

**Lee County Board Of County Commissioners  
Agenda Item Summary**

Blue Sheet No. 20050897

**1. ACTION REQUESTED/PURPOSE:**

Approve award of formal quotation (RFP B&R 2661-SM114) and issuance of a purchase order to Holtec International, the low price proposer, meeting all specification requirements for feedwater heaters in an amount not to exceed \$105,200.00.

**2. WHAT ACTION ACCOMPLISHES:** Provides the necessary feedwater heaters for the Waste To Energy Expansion Project.

**3. MANAGEMENT RECOMMENDATION:** Staff recommends approval of the motion.

**4. Departmental Category:** 8 *C8G*

**5. Meeting Date:** *06-28-2005*

**6. Agenda:**  
 Consent  
 Administrative  
 Appeals  
 Public  
 Walk-On

**7. Requirement/Purpose: (specify)**  
 Statute  
 Ordinance  
 Admin. Code *4-1*  
 Other

**8. Request Initiated:**  
 Commissioner \_\_\_\_\_  
 Department Public Works  
 Division Solid Waste  
 By: Lindsey J. Sampson  
*Lindsey J. Sampson*

**9. Background:**

Sealed quotes were received by the County's design engineer, Burns & Roe, on behalf of the Solid Waste Division on April 22, 2005. On that date three (3) responses were received.. After review, recommendation was made to award to the low-priced proposer meeting all specification requirements. Backup documentation indicates a price of \$5,250.00 for the option of a performance bond. The Solid Waste Division does not want to make use of this option.

Funds are available in account string: 200923 40102.506540

Attachments: Covanta Comments on the B&R bid evaluation dated 6/6/05  
 Burns & Roe bid evaluation dated 5/6/05  
 Tabulation sheet

**10. Review for Scheduling:**

Department Director	Purchasing or Contracts	Human Resources	Other	County Attorney	Budget Services				County Manager/P.W. Director
					Analyst	Risk	Grants	Per.	
<i>J. Saunders</i> <i>6-15-05</i>	<i>N.A. PK</i> <i>5/5</i>	<i>NA</i>			<i>6/15/05</i>	<i>6/15/05</i>	<i>6/15/05</i>	<i>6/15/05</i>	<i>J. Saunders</i> <i>6-15-05</i>

**11. Commission Action:**

- Approved
- Deferred
- Denied
- Other

RECEIVED BY  
 COUNTY ADMIN  
*6/15/05*  
*2:30*  
 COUNTY ADMIN  
 FORWARDED TO  
*9:30 PM*

Date: *6/15/05*  
 Time: *1:45*  
 Forwarded to:  
*Admin. 6/15/05*

## Lindsey Sampson - Feedwater Heaters - Selection and Recommendation

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**From:** "Young,Peter" <pyoung@CovantaEnergy.com>  
**To:** "Dennis Iavarone" <diavarone@roe.com>, <sampsolj@leegov.com>  
**Date:** 6/6/2005 3:57 PM  
**Subject:** Feedwater Heaters - Selection and Recommendation  
**CC:** "D'Amico,Don" <ddamico@roe.com>, "Stuhrke,Steve" <sstuhrke@roe.com>, "Anacker,Dennis" <danacker@CovantaEnergy.com>, "Howard,Jody" <Jody\_Howard@CovantaEnergy.com>, "Kelly,Jim" <Jim\_Kelly@CovantaEnergy.com>

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Gentlemen,

Based on B&R's Feedwater Heater Bid Evaluation, dated May 6, 2005, issued on May 6, 2005, Covanta concurs with B&R's selection and recommendation to purchase the subject package from Holtec. The following comments are for your consideration and guidance:

1. Commercial Terms & Conditions – Vendor has accepted the RFP Services/Goods Purchase Conditions, therefore requiring no further negotiations by the County.
2. Price: Covanta concurs with B&R's Recommended Award Price of \$105,200, however this price is only valid through June 7, 2005. **Don D'Amico is requested to reconfirm this price based on an order issued by the County by June 30, 2005.**
3. Bond: Vendor quoted a bond for County's consideration. This is an equipment delivery only order, therefore County does not require a bond and is not included in the recommended award.
4. Payment Terms: 10% for drawings; 40% upon receipt of tube material by Holtec; and 50% upon delivery to site.
5. Schedule: Delivery Date of March 1, 2006 supports that required by Project's Master Project Schedule.

