FOR BOARD ACTION

Agenda Item # 7.a. **Meeting Date:** 5/27/08

SUBJECT: Emissions Reduction Project
Mechanical Construction II

PREPARED BY: Wally Schlink, Director of Power Resources

ITEM DESCRIPTION:

The Emission Reduction Project (ERP) continues to proceed according to the project schedule. The Utility Board has previously approved a series of engineering and equipment purchase agreements and now we submit the last of the contractor construction activities for the project for the Board's consideration.

The Mechanical Construction II package covers the work required for complete installation of the Mobotec NOx reduction equipment, ductwork and piping installation, boiler & ductwork structural upgrades, burner modifications, start up testing and support. Additionally the scope includes the Unit 4 boiler ash hopper replacement which is not part of the ERP but rather the annual major maintenance work but was bid together with the ERP to take advantage of economies of scale.

Through our engineers, Utility Engineering (UE), a specification was distributed to 9 contractors, pre-bid meetings were conducted and we received bid packages from 2 bidders.

UE then developed a set of clarifying questions for the lowest bidder, Moorhead Machinery & Boiler Company, and met with their representatives to confirm that their offerings were compliant with the requirements of the bid document. It was determined that Moorhead Machinery & Boiler Company complied with the requirements of the bid documents.

Moorhead is experienced in this type of project having been selected by RPU to perform the Mechanical Construction I work on the emission reduction project and having a long history of performing similar boiler work on the RPU steam units for many years. Moorhead was the low qualified bidder with a bid of $3,402,011.

UE performed the evaluation and has issued a Recommendation for Contracting with Moorhead Machinery & Boiler Company for Mechanical Construction II and a Detailed Bid Analysis matrix, both of which are attached. Also attached is a copy of the Mechanical Construction II Scope of Work.

This is an approved project in the 2008 capital budget. The low bid came in at below the engineer's estimate for the scope of work. Staff will be at the Board meeting to answer any questions on this request.

Larry Koshire
General Manager

5/22/08
Date

ROCHESTER PUBLIC UTILITIES

FOR BOARD ACTION

Agenda Item # 7.a. **Meeting Date:** 5/27/08

UTILITY BOARD ACTION REQUESTED:

Staff recommends that the Board approve the execution of a contract and request that the Mayor execute the same for the Mechanical Construction II per the bid specification with Moorhead Machinery & Boiler Company for a firm lump sum price of $3,402,011.

General Manager Date

ROCHESTER PUBLIC UTILITIES

UTILITY ENGINEERING

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612.215.1300 • Fax 612.215.1499 • Web: www.ue-corp.com

May 20, 2008

Mr. Walter Schlink
Director of Power Production
Rochester Public Utilities
4000 East River Road NE
Rochester, MN 55906-2813

Subject: Silver Lake Plant Unit 4 Emissions Reduction Project
UE Project No. 012668
Recommendation for Contracting with Moorhead Machinery & Boiler Company for Mechanical Construction II

Dear Mr. Schlink:

Utility Engineering Corporation (UE) recommends contracting with Moorhead Machinery & Boiler Company (Moorhead) to perform the scope of work included in the Mechanical Construction II bid package per their proposal dated May 5, 2008.

Bidding Process

On March 21, 2008 the Request for Bid (RFB) for Mechanical Construction II was issued to AZCO INC. (AZCO), The Boldt Company, Frank Lil & Son, Inc., Harris Companies (Harris), Himec Mechanical, Jamar, Moorhead, NewMech Companies, Inc. (NewMech) and Wrigley Mechanical. During the bid period, Hybrid Mechanical requested a copy of the RFB documents.

Pre-bid meetings were conducted at the Silver Lake Plant on April 1, 2008 and April 14, 2008. Representatives from AZCO, Harris, Moorhead and NewMech attended at least one of these meetings. After the second pre-bid meeting, both AZCO and Harris advised UE that they would not be submitting proposals for Mechanical Construction II. However, Harris indicated that they would participate as a subcontractor to Moorhead.

Proposals for Mechanical Construction II were received from Moorhead and NewMech.

The bid drawings and specifications were prepared to allow for a consistent bid approach that would allow for bids to be evaluated as evenly as possible. The contractors were allowed to provide options that would reduce the overall contract costs. Environmental

Plant Services, Inc., Gagnon Inc. and Mavo Systems also requested and received copies of the RFB to assist in preparation of their bids to the aforementioned contractors.

