

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE J	PAGE OF PAGES 1 7
2. AMENDMENT/MODIFICATION NO. 0002	3. EFFECTIVE DATE 14-Jul-2007	4. REQUISITION/PURCHASE REQ. NO.		5. PROJECT NO.(If applicable)
6. ISSUED BY AFGHANISTAN ENGINEER DISTRICT US ARMY CORPS OF ENGINEERS KABUL APO AE 09356	CODE W917PM	7. ADMINISTERED BY (If other than item 6) See Item 6		
8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		X	9A. AMENDMENT OF SOLICITATION NO. W917PM-07-R-0081	
		X	9B. DATED (SEE ITEM 11) 28-Jun-2007	
			10A. MOD. OF CONTRACT/ORDER NO.	
			10B. DATED (SEE ITEM 13)	
CODE	FACILITY CODE			
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer <input type="checkbox"/> is extended, <input checked="" type="checkbox"/> is not extended. Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning <u>1</u> copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12. ACCOUNTING AND APPROPRIATION DATA (If required)				
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.				
A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.				
B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).				
C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:				
D. OTHER (Specify type of modification and authority)				
E. IMPORTANT: Contractor <input type="checkbox"/> is not, <input type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.				
14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.) This modification is made to release the Heat Study for the sites Gardez, Heart and Mazer-E-Sharif which are considered typical for the ANA sites being upgraded.				
Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.				
15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)		
		TEL:	EMAIL:	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA		16C. DATE SIGNED
_____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)		13-Jul-2007

Conclusions & Recommendations

Conclusions

The analysis conducted on the several courses of action have yielded many insights into the cost, feasibility, and suitability of installing each of the different proposed heating systems as defined within the RFP. The following is a brief summary discussion for each course of action and below, under **Recommendations**, is a discussion of the recommended actions to be taken to mitigate heat deficiencies on the site, as well as a tabulation of the recommendations for each facility type.

A) Course of Action A: Correcting Heat Deficiencies within Original Design

Intent:

This course of action would generally install electric heaters in locations where provisions for installation (wiring and outlet boxes) have already been installed. In addition, most of the electrical infrastructure, including electrical distribution equipment and power plant capacity is already in place on the site to support the infrastructure requirements of this course of action. This equipment is relatively maintenance free, fairly durable, and easy to operate. For these reasons, installation of electric heat in pre-wired areas should be considered a preferred course of action.

B) Course of Action B: Correcting Heat Deficiencies with Change in Design Standards to Account for Afghan Usage:

This course of action is similar to Course of Action A in that it would generally install electric heaters in locations where provisions for installation (wiring and outlet boxes) have already been installed. Under this course of action, the equipment to be supplied would include provisions to make it suitable for Afghan usage, including tamper proof thermostats and mechanical protection from potential abusive treatment. These equipment "upgrades" are relatively inexpensive and would provide added protection to prolong the life of the equipment and ensure consistent system operability.

However, this course of action also requires that the derating of the electrical heating loads included in the load calculations for each facility be removed to take into account that Afghans have shown the propensity to use full load on heating. Therefore the electrical heating load for each facility must be taken at 100% of the connected load under this course of action. The electrical distribution infrastructure (transformers, service drops, and distribution panels) for many facilities is not of sufficient size to serve the increased electric heating load at 100% of connected load. In addition, there are major Prime Power Plant expansion implications (new generators and building expansion) associated with this course of action that are very significant and costly.

This course of action is effective in addressing the operational challenges of installing equipment suitable to the abuse and misuse of the ANA. However, it

may not be appropriate to size and install equipment to meet the 100% demand criteria on heating loads. Rather, the protection of controls (thermostats) from unauthorized use and an increased diligence in gaining ANA cooperation to reduce system tampering would go a long way toward negating the need for 100% demand considerations on the electric heating system design. Should these steps not be seen as realistic with regard to the ANA's usage, it may be beneficial to consider upgrading the services for each building to prevent nuisance tripping and/or overloading at each facility. However, diversity of demand across the site (not all facilities occupied at the same time and not all occupied buildings operating at 100% heat load) can certainly be expected such that expansion of the Prime Power Plant may not necessarily be required. Expansion of the Prime Power Plant may be contemplated but should not be implemented until operating experience determines that the actual winter heating demand does indeed reach or exceed actual generating capacity. At a minimum, the equipment upgrades associated with this course of action should be considered for implementation.

C) Course of Action C: Correcting Heat Deficiencies with Wood Burning Systems

This course of action would install wood stoves that have a greater heating efficiency than those currently installed. In addition, the cast iron construction of the proposed wood stoves would be more durable than those currently installed. Heating with wood stoves provides the ANA with a system that they are familiar operating and maintaining. Given the relatively low cost of replacing the existing wood stoves, the above benefits to the ANA in heating efficiency and longevity, while not introducing a complicated heating system, are significant and should be considered. No new locations were identified where wood stoves should be installed.