Additionally, Covanta requests that the design fouling factors be reflected in the Covanta Attachment 2 data sheets and /or the feedwater heater specification sheets (included in the proposal by Holtec), and have both this Attachment 2 and Holtec's specification sheets included in the conformed specification.

B&R should proceed immediately in completing and submitting 1) a purchase order term sheet that reflects the final agreements and understandings to be incorporated into the purchase order, and 2) a conformed specification, with all data sheet data filled-in, for inclusion in the purchase order. **To support a June 2005 award, these B&R documents need to be provided to the County by June 10<sup>th</sup>.**

B&R's original and current schedule for issuing this PO is July 6, 2005 and June 24, 2005, respectively. **Covanta recommends that the County have this award approved by the BOCC no later than the June 28, 2005 BOCC Meeting to avoid the July BOCC recess.**

Peter



May 6, 2005

**LEE COUNTY  
WTE EXPANSION PROJECT  
FORT MYERS, FLORIDA**

**RFP 2661-SM 114  
Feedwater Heaters**

**BID EVALUATION**

Burns and Roe Enterprises, acting on behalf of Lee County, issued Request for Proposal No. 2661-SM 114 "Feedwater Heaters" on March 21, 2005 to the following pre-approved bidders: Holtec International, Manning and Lewis Engineering, Thermal Engineering International (TEI) and Yuba Heat Transfer. Manning and Lewis declined to bid. On April 4, 2005 Addendum No. 1 was issued to all bidders providing updated design conditions and Project Specific requirements. The original bid due date was extended from April 15 to April 22, 2005. Bids were received from:

- Holtec International - proposal number H-5014.HX
- Thermal Engineering International (TEI) - proposal number 05008F
- Yuba Heat Transfer - proposal number QH-4808-05

On April 22, 2005 the above three bids were opened and base bid prices recorded on the Proposal Opening Form (Attachment A).

**RECOMMENDATION:**

The recommended award of the contract is to Holtec International. Recommended award price is **\$105,200** which includes two Feedwater Heaters with accessories and freight costs FOB Jobsite. It does not include bonds or Sales/Use Tax.

**Recommended Award Price:       \$105,200.**

Holtec is holding recommended award price firm for order placement by June 7, 2005.

**BID EVALUATION 2661-SM114 "Feedwater Heaters" (cont'd...)**

**COMMERCIAL EVALUATION:**

Two of the three bids received were deemed competitive.

Attachment B is the bid abstract which shows base bids and pricing to conform bids to the Request for Proposal. The two low bids, Holtec and Yuba were reviewed.

**Thermal Engineering International's (TEI)** base price was approximately 74% higher than the lowest bid, and upon engineering's determination that the low bid (Holtec) bid was technically acceptable, no further consideration given to Thermal Engineering International's bid.

**Yuba's** base price is \$154,707 with a \$900. increase for pipe connection compliance (see technical section). Total price is \$155,607 which is 47% higher than Holtec. Yuba took exception to the Service/Goods Purchase Conditions and based their proposal its standard terms and conditions. As Yuba is 47% higher, no further commercial consideration was given.

**Holtec's** base bid is \$105,200 for both Heaters. Holtec's bid was valid through May 4, 2005. A purchase order is anticipated to be issued in early June. Holtec was requested to extend bid validity to June 1, 2005. Holtec responded with a \$5,000 price increase due to increasing tube pricing. Holtec further extended bid validity to June 7, 2005 at no additional increase. Holtec has withdrawn the \$5,000 increase and will keep bid valid through June 7, 2005 (see 5/6/05 email from Holtec). Included a set of channel gaskets and bolts for start-up spares. Holtec accepts the Service/Goods Purchase Conditions. Vendor drawings will be issued in four weeks after award and delivery is March 1, 2006 per the project schedule.

Payment Terms:           10% - submittal of approval drawings  
                                  40% - receipt of tube material by Holtec  
                                  50% - equipment delivery at jobsite

Deliverables:             4 week after order for drawing submittal  
Equipment Delivery:     March 1, 2006

Holtec International is the recommended bidder for furnishing the Feedwater Heaters based upon price and delivery schedule.

ATT "A"

LEE COUNTY, FLORIDA  
PROPOSAL OPENING FORM

RFP NUMBER 2661-SM 114

DATE 4.22.05

TITLE Feedwater Heaters

TIME 11 AM

Bidder	Proposal Date	Date Received	Unevaluated Price	Remarks
#1 Holtec International	4.19.05		\$105,200.-	
#2 TEI	4.15.05	4.15.05	\$183,800.-	
#3 Yuba	4.21.05	4.22.05	\$154,707.-	
#4				
#5				
#6				
#7				
#8				
Bid due date extended from 4/15/05 to 4/22/05				

OPENED BY: DDA 4.22.05

WITNESSES: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**ATTACHMENT B**

**BID ABSTRACT**

Burns and Roe Enterprises, Inc.