Bid Evaluation & Recommendation

Base proposal prices for Mechanical Construction II from Moorhead and NewMech were $3,402,011 and $3,815,658 respectively. For the option of an 8 week outage versus the specified 6 week outage pricing from Moorhead and NewMech were $3,448,219 and $3,730,658 respectively.

Questions were prepared for Moorhead regarding their proposal. A meeting was conducted with Moorhead on May 13, 2008 to discuss responses to these questions. Although the Moorhead proposal addresses lead paint on structural steel and in the ash hopper, Moorhead further stated their proposal has not included pricing for abatement of lead-based paint on boiler parts or ductwork in the event that lead paint is discovered after the insulation has been removed from these areas. Moorhead stated they will commit to meeting all of the critical milestone dates in the City's schedule. Based upon their responses it was determined the Moorhead base bid and 8 week outage option proposals complied with the requirements of the bid documents.

As Moorhead is currently completing Mechanical Construction I for the project, coordination between Moorhead and a separate contractor will not be required if the contract for Mechanical Construction II is awarded to Moorhead.

Due to their low bid for the base scope of work with the specified 6 week outage, UE recommends the award of this contract to Moorhead.

Recommended Contract Price

UE recommends the issuance of a contract to Moorhead for a firm lump sum price of $3,402,011, which includes a contingency amount of $175,000 and the cost of the performance bond of $20,389.

Sincerely,

Luther M Raatikka, P.E.
Senior Design Consultant, Mechanical

LMR/dlk

Enclosure

RPU SILVER LAKE PLANT
UNIT NO. 4 EMISSIONS REDUCTION PROJECT
MECHANICAL CONSTRUCTION II
DETAILED BID ANALYSIS

Item No.	Description	Moorhead Machinery & Boiler Co.	New Mech Companies
001	Mobilize and Demobilize	$ 298,597	$ 32,888
002	ROFA and Rotamix Fans Support/Deck Installation	$ 93,260	$ 105,238
003	ROFA and Rotamix Fans Installation	$ 158,463	$ 47,330
004	ROFA Box and Rotamix System Installation	$ 402,153	$ 1,058,599
005	Urea Tank Installation	$ 336,483	$ 19,897
006	Ductwork Installation	$ 310,470	$ 321,559
007	Equipment, Ductwork, and Piping Insulation	$ 444,884	$ 484,071
008	Boiler and Boiler Ductwork Structural Upgrades	$ 465,044	$ 330,833
009	Burner Modifications – Not Including Sleeve Dampers	$ 55,192	$ 79,553
010	Burner Sleeve Damper Allowance – Base on 500 Boilermaker Hours at Straight Time	$ 43,994	Not Incl.
011	Start-up and Testing Support	$ 144,702	$ 16,043
012	Ash Hopper Replacement	$ 369,175	$ 396,616
013	Ash Hopper Gunite Installation	$ 54,340	$ 62,857
014	Other (Define)	$ 29,865	$ 653,580
015	Performance Bond	$ 20,389	$ 31,594
016	Contingency Amount	$ 175,000	$ 175,000
017	**TOTAL FIRM LUMP SUM PRICE – BASE BID**	**$ 3,402,011**	**$ 3,815,658**
018	**TOTAL FIRM LUMP SUM PRICE – ALTERNATE BID (8 Week vs. 6 Week Outage)**	**$ 3,448,219**	**$ 3,730,658**
	DIFFERENTIAL - BASE BID	**BASE**	**$ 413,647**
	DIFFERENTIAL - ALTERNATE BID	**BASE**	**$ 282,439**

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.1 PROJECT DESCRIPTION

A. An Emissions Reduction Project (ERP) is currently underway for Silver Lake Plant (SLP) Unit 4. The purpose of the Project is to control emissions of sulfur dioxide, the oxides of nitrogen, and particulate matter within limits required by the facility's air permit.

