations must be in ink or typewritten. No pencil figures will be accepted. Mistakes are to be crossed out and corrections inserted adjacent thereto and initialed by the person signing the bid. Errors discovered after public opening cannot be corrected and bidder will be required to accept award if offered.

4. ***Error in Bid:*** In case of a pricing error between the two bid documents (the bid form and the computer printout), the entry on the bid form will govern. No bid will be altered, or amended after the specified time and date set for the bid opening. The KEDC Board reserves the right to waive defects and informalities in bids, to reject any or all bids, or to accept any bid as may be deemed to its interest.

5. ***Withdrawal of Bid:*** All bids shall be valid for a period of thirty (30) days from the bid opening date to allow for tabulation, study, and acceptance by the KEDC Board. A bidder may withdraw his bid after it has been submitted only if a written request is submitted and received prior to the expiration of the time during which bids may be submitted, without prejudice to himself, by submitting a written request for its withdrawal to KEDC, Attn: Bidding.

6. ***Return Instructions:*** Submit one (1) copy of the completed Bid Certification, Narrative and CAD drawings outlined in Sections 2 through 6, Computer Disk, and Printout of the Excel spreadsheet in a properly addressed sealed envelope. All envelopes should be CLEARLY marked **KEDC GSHP Sealed Bid** with the bid reference and opening date printed on the outside of the envelope as they appear on the Bid Invitation. The bidder should retain a duplicate copy. Bidders may keep all other pages for their files. An officer or member of the bidding firm who is authorized to legally bind the firm must sign the bid certification. The Bid Certification must be submitted with an original signature. The Bid Invitation Forms must be used without alterations. Modifications, additions, or changes to the terms and conditions of this Invitation to Bid may be a cause for rejection of a bid. Bidders are requested to submit all bids on KEDC's official forms. Bids submitted on company forms may be rejected.

7. ***Addendums:*** KEDC may issue an addendum to the bid after the bid has been released. In no instance will an addendum be issued within five (5) working days prior to the bid opening.

8. ***Contract Period***: The bid will be awarded for one year. The contract may be extended on an annual basis by KEDC not to exceed four additional years. The determination to renew the contract beyond the initial year shall be determined in part by the performance of the contractor. KEDC shall notify the contractor of its intent to extend or not to extend the contract by February 1 of each year. If notified of intent to extend, contractor shall respond by February 10 if it does not intend to extend the contract. KEDC reserves the right to extend

any individual one year term for up to 180 additional days to continue a source of supply until new or replacement contracts are completed. Any contract extension is contingent upon written agreement of KEDC and the contractor. The bid will not be automatically extended beyond any current year unless expressly approved by KEDC. KEDC reserves the right on any contract extension to revise, update, or supplement the contract terms and conditions including the assessment of administrative fees to the contractor as needed to cover the cost of KEDC servicing the bid contract, bidding program, or procurement service for the members.

9. ***Pricing****:* KEDC will award all items based on a prime vendor method. The prime vendor method of award is described as follows:

1) One contractor will be awarded the contract to provide all items on the bid form to participating KEDC/KPC member districts and,
2) KEDC/KPC Bidding Member districts participating in the contract agree to purchase all items on the bid form from the prime vendor exclusively.

Districts must be members of KEDC or KPC and agree to use the awarded contractor as their prime vendor for the items on the bid form to be eligible to participate in this bid. All bid pricing quoted for each period shall remain firm for the duration of that period. If KEDC notifies contractor of intent to extend the contract by one year, contractor shall either respond by February 10 that it does not intend to extend the contract, or respond by February 15 with any necessary price increases or decreases. If price increases submitted February 15 are deemed excessive by KEDC then KEDC shall have cause to not extend the contract. All price increases/decreases shall be accompanied by proper documentation of price increase/decreases to the contractor. Proper documentation shall include market bulletin(s) from an independent source, manufacturer's invoices, and freight bills. Price change notifications will follow the same pattern as above for any years in which this contract is extended. KEDC reserves the right to add or delete items on the bid list at each annual update.

10. ***Quantities:*** It shall be understood that any contract established as a result of this Bid Invitation will not obligate KEDC or its member school districts or schools to receive any quantity in excess of actual requirements.

11. **Liability:** The contractor agrees to protect, defend, and save harmless KEDC and members from any suits or demands for payment that may be brought against it for the use of any patented material, process, article, or device that may enter into the manufacture, construction, or form a part of the work covered by either order or contract; and contractor further agrees to indemnify and save harmless KEDC and members from suits or actions of every nature and description brought against it for, or on account of any injuries or damages received or sustained by any party or parties by, or for any of the acts of the contractors, his servants or agents.

12. **Recalls:** The contractor shall notify KEDC and its members immediately of any products recalls. Any products that have been recalled and have been delivered shall be issued a credit and/or a comparable substitute immediately.

13. **Delivery Charges*:*** All products or services procured from the Bid Contract are to be delivered free of freight charges FOB destination), unless stipulated on the Bid Form.

14. ***Review:*** After the public opening of proposals received from the Bid Invitation, KEDC staff and school officials will review the results, develop a preliminary tabulation, and may contact bidders for the purpose of clarification only. If necessary, school districts may purchase from the apparent low bidder pending approval by the KEDC Board of Directors.

15. ***Award***: After the review of the proposals, the KEDC Board will award a contract based on the total points awarded to each contract using the scale below.

CRITERIA FOR EVALUATION OF BID

The following criteria has been developed in conjunction with standards set by the Federal Energy Management Program (FEMP), the Energy Service Coalition (ESC), and the International Ground Source Heat Pump Association (IGSHPA) to evaluate the bids.

Selection Criteria and Procedures

Completeness
Each response will be reviewed prior to the selection process for completeness and adherence to format specification laid out in this document. A response will be considered complete if all requested sections are complete and included in the proper order.

Ranking
Statements of qualifications, minimum specifications, and sample design will be ranked according to the total number of sections that receive passing grades.

Evaluation of Bidder Qualifications

Evaluation Process
KPC will appoint a selection committee to formally evaluate each response. The selection committee will grade the response on merit and responsiveness. The evaluation process will include verification of references and confirmation of financial and technical information supplied in the RFP response.

Grading Format
Each of the six subsections of the RFP will be considered a separate selection criterion and will be graded individually. All scores will be summed to give the grand total score. The maximum total score for the response is 100 points. Scoring will be summarized on the formal evaluation form.

Point Values

Criterion	Point Value
Qualifications	**20 Total Points**
- Minimum specifications met and agreed to in the RFP	2
- Manufacturer or manufacturer verification of qualifications	3
- Technical training for service staff	5
- References	2
- Safety Program	3
- CEM / LEED / IGSHPA certified professionals	5
Experience	**10 Total Points**
- Years in business	3
- Number of projects	4
- Financials	3
Technical Approach	**25 Total Points**
Design approach meets minimum specification – LEED / IGSHPA / ASHRAE	15
- Commissioning approach	5
- M&V and performance guarantee defined	5
Sustainability	**20 Total Points**
- Owner training programs	10
- Statewide local resources	10
Pricing	**25 Total Points**
- Discounts meet KPC standards	25
Total	**100**

Percentage Grades

Grade	Description
0%	Criterion was not addressed or the material presented was totally without merit.
20%	Criterion was addressed minimally, indicated little capability, experience, or understanding of topic.
40%	Criterion was addressed minimally but shows some capability, experience, or understanding of topic.
60%	Criterion was addressed adequately. Overall, a basic capability, experience, or understanding of topic.
80%	Criterion was addressed well. Indicates some superior features.
100%	Criterion was addressed in superior fashion, indicating excellent or outstanding capability.

Grading Example
Each criterion has a point value of "10" points. If a response addresses the topic well, (the definition of the 80% grade), the 10 point value would be multiplied by 80% resulting in a score of 8.0.

Oral Interviews
After the formal evaluations have been completed, KPC may conduct oral interviews to address specific issues with the respondents. The respondents' answers will be graded using the same format as the evaluation for the KPC GSHP RFP. The maximum score for an interview will be 100 points.

Final Selection
The grand total scores of the statement of qualifications and oral interviews will be added together. The maximum possible score if oral interviews are conducted will be 200 points. The respondents with the highest score will be chosen as the prime vendor. In the case of identical bid scores, KEDC reserves the right to select and to award the contract by whatever method it chooses.

16. ***Usage Reports:*** Usage reports in electronic format (Microsoft Excel, Access or SQL) shall be issued to KEDC monthly by the 25th day of the next month during the period of the bid. Contractor shall compile usage reports by district and school in a format provided by KEDC. The reports shall indicate the total orders delivered by individual bid item. Failure to provide usage reports may be cause to remove the contractor from future bid participation. Since the usage report data is useful to both KEDC and the contractor, it is of benefit of both parties to share this information.

17. ***Transmittal of Orders:*** Distributor shall issue purchasing guides to KEDC and its participating districts.

18. ***Payments:*** Each school district and/or school shall be responsible for making payment to the contractor. See Section 2 below.

19. **Item Substitution and Out-of-Stock Back-Orders:** No substitutions are allowed without prior written authorization from the member. Member must be notified if item is out of stock, backordered or if timely delivery cannot be made. Upon member notification, the contractor must receive written directions from the member on how to proceed, i.e. cancel, process, etc.

20. ***Warning and Termination of Contract:*** KEDC may terminate the contract if the contractor fails to perform at the service level specified in the bid document. Contracts may be terminated at any time, on 30 days notice upon the mutual agreement of both parties or upon the discretion of KEDC, in a shorter period of time, if the terms of the contract are violated in any way. In the event of termination, the schools shall not be liable to any costs other than the cost of items delivered and accepted prior to the termination date. The contractor may terminate the contract if the school districts fail to meet mutually agreeable and specified payment terms.

Each party shall follow the following procedure if the contract is to be terminated:

Step 1. Issue a warning letter outlining the violations and state the length of time to correct the problem(s).
Step 2. Issue a letter of intent to cancel contract, if the problem(s) is not resolved by a given date.
Step 3. Issue letter to cancel contract.

In the event the physical facilities of the contractor are destroyed or a labor dispute makes performance under the terms of the contract impossible, the contractor shall not be held liable by KEDC or the school districts.

21. ***Access to Records:*** All contracts over $10,000 awarded by KEDC shall include the right of KEDC, the Kentucky Department of Education, USDA, the Comptroller General of the United States, or any of their duly

authorized representatives, to have unrestricted access to any books, documents, papers, records of the contractor which are directly pertinent to the awarded contract, for the purpose of making audit, examination, excerpts, and transactions.

22. ***Service Area:*** Contractor must be able to provide service to all districts in the state of Kentucky.

23. ***Administrative Fee:*** The contractor's pricing will include a two percent (2%) administrative fee that the contractor will remit to KEDC on a monthly basis. The two percent (2%) administrative fee will apply to all payments made by members under this contract. The contractor will also compile and provide to KEDC a monthly report showing all payments made by members under this contract in a format provided by KEDC. The contractor will make all administrative fee payments to KEDC by the 25th of the succeeding month and all checks are to be made payable to KEDC and sent to KEDC, 904 West Rose Road, Ashland, KY 41102-7104.

24. ***Pre-bid Conference:*** There is a mandatory pre-bid conference scheduled to discuss this bid. Bidder must attend the pre-bid conference. The pre-bid conference will be held at KEDC, 904 West Rose Road, Ashland KY 41102 on January 31st, 2005 at 2:00pm EST.

25. ***Subcontractors:*** KEDC, KPC and KPC Member agencies reserve the right to approve each subcontractor to be used by the successful Bidder. Subcontractors employed by the successful Bidder shall adhere to all terms and conditions of this contract.

26. ***Glossary of Terms:*** No terms defined.

No Terms Defined

27. ***Standard Contract Conditions*:**

A. This contract shall be governed in all respects as to validity, construction, capacity, performance, or otherwise by the laws of the Commonwealth of Kentucky.

B. Contractors providing services under this bid invitation, herewith assure KEDC they are conforming to the provisions of the Civil Rights Act of 1964 as amended.

C. Contractors shall comply with the Executive Order 11246, entitled, "Equal Employment Opportunity," as amended by Labor regulations (41 CFR Part 60).

D. Kentucky Sales and Use Tax Certificate of Exemption Form will be issued upon request.

E. Contractor shall comply with applicable federal, state, and local laws and regulations pertaining to wages, hours, and conditions of employment. In connection with the contractor's performance of work under this contract, contractor agrees not to discriminate against any employee(s) or applicant(s) for employment because of race, age, religious creed, sex, national origin, or handicap.

F. Contractor agrees to retain all books, records, and other documents to this agreement for three years after final payment. KEDC and its school districts, its authorized agents and/or state/or federal representatives shall have full access to, and the right to examine any or said materials during said period which are directly pertinent to that specific contract for the purpose of making audit, examination, excerpts and transcriptions. If the investigator or audit is in progress, records shall be maintained until stated matter is closed.

G. Contractor shall comply will all applicable standards, orders or requirements issued under Section 306 of the Clean Air Act (42 U.S.C.) 187 [h], Section 508 of the Clean Water Act (33 U.S.C. 1368, Executive Order 11738 and Environmental Protection Agency (EPA) regulations, (40 CFR Part 15), which prohibit the use under non-exempt federal contracts, grants or loans of facilities included in the EPA list of violated facilities.

H. By signing this document, the contractor certifies that this proposal is made without prior understanding, agreement, or connection with any corporation, firm or person submitting a proposal for the same materials, supplies, or equipment, and is in all respects fair and without collusion or fraud. The contractor certifies that collusive bidding is a violation of federal law and can result in fines, prison sentences and civil damage awards.