W/O: 2661 Lee County Expansion Project  
RFP 2661-SM1.14 Feedwater Heaters

**BUDGET: \$**

**FEEDWATER HEATERS**

		1	2	3	4	5
		\$	\$	\$	\$	\$
HOLTEC	TEI			Yuba		
ITEM	QTY	DESCRIPTION	UNIT			
1	2	Feedwater Heaters:	ea			
		Engineering		Included	Included	
		CD-HX-004		\$ 53,000	\$ 98,800	\$ 81,011
		CD-HX-005		\$ 52,200	\$ 85,000	\$ 73,696
		Shop Tests		included	included	
		As Bid Total		\$ 105,200	\$ 183,800	\$ 154,707
		Technical Adjustments		none	Not Evaluated	
		Extend Bid Validity		\$ 5,000	n/a	900
		Recommended Award Price		\$ 110,200	\$ 183,800	\$ 155,607
				base	+73,600	+45,407
					+66%	41%
		Start-up Spares-Gaskets/Bolts		included	extra	none
		Sales/Use Tax		none	none	none
		PERFORM./PAYMENT BONDS		\$ 5,250	\$ 6,400	\$ 11,350
		Bid Validity		7-Jun-05		23-May-05
		Drawings Submitted		4-8 wks		
		Jobsite Delivery		1-Mar-05		1-Mar-06
		PAYMENT TERMS		Milestones		Progress
		F.O.B. Delivered DESTINATION		Ft. Myers		Ft. Myers
		TECHNICALLY ACCEPTABLE		Yes		Yes
AWARD RECOMMENDATION: Holtec						
REASON FOR RECOMMENDATION:						
				Prepared by: D'Amico	DATE:	DATE:
				REVIEWED BY:	DATE:	DATE:

**ATTACHMENT B**

**BID ABSTRACT**

**FEEDWATER HEATERS**

Burns and Roe Enterprises, Inc.

W/O: 2661 Lee County Expansion Project  
RFP 2661-SM114 Feedwater Heaters

**BUDGET: \$**

1		2		3		4		5	
ITEM	QTY	UNIT	DESCRIPTION	HOLTEC	TEI	Yuba			
1	2	ea	Feedwater Heaters:						
			Engineering	Included	Included	Included			
			CD-HX-004	\$ 53,000	\$ 98,800	\$ 81,011			
			CD-HX-005	\$ 52,200	\$ 85,000	\$ 73,696			
			Shop Tests	Included	Included	Included			
			As Bid Total	\$ 105,200	\$ 183,800	\$ 154,707			
			Technical Adjustments	none	Not Evaluated				
			Extend Bid Validity	--	n/a	n/a			
			Recommended Award Price	\$ 105,200	\$ 183,800	\$ 155,607			
				base	+78,600	+50,407			
					+74%	47%			
			Start-up Spares-Gaskets/Bolts	Included	--	extra			
			Sales/Use Tax	none	none	none			
			PERFORM./PAYMENT BONDS	\$ 5,250	\$ 6,400	\$ 11,350			
			Bid Validity	7-Jun-05	--	23-May-05			
			Drawings Submitted	4-8 wks	--				
			Jobsite Delivery	1-Mar-05		1-Mar-06			
			PAYMENT TERMS	Milestones		Progress			
			F.O.B. Delivered DESTINATION	Ft. Myers	Ft. Myers	Ft. Myers			
			TECHNICALLY ACCEPTABLE	Yes		Yes			
AWARD RECOMMENDATION: Holtec									
REASON FOR RECOMMENDATION:									
						Prepared by: D'Amico		DATE:	
						REVIEWED BY:		DATE:	

FEED WATER HEATERS  
TECHNICAL REVIEW OF PROPOSALS  
FOR SM-114

Bids were received from the following three (3) vendors for the supply of the feed water heaters:

- Holtec International
- TEI
- Yuba

All of these bidders came in with bids in the \$150,000 range, with Holtec International being the least at \$105,200 and TEI the most expensive at \$183,800. A comparison of proposal pricing can be seen in attachment 1. All three bidders submitted their bids with no technical exceptions or clarifications. All bids were reviewed for technical acceptability. After review, Holtec and Yuba were technically acceptable. Since TEI's proposal was not competitively priced, it was not fully reviewed.

