

# FOR BOARD ACTION

Agenda Item # 6.b.

Meeting Date: 3/28/06

**SUBJECT:**

SLP Unit 4 Boiler Chemical Cleaning  
Purchase Order to Babcock & Wilcox for Professional Services

**PREPARED BY:**

Wally Schlink, Director of Power Resources

**ITEM DESCRIPTION:**

SLP Unit 4 boiler is a pulverized coal, natural circulation boiler that was manufactured by The Babcock & Wilcox Company and went into service in December of 1969. The operating conditions of the boiler are 520,000 pounds of steam per hour at 1,350 p.s.i.g. and 955° F.

The high operating pressure and temperature cause compounds, primarily iron and copper, in the water and steam to plate out and adhere to the water side of the boiler tubes which causes overheating, tube failures, corrosion and inefficiencies. The process to remove these compounds is chemical cleaning. The need to chemical clean is governed by the amount of deposits in a given area of the tube surface. Unit 4's volume of deposits exceeds the guideline for chemical cleaning. The last time the unit was chemically cleaned was approximately 18 years ago.

During the chemical cleaning process, three stages of chemicals are introduced; hydrochloric acid and other chemicals for the removal of iron, sodium bromate and other chemicals for the removal of copper and hydrochloric acid again to remove any remaining iron. Between each of these stages, the boiler must go through multiple rinses, neutralization and passivation. The spent chemical and rinses must be disposed of appropriately which includes disposal of some chemicals as hazardous waste.

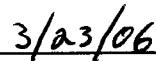
Due to the technical expertise required, significant safety and environmental issues involved and the level of professions knowledge of the boiler, associated equipment, operational issues and chemical reaction and handling technical knowledge required, staff is recommending the project as a professional service provided by the original equipment manufacture's Service Specialists from The Babcock & Wilcox Company. The attached proposal defines the services that will be provided by Babcock & Wilcox.

This project is an approved 2006 Major Maintenance project and is included in the current year's budget.

**UTILITY BOARD ACTION REQUESTED:**

Staff recommends that the Board approves a purchase order agreement with The Babcock & Wilcox Company to provide professional services for the chemical cleaning of SLP Unit 4 boiler. The purchase order agreement will be issued on a not to exceed amount of \$252,279.80 which is the estimated cost plus a \$40,000 contingency.

  
General Manager

  
Date



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March 8, 2006

Rochester Public Utilities  
4000 East River Rd, N. E.  
Rochester, MN 55906-2813

Attention: Walter Schlink

EMAIL: [wschlink@rpu.org](mailto:wschlink@rpu.org)

Reference: Silver Lake Station, Unit 4 (S-10209)

Subject: Boiler Chemical Cleaning

Dear Wally,

Per your request, B&W is pleased to provide you with this proposal to chemically clean the referenced boiler at Silver Lake Station. Since performing chemical cleanings can involve unexpected delays such as; tube leaks which can occur when introducing the chemical cleaning solution into the boiler, delays due to cold weather, delays due to insufficient laydown space available, costs associated with additional rinse requirements, and methods to provide hot rinse water to name a few, B&W is proposing to perform this work on a time and material basis as outlined below.

B&W is providing you with the estimated costs based on anticipated costs. These costs include: 1) the chemical supplier/disposal company, 2) a 20% mark-up of their costs to manage them and provide safety instructions to all parties, and 3) the estimated costs for B&W Field Engineering to interface with plant operations and the chemical cleaning contractor during the chemical cleaning procedure, 24 hours around the clock coverage until the cleaning is complete.

## **Background**

B&W solicited three competitive bids from chemical suppliers/waste disposal companies. Based on the bids we received, B&W feels that the bid received from MPW will be the least expensive company for Rochester Public Utilities with respect to chemical supply, manpower, equipment rental, and waste disposal. In order to obtain these competitive bids, we used a prior lab analysis you provided from Nalco. B&W would still like to obtain a recent tube sample to verify that the chemical concentrations and duration is as accurate as possible prior to starting the process. Depending on the results of a new test, chemical concentrations and duration may change slightly.



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## MPW Estimate (Chemical Supplier/Waste Disposal)

Basis: Volume = 24,000 gallons / 200,000 pounds,

Timeframe: 72 hours

### Chemicals:

7.0% Hydrochloric acid, 31,4%	4,200 gal @ \$1.85/gal	\$7,770.00
0.3% Rodine 213, inhibitor	72 gal @ \$45/gal	\$3,240.00
0.5% Ammonium Bifluoride	1000 lbs @ \$1.14/lb	\$1,140.00
0.4% Sodium bromate	800 lbs @ \$2.36/lb	\$1,888.00
0.64% Ammonium bicarbonate	1,300 lbs @ \$0.66/lb	\$858.00
Aqua Ammonia, 29%	1,500 gal @ \$2.10/gal	\$3,150.00
1.0% Sodium sulfate	2,000 lbs @ \$0.56/lb	\$1,120.00
7.0% Hydrochloric acid, 31,4%	4,200 gal @ \$1.85/gal	\$7,770.00
0.3% Rodine 213, inhibitor	72 gal @ \$45/gal	\$3,240.00
0.5% Ammonium Bifluoride	1000 lbs @ \$1.14/lb	\$1,140.00
1.5% Thiourea	3,000 lbs @ \$1.37/lb	\$4,110.00
1.0% Soda Ash	2,000 lbs @ \$0.45/lb	\$900.00
50% Liquid Caustic	5,400 gal @ \$2.42/gal	\$13,068.00
Nitrogen gas, 13,000 scf	4 bks @ \$400	\$1,600.00
<b>Chemical Total Estimate</b>		<b>\$50,994.00</b>