I. Prohibition against conflicts of interest, gratuities, and kickbacks: Any employee or official of KEDC or member school districts, elective or appointive, who shall take, receive, or offer to take or receive, either directly or indirectly, any rebate, percentage of contract, money, or things of value as an inducement or intended inducement, or in the procurement of business, or the giving of business, for or to or from, any person, or in open market seeking to make sales to the school district shall be deemed guilty of a felony and upon conviction such person or persons shall be subject to punishment or fine in accord with state and/or federal laws.

J. The bidder is legally entitled to enter into contracts with agencies of the Commonwealth of Kentucky and is not in violation of any prohibited conflict of interest, including those prohibited by provisions of KRS 164.390, KRS 61.092-61.096, and KRS 42.990.

K. The provisions of KRS 365.080 and KRS 365.090 which permit the regulation of resale price by contract, does not apply to sales to the State.

L. The bidder is fully knowledgeable of KRS 45A.335-45A.490, Kentucky Model Procurement Code, including the provisions for violation of the Code. KRS 45A.455 prohibits conflicts of interest, gratuities, and kickbacks to employees of KEDC or the Boards of Education in connection with contracts for supplies or services whether such gratuities or kickbacks are direct or indirect. KRS 45A.990 provides severe penalties for violations of the laws relating to gratuities or kickbacks to employees that are designed to secure a public contract for supplies or services.

Section 2 - Minimum Bidder and Manufacturer Requirements

2.0.1.
Bidder Submission Procedures
The following minimum bidder requirements are in addition to the general KPC bidder requirements. Please review each, submit the required material and have a certified agent of your company sign the signature line provided on the Statement of Submission.

2.0.2.
Bidder must be able to provide not only an energy efficient system but also to support their product through a long term maintenance agreement should it be requested. The successful Bidder must have a large bonding capacity. Since the amount of work necessary may exhaust the capacity of many companies KPC is asking each company to document their current bonding capacity.

2.0.3.
When submitting a response to the RFP, Bidder shall follow the format laid forth here by entering each section and line and then responding to the section and line in a clear and concise manner. Bidders not responding to the full RFP in this manner will be disqualified from final selection for failure to follow the format for selection.

2.1.0. Minimum Manufacturer Terms and Conditions
Bidder must provide 20 quarters of written evidence of continuous plant inspections of the GSHP manufacturers sites over the past five (5) years by an independent nationally recognized testing laboratory (NRTL) as defined in 29CFR, Part 1910, Products requiring NRTL Approval" dated December 14, 1998 from the Occupational Safety and Health Administration (OSHA).

2.1.1.
Bidder shall have a proven record of HVAC work in Kentucky the manufacturer must provide details, where work has been successfully accomplished. Provide the name of the agency, when the GSHP was installed, contract amount and contact name for the agency project manager for installations completed in the past 3 years.

2.1.2.
Any business that has served the public for more than 5 years will have had problem projects. List two projects that have had difficulties and how your company responded to each. Identify the main problem encountered. Also detail what steps were taken to solve the customers concerns. Provide the customer name, type of HVAC complaints, contract amount, contact name, and telephone number.

2.1.3.
Bidder must name all proposed dealers and/or sub contractors that will work on the project and their manufacturer certifications to install the products. The bidder must identify how their dealers are certified by providing written documentation of the certifications process. Please provide a dealer list with business names, addresses and telephone numbers and a state contractor license.

2.1.4.

Cost for inspections must be separated from construction costs but may be included in line item costs on a per contract basis. Should manufacturers products fail inspection during a twelve-month post installation period post manufacture the bidder must be willing to submit a partial refund of the inspections cost. Detail this process and what portion of the inspection cost will be refunded.

2.1.5.

Bidder must offer extended warranties available at extra cost for KPC members who agree to purchase a maintenance contract. The maintenance contract must be offered as a separate line item upon request. Bidders will detail extended warranty programs and the ability to service Kentucky Schools. Detail minimum response times to GSHP HVAC related problems.

2.2.0.

Bid Security Procedures and Requirements

Acceptable bid security, which must be provided with the submission of an initial offer, will be an annual or one time bid bond underwritten by a surety company licensed to issue bonds in Kentucky. The bid bond will only apply to projects which have been issued purchase orders, or to work in progress. The bid bond will be in the amount specified by KPC and must be provided with in two days of signature of the contract. Bidder must agree to keep the basic bid security active as long as the project is active. Bidder agrees to provide all performance and payment bonds required by the public agency at the time a contract between the successful Bidder and KPC member is executed. Should the successful Bidder fail to deliver any required performance or payment bond, the bid security shall be enforced and the contract will be cancelled. Bidder shall detail the bonding capacity of their company.

2.2.1.

When the Successful Bidder signs a contract with a KPC member any inadequacy of the bid bond shall be corrected to bring the total security of the bid equal 10% of the contract amount within three days of the agreement.

2.2.2.

Bidder agrees to provide all performance and payment bonds required by KPC at the time a contract between the member of KPC and the Bidder is executed. If the Bidder fails to deliver any required performance or payment bond the bid security shall be enforced and the contract may be cancelled. The Bidder will have the right to refuse work once its bonding capacity has been reached.

2.3.0. Bond Procedures and Requirements

2.3.1.

Upon execution of a contract between, KPC, its member public agencies and the successful Bidder, the successful Bidder shall provide performance and payment bonds.

2.3.2.

A performance bond in an amount equal to 100% of the contract price in the contract between the KPC member and the successful Bidder shall be executed by a surety company authorized to do business in the Commonwealth of Kentucky.

2.3.3.
Both bonds shall be delivered by the by the successful Bidder to the KPC member agency at the time the contract is executed.

2.3.4.
The KPC member agency shall file all suits for non-payment or non-performance as allowed by KRS.

2.4.0. Payment Retentions, Progress Payments
The following details methods and procedures for payments between KPC member agencies and the successful bidder.

2.4.1.
Ten percent of all contract payments shall be retained by the KPC member as insurance of proper performance of the successful bidder. The successful bidder agrees to identify the amount to be retained on invoices to the KPC member and to KPC for the progress payment.

2.4.2.
If the member and the successful Bidder agree to a substitute security, the agreement must be in full compliance with KRS statutes. If a substitute security is agreed to the successful Bidder must provide the KPC member with a signed and acknowledged waiver of any right or power of the obligor to set off any claim against KPC, the KPC member agency or the successful Bidder in relationship to the security assigned.

2.4.3.
Progress payments shall be made by the KPC member to the successful Bidder on the basis of a duly certified and approved estimate of work performed during the preceding month. The successful Bidder agrees to follow all relevant rules for progress payments. The successful Bidder as authorized by KRS will pay any interest due a subcontractor or material supplier. The successful Bidder may elect to invoice the entire project upon substantial completion and pay subcontractors in a timely fashion as agreed between the subcontractors and the successful Bidder.

2.4.4.
Once all bonds are in place, the successful Bidder and the buyer will agree upon a schedule of payments based on identifiable milestones.

2.4.5.
Upon successful completion of the project as defined by the contract with the KPC member agency, final payment shall be made to the successful Bidder, including the ten percent retainage.

2.5.0
Contract between KPC members and Successful Bidder
The following section details the responsibility of KPC and its member agencies during for a GSHP project purchased through the KPC Prime vendor contract.

2.5.1.
In any contract between the successful Bidder and KPC member agency based on this RFP, the

terms and conditions of final KPC successful Bidder contract for GSHP will prevail.

2.5.2.
A contract between the public agency and the successful Bidder for GSHP HVAC installations shall be an industry standard agreement.

2.5.3.
Work to be performed by the KPC member agency will be clearly defined in any contract between the successful Bidder and the KPC member agency.

2.5.4.
The KPC member agency must provide an all weather road to the site and prepare the site with room for construction equipment.

2.5.5.
Condition of the site prior to start of construction will be agreed upon between the KPC member agency and the successful Bidder and will be written into the contract. The successful Bidder shall assume full responsibility for the protection and safekeeping of any products stored on the premises.

2.5.6.
Temporary electrical service, the cost of power, water, and other miscellaneous expenses to be paid by the KPC member shall be identified in the contract.

2.5.7.
Access to the building shall be through any entrance deemed accessible by school officials in compliance with school safety regulations and KPC member guidelines.

2.5.8.
Air conditioning units and other HVAC equipment shall be moved as required for installation by the successful Bidder. Before new units or existing equipment are moved, a written plan detailing the removal storage disposal or future usage of said equipment will be agreed upon with the successful Bidder and KPC member agency.

2.5.9.
Appropriate measures shall be taken to prevent rust, vapors, construction debris, and waste from entering the building during removal and installation and repair of any GSHP product or project.

2.5.10.
A licensed mechanical and electrical contracting company licensed to perform work in the Commonwealth of Kentucky shall perform all disconnections. The standards of the Uniform Plumbing Code shall prevail when disconnection of gas lines and units on such lines occurs. A licensed contractor will complete all testing on said units.

2.5.11.
Any damage to reinstalled equipment caused by the disconnection, storage, or reconnection of equipment caused by the successful Bidder shall be repaired at no additional cost to the KPC

member agency.

2.5.12.
All work performed shall be in compliance to OSHA safety requirements as described in OSHA CFR 29 Part 1926 “Safety and Health Regulations for Construction” and any additional Commonwealth of Kentucky and/or local fire and safety regulations and requirements

2.5.13.
The KPC member agency and the successful Bidder shall designate mutual points of contact as a part of the contracting process. A methodology for contacting said parties during non-construction hours and emergencies will be stated in the contract. The successful Bidder must advise the KPC member contact when work is expected to be hazardous to school children, employees, and/or operators. No hazardous work shall be performed within occupied areas of the building during school hours.

2.5.14.
The successful Bidder will deliver materials to the worksite in new, dry, unopened, and well-marked containers showing product and successful Bidders name. Damaged or unlabeled materials will not be accepted.

2.5.15.
The successful Bidder will deliver materials in sufficient quantity to allow for continuity of work. Delivery will be coordinated with the KPC member agencies designated contact person.

2.5.16.
The prime contractor must agree to treat its labor in keeping with its labor contract agreement and in the best interest of the KPC member agency. Any overtime practices or retroactive agreements with labor unions that would be to the detriment of the KPC member agency must be limited to only those approved by the KRS of the Commonwealth of Kentucky.

2.5.17.
A change order that increases the contract amount in excess of $5,000 must be approved in writing by KDE and the KPC member agency. A copy of the approval must accompany a revised purchase order from the KPC member agency. No change order that increases the cost of the project will be permitted without a purchase order through KPC member agency ordering the change. Minor changes under $5,000 mutually agreed between the KPC member and the successful Bidder shall be approved in writing and do not require a purchase order change. Minor changes not involving compensation may be made without informing KPC, unless such change significantly modifies the scope of the project.

2.5.18
Terms for acceptance by the owner and title to work must be clearly agreed upon and described in the contract. If any part of the construction requires the owner to assume control prior to the completion, this needs to be defined. Both parties must agree on the definition of what constitutes final acceptance before payment of any retained compensation.

2.6.0. Special Safety and OSHA Requirements

Bidder will submit their safety plans and requirements following the corresponding format and sections detailed here in after. Bidders will provide the name and contact name of their safety coordinator for the purposes of contact and clarification.

2.6.1.
Successful Bidder will use a fall protection program as described by OSHA. Bidders shall submit their fall protection program.

2.6.2.
Bidder shall provide, for each worksite in which the above plan will not be used, documents that are in compliance with 29 CFR 1926.502(k)(M)'s requirement that: "Employers engaged in leading edge work... who can demonstrate that it is infeasible or creates a greater hazard to use conventional fall protection systems must develop and follow a fall protection plan.... This sample plan can be modified to be used for other work involving leading edge work." A copy of a sample plan to be used will be included.

Section 3.0 - Minimum General Bidder Specifications and Work Standards for Ground Source Heat Pumps and Ancillary Equipment

Below are listed the minimum general requirements for bidders that must be followed and met for the KPC GSHP prime vendor contract. Minimum requirement for projects under this contract are listed below.

3.0.1.
Successful Bidder shall provide all applicable Division 15 documentation and contracting requirements.

3.0.2.
Successful Bidder shall be able to complete installation of a GSHP system in compliance with all applicable codes of the locality where the GSHP will be located and the Commonwealth of Kentucky. Bidder shall obtain and pay for all applicable permits and fees associated with said project.

3.0.3.
Successful Bidder shall be willing and able to demonstrate their capability in designing and installing the following:
Heat-Generating Systems,
Geo-Thermal Well Drilling,
Air Conditioning Systems,
Air Distribution Systems,
Terminal Equipment,
Temperature Control Systems,
Insulation,
Testing and Balancing,
Installation of Manufacturer Drop Shipped Items, and
Other relevant HVAC issues the bidder believes they will encounter upon the design and implementation a GSHP system.

Bidder will document their experience in installing the above systems in Kentucky schools and set forth a methodology for handling the associated work in a school environment. Bidder will set forth a list detailing what product lines they can install. If a product line does not exist bidder should demonstrate what HVAC Companies they have developed an exclusive vendor relationship.

3.0.4.
Successful Bidder shall furnish information required for other parts of the construction process. These sections include but are not limited to roof curb sizes and motors. Bidder should document exclusive relationships with outside companies involved in the above-mentioned work.

3.0.5.
Successful Bidder shall provide earthwork as an integral part of this contract. Detail your company's relationships throughout the state in working with earthmoving and drilling companies and how you insure best practices and pricing on a uniform basis.