1.2 MECHANICAL CONSTRUCTION II SCOPE OF WORK

A. This scope of work includes, but is not limited to, work to be done under this Contract. This scope of work description provides a summary of work, which may not include all details of the work. At the end of the work, the Contractor is expected to have constructed complete working mechanical systems as shown on the contract drawings and described herein. The working mechanical systems include the Mobotec ROFA and Rotamix systems, the urea handling and storage systems, the Unit 4 boiler implosion prevention work, the Unit 4 ash hopper replacement, the ash line relocation, and other system work shown on the drawings.

B. Nalco Mobotec NOx Emissions Control System

1. Rotating Opposed Fired Air (ROFA) system installation
2. Selective non-catalytic reduction (SNCR) Rotamix system installation
3. Burner sleeve dampers installation

C. Piping

1. Demineralized water piping
2. Closed cooling water piping
3. Humidification water piping
4. Instrument air piping
5. Soot blower piping
6. Aspirating air piping

D. Demolition

1. Evaporator
2. Bottom ash hopper
3. Stairs and platforms
4. Electric boiler and control cabinet

E. Relocation

1. Blower and related piping
2. Low-pressure steam piping
3. High-pressure soot blower piping
4. Aspirating air piping

F Bottom Ash Hopper Replacement
1. Replace structural steel
2. Replace seal skirt
3. Install Vendor furnished equipment
4. Replace refractory

G. Fly Ash Piping Modification in Existing ESP Hopper Enclosure

H. Boiler Waterwall Reinforcement
1. Boiler and flue structural upgrades
2. Insulation and lagging removal and replacement

I. Burner Modifications
1 Install sleeve dampers
2. Remove and replace burner refractory

J. Instrumentation Installation

K. Testing

L. Painting

M. Concrete

N. Structural Steel

O. Grout

P. Asbestos and Lead Paint Abatement

Q Start-Up and Commissioning Support

1.3 RELATED SECTIONS

A. Section 00001 – Project Specific Information

B. Section 01330 – Submittals for Construction

C. Section 01400 – Quality Assurance and Quality Control

D. Section 01601 – General Material and Equipment Requirements

E. Section 01650 – Starting of Systems

F. Section 01666 – Testing of Piping Systems

G. Section 01700 – Contract Closeout

H. Section 01730 – Demolition

I. Section 03100 – Concrete Formwork

J. Section 03200 – Concrete Reinforcement

K. Section 03300 – Cast-in-Place Concrete

L. Section 03390 – Concrete Curing

M. Section 03600 – Grout

N. Section 04500 – Refractories

O. Section 05120 – Structural Steel

P. Section 05510 – Metal Fabrication

Q. Section 05531 – Gratings and Floor Plates

R. Section 09900 – Painting

S. Section 09902 – Field Applied Coatings

T. Section 13285 – Asbestos Abatement

U. Section 14550 – Bottom Ash Hopper Replacement

V. Section 15000 – Piping-General Requirements

W. Section 15002 – Piping Fabrication

X. Section 15050 – General NOx Reduction System Requirements

Y. Section 15080 – Mechanical Systems Insulation

Z Section 15100 – Valves

AA. Section 15120 – Piping Specialties

BB. Section 15140 – Pipe Hangers and Supports

CC. Section 15210 – Instrument Air Piping Installation

DD. Section 15221 – Closed Cooling Water Piping Installation

EE. Section 15222 – Service and Cooling Water Piping Installation

FF. Section 15500 – Boiler Waterwall Reinforcement

GG. Section 15830 – Fan Installation

HH. Section 15850 – ROFA Box Installation

II. Section 15890 – Duct Installation

JJ. Section 16146 – Control and Instrumentation Installation

1 4 ATTACHMENTS

A. Attachment A – Utility Engineering Drawing List

B. Attachment B – Reference Drawing List

PART 2 SUMMARY OF WORK (REFER TO RELATED SECTIONS FOR DETAILS)

2.1 GENERAL

A. Significant portions of this work must occur during the Unit 4 outage. Those items are designated herein as OUTAGE. For OUTAGE designated items, 100% of the work associated with these items must be completed after the start of the outage and prior to the end of the outage. The Contractor shall cooperate and coordinate with other Contractors, UE, and RPU during this time, and shall attend daily outage coordination meetings