D) Course of Action D: Correcting Heat Deficiencies with Propane Burning Systems

Under this course of action, propane burning systems are proposed to be installed in all areas where wood burning stoves have been installed under the original design and construction at the base. In some cases, locations have been identified where additional propane burning systems could supplement or replace electric heat within a building, or be installed where no heat is currently provided. Propane burning systems are relatively complex systems versus the heating methods that the ANA is normally used to operating and maintaining. In addition, propane systems will require significant operations and maintenance commitments. For these reasons, the benefits of replacing wood stoves with propane burning systems are not significant enough to warrant consideration.

There are two locations where installation of propane burning systems may be warranted in lieu of electric heating. The electric heating load associated with each Maintenance Garage and the CS Maintenance Building is substantial. Installation of propane burning systems in the open bay areas of these facilities

will greatly reduce the electric heating load on the site and reduce the impact on the Prime Power Plant.

Recommendations

Based on the evaluations of each course of action outlined in the conclusions above, the following is a summary of recommended actions to be taken to mitigate the heat deficiencies in on the site. Facility specific recommendations follow below.

- Install electric heaters in all facilities where provisions for electric heat were included in the original design and construction, with the exception of the open maintenance bay areas within the Maintenance Garages and Maintenance Building.
- Revise the heating system in the open maintenance bays of the Maintenance Garages and Maintenance Building to be propane burning systems in accordance with Course of Action D.
- Provide all electric heaters in accordance with Course of Action B which provides for the more durable heating units and tamper proof thermostats.
- Provide a new electrical heating system in all Toilet and Shower Buildings.
- Provide a new electrical heating system in the Fire Station.
- Replace all wood burning stoves with new, more efficient and more durable stoves and with electric heat re-claimers in the flues in accordance with Course of Action C.
- Do not add heat to the storage areas of the Central Receiving Warehouse and do not add heat to the Arms Storage Buildings or Battalion Storage Buildings.
- Replace the wood stove with an electric heating system in the Guard House.
- Replace the wood stove with electric heat in the classroom of the Communications Center.
- Do not revise the electrical distribution system and infrastructure to support a 100% use factor on heating load.
- Continue with the planned upgrade of the Prime Power Plant to 7MW since it appears that this will be adequate to support the needs of the base.

There is no single course of action that satisfies all facility needs. In some cases, multiple heating systems are recommended (as currently configured on the base or as proposed below). The following is a list of facilities and the actions recommended to mitigate the heat deficiencies within each facility:

BUILDING TYPE	RECOMMENDED ACTION
Barracks Type A	Install electric heaters in accordance with COA B and replace wood stoves.
Barracks Type B	Install electric heaters in accordance with COA B and replace wood stoves.
Barracks Type C	Replace wood stoves.
Barracks Type D	Install electric heaters in accordance with COA B and replace wood stoves.
Senior NCO	Install electric heaters in accordance with COA B.
Bachelor Officers Quarters	Install electric heaters in accordance with COA B.
Toilet/Shower	Install electric heaters in accordance with COA B.
Battalion Headquarters	Install electric heaters in accordance with COA B and replace wood stoves.
Brigade Headquarters	Install electric heaters in accordance with COA B and replace wood stoves.
Garrison Headquarters	Install electric heaters in accordance with COA B and replace wood stoves.
Dining Facility	Install electric heaters in accordance with COA B and replace wood stoves.
Training	Install electric heaters in accordance with COA B and replace wood stoves.
Arms Storage	Install electric heaters in accordance with COA B in those areas addressed in the baseline design. Do not add heat in the storage bays.
Battalion Storage	Install electric heaters in accordance with COA B in those areas addressed in the baseline design. Do not add heat in the storage bays.
Central Receiving Warehouse	Install electric heaters in accordance with COA B in those areas addressed in the baseline design. Do not add heat in the storage areas.
Class VIII Warehouse	Install electric heaters in accordance with COA B.
Maintenance Garage	Install electric heaters in accordance with COA B in enclosed spaces. Provide new propane burning systems in open maintenance bays.
CS Maintenance Building	Install electric heaters in accordance with COA B in enclosed spaces. Provide new propane burning systems in open maintenance bays.
Reception Building	Install electric heaters in accordance with COA B and replace wood stoves.
Guard House	Remove wood stove and install electric heaters in accordance with COA B.
Guard Tower	Install electric heaters in accordance with COA B.
Communications Center	Remove wood and install electric heaters in accordance with COA B.
Fire Station	Install electric heaters in accordance with COA B.

Other Considerations

Course of Action E in the 1 February 2006 RFP, but not authorized for this study, included several alternate heating methods to be studied. While many of the noted alternative heating methods noted may be too expensive to construct and/or maintain, as well as depend on technology that is not easily operated by the ANA, there are some that may warrant further evaluation by the customer. For example, there are sources of fuel such as waste oil (particularly at the Prime Power Plant) and trash that are normal by products of site operations and use. These fuel sources could perhaps be used on isolated areas of the site to fuel multi-fuel burning systems to provide hot air or hot water to heat specific buildings or a complete barracks complex.