3.0.6.
Successful Bidder shall be able to facilitate or perform applicable testing to insure an installed GSHP is functioning as designed. Successful Bidder shall be able to provide or facilitate testing for heat loop piping at two times the working pressure for four hours without pumping, and submit certification of test results to the KPC member agency purchasing a GSHP system. Bidder will demonstrate capability to do proper testing by documenting procedures to be followed for said testing and or outside relationships of those who will be doing the actual testing on the installed GSHP system.

3.0.7.
Successful Bidder shall submit shop drawings in accordance with the requirements of local codes, the codes of the Commonwealth of Kentucky, and Kentucky Department of Education standards for projects contracted after bid award.

3.0.8.
Successful Bidder shall provide manufacturer maintenance data and operating instructions in the operation and maintenance manuals for all listed shop drawings.

3.0.9.
The following Division 15 documents shall be provided by the successful Bidder:
Heat Generation,
Chilled Water generation, Centrifugal or Air Cooled,
Cooling Towers,
Pipe System Cleaning,
Pipe System treatment,
Base Mounted Pumps,
Grilles and Diffusers,
Balancing, and
Water Source Heat Pumps.

If the above drawings are completed by an outside firm, detail contingencies for delivering said documents.

3.0.10.
Successful Bidder shall provide pump curves and fan curves in relation to selected manufacturer's equipment for the use in balancing, marking the final points of operation, and be included in the operations and maintenance manuals.

3.1.0. Associated Installations and Maintenance Products
The following products are associated with the installations of a GSHP system. Bidder is asked to document their ability to handle such items in the following section.

3.1.1.
Lubrication is a vital part of any GSHP installation. Successful Bidder shall provide lubrication where supplied equipment has inadequate fittings to ease maintenance.

3.1.2.
Successful Bidder shall provide lubrication charts in a glass or holder.

3.1.3.
Information may be required for other construction divisions during the installation of a GSHP system. Successful Bidder shall provide wiring diagrams of equipment to be installed where required for other divisions. Successful Bidder shall provide drawings to the KPC member district and other state or local entities that may require said drawings.

3.1.4.
Sleeves through drywall partitions should be of industry standard 16 gauge galvanized sheet steel with lock seam joints. When through concrete floors, walls, and masonry partitions install schedule 40 gauge galvanized steel pipe sleeves. Through outside wall foundations or footing bidder will install sleeves of Schedule 40 galvanized steel pipe or of extra heavy cast iron soil pipe.

3.2.0. Excavation

3.2.1.
Excavation, trenching, backfilling, and rock will be a part any GSHP system installation. Successful Bidder shall detail all interior systems which require trenching and backfilling where indicated on the drawings for any awarded GSHP system. All exterior systems, which require trenching, and backfilling should be indicated on the Site Plan as well.

3.3.0. Openings and Chases
The following products are associated with the installations of a GSHP system. Bidders will be asked to document their ability to handle such items in the following section.

3.3.1.
Successful Bidder shall provide boxes, openings, recesses, lintels and bucks required for the installation of a GSHP system. Successful Bidder shall furnish necessary design and information required for the delivery of said items in ample time to the supplier of stated items. If openings, chases, recesses, lintels or bucks are omitted or are not correctly located, successful bidder will bear the cost of subsequent patching as required. Successful Bidder or their subcontractors will

not cut walls or floors that are waterproofed, or pierce any structural member without written permission from the KPC member agency, or their designated representative.

3.4.0. Protection of Work and Materials

3.4.1.
The protection of work is key to any job. Successful Bidder shall temporarily protect all openings during construction to prevent entry of foreign materials.

3.5.0 Access Doors and Panels

3.5.1.
Successful Bidder shall locate and label openings for access doors and panels for the KPC GSHP bid.

3.6.0. Concrete Pads, Equipment Grout, and Anchor Bolts

3.6.1.
Successful Bidder shall be responsible for properly preparing building surfaces for the bonding of concrete or grout. Where needed, concrete pads shall be 4" min. thick and 2" min. beyond equipment base.

3.6.2.
Anchor bolts may be required. Successful Bidder shall be required to insure these items for installation in concrete floors are delivered as well as determine the required location and dimensions for these items.

3.7.0. Connections to Fixtures Supplied By Other Construction Divisions or Owner

The following products are associated with the installations of a GSHP system.

3.7.1.
Connections to fixtures supplied by other construction divisions or owners may be present in a KPC GSHP project. Successful Bidder shall provide rough-in for, and make final connections to fixtures and equipment furnished by other contractors or by the owner. Roughing and final connections to equipment shall be made in accordance with manufacturer's instructions or details. Bidder will verify the location of each piece of equipment before roughing and secure approved layouts from the equipment manufacturer where they are available.

3.8.0 Temporary Utilities

This section deals with the handling of temporary utilities during the construction phase of a project.

3.8.1.
Temporary utilities may be needed. Successful Bidder may be required to make temporary connections for the services requiring them as shown on the plans. Piping materials for each service shall be as called for under the system section for that service. Execution for each system should be described in detail. Successful Bidder will be responsible for testing or supplying the tests for installed lines. When the need for the temporary lines is over, the successful Bidder will

disconnect the lines and remove them as called for on the division drawings.

3.8.2.
If needed, the bidder will install temporary lines and have ready to make connections to existing lines before taking the existing lines out of service so that service will be out for the absolute minimum of time. The bidder will warn the Owner a minimum of 48 hours in advance when service will be cut and obtain approval that time.

3.9.0. Sleeves
The following products are associated with the installations of a GSHP system.

3.9.1.
Successful Bidder will provide sleeves where pipes pass through floors, walls, or partitions. Successful Bidder will be required to maintain sleeves in position. If sleeves and inserts are omitted or are not correctly located, the Successful Bidder will be required to cut and patch as required to install sleeves. Sleeves as specified shall be installed after drilling, where drilling is allowed. Where sleeves are for insulated pipe, make sleeves of size sufficient to pass insulation. Successful Bidder will terminate sleeves flush with walls, partitions and ceilings. The termination of sleeves 1/4" above finish floors will be required. Bidder will detail their willingness to meet these requirements and any subcontractors or manufacturer providing this equipment and services.

3.9.2.
Any mechanical room (not slab-on-grade) shall have sleeves extending 4" above the finished floor. The fill space between the sleeve and pipe in underground walls shall be filled with oakum and caulked lead on both sides of wall. Linkseal, O-Z Gedney, and Spring City are also viable alternative.

3.9.3.
Fill space between the sleeve and pipe or wall and duct in fire-rated walls should be filled. Additionally they should be caulked tight and sealed with Portland cement. This shall be done also for sleeves through floors. If bidder is unable to comply with this option, please state this and list the alternative to be used.

3.9.4
Successful Bidder will provide 6 lb. lead flashing extending 12" beyond sleeve in all directions for sleeve passing through membrane waterproofing or lead safe. Successful Bidder will be responsible for securing flashing to waterproofing or lead safe, turning down flashing into the space between pipe and sleeve and inserting oakum gasket, pour lead, and caulk watertight.

3.10.0. Flashing
The following products are associated with the installations of a GSHP system.

3.10.1.
Successful Bidder will furnish 6 lb. sheet lead flashing for any work passing through the roof. The above requirement will follow Division 7 guidelines for Roofing.

3.10.2.

Flashing is not required for equipment supplied with curbs furnished by this Division 15 project and installed by the Division 6 Contractor. Examples are power roof exhaust fans, etc.

3.11.0. Start-Up Procedures

Prior to final inspection, in presence of the KPC member's representative, the successful Bidder will complete start up procedures. Successful Bidder shall detail their start up procedures and document a written start up plan.

3.12.0 Equipment Identification

Each piece of exposed equipment is to be properly identified by stamping, tagging or stenciling. Successful Bidder shall identify exposed equipment.

3.13.0. Pipe Labels

Since this is a mainly an HVAC Mechanical project prime vendor bid in a school environment and the safety and welfare of children is being considered Pipe labels will be of special significance. Successful Bidders shall detail their pipe labeling procedures and plans in the project plan.

3.14.0. Electrical Requirements

The Electrical requirements for a GSHP system are vast and the successful Bidder must be able to control and manage this process if it is subcontracted to a Division 16 contractor. The following guidelines detail specifics for Division 16 work. The successful Bidder shall accept the defined process and list the names and contact numbers for any sub-contractors the Bidder will be working with throughout the Commonwealth of Kentucky.

3.14.1.

Successful Bidder shall provide power circuits, safety disconnects, fuses, and starters complete into the motor with the exception that starters and devices specified or indicated as part of an item of equipment or temperature control will be provided and wired as work by Division 16. Successful Bidder will denote the Power Outlet Schedule on the Electric Drawings for each power circuit and which Division 16 Contractor will furnish and install these devices. Control wiring, unless specifically excluded by the KPC member agency, will be provided by the Successful Bidder. Three phase controls furnished shall include single phasing protection of internal electrical components. Successful Bidder or Division 16 Contractor will provide other manual automatic control devices and control wiring complete into the starter (and/or motor control center) or power circuit.

Successful Bidder shall be responsible for coordination with their selected Division 16 contractor, so that starters furnished by their Division 16 Contractor shall be fully compatible with requirements of motors and system controls furnished by the successful Bidders GSHP system.

3.14.3.

Electrical Power, Volts and Phase are a key component of any KPC GSHP project. Successful Bidder or Division 16 Contractor will comply with the power outlet schedule on electrical documents for requirements as size, type, HP, KW, amps, volts and phase for each device provided by the Successful Bidder or their Division 16 contractor.

3.14.4.

Wiring materials and methods for any KPC GSHP project shall conform to requirements in applicable sections of Division 16 local electrical building, the National Electrical Code, and the

Building Codes of the Commonwealth of Kentucky. Work will be completed by a qualified licensed electrical contractor. Successful Bidder will identify the name of their preferred electrical contractor or contractors and list the Commonwealth of Kentucky Counties where they have completed work

3.14.5.

Motors are also a vital part of any KPC GSHP Project. Successful Bidder shall supply the following motors:

1. Type: Continuous duty, radio non-interfering, open, drip or TEFC construction as required by service.
2. Output shaft: Direct connection or belt drive as required by the service, provide slide rails or integral belt tightening bases on belt driven motors.
3. Rating and characteristics: Single or three phase, NEMA rated at 115, 200, 230, 460 volts a.c. as required; suitable for full voltage starting and non-injurious heating when operated within 10% of rated voltage. Special windings for reduced voltage starting as required, as specified herein.
4. Efficiency: Premium efficiency type with percent efficiency submitted with motor information.
5. See Power Outlet Schedule on the Electric Drawings for HP, KW, Volts, and Phase.
6. Size: As published by the manufacturer of driven machinery or as specified, whichever is greater.
7. Manufacturer: GE-KS, Siemens or Reliance of equal specification.

3.15.0 Geothermal Well Field Installation Scope:

The following minimum scope and products are associated with the installations of a GSHP system. Successful Bidder shall handle such items in the following section and go above the minimum scope required.

3.15.1.

Successful Bidder shall be required to install new geothermal piping in KPC Member agencies buildings. All piping is to be pre-formed using polyethylene piping.

3.15.2.

Successful Bidder shall perform all necessary drilling and trench work for the completion of the new geothermal well field. Successful Bidder shall install the piping needed for the geothermal well field. The well field is to have 90 psi of water pressure in the pipe for an extended period of time to stretch the pipe, before building connections are made. The field shall be piped as a reverse return system.

3.15.3.

Each bore hole well shall be a minimum of 6” in diameter. Each well shall contain quantity two (2) 1” U-Bend pipes.

3.15.4.

All horizontal runs of pipe shall be buried at a minimum of 4 feet. Successful Bidder will be responsible for clearing rocks from the horizontal trench prior to installing the pipe.

3.15.5.

The backfill/grouting for the vertical wells shall be #9 limestone rock. Successful Bidder will be responsible for providing all labor and materials to properly flush the system of debris and purge the system of air. For purging air from the system, the flow rate through each pipe must be a minimum of 2 ft./second.

3.15.6.

All field piping must be clean before connecting to the building. Flush with potable water at 2 fps or higher and observe for free flow.

3.15.7.

Proper procedures per pipe manufacturer recommendations shall be followed for fusing polyethylene pipe.

3.15.8.

Successful Bidder will provide all necessary pipe hangers and vibration eliminators to support pipe.

3.15.9.

Successful Bidder will responsible for new pumping pads for setting the pumps.

3.15.10.

Successful Bidder will clearly label building piping direction of flow every 20’ or at every junction point whichever is less.

3.15.11.

Successful Bidder will furnish and install all necessary pipe, fittings, valves, hangers, isolators, insulation, thermometers, gauges, valves, etc. for a complete and operational system.

3.15.12.

Successful Bidder will clean and flush all water piping.

3.15.13.

Successful Bidder will prepare the total system for start-up. Successful Bidder will work in conjunction with the KPC member agency to develop a comprehensive check/punch list to be provided to the KPC member agency.

3.16. 0. Commissioning Plan

Commissioning is vital to the success of a project.

3.16.1

Successful Bidder shall provide a fully written and documented commissioning plan. The plan will be distributed via paper and electronic copy to the KPC Member agency.

Section 4 - Minimum Scope, Specification and Model Design for a GSHP System and its Component System Parts

The following sections detail the minimum specifications to be used by the KPC GSHP Prime Vendor for a GSHP system and it's component parts. Bidders should note the nature of Kentucky topography and model their designs around the varied geography of the state.

4.0.0 Heat Generation Specifications and Scope

4.0.1.

Bidder will provide 4" high concrete pad for boilers.

4.0.2.

Bidder will obtain and deliver Division 16 certified correct wiring diagrams specifically drawn for any awarded KPC GSHP Project. Bidder will indicate the wiring required for proper boiler-burner operation.

4.0.3.

Bidder will locate equipment prior to installation for proper access, door swing, tube pulls or component removal.