2.2 NOX EMISSIONS CONTROL SYSTEM

A. Install new Rotating Opposed Fire Air (ROFA) system and all associated equipment and ductwork consisting of:

1. Components supplied by Mobotec:

   a. One (1) ROFA fan and isolation base

   b. Seven (7) ROFA boxes and cast boxes – OUTAGE

   c. ROFA ducting

   d. Duct supports and hangers

   e. Miscellaneous support steel required for supports and hangers

   f. Dampers and actuators

   g. Expansion joints

   h. ROFA flow elements

   i. Waterwall tube bend sections – OUTAGE

   j. Downcomer tube bend sections – OUTAGE

   k Pressure transmitters

2. Components supplied under this contract:

   a. Insulation for ROFA ductwork

   b. Refractory for ROFA boxes – OUTAGE

   c. Formwork material for cast refractory framing – OUTAGE

   d Piping and manual globe valves for pressure transmitters

   e. Remove and re-install soot blower piping around ROFA boxes to avoid interferences – OUTAGE

   f. Bearing cooling water piping and manual valves, including tie-in to existing plant system

B. Install new Rotamix system and all associated equipment and piping consisting of:

1. Components supplied by Mobotec:

   a. One (1) Rotamix fan

   b. 15 Rotamix injection devices – OUTAGE

   c One (1) furnace temperature probe - OUTAGE

   d. Rotamix ducting

   e. Duct supports and hangers

   f Miscellaneous support steel required for supports and hangers

   g. Dampers and actuators

   h. Expansions joints

   i Water wall tube bend sections – OUTAGE

   j Urea storage tanks

   k. Urea transfer pump skid

   l. Urea metering pump skids

   m. Urea dilution holding tank

   n. Urea and dilution water flow meters

   o. Humidification water pump skid

   p. Humidification water tank

   q. Humidification water rack

   r. Flow transmitters

   s. Pressure transmitters

2. Components supplied under this contract:

   a. All interconnecting piping between skids, tanks, and injection devices including, but not limited to, the following:

      1) Urea piping and manual valves

      2) Dilution water piping and manual valves, including tie-in to existing plant system

      3) Humidification water piping and manual valves, including tie-in to existing plant system

      4) Closed cooling water piping and manual valves, including tie-in to existing plant system

5) Instrument air piping and manual valves, including tie-in to existing plant system

6) Vent and drain piping and manual valves

7) Piping and manual globe valves for flow and pressure transmitters

8) Gaskets, nuts, bolts, fittings, etc required for complete piping installation

9) Anchor bolts for skids

2.3 DEMOLITION

A. Demolish existing out-of-service evaporator including abatement of asbestos insulation and remove from Site to make room for new equipment. Becomes property of Contractor.

B. Remove existing electric boiler and associated control panel and remove from Site to make room for new urea storage tanks. Becomes property of Contractor.

C. Remove platform and staircase to make room for new ROFA fan installation.

D. Remove and replace lagging and insulation from existing boiler and ductwork to allow for reinforcement – OUTAGE.

E. Prior to the removal of boiler lagging and insulation, the Contractor shall clean all exposed surfaces of the existing boiler insulation to prevent accumulations of fly ash and dust from becoming airborne. Removal of boiler lagging and insulation shall not commence until the Engineer has inspected these areas and is assured that boiler work will not adversely affect air quality within the boiler building. The City will use air monitors periodically to ensure that indoor dust levels are acceptable.

F During removal of existing insulation, the Contractor shall prevent insulation fibers from becoming airborne.

G. If necessary, remove and replace lagging and insulation from existing boiler building to facilitate installation of large equipment.

2.4 RELOCATION

A All relocation work must be coordinated with RPU's operations personnel and follow RPU and Contractor's lockout/tag out (LOTO) procedures.

B. Relocate platform at the rear of boiler to make room for new ROFA box installation per Engineer's drawing.

C. Remove and re-install blower and associated piping near new urea storage tanks.

D. Remove and re-install low pressure steam piping near new urea storage tanks.

E. Remove and re-install high pressure soot blower piping to avoid interference with new ROFA boxes and ductwork – OUTAGE.