*(Unit Pricing applies to over and under bid estimate)*

### Personnel:

Supervisor	72 hrs @ \$50/hr	\$3,600.00
Chemist	72 hrs @ \$45/hr	\$3,240.00
Operator	72 hrs @ \$40/hr	\$2,880.00
Per Diem	15/mandays @ \$90/hr	\$1,350.00
Preservice Day	1 day @ \$900/day	\$900.00
Travel Charge	1 time @ \$1,500	\$1,500.00
<b>Personnel Estimated Total</b>		<b>\$13,470.00</b>

*(Variance is \$135.00 per hour plus per diem.)*



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## Equipment:

Pump Unit	72 hrs @ \$40/hr	\$2,880.00
Transport	72 hrs @ \$25/hr	\$1,800.00
Eductor, Skid Pump, Exchanger, Sandpiper, 2" Hose, Flow Meters & Manifold	1 job @ \$1,950	\$1,950.00
<b>Equipment Estimated Total</b>		<b>\$6,630.00</b>

<b>Mobilization/Demobilization</b>	1 Charge	<b>\$3,950.00</b>
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Frac Tanks, 10 days on-site		
8 tanks x 10 days	\$60/day	\$4,800.00
10 berms x 10 days	\$45/day	\$4,500.00
Delivery	\$5,000	\$5,000.00
Pick-up	\$5,000	\$5,000.00
<b>Frac Tank Estimated Total</b>		<b>\$19,300.00</b>

*(Variance is \$105.00 per tank per day after 10 days)*

## Waste Disposal:

Based on:

Volume of 72,000 gallons (non-haz), 3 boiler volumes	\$0.74/gal	\$53,280.00
Volume of 48,000 gallons (non-haz), 2 boiler volumes	\$0.74/gal	\$35,520.00
Volume of 24,000 gallons (haz), 1 boiler volume	\$1.11/gal	\$26,640.00

*Pricing includes all transportation.*

*Demurrage is \$85.00/hr for delays.*

*MPW Personnel on-site at \$490.00 per man per day to handle waste if necessary.*

*Tanks must be clean for removal.*

*Waste Water Treatment, Inc. is sub-contractor for waste disposal.*

*Waste must be pre-approved after it is generated.*



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## **B&W Chemical Cleaning Specialist (1), and B&W Service Engineer (1):**

Basis: 24 hour coverage per the attached rate sheet for 3 continuous weekdays, including travel and living expenses:

Estimated Cost: **\$24,475.00**

### **TOTAL ESTIMATED COSTS**

1. MPW
  - a. Chemicals .....\$50,994.00
  - b. Personnel .....\$13,470.00
  - c. Equipment, Mob/demob, Frac Tanks .....\$29,880.00
  - d. Waste Disposal (2 boiler volumes,  
non-hazardous & 1 volume of hazardous) .....\$62,160.00
2. 20% markup to manage MPW (\$156,504.00) .....\$31,300.80
3. B&W Field Engineering .....\$24,475.00

The total estimated price is based on the above information is **\$212,279.80**.

Invoiced costs for the B&W Engineers will be based on the attached rate sheet, and will be invoiced for actual time worked. Travel and living expenses while on site will be invoiced at cost. Costs for the Chemical Supplier/Disposal contractor is based on the above pricing as outlined above, and will be invoiced accordingly.

### **Validity and Terms**

This proposal is valid for 45 days from the date of this proposal and is offered in accordance with the attached terms and conditions.

Should you have any questions concerning the above proposal, please feel free to contact me at (630)719-5085.

Sincerely,  
THE BABCOCK & WILCOX COMPANY

Larry M. Polster  
District Field Engineering Manager



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## THE BABCOCK & WILCOX CO. FIELD ENGINEERING SERVICES

### SERVICE RATES

EFFECTIVE JANUARY 1, 2006

██████████:	\$1,336 per day
Principal Service Engineer:	\$1,512 per day
Babcock & Wilcox Service ██████████ Consulting: (Air Heater, Boiler, ██████████, Pulverizer, Metallurgical/Welding, Condition Assessment, Scrubber, Structural, & Water Treatment)	\$1,512 per day
Design Engineer: (Boilers, Air Heaters, Controls, Electrical, Combustion, Pulverizer, & Technology)	\$1,512 per day
Principal Test Engineer: \$1,512 per day (w/Computer Aided Diagnostics)	
Test Engineer:	\$1,336 per day
Test Technician:	\$1,160 per day
Flame Doctor® Service Team:	\$3,624 per day
Spyron™ Sensor System:	\$30/burner per day

- Rates shown are in U.S. Dollars.
- Rates are for Monday through Friday, 8 hours per day.
- 1.5 x \$ for time over 8 hours/weekday.
- 2 x \$ for Saturday, Sunday and Holidays.
- Rates are exclusive of travel and living. Travel and living will be billed at cost.
- Car mileage rate: 65¢/mile

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**Flame Doctor®** is a registered mark of the Electric Power Research Institute.  
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## RESOLUTION

BE IT RESOLVED by the Public Utility Board of the City of Rochester, Minnesota, to approve a purchase order agreement with The Babcock & Wilcox Company for

Professional Engineering Services for  
Chemical Cleaning of SLP Unit 4 Boiler

The amount of the purchase order agreement not to exceed TWO HUNDRED FIFTY-TWO THOUSAND TWO HUNDRED SEVENTY-NINE AND 80/100 DOLLARS (\$252,279.80) which is the estimated cost plus a \$40,000 contingency.

Passed by the Public Utility Board of the City of Rochester, Minnesota, this 28<sup>th</sup> day of March, 2006.

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President

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Secretary