4.1.0 Applicable Codes and Standards

4.1.1

Bidder will meet the ASME low-pressure boiler code and submit a copy of insurance inspection report sent to the KPC member prior to final approval of project. Bidder will meet Underwriters Laboratories, National Electric Code (AGA) and document this in their final inspection report.

4.2.0. Heat Generation Products Minimum Scope

The following requirements are minimum scope for all boilers.

4.2.1.

Bidder will provide flue brushes and handles to owner. Bidder will use preassembled steel water tube boiler. The boiler shall be complete with a multiport type for gas, forced draft, and burner controls, refractory, boiler trim in accordance with ASME Code for hot water boilers and applicable state codes as specified in Part 1, paragraph 1.02. of the ASME Code. Boilers shall be specifically designed for hot water generator. Hot water boilers must withstand 30 psi. Boilers shall be insulated with 2" fiberglass insulation with steel jacketed cover, and entire assembly painted with silicone enamel.

4.2.2. Water Boiler Trim

Boiler shall be fitted to conform to requirements of ASME code with regard to materials, pressure and temperature ratings and arrangement. All controls shall be factory mounted and wired. The relief valve shall be ASME rated for full capacity of boiler. Standard controls for hot water boilers shall include:
1. McDonnell Miller #902M low water cutoffs with manual reset or equivalent.
2. McDonnell Miller # 63 M auxiliary low water cutoffs with manual reset or equivalent.
3. Honeywell operating temperature controller to match burner sequencing or equivalent.
4. Honeywell high limit temperature controller with manual reset or equivalent.
Combination pressure, temperature, altitude gauge mounted in boiler tapping.
Dial type stack thermometer, 150-750 degree F range, mounted in connector.

4.3.0 Burners and Controls

Burner shall be air-atomizing type suitable for the fuel specified by the manufacturer. Burner shall be set to provide low fire start full modulating firing. Gas burner train shall be to U.L. standards complete with shut-offs, motorized valves, pressure gauges, vents, stainless pressure switches and test cocks required.

4.3.1. Controls:

Pre-wired burner control panels shall contain all motor starters, overload relays, terminal strips, control transformers, programming and combustion controls. Panel mounted lights shall indicate burner status.
An electronic combustion and combustion safety-programming controls shall be I.R.I. approved and provide the following functions:

a. Safe start/check on each start. If flame signal is detected, ignition will not be energized.
b. Prepurge period of not less than 60 seconds.
c. Pilot trial for ignition limited to 7 seconds. Main flame trial for ignition limited to 15 seconds.
d. Safety shutdown following flame failure with fuel and ignition circuits de-energized within 4 seconds. Alarm bell to sound on safety shutdown.
e. Postpurge period of 20 seconds following a shutdown.
f. The control system shall recycle automatically under control of the operating control and when power is restored following power failure. Manual reset shall be required following a safety lockout.
g. Control shall provide for direct connection of limit and operating controls. Fuel valve interlock, low fire start interlock, running interlocks airflow, fuel pressure fuel temperature and burner motor, ignition. Main fuel valves and lockout alarm.
h. Test jacks shall be provided for measuring flame signal strength, line and load voltages.
i. Control shall be of the plug in design.
j. Plug in solid-state flame amplifiers shall be provided for ultra-violet flame detection.

Burner flame safe guardS and programming controls shall be Fireye Series D or equal of Minneapolis-Honeywell.

4.4.0. Draft Controls

Bidder will insure their boiler burner manufacturer determines specific draft requirements for proper operation of burners. Bidder through manufacturer will provide barometric type draft regulator as required to maintain proper draft for the new units. The minimum basis of design shall be, “The Field Controls Co.”

4.5.0. Execution of Design

This section discusses execution for Draft Controls.

4.5.1. Control Circuits
Bidder will provide control wiring, including connection of the service brought into the control panel.

4.5.2. Piping
Blowdown piping shall be full size of boiler tappings or relief valves, and shall terminate near the floor. Extend water piping to all expansion tanks, water feeders and quick make up connections required by the boiler system. Bidder will provide vent connections from the gas train. If valving (main stop valve, safety valve, relief valve, etc.) is installed so as to require access from a platform according to code, the bidder will provide the platform and install according to the appropriate code.

4.5.3. Boiler Service and Tests
Bidder will provide the services of qualified factory technician to start up and adjust the boilers, perform tests, submit a report to the KPC Members' Architect and instruct the plant operator for a period of not less than two days. KPC Members official representative shall sign affidavits of manufacturer's instruction. The factory technician shall verify that various controls and systems are functioning and shall instruct the KPC Member agent in their functions, especially the following items:

1. Boiler has been filled with fresh water and vented for air release.
2. Minimum pressure exists on the boiler (for hot water systems).
3. Boiler is started up on low fire and maintained on low fire until the whole system is up to operating temperatures.
4. All main circulating pumps, boiler rear tube sheet circulating pumps and other required circulators or controls thereof are in operation.
5. Safety valve testing, blow-down valve testing.
6. Verify the piping connections, direction of flow, etc., as may affect the boiler operation.

4.5.4.
Bidder will perform a combustion test demonstrating that the gas burners will burn the specified quantity of fuel without objectionable vibration, noise or pulsation, with not more than 20% excess air and 10% CO in the products of combustion on gas firing and a maximum of #2 smoke measured by Bacharach Scale for oil firing.

4.6.0. Draft Controls
The Bidder shall install the draft control within the branch of a tee as part of the combustion breeching located between the flue gas outlet and the main breeching. Install damper in strict accordance with the draft control and burner manufacturer's installation instructions.

4.7.0. Chilled Water Generator Centrifugal and Air Cooled
Bidder will provide Air cooled, centrifugal chilled water generators complete with centrifugal chiller, air-cooled condensers and fans, complete refrigeration system, starters, controls, etc. requiring only pumped chilled water connections and power wiring. Compressor is mounted within a weather tight equipment room. Bidder will provide a Five (5) year compressor warranty from manufacturer.

4.7.1. Product
Bidder will insure the following capacity and basis of rating ARI 590-86, ASME, ANSI B9.1, NEC.

4.7.2. Compressor Construction and Requirements
Compressor assembly shall meet the following standards:

1. Compressor Casing - External parts constructed of steel or high strength ductile iron castings. Hydrostatically tested at 375 psig prior to assembly. O-ring gaskets are to be used between casing joints.

2. Motor shall be hermetically sealed motors that are two-pole, low-slip squirrel cage cooled by refrigerant. Motor windings specifically insulated for use with refrigerant. Designed for continuous operation at nameplate rating. Load limit mechanism and solid-state sensors in motor windings provide positive thermal and current overload protection. Motor shaft of heat- treated, carbon steel. Two babbitted sleeve bearings shall support the rotating motor assembly. Motor bearings shall be pressure lubricated. Motor removal shall be accomplished without disassembling the compressor.
3. Drive Train Gears and impeller shaft shall be of aircraft-quality materials. Both gears, bearing surfaces and thrust faces case hardened and precision ground. Single-piece impeller shaft shall be supported by Babbitt lined journal and thrust bearings. First critical speed should be well above operating speed. Compressor end bearings should be double-faced to absorb residual thrust.
4. Lubrication System will be a positive displacement gear-type oil pump located below the normal level of oil in sump. Oil sump will have a heater to maintain a temperature, which minimizes affinity for refrigerant.
5. The refrigerant distillation system will remove any oil from refrigerant. Oil cooled by refrigerant before delivery to bearings.
6. Impellers shall be cast, high strength aluminum alloy. Blades shall be curved at inlet with backward inclined tip. A Two-stage impeller shall be connected to the motor by a gear train. Testing shall be at a speed 20 percent above normal operating speeds. Motor, gear and compressor assemblies should be balanced to vibration levels less than l mil at operating speed.
7. Vane Controls, variable guide vanes at inlet to first stage shall be controlled by a ball-joint linkage and modulate between fully open and fully closed positions as required by the refrigeration load on the compressor. Each vane and shaft should be a single-piece stainless steel casting.

4.7.3. Evaporator:

Bidders are required to meet the following evaporator standards. The evaporator minimum standards are as follows:

1. Shell and Water Box – The evaporator shell shall be carbon steel. Two, three, four, five and six-pass water boxes at 150 and 300 psig design have steel pipe stub connections grooved for victaulic couplings. Evaporators shall be built per ASME Code for Unfired Pressure Vessels and have an ASME stamp on the refrigerant side. Refrigerant side tested at should be 285 psig and waterside 1-1/2 times design working pressure.
2. Tube Sheet - Steel, should be welded to each end of shell, drilled and reamed to accommodate tubes. Annular grooves will be present to prevent refrigerant leakage at tube-to-tube-sheet bond. Tube support sheets shall be placed along axis of shell.
3. Tubes: Shall be 3/4 inch diameter seamless copper tubing rolled into tube header sheets and intermediate support.
4. Eliminators: Multiple layers of mesh metal screen throughout the entire length of evaporator.
5. Orifice: Multiple orifice refrigerant flow control, with no moving parts, Shall maintain pressure differentials between condensers and evaporators. Low ambient units for operation to 0°F shall incorporate a refrigerant pump to maintain evaporator pressure.

4.7.4. Condenser:

Bidders are required to meet the following condenser standards:

1. Fans and Motors: Shall be Vertical discharge, low speed, belt driven, and propeller-type fans cycle to maintain head pressure. Multiple belt drives selected in excess of 1.75 service factor. Formed orifices will allow close tip clearance.

2. Condenser Coil: Shall be configurated aluminum fin mechanically bonded to 5/8 inch OD seamless copper tubing. Subcooler circuit standard are factory tested to 375-psig air-under-water.

4.7.5. General

1. Equipment Room: Components, except air-cooled condenser and starters, shall be housed in weather tight, insulated metal equipment room to protect equipment and provide tempered environment for service. Starters and disconnects are located in their own separate, weather tight enclosure. Lighted equipment room has 115-volt convenience outlet and electric unit heater for freeze protection to -20°F ambient. Enclosures of galvanized steel finished with special vinyl paint.
2. Control Panel: Electronic panel complete with refrigeration and electrical controls mounted on compressor-evaporator assembly within equipment enclosure.
3. Starters: Starters contained in NEMA 3 weatherproof enclosure are completely prewired to motors. As standard, includes three phase magnetic overload protection, 115-volt fused pilot and safety circuits, three-phase fused fan and oil pump starters with overloads, one kva fused control power transformer (115-volt secondary), current transformer for load limit relay, door with mechanical interlock to disconnect system when door is opened.
4. Run Test: Final run test, under load, confirms proper operation and performance.
5. Vibration isolators shall be furnished.
6. Furnish the services of a factory representative to supervise the testing, dehydration and charging of the machine, starting operation and instruction of the operator for a period of 40 hours. Submit data on flow and temperature drop. Owner's official representative shall sign affidavits of manufacturer's instructions; submit copy.

4.7.6. Execution

Bidders are required to meet the following execution standards:

1. Bidder will mount unit where shown, on vibration isolators. Locate equipment for proper clearance for air flow, tube pull, and servicing.
2. Bidder will provide flexible connectors for chilled water connection to chiller. Hang piping within equipment room on isolating hangers.
3. Bidder will provide a cold-water make-up including gate valve and strainer.
4. Bidder will furnish wiring diagrams for power connection by Division 16.
5. Bidder will provide control wiring required including a chilled water flow switch and chilled water pump remote that is starting.
6. Bidder will provide a safety relief device piping to outdoors.
7. Bidder will provide a valved drain from water boxes.
8. Bidder will provide pressure gauges and thermometers in and out of the chiller.
9. Bidder will provide two inch stubbed pipe taps for chemical cleaning apparatus.

4.8.0 Cooling Towers

Work included for this section contains minimum specifications for a complete Cooling Tower.

4.8.1

The cooling tower shall be a factory assembled cooling tower with sectional counter flow, blow through design, and a centrifugal fan assembly, factory mounted and aligned to prevent vibration with single side air entry; hot dipped galvanized steel with a protective coating of zinc, a chromatized aluminum; and a three-foot discharge hood.

4.8.2. Cooling Tower Product

The cooling tower shall have the capacity to cool water from 95°F. to 85°F with 77°F entering air wet bulb temperature. The make of the cooling tower shall be BAC, or Marley or equivalent.

4.8.3. Cooling Tower Construction

Pan-Fan Section: The combination pan-fan section shall consist of heavy gauge hot-dip galvanized steel pan sides. The fans and motors shall be located in the dry entering airstream to provide greater reliability and ease of maintenance. Intermediate fan shaft bearing supports are required and shall be a split pillow block design. The forwardly curved centrifugal fans shall be statically and dynamically balanced. Fan housing shall have specially designed inlet rings for efficient of air entry, and four-sided discharge cowls within the pan for increased fan efficiency and to prevent water from entering the fans. Fans shall be mounted on a steel fan shaft supported by heavy-duty, self-aligning, relubricatible bearings with cast iron housings.

Fan Motor and Drive: 1750-rpm drip proof ball bearing fan motor with 1.15 service factor shall be furnished. Motor shall be suitable for outdoor service. Each motor shall be mounted on an easily adjusted heavy-duty motor base located so the drive and motor are in a protective enclosure beneath the pan side. V-belt fan drive shall be designed for not less than 150% of motor nameplate horsepower. Removable hot-dip galvanized steel screens and panels shall protect drive and moving parts. The heat transfer casing sections shall be removable from the pan-fan section to facilitate rigging. Each section shall include wave-formed, PVC wet deck surface below a spray-type water distribution system, encased by hot-dip galvanized steel panels with removable sectional eliminators at top. The wet deck surface shall consist of wave-formed sheets of self-extinguishing polyvinyl chloride (PVC), a minimum of 20 mils thick. It shall have a flame spread rating of 25 per ASTM standard E-84 and be impervious to rot, decay, fungus or biological attack. The surface shall be manufactured and performance tested by the cooling tower manufacturer to assure single source responsibility and control of the final product.