F. Remove and re-install aspirating air piping to avoid interference with new ROFA boxes and ductwork – OUTAGE.

G. Remove and replace any other small bore piping, conduits, cable, cable tray, steel structures or platforms not described herein needed to complete work. The Contractor shall be totally responsible for identifying and managing these relocations, and cooperating with the City in performing this work. The Contractor shall be financially responsible for all such work. The Contractor shall not perform these relocations without permission from the City. The Contractor shall inform the City or Engineer of these relocations sufficiently in advance so arrangements can be made for temporary outages, LOTO, and other pre-work. (Refer to Mobotec Interference Identification List in drawings.) NOTE: Prior to the submittal of the Contractor's bid, the Contractor shall determine all interferences that will affect equipment and material installation and shall include all of the costs associated with such interferences.

2.5 BOTTOM ASH HOPPER REPLACEMENT – OUTAGE, ALL SECTIONS BELOW

A. Contractor shall remove existing hopper sections as described herein and dispose of off site. Contractor shall install all new hopper parts as described herein, and any appurtenances removed by Contractor to facilitate his work. Contractor is responsible for a totally operable ash hopper at the end of the outage.

B. Demolition of existing bottom ash hopper and associated equipment and piping necessary for access consisting of:

1. Remove gunite and brick refractory as required to remove all steel plate.

2. Remove all steel plate in contact with refractory or brick liner.

3. Remove 3 inch seal trough drain piping, valves, and Chicago coupling up to header.

4. Remove seal trough supply piping from 1-inch union to fabricated nozzles inside trough.

5. Remove all other piping and electrical equipment to allow for Contractor access

6. Disassemble water jacketed door frame piping to minimum extent

C. Install new bottom ash hopper and all associated equipment and piping consisting of:

1. Components supplied by United Conveyor Corporation (UCC):

a. Three (3) Excen Crushers

b. Two (2) poke hole doors and associated carbon steel adapters

c. Three (3) frames for vertical lifting doors

d Three (3) lifting door cylinders

e Bolts, nuts, washers, gaskets, and silicone

2. Components supplied by Babcock & Wilcox:

a. Drip ledge castings

3. Components supplied by RPU, manufactured by American Energy Products:

a. Seal trough

b. Supports above 12 inch channel

c. Six (6) 18 inch x 60 inch stainless steel screens

4. Components supplied by RPU, manufactured by United Conveyor Corporation:

a. Three (3) vertical lifting door removable fronts

b. Three (3) 9 inch x 12 inch doors

c. Three (3) poke holes

d Three (3) flood lights

e. Grease piping for lifting doors

f. Two (2) 12 inch Schedule 40 pipe ducts between lifting doors

g. Seal trough nozzles

5. Components supplied under this Contract:

a. Flat carbon steel plate required for seal trough

b. Flat carbon steel plate required for ash hopper

c. Flat carbon steel plate required for south access door

d. Materials for items 5.a., b., and c above shall be as specified on UCC drawing entitled "DESIGN OF ASH HOPPER – DRY (BOILER #4)."

e. 10 gauge corrugated Inconel 625 seal skirt

f. 3 inch seal trough drain line and all associated valves, fittings, Chicago couplings, and small piping.

g Seal trough piping from 1 inch union to new nozzles in seal trough.

h. Minor assembly piping and hardware for materials furnished under this Contract and for materials furnished by City.

i. Refractory anchors and refractory to be installed by Gagnon Incorporated, Refractory Services, M. Lukas Co., Inc., Refractory Products & Services, or City approved subcontractor.

1) KS-4V GR

2) Kast-O-Lite 22 G Plus

j. Hoses and clamps to five (5) poke hole doors

k. Piping and fittings to five (5) poke hole doors as required

2.6 FLY ASH PIPING MODIFICATION

A Re-route fly ash piping in existing ESP to allow door access to booster fan enclosure as shown on Vendor drawings.

1. Work performed under this contract:

a Removal of existing ash piping - OUTAGE

b. Installation of new ash piping - OUTAGE

c. Installation of new pipe supports and anchors

d. Penetration of ESP building wall for ash pipe

e Closing existing penetration of ESP building wall from ash pipe

2. Components supplied by RPU, manufactured by United Conveyor Corporation:

a Ash piping remaining from demolition under existing air heater hoppers.

b. Any new ash piping and fittings required to finish work.

3. Components supplied under this contract:

a. Pipe supports, anchors and support steel as shown on Vendor and Engineer's drawings.