Upon review of Holtec and Yuba, Holtec should be awarded the bid. Technical comparisons of CD-HX-004 can be seen in attachment 2. Technical Comparisons of CD-HX-005 can be seen in attachment 3.



Holtec International

Holtec's Bid of \$105,200.00 is FOB to the jobsite. The cost breakdown is as follows: CD-HX-004, \$53,000.00 and CD-HX-005, \$52,200.00. Engineering services and shop tests are included into the cost of the units.

Holtec's Bid includes one set of spare gaskets and one set of spare bolting per heat exchanger. Also included, one per heat exchanger, are: Tubeside Relief Valve, shellside relief valve, tube installation/removal kit, vent orifice, and shell side level gauge.

The following Specifications need clarification:

CD-HX-004:

Desc.	SPEC REQUIREMENTS	Holtec Intl.	Resolution
Temperature of Feedwater leaving, °F	173°F	178.7°F	After review, Holtec admitted to error, temperature should be 173°F
Overall Heater Length, ft-in	16'-0" max	17'-6"	This Length is acceptable.

CD-HX-005

Desc.	SPEC REQUIREMENTS	Holtec Intl.	Resolution
Temperature of Feedwater leaving, °F	221°F	225.8°F	After review, Holtec admitted to error, temperature should be 221°F

Both CD-HX-004 and CD-HX-005

Desc.	SPEC REQUIREMENTS	Holtec Intl.	Resolution
Compliance with 2.11 Pipe Connectios	As per specified in 2.11		Included
Nozzle Orientation at 0° and 180° Change to 90° and 270°	Not Specified	0° & 180°	No Impact to Proposal for Change

In order to keep a June 1, 2005 validity, Holtec Int. requires the addition of \$5,000.00 per heater. Holtec's proposal, after questions answered, has been deemed technically acceptable.

Yuba Heat Transfer

Yuba's Bid of \$154,707.00 is FOB to the jobsite. The cost breakdown is as follows: CD-HX-004, \$81,011.00 and CD-HX-005, \$73,696.00. Engineering services and shop tests are included into the cost of the units. For compliance to Section 2.11 Pipe Connections, Yuba provided a price adder of \$900.00.

Yuba has included Operational spare parts list. They are :  
 Two (2) EACH Channel Cover Gaskets - \$500.00  
 Two (2) EACH Pass Partition Cover Gaskets - \$500.00

The following specifications need clarification:

CD-HX-004

Desc.	SPEC REQUIREMENTS	Yuba	Resolution
Transfer Rates, Clean & Service Condensing Zone	Not Specified	490/1.00	Service transfer rates w/ clean factor were stated. Amended to 551 / 490
Transfer Rates, Clean & Service Subcooling Zone	Not Specified	253/1.00	Service transfer rates w/ clean factor were stated. Amended to 281 / 245
Drain Inlets	1 X 4" BW	2" WE	Will Comply with Price Adder, see below "Compliance with 2.11 Pipe Connecitons"
Tube Side In	1 X 6" FLG	4" WE	Will Comply with Price Adder, see below "Compliance with 2.11 Pipe Connecitons"
Tube Side Out	1 X 6" FLG	4" WE	Will Comply with Price Adder, see below "Compliance with 2.11 Pipe Connecitons"

CD-HX-005

Desc.	SPEC REQUIREMENTS	Yuba	Resolution
Operating Temperature, °F	225.8°F	183°F	Temperature should be 225.8, Holtec amended.
Transfer Rates, Clean & Service Condensing Zone	Not Specified	610/1.00	Service transfer rates w/ clean factor were stated. Amended to 704 / 608
Transfer Rates, Clean & Service Subcooling Zone	Not Specified	225/1.00	Service transfer rates w/ clean factor were stated. Amended to 228 / 219

Desc.	SPEC REQUIREMENTS	Yuba	Resolution
Tube Side In	1 X 6" FLG	4" WE	Will Comply with Price Adder, see below "Compliance with 2.11 Pipe Connectios"
Tube Side Out	1 X 6" FLG	4" WE	Will Comply with Price Adder, see below "Compliance with 2.11 Pipe Connectios"

Both CD-HX-004 and CD-HX-005

Desc.	SPEC REQUIREMENTS	Yuba	Resolution
Compliance with 2.11 Pipe Connectios	As per specified in 2.11		Yuba will comply to 2.11 Pipe Connections for CD-HX-004 and CD-HX-005 with a price adder of \$900.00

Since questions submitted to the bidder have been answered, Yuba's Proposal has been deemed technically acceptable.