Water Distribution: Water shall be distributed evenly over the tower fill area by a water distribution system consisting of hot- dip galvanized steel header and spray branches with plastic distribution nozzles having a minimum orifice of 3/4" x 5/16". The branches and plastic spray nozzles shall be held in place with snap-in rubber grommets providing quick removal of individual nozzles or complete branches for cleaning or flushing. The header shall include provisions for measuring spray pressure externally.

Eliminators: Eliminators shall be constructed of hot-dip galvanized steel and be removable in easily handled sections. They shall have a minimum of three changes in air direction with a hooked leaving edge, and shall direct discharge air away from the fans.

Discharge Hood: Should be hot dipped galvanized steel, approximately 3 feet high.

Capacity Control Dampers: The tower manufacturer shall provide freeze proof, airfoil type, modulating capacity control dampers mounted in the fan scrolls (control is by temperature control section).

4.8.4. Cooling Tower Refrigeration System

Bidder will furnish (1) PS-12 16-gauge filter system consisting of a type 304 Stainless Steel 12-inch diameter spherical pressure vessel, separated in the middle and joined with stainless steel clamps. Filter media shall be silica sand with 90% passing through a #20 sieve screen and the total retained on the #40 sieve screen. Media support shall be of disc design of ABS, covered with polypropylene mono screen to prevent media passage. Bronze Y strainer on return side and bronze prestrainer with see through lid and removable clamp for cleaning shall be provided.

The pump shall be a bronze, totally enclosed. The system shall be plumbed in hard copper, mounted on an ABS skid and shall have the capacity to filter 28,000 gallons per day.

The filter system shall be furnished with factory prepiped and prewired automatic backwash system to clean filter when differential pressure across media increases 8 psi above initial clean media pressure drop.

An automatic filter backwash system shall also include: A prewired NEMA 12 control panel with transformer, pump motor starter, two (2) solenoid valves (prepiped and prewired), check valve on city water inlet at pump suction, hydro cylinder and necessary controls. Also to be included are valve and the second time clock to control filter backwash cycle. Control panel shall have an access door with integral safety lockout switch and manual override to manually control backwash cycle.

The filtration system shall be manufactured by Process Efficiency Products, Inc. or approved equal.

4.8.5. Cooling Tower Execution

Bidder will pitch supply and return back towards mechanical room for drainage. Bidder will provide a leveling pad. Bidder will provide city water make-up with gate valve, and pressure reducing valve from cold-water source. Bidder will provide valved connections to make-up valve and filter backwash. Provide valved discharge to floor drain for backwash. Bidder will provide galvanized steel overflow and drain. Bidder will heat trace all exposed water piping with a thermostatically controlled element.

4.9.0 Piping System Cleaning

The following are the minimum scope and specifications for pipe cleaning in GSHP installed system.

4.9.1. General Scope

Testing Equipment: Bidder will provide any necessary testing equipment for maintaining cleaning standards. Chemicals supplied shall meet EPA, Federal, State and local regulations pertaining to pollution.

4.9.2. Flushing and Testing of Pipe

Extreme care must be taken to prevent dirt and other foreign matter from entering pipe or components of system during construction. Pipe stored on a project site should have open ends capped and equipment should have all openings fully protected. Before erection, each piece of pipe, fitting or valve must be visually examined and all dirt removed. Bidders are required to fill the system (new) (existing) completely and release any trapped air from the system. At this point, hydrostatic test for leaks shall be performed and any leaks in system must be repaired before proceeding. When the hydrostatic test is complete, bidder will drain the system and clean riser drains and all low points in the system of dirt and debris. Bidder will fill the system a second time, release any trapped air and establish circulation. Bidder will circulate for a minimum of four hours and drain system completely, cleaning riser drains and all low points of any dirt and debris. Bidder will visually test the system in the presence of the KPC member agency agent to certify that all foreign matter, suspended solids, etc., have been removed from the system. If the system, as determined by KPC Member agency agent still contains contaminants, the system must be flushed again as outlined above. Bidder shall adjust the system to circulate freely without noise.

4.9.3. Chemical Cleanout

The following are procedures to be followed by the Bidder regarding chemical cleanout:

1. All new boilers shall be boiled out with an alkaline boiling out compound to remove grease, oil and foreign matter, at the rate of 1/2 pound per boiler horsepower. This work shall be performed by the bidder under the supervision of a representative of the Water Treatment Company and be verified by KPC member agent. The bidder shall verify that the system has been thoroughly

cleaned. A minimum of four (4) flushes is required to remove chemicals and the pH of the system water shall be within ±0.3 pH units of the supply water.

2. Bidder will make temporary hook-ups to bypass each piece of equipment that could be harmed be the chemicals so that the equipment is not contaminated during cleaning. After cleaning, make final connections to the equipment and verify proper flow through the equipment.
3. A temporary strainer shall be used during cleaning.
4. Final adjustments: Adjust system to circulate freely without noise.

4.10.0 Base Mounted Pumps

This Section includes minimum bidder specifications for centrifugal pumps mounted on a common bedplate with its motor and drive thru a flexible coupling.

4.10.1. Products Specification

Design working pressure should be 175 PSI.
The operating temperature range should be between 20 to 250°F water.
The impeller shall be bronze. The pump body shall be a vertical split case design to permit the removal of a bearing bracket and pump impeller without breaking pipe connections or motor fastening. Pump bearings should have a grease lubricated sleeve type. Pump seal shall ride on replaceable shaft. The make shall be one of the following: Bell & Gossett, Taco, Thrush, Armstrong.

4.10.2. Execution for Base Mounted Pumps

The following standards are for the execution of base mounted pumps.
Bidder will provide a concrete base anchor bolts, and sleeves for each pump.
Bidder will set the pump on a concrete base, and will shim level and grout the base. Bidder will insure the pump is set and grouted with a piping disconnected.

4.10.3. Accessories for Each Pump

Bidder will provide two 0-100 psi pressure gauges with snubbers and cocks.
Bidder will provide a balance-check-stop valve sized for the flow.

4.11.0 Grilles and Registers

The following are minimum products specifications for Grilles and Registers.
Grilles and registers are to be easily adjustable in the field and capable of delivering indicated air quantities with throw to reach intended space limits; diffuse this air properly with room air without producing objectionable draft or adding noticeable noise to sound level of room. Maximum N.C. is 35. Register bottoms shall be a multi-bladed type with adjacent blades rotating in opposite direction. Blades shall be operable with a removable key through the face. Bidder will furnish six keys of each type required. Grilles and registers are to be steel except for the following areas, which are to be aluminum: locker rooms, shower rooms, and kitchens. The make shall be Titus, Carnes, Metal-Aire, or equivalent.

4.12.0 Air Diffusers

This section includes round and square face, panel perforated, and special location air diffusers. Bidder will furnish diffusers of size, type and capacity indicated on drawings or specified herein. The make shall be Titus, Carnes, Metal-Aire or equivalent.

4.12.1. Performance

Diffusers are to be easily adjustable in the field and capable of delivering indicated air quantities with throw to reach intended space limits; diffuse this air properly with room air without producing objectionable draft or adding noticeable noise to sound level of room. Maximum N.C. is 35.

4.13.0. Ceiling Diffusers

All diffusers to be adjustable; all frames are to match ceiling type and have necessary clips, etc. Necks may be round or square. The following is the minimum diffuser schedule to be used by the bidder.

CEILING DIFFUSER SCHEDULE

	(Titus Model Numbers)			
		Square or		
Ceiling Type	Round	Square	Perforated	Rect.-Directional
Plaster or Drywall	TMA	TMSA-1	PAS-1	TDCA-1
12"Sq. Spline	TMA	TMSA-4	PAS-4	TDCA-4
Lay-in	TMA	TMSA-3	PAS-3	TDCA-3
Exposed Duct	TMA/Angle Ring	TMSA-1	PAS-1	TDCA-1
Metal Pan	TMA	TMSA-2	PAS-2	TDCA-2
Matching Return				
Accessories	AG-65 Combo	AG-65 Combo	AG-65 Combo	AG-95 Damper & EGS Grid

Color: All to be baked white enamel finish.

Material: Steel or Aluminum; Aluminum only for Kitchens, Shower Rooms, Locker Rooms.
NOTE: Model numbers shown are
for Steel; for Aluminum add 'AA'. i.e., TMSA-AA-1, PAS-AA-1, TDCA-AA-1, etc.

A. Fixed Pattern Linear Diffuser:

1. Linear grilles are to be fabricated of high quality aluminum extrusions, Satin Anodized finish, components to be mechanically interlocked, volume damper integrally fastened to grille, adjustable control grids to provide spread pattern deflection. Frames as required to match building requirements.

2. Make: Titus Series CT.

B. Adjustable Pattern Linear Slot Diffuser:

1. Diffusers fabricated of high quality aluminum extrusions, Satin Anodized finish or white to match ceilings. Pattern controller to be coated dull black, slots to be 1/2", 3/4" or 1" as shown on drawings or otherwise noted herein. Each slot to contain a uniflex pattern controller for proper pattern control.
2. Make: Titus Modulinear ML 37,38,39

C. Linear Diffusers:

1. Single slot, linear diffuser including a double nested channel air weir, with a distributing air plenum, plug-in supply opening for a flexible duct connection; slot (3/4" or 30 to 40 cfm/ft) (1" or 45 to 60 cfm/ft.) (1-1/4" or 60 to 80 cfm/ft.).

2. Make: Air Factors West or Titus Adjustable Pattern.

D. Perforated Tube Diffuser:

1. Type: Special perforated round duct for distribution of air. Size of opening, size of duct and angle of opening shall be carefully selected for distribution of supply air so that velocities at the 5 foot level will not exceed 35 feet per minute, uniformly distributed. A metering station shall be included for balancing the air quantity.

2. Make: Air Factors West.

E. Cannon Diffuser:

1. Type: Special round tube diffuser with an adjustable throw and direction for sidewall application.
2. Size: The size shall be selected by the manufacturer for the air quantity and throw required.
3. Finish: Flat-black interior, off-white exterior.
4. Make: Air Factors West.

F. Unit Heaters:

1. Units mounted 15 ft. or more above the floor. Anemostat HU-3.
2. Units mounted less than l6 ft. above the floor - Anemostat HU-4.

4.13.1. Execution of Diffusers

Bidder will coordinate with the ceiling portion of Division 9 for proper installation of the diffusers. For perforated tube diffusers bidder will install diffusers using strap hangers and angle iron applied at the steel panel points. Joints shall be sealed and pop riveted every 8 inches. Bidder will rotate ducts for proper angle and align perforations for proper appearance. For Cannon Diffusers Bidder will properly locate diffusers and furnish mounting details. Bidder will aim the diffuser according to the manufacturer's directions.

4.14.0 Unit Heaters

Bidder shall provide a sheet metal conversion to adapt diffuser to the any supplied unit heater outlet. Bidder shall use sheet metal screws 8 in. o.c. for unit heater and diffuser mounting.

4.15.0 Balancing

Bidder will provide work as required for balancing the heating, ventilating and air conditioning systems. Instruments shall be accurately calibrated and maintained in good working order. If requested, the balancing shall be conducted in the presence of the KPC Member agency Representative. Balancing shall not begin until systems have been completed and are in full working order. Work Included in balancing a system is as follows:
1.All new air in moving systems.
2.All new water circulating systems.
3.Chiller and air cooled condenser.
4.Cooling Tower.

4.15.1.

Bidder will include an extended warranty of one year, after completion of balance work, during which the KPC member agent at their discretion may request a recheck, or resetting of water system or air system as listed in test report. Bidder will provide technicians to assist the KPC member agency in making any test they may require during this period of time and readjust any system as directed. Upon the completion of the balancing the bidder will submit four copies of the complete data to the KPC member agency Representative for evaluation. Bidder will determine which fans may require sheave and belt changes or motor changes and make changes of the sizes required, installing and aligning the change as needed, with final adjustment as required for the air flow required.

4.15.2. Product

This Section covers a service function. There shall be no products involved other than belts, sheaves, dampers, etc., which are required in order to properly balance this system. Balancing organizations shall be certified members of AABC or NEBB or an approved equal.

4.15.3. Balancing Execution

Bidder will perform tests listed in the "Testing Procedure" portion of the "Approved Associated Air Balance Council Specifications for Air Systems & Air Distribution Test & Balance and Chilled and Hot Water Systems Balance" which apply to this project and balance the system in accordance with those requirements. The following forms shall be used:

Form No.	Title
12766	Air Moving Equipment Test Sheet
12866	Exhaust Fan Test Sheet
12666	Diffuser and Grille Test Sheet
12166	Circulating Water Pump Data
12266	Water Balance Element - Test Sheet
12366	Chiller and Air Cooled Cond. Data
12466	Pump and Cooling Tower Data
12566	Sound Level Report
12968	Duct Traverse Sheet - Zone Totals
13068	Duct Traverse Readings

4.16.0. Sound and Vibrations Tests

Tests shall be performed upon the completion of the air conditioning systems when requested by the KPC Member agency Representative as an additional cost to the project.

4.17.0 Cooling Tower Tests

Bidder will perform tests on cooling towers, evaporative cooler, or industrial cooler in full accordance with AABC Minimum Test Standards Number 14. Bidder will conduct these tests and provide the following certified information.