HEAT DESIGN FOR ANA: GARDEZ, HEART, MAZER-E-SHARIF :: 22 NOV 06 :: M. HORTON

A	B	C	D	E	F	G
3	HEAT DESIGN OPTIONS RANK: 10 = EXCELLENT 1 = EXPENSIVE, POOR	PERINI "A & B ALL ELECTRIC HEAT NEW: 2-GEN- SETS	PERINI "C" WOOD-BURN STOVES 60 \$/m3 150 \$/1000 kg	PERINI "D" PROPANE INDIVIDUAL HEATERS 0.65 \$ / lt	**** AED **** DIESEL BURN HEATERS W/ EVAP- COOLING 0.92 \$ / lt	**** AED **** HEAT-PUMP AHU, HEAT & COOL. ELECTIC PWR COP = 2.8
5	RANK CONSTRUCTION COST. US\$	1 9,250,000	9 1,200,000	3 4,500,000	8 1,900,000	2 7,200,000
7	RANK FUEL COST. US\$ (FUEL ONLY)	1 2,560,000	9 920,000	7 1,110,000	8 1,040,000	9 920,000
9	RANK MAINTENANCE COST. US\$	2 510,000	5 70,000	6 100,000	5 80,000	3 240,000
11	O&M COST. US\$ SUM (B7 + B9)	3,070,000	990,000	1,210,000	1,120,000	1,160,000
13	PER YEAR COST 10 YEAR OPER. B5 / 10 + B11	4000000 \$4.00 M	1110000 \$1.11 M	1660000 \$1.66 M	1310000 \$1.31 M	1880000 \$1.88 M
	EASE OF USE	10	1	9	9	10
	TOTAL RANK	14	22	25	30	24

COMPUTATION PARAMETERS COSTS ARE FOR ONE SITE (MAZER-E-SHARIF)

TOTAL HEATED FLOOR AREA = 45,000 m² :: WINTER MAX DIFF dt = 30 'C, SUMMER dt = 15 'C
 VENTILATION (NO SMOKING) 15 m³/h / PERSON :: DENSITY 3 m² / PERSON (M/F)
 THERMAL RESISTANCE: WALLS, R = 3.5 m²-°C / watt (R 20); ROOF, R = 5.5 m²-°C / watt (R30)
 HEAT LOAD TAKEN AS 0.15 tkW / m² FLOOR AREA :: WINDOWS & DOORS 20% OF WALLS
 HEATING SEASON TAKEN AS 4 MONTHS, (120 days AT 12 h / day) FOR ABOVE COSTS
 TOTAL HEAT:: 45,000 m² * 0.15 tkW / m² * 120 days * 12 h/day = 9,720 tmW-h (8.36 E9 Kcal)
 CATERPILLAR 75% LOAD: 800 ekW / 218 lt/h * 0.95 (5% LOSS) = 3.49 ekW-h / lt DIESEL
 TYPICAL DIESEL BURNING HEATER: 85 tkW * 0.80 eff / 7.80 lt / h = 8.72 tkW-h / lt DIESEL.
 DIESEL: 44.8mj/kg*238.9Kcal/mj*0.86kg/lt / 860 Kcal/h/tkW = 10.70tkW/lt * 0.80 eff = 8.56 tkW-h/lt
 AVG. WOOD:3900(Kcal/kg*400(kg/m3)*0.35(eff) / 860(Kcal/h/tkW) = 635(tkW-h/m3) [1.59 tkW-h/kg]
 VOLUME WOOD (20% MOIST.) VS. DIESEL-BURNING HEATER = 8.60 / 0.635 = 13.5

NOTE: FOR GEN-SETS, 15% OF FUEL COSTS ARE ADDED TO MAINTENANCE LISTED COSTS.
 FOR ELECTRIC (RESISTANCE) HEAT: MAINT. = C7(FUEL) * 0.15 + 125,000
 CONSTRUCTION COST = EQUIPMENT + MATERIALS + INSTALLATION (ie air ducts)

PROPOSE OPTION "F" BASED ON CONSTRUCTION & FUEL COSTS AND OPERATION EASE

AHU (AIR HANDLING UNIT) DIESEL-HEATER HAS CAPABILITY OF EVAPORATIVE COOLING IF
 SUMMER WET-BULB TEMP. IN THE 20 TO 25 'C RANGE; COOLING IS ABOUT 1/2 OF A/C
 REFRIGERATION COOLING. PROPANE BURNERS CAN BE USED IN PLACE OF DIESEL.
 PACKAGE UNIT, 75 tkW (250 MBH) MOUNTS OUTSIDE, ONLY AIR-DUCTS REQUIRED INSIDE.