TEI (Thermal Engineering International)

TEI's Bid of \$183,800.00 is FOB to the jobsite. The cost breakdown is as follows: CD-HX-004, \$98,800.00 and CD-HX-005, \$85,000.00. Engineering services and shop tests are included into the cost of the units.

CD-HX-004:

Desc.	SPEC REQUIREMENTS	TEI	Resolution
Temperature of Feedwater Leaving the condensing zone	173.7°F	173°F	

CD-HX-005:

Desc.	SPEC REQUIREMENTS	TEI	Resolution
Temperature of Feedwater Leaving the condensing zone	220.8°F	221°F	

Both CD-HX-004 and CD-HX-005:

Desc.	SPEC REQUIREMENTS	TEI	Resolution
Design Temperature, °F, Shell	370°F	300°F	
Compliance with 2.11 Pipe Connectios		Included	

Answers to questions submitted to bidder need clarification. However, since the price of TEI's proposal is not competitive, no further action was taken. If TEI is to be considered, new data sheets need to be submitted with corrected values.

**Attachment 1**  
**Bid Prices**  
**Low Pressure Feedwater Heaters**  
**Mark Numbers – CD-HX-004 & CD-HX-005**

DESCRIPTION	BIDDER		
	Holtec	Yuba	TEI
Engineering Services	Included	Included	Included
Item (Mark#) CD-HX-004	\$53,000.00	\$81,011.00	\$98,800.00
Item (Mark#) CD-HX-005	\$52,200.00	\$73,696.00	\$85,000.00
Shop Tests	Included	Included	Included
Bid Price (Total of Above)	\$105,200.00	\$154,707.00	\$183,800.00
Price for Delivery to Site	Included	Included	Included
Price Adder for Section 2.11 Pipe Connection Compliance	Included	\$900.00	Included
Price Adder to Keep June 1, 2005 Validity	\$5,000.00 per Heater		
Total	<del>\$110,450.00</del> 110,200	\$156,607.00	\$183,800.00

Spares	Start-up / Commissioning	Operational Spares (2 yrs)
	Channel Gaskets - \$1000.00 ea Channel Bolting - \$750.00 ea (one set included for startup)	2 ea. Channel Cover Gaskets \$500.00 2 ea. Pass Partition Cover Gaskets - \$500.00

**Attachment 2**  
**Specification SM-114**  
**Low Pressure Feedwater Heater**  
**Mark # CD-HX-004**

Description	Specified Requirements	Bidders		
		Holtec International	TEI	Yuba
<b>Heater Performance Data</b>				
<b>Feedwater</b>				
Flow, lb/hr	147,267	147,267	147,267	147,267
Velocity Through Tubes, ft/sec		5.5	3.23	4.2
No. of Passes Through Tubes		4	4	4
Pressure Drop, psi		7.5	3	5
Temperature In, °F	114	114	114	114
Temperature Out, °F	173	173	173	173
<b>Steam</b>				
Operating Pressure, psia	7.3	7.3	7.3	7.3
Operating Temperature, °F	178.7	178.7	178.7	178.7
Steam Inlet Enthalpy, BTU/lb	1073	1073	1073	1073
<b>Overall Data</b>				
Terminal Temperature Difference, °F	5	5.7	5	5.7
Drain Subcooler Approach °F	10	10	10	10.0
Total Effective Surface, sq. ft.		676	885	827
<b>Condensing Zone</b>				
Duty, BTU/hr		8,200,000	7,829,000	7,820,535
Effective Surface, sq.ft.		575	746	700
LMTD, °F		23.4	22.8	22.8
Temperature of Feedwater Leaving °F		173**	173	173
Transfer rates, Clean & service BTU/hr (sq. ft.) °F		699.1** / 607.8	513/460	551* / 490*
<b>Subcooling Zone</b>				
Steam Pressure Drop, psi		0	Nil	7.47
Duty, BTU/hr		500,000	853,000	860,303

\*Changed as per Yuba e-mail response

\*\* Changed as per Holtec Responses

Attachment 2  
 Specification SM-114  
 Low Pressure Feedwater Heater  
 Mark # CD-HX-004