1. Pump and fan nomenclature.
2. Size and capacities.
3. Pump motor and fan motor information, operations and characteristics.
4. Pump flows, discharge head, suction head, Total Dynamic Head.
5. Fan C.F.M. and velocities.
6. Wet and dry bulb temperatures of inlet and outlet air flows.
7. Water temperature of hot water, cold water, make-up to blow down.

Information shall be compiled on approved test sheet forms number 12466 AABC and submitted to KPC Member agency Representative.

4.18.0 Pattern of Grilles and Adjusters

Bidders will adjust the pattern of each grille, register or diffuser to properly distribute the air within the room so as to avoid drafts or cold spots. Where there is a demand controller bidder will verify that the demand controller is automatically sensing base electric loads of lights, motors and power. Bidder will also, determine that various deferred loads are properly disconnecting, such as heating elements in hot water generators, outside air damper closure, and other electric load disconnect functions.

4.19.0 Water Source Heat Pumps

The following are minimum general specifications for water source heat pumps. Bidder will provide where specified in KPC GSHP Projects permanently installed, self-contained, heat pump terminals as hereinafter described. Bidder will provide temperature control equipment and wiring. Equipment shall be U.L. listed and carry the U.L. reexamination service marker. Equipment shall be furnished for extended range operation of 40° loop temperature and 40° entering air temperature when the necessary internal components are hereinafter specified. Temperature controls under this section shall be furnished by the heat pump manufacturer. Supervision of the installation of heat pump equipment and temperature controls, as well as observation of loop water flushing, shall be provided by heat pump manufacturer.

4.19.1. Water Source Heat Pump Product

The following are minimum product specifications for water source heat pumps.

A. Casing:

1. Corner post and panel construction with 14 gauge galvanized base pan, 16 gauge panels.
2. Interior surfaces shall have dual density 1.5 lb. neoprene backed insulation.
3. Internal surfaces subject to water exposure coated with baked on thermosetting plastic.
4. Casing shall contain filter frame with snap out access panels so that filter may be removed from top, bottom or either side.
5. Angle iron hanger brackets to be welded to casing posts.
6. Discharge collar for supply ductwork connection.
7. Oilers extended through casing for fan motor lubrication.

B. Heating/Cooling Chassis:

1. Product shall contain a complete assembly including hermetic compressor, reversing valve, air to refrigerant heat exchanger, capillary tube expansion device, water to refrigerant heat exchanger, safety controls, fan deck, blower motor, filters, supply, return and condensate drain connection.
2. Blower motors shall be permanent split capacitor.
3. Hanger kits with vibration isolators.
4. Copper supply return and condensate connections extended through casing.
5. Roomside blowers shall be double width, double inlet aluminum centrifugal direct drive.
6. Compressor assemblies shall be specifically designed for low operating sound level. Shock loops shall be provided on intake and discharge refrigerant lines. Internal compressor springs and external vibration isolators.
7. Refrigeration circuit shall contain fusible plug.
8. Water to refrigerant heat exchangers shall be copper tube aluminum fin.
9. 35% NBS high capacity 2" filters in removable frame. Provide temporary set of throwaway filters.
10. Spare cooling chassis shall be used for each size on any installation.
11. Water circuit to be designed for minimum 300 psig working pressure.

12. Extended range components shall include refrigerant accumulator, crankcase heater, and insulated internal refrigerant lines.

C. Internal Controls:

1. A microprocessor control in service diagnostic module shall provide the following features:
   - Random start.
   - Delayed compressor actuation cooling cycle.
   - Delayed compressor actuation heating cycle.
   - Delayed reversing valve de-energization.
   - Equipment malfunction signal.
   - Clogged filter signal.
   - Selection of continuous or cycled fan occupied or unoccupied cycle.
   - Pilot light to indicate power on.
   - Pilot light to indicate high pressure compressor malfunction.
   - Pilot light to indicate low pressure/temperature compressor malfunction.
   - Pilot light to indicate condensate overflow malfunction.
   - Condensate overflow compressor cut-out circuit with water sensor preassembled in drain pan.
   - Protection against primary single phasing.
   - Plug in service module to alter timing circuits for fast start up and checking function.
   - Circuit breaker protected controls circuit (with reset at main breaker panel only).

D. Acoustic Construction:

1. Compressor completely isolated from air stream with 14 gauge steel bulkhead insulated on both side with 1" double density fiberglass insulation.
2. Compressor to be internally spring mounted and shall have external spring type isolation (in lieu of standard rubber mounts). Additionally, compressor mounting systems shall be supported by 14 gauge steel section insulated on both sides with high density felt. No metal to metal contact.
3. The centrifugal fan blower outlet shall be insulated from the heat pump casing using sound deadening high density rubber material. The blower motor mount shall be isolated from the heat pump base pan using high density neoprene rubber material.
4. An adjustable air volume control on the fan discharge shall alter fan cutoff for various external static pressure variations.

E. Hose Kit, Shut-off and Balancing Valves:

1. Each heat pump shall be provided with a combination reinforced hose assembly with integral temperature/balancing assembly for supply and return connections. Assembly shall be suitable for 200 psig working pressure and shall contain the necessary flare fittings, unions, etc. to accommodate the piping system.
2. Provide condensate hose assembly suitable for forming into trap.
3. Provide ball type shut-off valve and combination shut-off/ balancing valve.
4. Hose kit/temperature sensing assemblies and supply and return balancing and shut-off valves to be furnished by unit manufacturer.

5. Size of hose:

GPM	Hose
Less than 6	3/4"
6 to 11	1"
11 to 16	1-1/4"
16 to 32	1-1/2"
32 to 55	2"

6. Pipe runouts ahead of hoses shall be the same size as the hose. Shut-off valves, etc., shall be same size as piping. Reducers shall be installed at the equipment connection.

F. Controls:

1. Automatic changeover low voltage wall mounted thermostat with each conditioner. Each thermostat shall have an integral night setback feature with local override which in conjunction with low voltage wiring loop provided by others shall allow each heat pump conditioner to be started and stopped at predetermined times and allow the occupant to override the central shutdown when desired.
2. Thermostat shall have attitude light and cover and clogged filter indicating light (unit to be prewired to provide both signals).
3. Provide locking cover.

G. System Control, Monitoring and Alarm Panel:

1. A factory assembled, fused and wired solid state electronic control panel to control the addition of supplementary heat to the closed loop and control the operation of the industrial cooler in stages in response to the loop temperature leaving the cooler. The panel will also indicate the operating condition of the main and standby loop circulating pumps including a manual sequencing selector switch for "lead lag" sequence of the pumps and automatically activates the standby pump whenever the main pump fails or is unable to provide the required flow. The control panel shall also sound an alarm to signal an abnormal system operating condition as hereafter outlined, indicate the closed loop water temperature and indicate outside air temperature. This panel, furnished complete by the heat pump manufacturer shall include the electronic temperature sensors and wells, plug in relays, push to test indicator lights, alarm horn, and terminal blocks. Power supplied to the panel will be l20V, single phase. Install the temperature sensors, wells, and flow switches and field wiring from panel to the industrial cooler and heat adder and main system pumps.

2. Sequence of operation shall be as follows:
   a. On a loop temperature rise to 85°F, control shall energize damper relays to open a positive closure damper mounted on discharge of industrial cooler and amber pilot light shall illuminate.
   b. On a rise to 88°F, control shall close starter circuit to recirculating spray pump motors and amber pilot shall be illuminated.
   c. On a rise to 90°F, control shall close starter circuit to fan motors and amber pilot light shall illuminate.
   d. On a fall in loop temperature leaving cooler, the sequence shall take place in reverse.

e. On a loop temperature fall to the selected heat add point, the control shall close two pairs of normally open contacts to activate stage one of the supplementary heater and amber pilot shall illuminate. Outside air temperature sensor will reset the heating control point up 8°F as the outside air temperature falls from 60°F. Supplemental heat adder must be completely off at 80°F loop temperature.

f. Alarm functions shall be as follows:
   1) Loss of loop water flow.
      a) Deactivate stages of control. Spray pumps, fans and supplemental heat must not operate until flow is provided.
      b) When flow is proven or restored in the event of power interruption, there shall be a delay between stages to limit current in rush.
      c) On a loop temperature fall to 57°F, the control shall sound the alarm horn and illuminate a red pilot light.
      d) On a loop temperature rise to 105°F, the control shall sound the alarm horn and illuminate pilot light.
      e) In the event of loss of loop water flow, the control shall sound the alarm horn and illuminate pilot light. Mount repeater alarm on an outside wall.

g. The system control and alarm panel shall incorporate an automatic pump sequencing circuit to automatically activate a standby circulating pump whenever the operating pump fails or is unable to provide the required flow and indicate "flow normal" condition whenever the lead or standby pump is operating and also indicate lead pump failure. If the flow is interrupted for more than 15 seconds, the time delay relay will simultaneously energize the standby pump, activate "lead pump failure pilot light, trigger the alarm and lock out the lead pump". The control panel shall incorporate electronic temperature indicators for both water loop and outside air temperatures with dual celsius and fahrenheit scales. The complete control panel shall incorporate simulator test switches to facilitate servicing and verification of control and alarm operation.

H. Evaporative Cooler Motor Control Center:

1. Provide assembled motor control center in NEMA 12 enclosure to include main disconnect - all starters for the cooler spray pump - fan motor - sump heater and damper motors.
2. Motor control center to be complete with control transformer and numbered terminal blocks for interconnections to system control and alarm panel.

I. Loop Water Piping Separator:

1. Provide centrifugal filtration device to separate solids from loop water. Mounted loop bypass as indicated on plans.
2. Carbon steel all welded construction maximum pressure rating 125 PSI - 3/4" FPT purge connection, mounted on collection chamber.
3. Flow capacity of system separator to be 25% of total loop flow.

J. Schedule: See Schedule. See Power Outlet Schedule on electrical drawings for motors, volts and phase.

4.19.2. Water Source Heat Pump Execution

Successful Bidder will meet the following specifications when executing a heat pump project.

1. Successful Bidder will hang units in spaces indicated using vibration isolators.
2. Ducts shall be easily and quickly removed using connectors specified.
3. Pipes shall be easily removed.

4. Balancing shall be done using temperature reading for the loop water side.
5. Successful Bidder will refer to manufacturer's installation instructions in detail. Heat pump manufacturer shall provide integrated power and control wiring diagram for the complete system.
6. Control wiring by this Division and power wiring by Division 16.
7. During construction the successful Bidder will prevent dirt and debris from entering the piping system. Bidder shall cap or plug open ends of stored piping and open ends of installed piping at each workday's end. Inspect each piece of pipe, valve or fitting before installation and remove all visible dirt and debris.
8. After piping is installed the successful bidder will fill the piping loop and all run outs with clear, clean water. Make temporary connection between supply and return line at each heat pump location. Do not connect piping to heat pumps. Circulate water through system for 1 hour. Drain and flush.
9. Successful Bidder shall deliver the proper amount of treatment chemicals and supervise water treatment. Dosage shall consist of inhibitive acid (Nalco 8930) conditioner (Nalco 439L) and PH test kit (Nalco C0054). The inhibitor shall be added in the approximate dosage of 1 gallon per thousand gallon of system capacity until the PH is down to 3. The solution should be recirculated through the system for 3 to 4 hours. The acid solution should be drained from the system and immediately flushed with fresh water until the PH of the system water reaches that of flushed make-up water (PH of 7 or higher). Within 24 hours of the flushing procedure, the system should be charged with Nalco 439L at a dosage of 2 ounces per gallon. The dosage level can be determined by using the test kit. If the system is charged with water containing high hardness Nalco 8350 should be substituted for the 439L.
10. Successful Bidder shall provide the services of an authorized technician to supervise the installation and instruct the owner for a minimum of 40 hours. KPC Member agency Repsentative shall sign affidavits of manufacturer's instruction. During start-up, manufacturer shall deliver operating and maintenance instructions and appropriate warranties. Bidder shall obtain receipt. Equipment warranty shall include complete parts and labor for a period of one year from systems start up and compressor warranty for five years.

4.20.0 Geothermal Heat Pump and Loop Piping Systems (High Density Polyethylene)

This section includes specification and references for HDPE pipe used for geothermal heat pump water loop installations. Standards for these systems are to be referenced from ASTM D1683-98, Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics. The following are further testing and standards to be used:

A. ASTM D2447-99, Standard Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80, Based on Outside Diameter.

B. ASTM D2513-99, Standard Specification for Thermoplastics Gas Pressure Pipe, Tubing and Fittings.

C. ASTM D2683-98, Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-controlled Polyethylene Pipe and Tubing.

D. ASTM D2837-98a, Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.

E. ASTM D3261-97, Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.

F. ASTM D3035-95, Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.

G. ASTM D3350-98a, Standard Specification for Polyethylene Plastics Pipe and Fitting Materials.

H. ASTM F714-97, Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.

I. ASTM F1055-98, Standard Specification for Electrofusion Type Polyethylene Fitting for Outside Diameter Controlled Polyethylene Pipe and Tubing.