2.7 BOILER WATERWALL REINFORCEMENT – OUTAGE, ALL SECTIONS BELOW

A. Strip and replace all insulation and lagging required to install support steel as indicated on Engineer's and B&W drawings for all associated equipment and ducting consisting of:

1. Flue gas ductwork

2. Combustion air ductwork

3. Boiler waterwalls

B. Install support steel for reinforcement as follows:

1. Components supplied under this Contract:

a. Flue gas ductwork reinforcement support steel as shown on Engineer's drawings

b. Combustion air ductwork reinforcement support steel as shown on Engineer's drawings

2. Components furnished by Babcock & Wilcox:

a. Support steel required to reinforce boiler waterwalls and flues as shown on Vendor drawings.

C. Prior to commencing work in the penthouse and rear wall arch support dead air space, the Contractor shall remove and dispose of ash in these areas

2.8 BURNER AND SECONDARY AIR MODIFICATIONS – OUTAGE, ALL SECTIONS BELOW

A. Removal of existing refractory in throat section of each burner per Vendor drawings. (Refer to Nalco Mobotec Installation Specification for Burner Throat Refractory Modifications.)

B. Replacement of refractory in burner throat sections per Vendor drawings. (Refer to Nalco Mobotec Installation Specification for Burner Throat Refractory Modifications.)

C. Installation of burner sleeve dampers and associated actuators and controls. (Refer to Nalco Mobotec Installation Specification for Burner Secondary Air Modifications.)

D. Installation of coal flow monitors in burner coal pipes per Vendor drawings. (Note: These Vendor drawings will be issued later by an addendum to the RFB.)

E. Components furnished under this Contract:

1. Refractory and refractory attachment pins

F. Components furnished by Vendor:

1. Six (6) burner sleeve dampers and actuators

2. Six (6) coal flow monitors and transmitters

2.9 INSTRUMENTATION INSTALLATION

A. All instruments shall be installed per Section 16146 and Vendor drawings.

2.10 TESTING

A. All installed piping except for ash piping shall be tested according to Section 01666 – Testing of Piping Systems

2.11 PAINTING

A. All exposed steel shall be prime painted according to Vendor specifications

2.12 CONCRETE

A. All concrete shall be provided as specified herein and in Vendor drawings for the following:

1. Foundation for ROFA fan
2. Foundation for Rotamix fan
3. Pads underneath storage tanks

2.13 STRUCTURAL STEEL

A. Structural steel shall be provided and installed as specified in Engineer's and Vendor's drawings for the following:

1. ROFA fan platform
2. Rotamix fan platform
3. Platform at rear of boiler
4. Additional platforms, staircases, and handrail

2.14 GROUT

A. All grout shall be provided as specified in Vendor drawings.

2.15 ASBESTOS AND LEAD PAINT ABATEMENT

A Asbestos abatement shall include removal of all asbestos containing materials as listed in the asbestos inventory included in the reference drawings and in accordance with the asbestos abatement plan. All asbestos abatement shall be done in a safe manner and in accordance with all federal, state, and local regulations and requirements.

B. Lead paint containing materials are listed in the lead paint inventory included in the reference drawings and removal shall be done in a safe manner and in accordance with all federal, state and local regulations and requirements.

2.16 START-UP AND COMMISSIONING SUPPORT

A. Seller to provide two (2) pipe fitters at 80 hours each and two (2) millwrights at 40 hours each during the checkout/start-up/commissioning period. Personnel selected are subject to City approval and will be under the direction of the Engineer. Timesheets must be submitted daily.

2.17 WORK NOT INCLUDED IN THIS CONTRACT

A. Vendor supplied materials.

B Electrical construction.

C. Lubrication materials

rpu
we pledge, we deliver
an enfinity energy partner

RESOLUTION

BE IT RESOLVED by the Public Utility Board of the City of Rochester, Minnesota, to approve a contract agreement with Moorhead Machinery & Boiler Company, and request that the Mayor and the City Clerk execute the agreement for

Mechanical Construction II
Emission Reduction Project

The amount of the contract agreement to be THREE MILLION FOUR HUNDRED AND TWO THOUSAND ELEVEN AND 00/100 DOLLARS ($3,402,011.00) and Moorhead Machinery & Boiler Company being lowest responsible bidder.

Passed by the Public Utility Board of the City of Rochester, Minnesota, this 27th day of May, 2008

_____
President

_____
Secretary