4.20.1. Product

Successful Bidder will submit manufacturer's technical product data and installation instructions for pipe and fittings. Bidder will submit names and certificates of successful completion of manufacturer training for the application specified. Bidder will submit manufacturer's technical data on fusion machine to be used in joining the pipe and fittings. Bidder will submit copies of pipe and fitting warranties.
Material to be used: Material Description- ASTM D3350- Type III, Grade PE34

A. The pipe shall be virgin resin with an allowance for on-site manufacturer re-processed resin. No recycled resin shall be used. All pipe and heat-fused materials shall be manufactured from a virgin polyethylene extrusion compound material in accordance with ASTM D-2513, Sections 4.1 and 4.2. The material shall maintain a 1600 psi (110.316 Bar) Hydrostatic Design Basis at 73.4^{o} F (23.5^{o} C) per ASTM D-2837, and shall be listed in PPI TR4 as a PE3408 piping formulation. The material shall be a high density extrusion compound having a cell classification of PE345434, PE355434, or PE345534 with a UV stabilizer of C, D, or E as specified in ASTM D-3350 with the following exception: this material shall exhibit zero failures (F0) when tested for a minimum of 192 hours under ASTM D-1693, Condition C, as required in ASTM D-3350.
Pipe shall be manufactured to outside diameters, wall thickness, and respective tolerances as specified in ASTM D-3035 or D-2447. Molded fittings(White/Drisco) shall be manufactured to dimensional specifications and requirements of (White/Drisco) ASTM D-2683 for socket fittings, ASTM D-3261 for butt/sidewall fittings, ASTM D-2513, Section 6.10.1 for Mechanical Stab fittings, and ASTM F-1055 for electrofusion fittings.

B. Pipe with a diameter of 1.252 inches or less (3.175 cm) (nominal) shall be manufactured in accordance with ASTM D-3035 with a minimum[based on pressure rating]dimension ratio of 11.

Pipe manufactured with a diameter of 1.253 inches (3.175 cm) (nominal) and larger shall be manufactured in accordance with ASTM D-3035 and ASTM F714 with a minimum [based on pressure rating]dimension ratio of 15.5, or ASTM D-2447 Schedule 40. If the pipe is used in a vertical bore application, it shall be manufactured in accordance with ASTM D-3035 with a minimum [based on pressure rating] dimension ratio of 11.

Factory- shipped U-bend assemblies shall be sealed and under air pressure.

Fittings: The geothermal system pipe fittings which are molded shall be manufactured to the dimensional specifications and requirements of ASTM D-3261 for butt/sidewall fittings. The material used in the manufacturing of the fitting shall be the same approved extrusion material as the connecting pipe. For fabricated fittings, a minimum 'quick-burst' strength of the fittings shall not be less than that of the pipe, nor less than four times the long-term water-rated working pressure.

Purpose-designed U-bend fittings shall be used instead of L+Stree for ease of insertion. Manufacturers include Phillips and Enlink.

Joints: The approved joints are heat fusion, flanging, transition fittings and proof-tested, approved mechanical "couplers". The butt fusion machine used to make the joints shall encompass the following features:

1. Guide rods shall be in a plane that passes through the centerline of the pipe, thus canceling the bending forces in the machine caused by the fusion forces.

2. The pipe clamps shall have the strength to ‘round-up’ the pipe close to the fusion joint. They must be adjustable for removal of high/low mismatch of pipe walls and clamp each piece on continuing straight centerline.

3. The pipe- facing device shall be capable of rapid facing of the pipe ends to a perfectly flat surface, so when the ends are brought together, there is 100 percent plastic contact.

4. The facer may be hand or electric powered for pipe sizes up to 2 inches (5.1 cm), and electrically powered for pipe sizes up to 8 inches (20.3 cm).

5. The facer shall have precisely machined stops to lock the facer squarely between the clamping jaws at the end of the face off.

6. The heater plate shall be electrically heated and thermostatically controlled. The surface shall be smooth with a high quality non-stick coating. The heater shall be capable of quick heat-up and maintaining a constant surface temperature in the desired temperature range even in inclement conditions. The heater plate shall be equipped with a thermometer to indicate temperature change. A surface pyrometer is used periodically to assure proper temperature. Use pipe manufacturer’s recommended fusion temperature.

7. The socket fusion machine used to make the joints shall encompass the following features:

   a) An electric, thermostatically-controlled heater plate. The surface shall be smooth and free of foreign material. The heating tool shall be capable of heating socket faces to the appropriate fusion temperatures as per manufacturer’s recommendations.

   b) A set of metal socket faces which are dimensionally accurate according to current industry practices. The surface of the socket face that will be in direct contact with the pipe or fitting shall be smooth and coated with a high quality non-stick coating.

   c) Temperature-indicating crayons or a surface pyrometer. One temperature crayon shall be for the proper ‘low’ end temperature indication and another crayon shall be for indicating the ‘high’ end temperature. Use pipe manufacturer’s recommended fusion temperature range.

   d) A depth gauge that is sized according to pipe diameter and corresponding fusion fitting socket depth. The depth gauge shall be used to locate the cold ring the proper distance from the pipe end.

   e) A metal locking cold ring clamp which supplies support for the entire circumference of the piping material. Cold ring shall have the ability to keep the pipe end round. The cold ring shall be used to limit the pipe depth entry into the socket face and fusion fitting socket.

f) A timing device that emits an audible tone and a timing light on one second intervals. Timer shall be used to determine proper heat cycle for the pipe and fitting. Use pipe manufacturer's recommended heating times.

g) A number of clean, dry, 100 percent cotton rags used to clean the socket heater faces after each fusion application. Rags shall be free of any cleaning solvents, grease, or dirt.

8. Install piping in accordance with manufacturer's written instructions. The pipe and fittings must be joined using the butt, socket, electrofusion, or fusion process. No other method is acceptable. The vertical loop take-off tee fittings may be made using tees or the saddle fusion process on header piping 1.25 inch (3.18 cm) and above. Exercise extreme caution to completely remove the cutout on saddle tees. Bell reductions shall be used at all pipe reductions to eliminate trapped air.

9. Use reducing socket tees when fabricating socket type reducing headers. Consult with manufacturer for available fittings and fabricated headers.

10. Avoid sharp bends in piping. Consult pipe manufacturer for minimum bend radius. Install elbow fittings for bends which require tighter radii than manufacturer recommends. Use only continuous pipe in sharp bends.

D. Marking: Each pipe shall be permanently indent marked with the manufacturer's name, nominal size, pressure rating, relevant ASTM standards, cell classification number and date of manufacture.

1. Each fitting shall be identified with the manufacturer's name, nominal size, pressure rating, relevant ASTM standards and date of manufacturer.

2. Each pipe and factory-fitted "U-bend" vertical heat exchangers shall be permanently indent marked with distance in feet or meters from the U-bend tip, with marking every two feet or one meter.

Packaging, Handling, And Storage: The pipe and fittings shall be packaged, handled and stored in accordance with the approved manufacturer's general guidance and recommendations.

4.20.2. Pressure Ratings

The following are minimum Table Of Water Pressure Ratings at 73.4^{o}F (23.5^{o}C) for DR-PR PE 3408 Plastic Pipe:

Dimension Ratio	Pressure Rating, psi	Pressure Rating, Bar
7	267	18.4
9	200	13.8
9.3	193	13.3
11	160	11.03
13.5	128	8.8
15.5	110	7.6
17	100	6.9

4.20.3 Source Control

Bidder will obtain pipe and fittings from compatible manufacturers.
The pipe and fittings manufacturer shall have in place a functional quality assurance program. Such QC/QA programs shall deal with quality and workmanship, OA verification, OA rejection and have OA record retention systems in place.

4.20.4. GSHP Pipe Execution

The following are pipe execution specifications:

1. Successful Bidder will space pipe supports per following table or per applicable manufacturer's instructions, if available:

Size (in.)	Maximum spacing
1.25	2 ft 9 in.
2	3 ft 0 in.
3	3 ft 6 in.
4	3 ft 9 in.

2. Successful Bidder will remove sharp edges and burrs of hanger parts which contact pipe.

3. Successful Bidder will not rigidly clamp or force pipe into position by means of hangers.

4. Successful Bidder will support vertical pipe with riser clamps. Restrict side motion by means of oversize U-bolts.

4.20.5. Repair

Successful Bidder will repair leaks found when testing by cutting the damaged section and replacing it with an approved socket or butt-fused piece (or approved mechanical connector). Large diameter polyethylene piping may be repaired by use of a torch.

4.20.6. Field Quality Control

Successful Bidder will perform Pressure/Leak Test per manufacturer's instruction on the following products at the following points:

U-bend assembly before insertion.

U-bend assembly before circuit header installation.

Each circuit.

System at the vault or interior pump manifold.

4.20.7.

The following are minimum specifications for cleaning a GSHP piping system. Successful Bidder will flush the piping system with potable water at 2 fps and observe for free flow. [**Designer Note**: The successful bidder will ensure there is not partial kinking, or crimping, either in the header or in the U-bend. Successful Bidder will remove material or obstructions that interfere with full flow. Successful Bidder will adjust piping to remove kinks or crimping in piping, U-bends, and header system.

4.21.0 Design Standards

In an effort to insure quality design is employed in selecting a prime vendor, bidders are asked to submit a design that includes the use of these component parts to demonstrate their

technical ability. Bidders shall submit one GSHP design utilizing their unique design capabilities and standards. Bidders will include with their bid packet a design for the Sample Elementary School listed below. Sample plans should be labeled clearly. In an effort to secure the best possible design capabilities, KPC is asking bidders for the KPC GSHP Prime Vendor contract to design a model GSHP project for a model building. Bidders are not asked for pricing on this model but rather their best design. The specifications, which follow, detail pertinent information about the building and building envelope and should be used as a guide for the building design. It is up to the individual Bidders to provide all design related materials for this model project, which they believe to be relevant.

4.21.1. Minimum Design Specifications

The design of the Sample Elementary School shall include all minimum specifications contained herein, plus any additional options as determined by the bidder. The bid document shall include CAD drawings of the project and a detailed narrative explaining the design.

4.21.2 Building Type

School Type: Elementary
Total Bldg Area: 60,000 ft^2
36 classrooms at 800 ft^2 each
Library: 3,200 ft^2
Cafeteria: 5,000 ft^2
Kitchen: 1,500 ft^2
Office Area: 3,000 ft^2
Gym Area: 8,000 ft^2
Misc Areas – Hallways etc.: 10,500 ft^2
500 Students
50 Staff Personnel

4.21.3. School Construction

Single Story Building
Walls: Face Brick / Concrete Block / 2” insulation
Roof: Flat rock ballast roof with 3” insulation
Windows: 15% of the wall area

4.21.4. Existing HVAC System Specifications

25-year-old VAV roof top units
25-year-old water-cooled chiller
25-year-old hot water boiler
4-year-old cooling tower
Pneumatic control system
Individual Shutoff VAV boxes per classroom

4.21.5. Geothermal Well Field Installation Scope

Geothermal Well Field Layout: Install a complete geothermal well field. Each of the vertical wells shall be 300 feet deep. The well field shall be configured in 12 x 4 layout for a total of 48 wells. Each well shall be spaced at a minimum of 20-foot centers. Each borehole well shall be a minimum of 6” in diameter. Each well shall contain two (2) 1” U-Bend pipes. The field shall be piped as a reverse return system. Pre-drilling and post drilling site work includes trenching for the horizontal pipe runs, trenching through pavement, repair of pavement, well field ground leveling, grass seeding of well field and any runoff barriers required.

Section 5 - Service and Ongoing Support

It is the goal of KPC to select a prime vendor who can be a full service provider across the Commonwealth of Kentucky. With this stated goal in mind it is incumbent upon all interested parties to submit a plan detailing how service would be addressed in Kentucky. As of 2003, Kentucky was the fourth largest GSHP heat pump market in the United States. KPC is looking for a company that can meet not only the short term needs of installing a GSHP system but a cradle to grave approach dealing with services and parts. With this in mind KPC will ask each company submitting a response to detail their service plan as follows.

5.0.0 Identifying the Service Opportunity

In this section Bidders will in detail define the Scope of Service Solutions offered by your company and describe how the individual components of your service program fit into the maintenance program of a GSHP system.

5.0.1

Detail any existing exclusive relationships your company has with outside manufacturers and vendor for the ongoing support of GSHP system. Detail any existing agreement your company may have with any other educational cooperatives in Kentucky and beyond. Define the nature of such agreements and detail how they will impact any potential relationship with KPC.

5.0.2

Detail your companies approach to HVAC technical labor type involved and service technician pricing.

5.03.

List the number of technicians who are factory certified to work on your companies proposed GSHP system.

5.0.4.

It is the intent of KPC to provide to its members a GSHP prime vendor
contract that provides the highest level of technical expertise to Kentucky Schools. List each technician employed by your company in the following manner: Years of HVAC employment experience, education background, other factory certifications received either from the manufacturer of the GSHP system you are representing or product lines your company represents. If your company relies on outside agents for service detail the above requested for the partner company who will be responsible for service.

5.05.

Define how your company will approach a statewide agreement. This should include detailing service technician response times and geographical locations. List any office where your company has technical staff.

5.0.6.

KPC requires 24-hour-emergency answering service for the use of KPC member agencies. Bidders will state their agreement with this requirement and how they are set up to currently manage 24-hour emergency calls.

5.0.7.

Bidders must provide with their proposals in this section a sample service work report demonstrating the type and quality of information provided to an owner upon completion of each scheduled or unscheduled service visit.

5.08.
Bidders will provide with their proposals any general terms and conditions of their service agreements such as but not limited to procedures for renewal and cancellation, liability insurance requirements and certificates. Bidder will also provide any KPC member owner obligations or exceptions that nullify warranty, service or training agreements.

5.0.9
Bidders must provide with their proposal details for an optional multi-years service/training agreement.

5. 0.10
Bidders will detail with their proposals any special parts or training discounts provided to the KPC member agency as a service or training agreement customer. If none are provided, bidder will state this in their proposal.

5.0.11
Bidders will provide with their proposals any special parts and or additional charges not specifically mentioned in the body of their service agreement proposal including but not limited to: labor, travel time, mileage, materials, meals, and hotel reimbursements. If a Bidders proposal includes all items necessary to execute the stated service agreement, the Bidder will state this in their proposal.

5.1.0. General Service Scope, Specifications and Conditions

Bidders shall meet the following conditions.

5.1.1. Technician Qualifications:

All service work to be performed on any KPC Prime Vendor contract purchased GSHP system will be a completed by a manufacturer certified technician. Bidder agrees under penalty of losing their prime vendor agreement that their company can meet or comply with this requirement. If Bidder is working in conjunction with a partner agency to fulfill service agreements the Bidder will include a statement from their service subcontractor detailing the technical qualifications and educations levels of the sub-contractors staff and agreement from their subcontractor to meet the service requirements stated by KPC.

5.1.2.
Minimum qualifications for service technicians will include a Kentucky Journeyman's license and an EPA Universal Certification.

5.1.3.
A comprehensive list of technician certifications and contractor licenses will be included in this section.

5.1.4.
All technicians working on KPC Prime vendor agreement purchased service packages or projects are required to undergo a thorough safety training program prior to working in the field. The10 hour OSHA general industry training is required and the ARSC general safety course is highly recommended. Bidder will certify that their service and engineering employees will have completed the OSHA 10 hour course and detail any employee who has completed the ARSC general safety course.

5.1.5. Technician Supplies and Equipment
All technicians are to be equipped with a cell phone and lap top computer.

5.1.6. Technician Vehicle and Tools
Technicians are to be equipped with a safe vehicle and an adequate complement of tools and test equipment as recommended by the manufacturer.

5.1.7. Technician Training Program
Technicians are to be factory trained and certified to service, operate and maintain the Bidders specified HVAC equipment and control systems.
Where applicable, factory certification of control service and operation is required.

5.1.8. Health and Safety Program
A written Health and Safety program should be provided to all associates working for the servicing agent. The safety program is to address, at a minimum, the following:
Purpose statement,
Management & employee involvement statement,
Assigned responsibilities,
Disciplinary policy statement,
General safety description,
Lifting guidelines,
Housekeeping guidelines,
Driver safety guidelines,
Auto/Truck accident procedures,
Fire safety guidelines,
Operator safety guidelines,
Refrigerant safety guidelines,
Electrical safety guidelines,
Personal protective equipment audit,
Eye protection requirements,
Foot protection requirements,
Hearing protection requirements,
Hand protection requirements,
Fall protection requirements,
Floor and wall opening safety guidelines, and
General construction safety.
Bidder will include their written safety program for non-service employees and details of who presents this material and how often it is presented to employees. The reason for this requirement deals specifically with a culture of safety KPC and its member agencies try to foster in schools in the Commonwealth of Kentucky.

5.1.9. Refrigerant Handling
Technicians handling refrigerant are to be CFC certified and follow all guidelines for proper refrigerant handling and disposal. Refrigerant records are to be kept whenever a technician handles refrigerant of any kind. Technicians are responsible for supplying, maintaining and performing proper maintenance on recovery equipment.

5.1.10. Transporting Hazardous Materials
Hazardous materials are defined as any substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety and property when transported in commerce. Examples of commonly used hazardous materials used during HVAC service include nitrogen, high pressure refrigerants, propane, acetylene, compressed oxygen, acidizing chemicals and water treatment chemicals. It should be understood by the bidder because schools and learning environments are directly affected by these agents a hazardous materials procedure is of

prime importance to KPC and its member agencies. Therefore, the servicing agent is required to maintain MSDS sheets for all chemicals used by the servicing technicians. If the Bidder is working with a service partner the Bidder will include a statement from the subcontractor agreeing to comply with this requirement.

5.1.11. Emergency Spill Procedure

In the case of an emergency, the technician is to follow the KPC member agency emergency response plan. Bidder will detail in their emergency plan procedure.

5.2.0 Emergency On Call Service Plan

Emergencies are a fact of life, whether related to normal wear and tear of equipment or climate, the successful Bidder shall be able to handle difficulties at multiple schools on a statewide basis. Bidders must provide a 24-hour emergency service to all KPC GSHP service agreement and warranty holders. Bidders should detail and document their emergency on call service plan.

5.3.0 Statewide Coverage

The nature of KPC is to serve the entire Commonwealth of Kentucky. It is for this reason service technicians should be located and available throughout the state of Kentucky for a quick response and minimized travel expenses. Bidders will detail where their service technicians are located. If the Bidder will be relying on outside partnerships with subcontractors bidder will include a list of technicians and a contract from the subcontractor to the Bidder allowing for KPC Member projects to take precedence over other clients in the event of a weather or service related emergency.

5.3.1.

KPC will require the successful Bidder to have a minimum number of fourty (40) trained technicians available by the servicing agent for effective response. Bidder shall state their number of trained service technicians. If the Bidder is working with a service partner for the Bidder will include a statement from the subcontractor with a statement from the subcontractor listing the names of their currently full time employed technicians.

5.3.2.

KPC divides The Commonwealth of Kentucky into servicing areas. Each area has unique geographical, cultural and servicing challenges. It is the request of KPC that its Bidders have regionalized technicians and account management responsibilities per each region of the Commonwealth served by KPC. Bidder will state their ability to comply with this requirement. If the Bidder is working with a service partner the Bidder will include a statement from the subcontractor stating their ability to comply with this requirement. If the bidder is not currently set up to do business in this manner, a signed narrative from the subcontractor will be needed detailing plans to meet this requirement.

5.3.3.

This further means on call technicians are to be located in each territory to minimize response time to any given jobsite. All Bidders will include a map in their proposal detailing current service areas and where technicians are located.

5.4.0. Analysis Services

Both field and factory analysis services are to be made available to the KPC member agency. The analysis services options that are to be made available to the KPC member agency by the successful Bidder include, at a minimum:
Factory lab and field oil analysis,
Factory lab and field refrigerant analysis,
Vibration analysis with or without a factory report, and

Factory lab and field water quality analysis.
Bidder shall detail their analysis service and agreement to comply with this requirement.

5.5.0. Product Submittals, Manuals and Operational Literature

It is the requirement of KPC that all Bidders will maintain a current database or library of all Installation, Operations and Maintenance (IOM's) manuals for any KPC purchased prime vendor contract purchased HVAC equipment. Bidders will detail their current system for handling product literature and the contact person in their office in charge of this information.

5.5.1.
Service bulletins are to be readily accessible to the service technicians. Technicians shall be capable of pulling up service literature while on site using a lap top computer. Bidder will state whether or not they have this ability currently.

5.6.0 Warranty Service

For all warranty service requests, the successful Bidder or their serving agent shall be a factory authorized/certified equipment and control system service provider.

5.6.1.
Bidders shall maintain a direct line to their chosen manufacturers factory engineers and warranty administrators for expedited warranty and factory defect problem resolution. Bidder shall list their primary manufacturing contact person and their number.

5.6.2.
A factory approved, comprehensive service program shall be implemented for all HVAC systems in order to help ensure warranty compliance. Bidders will detail their current program.

5.7.0. System Start up and Commissioning

Successful Bidder shall act as the start up and commissioning agent, working directly with the installing contractor and project management teams. Start up and commissioning will be done by a factory trained and certified technician with documented experience working on like systems.

5.8.0. Informal On-the-Job Owner Training

During scheduled system servicing, KPC will encourage its member agency Representative to be present for informal on the job training. This training involves the KPC Member Representative accompanying the service technician to the equipment and asking questions to develop general system knowledge. Additional owner training can be included within the scope of coverage to include dedicated classroom training, control system training and offsite training courses sponsored by servicing agent. Bidder will detail their current training ability and list any classes they can host either on site or at their facilities.

5.9.0. Service Conditions

If a Bidder or subcontractor is found to have submitted incorrect information it will be grounds for immediate dismissal from the contract and KPC will pursue legal action to the fullest extent of the law as allowed by KRS Statutes.

Section 6 - Professional and Engineering Services Necessary to Complete a GSHP Project

6.0.0. Educational Training Provisions:

Training is critical for the success of any GHSP or energy efficiency-contracting project. As stated before, the successful Bidder shall provide complete training resources for KPC Member agencies and their staff about the operation of GSHP system in relation to the operation of their facilities and about the importance of energy conservation. The main goal of KPC besides providing a viable procurement method for a complex facility solution in a cost effective manner is to promote energy awareness and self-sufficiency by developing individual skills and knowledge. Training services must keep an eye on the future by keeping in mind long-term energy conservation goals. Bidders are asked to submit a plan for helping KPC member schools incorporate an energy education program for voluntary use by schools where a GSHP system may be installed.

6.1.0. Performance Guarantee

Kentucky law allows for a unique approach to building solutions called an energy savings performance guarantee. A performance guarantee is not required for the completion of a GHSP project but they successful Bidder awarded this Prime Vendor contract may be asked to provide this service as a part of the contract to aid in the financing of a GSHP project. Bidders for the KPC GSHP Prime Vendor contract must have the ability to provide this type of service and be accredited by the National Association of Energy Service Companies. Bidders should document their NAESCO accreditation and list two projects in Kentucky they completed in the past year where performance contracting was used. Bidders should detail energy saved, scope of the project, and a reference person to contact.

6.2.0. Monitoring and Verification

KPC and its member agencies will utilize the International Performance Measurement & Verification Protocol (IPMVP) for GSHP Projects with an energy saving component as the basis for monitoring and verifying guaranteed performance. One of the benefits of utilizing this standard protocol is the ease and access to third-party verification of savings. The KPC approach to savings measurement is designed to ensure that maximum energy savings are realized throughout the term of any agreement for the benefit of any KPC Member agency. Bidders shall provide measurement of savings on an ongoing basis through their measurement and verification services. Bidder will submit Measurement and Verification data using the IPMVP method for a Kentucky school project completed in the past year. Bidder will also detail projects where savings were not fulfilled and where payments were made due to unfilled savings guarantees. Bidder should also include a narrative detailing how their company approaches a measurement and verification project.

6.3.0. Project Financing

In procuring a GSHP project KPC and its member agencies along with the Commonwealth of Kentucky have several options. It is the desire of KPC to award the Prime Vendor contract to a company who can creatively deal with the unique financing difficulties faced by Kentucky Schools. The successful Bidder shall be able to work with the various financing vehicles available to KPC and Kentucky schools. Bidders should discuss and detail their financing experience with Kentucky schools. Include relevant experience in using Municipal Bonds, and experience in helping schools write grants and use utility rebate programs.

6.4.0. Emissions Reduction Reporting

The successful Bidder shall be capable and willing to work with KPC member agencies to document Emissions Reductions throught the usage of GSHP technology.In procuring a GSHP project KPC and its member agencies along with the Commonwealth of Kentucky

Section 7. Pricing

It is the intent of KPC to seek the best quality pricing from the GSHP Prime Vendor. KPC asks bidders to define their pricing and discount schedule in the format detailed in the Excel spreadsheet. This pricing is not for the Sample Elementary School specified in Section 4.

Pricing should reflect only aspects of GSHP systems deemed appropriate and applicable to the GSHP program. Bidders shall designate pricing to account for the variances in Kentucky schools and across the territory of KPC in the pricing model. Bidders should list their prices according to the type of school being served and what services they are offering in conjunction with the categories listed below. Vendors are encouraged to offer realistic and competitive pricing which allow for sustainable offerings over the life of the Prime Vendor GSHP Contract. Bidders are allowed to expand upon the pricing model. If a bidder does this, they must offer a detailed explanation of why they have expanded the model. The following costs shall be stated as required to comply with all base/minimum specifications.

7.0.1. Professional Services

In the Excel spreadsheet, list your bid for each of the Professional Service categories. Bidder shall provide a price for the Elementary School, Middle School, and High School stated in “dollars per square foot” units. Bidder shall list the total amount of bonding capacity under the heading “Bonding Capacity”.

7.0.2. Construction Costs

In the Excel spreadsheet, list your bid for each of the Construction Costs categories. Bidder shall provide a price for the Geothermal Equipment and Installation stated in “dollars per ton” units. Bidder shall provide a price for Electrical and Mechanical Equipment and Installation stated in “dollars per square foot” units.

7.0.3. Equipment and Controls Pricing

In the Excel spreadsheet, list each item in your equipment and controls category along with the pricing stated in “unit cost”. Bidder may add rows under each category for each item on they wish to bid.

7.0.4. Ancillary Services

In the Excel spreadsheet, list each ancillary service your company can provide along with the corresponding cost. Bidder may add rows under each category for each service they wish to bid.

KEDC GSHP BID CERTIFICATION – GSHP-2005-4

STATEMENT OF SUBMISSION

We have read all the conditions and requirements of the bid invitation. In compliance with all general and specific terms and conditions of the bid invitation, in consideration of the detailed description attached hereto, and subject to the statements of Authentication, Non-Collusion, and Non-Conflict of Interest thereof, the undersigned agrees that, upon proper acceptance by the KEDC Board of Directors of any part of the bid offer within the time stipulated, a contract shall thereby be created in accordance with the specifications for that part of the bid offer accepted.

Bid Packet Checklist

Please include the following in your sealed bid packet.

1. Narrative describing:
   a) Your abilities relating to Section 2.1.x and 2.6.x,
   b) Commissioning for the Sample Elementary School as described in Section 3.16.x,
   c) The design of the Sample Elementary School described in Section 4.21.x,
   d) Your ability to meet Section 5 - Service and Support requirements,
   e) Your ability to meet Section 6 – Professional and Engineering Services requirements.
2. CAD drawings detailing the Sample Elementary School described in Section 4.21.x
3. This page of this bid invitation completed and signed
4. Listing of subcontractors (name, address, phone number, web address) you will work with to complete projects under this contract
5. the Excel spreadsheet with your pricing on diskette or CD, and
6. a printout of the four Excel spreadsheets

****

Bidding Firm _____ **Authorized Signature** _____

Printed Name _____ **Email Address** _____

Phone # _____ **Fax #** _____

Address _____

City, State, Zip _____