Description	Specified Requirements	Bidders		
		Holtec International	TEI	Yuba
Effective Surface, sq. ft.		101	139	127
Effective Tube Length, Ft-in		8'-9"	7'-0"	8'-4"
Drains, Pressure Drop, psi		0	0.1	0.2
Temperature of feedwater leaving zone, °F		124	119.8	119
LMTD, °F		28.3	27.6	27.57
Transfer Rates clean & service BTU/hr (sq. ft.) °F		175.3** / 168.8	251/222	281* / 245*
<b>Heater Construction Data</b>				
<b>Tube Side</b>				
Design Pressure, psig	275	275	275	275
Test Pressure, psig		358	Per Code	Code
Design Temperature, °F	300	300	300	300
Number of Tubes (U-Tubes)		141	243	186
Tube OD, in		0.625"	0.625"	0.625"
Tube Thickness, in. (State if AVG or MIN)	No less than .035 AVG	.035" AVG	.035" AVG	20 BWG AVG
Average Effective Straight Legth, in		353.16"***	127"	158"
<b>Shell Side</b>				
Design Pressure, psig	50	50	50	50
Test Pressure, psig		65	Per Code	Code
Design Temperature, °F, shell	370	370	300	370
<b>Materials</b>				
Shell	SA-516-70	SA516-70	SA516-70	SA-516-70
Shell Cover		SA516-70	SA516-70	SA-516-70
Tubes	SA-688 Type 304 (0.05% C max)	304 S.S.	304 S.S.	304 S.S.

\* Changed as per Yuba e-mail response  
 \*\* Changed as per Holtec Responses

**Attachment 2  
Specification SM-114  
Low Pressure Feedwater Heater  
Mark # CD-HX-004**

Description	Specified Requirements	Bidders		
		Holtec International	TEI	Yuba
Tubesheet	SA-516-70	SA516-70	SA516-70	SA-516-70
Support Plates		SA-36	A285	SA-285
Channel	SA-516-70	SA516-70	SA516-70	SA-516-70
Channel Cover	SA-516-70	SA516-70	SA516-70	SA-516-70
Channel Nozzles	SA-106-GRB	SA106B	SA105	SA-105
<b>Dimensions</b>				
Overall Heater Length, ft-in	16'-0" Max	17'-6"	16'-0"	15'-7"
Shell OD, in.		24"	32"	29"
Clearance required for removal of shell (or bundle)		16'	9'6"	12'-10"
<b>Weights</b>				
Shipping		6000	8000	7100
Full of Water		8741	12000	10900
Tube Bundle		3500	4400	4900
Shell		2328	3600	2200
<b>Relief Valves</b>				
Size, inlet x outlet, in		Shell 3" x 1" Tube 3/4" x 1"	Shell 3"150# x 4", 150# Tube 3/4" x 1"	Shell 2 x 3 Tube 3/4 x 1
Holtec -- added		Dresser	Consolidated	Consolidated
<b>Fig No.</b>		Shell - 1900 Tube - 1982	Shell 1905-30-KC Tube 19096MC	Shell 1905-30JC- LA Tube 19096LC-LA
<b>Valve Body Material</b>		C/S	Steel	Carbon Steel
Holtec -- added				

\*Changed as per Yuba e-mail response  
\*\* Changed as per Holtec Responses



**Attachment 2**  
**Specification SM-114**  
**Low Pressure Feedwater Heater**  
**Mark # CD-HX-004**

Description	Specified Requirements	Bidders		
		Holtec International	TEI	Yuba
Capacity at 110% set press lb/hr at temp-Holtec - added		281°F Shell 126,500 btu/hr 173°F Tube 2,725 btu/hr	70°F Shell 201,500 Tube 5000	+221°F Shell 137794 Tube 20830
<b>Connections</b>				
Tube side -- in.	1 X 6" FLG	As Per Spec	6" 300# RF	4" W.E.
Tube side -- Out	1 X 6" FLG	As Per Spec	6" 300# RF	4" W.E.
Shell Side (Extraction Steam)	1 X 12" BW	As Per Spec	12" W.E.	12" W.E.*
Shell Side (From Drain Cooler)		As Per Spec	4" W.E.	2" W.E.
Drain Inlets	1 X 4" BW	As Per Spec	4" W.E.	2" W.E.*
Level Controls	6 X 2" FLG	As Per Spec	As Required	Later
Chem Cleaning -- Shell Side	3 X 2" FLG	As Per Spec	As Required	Later
Chem Cleaning -- Tube Side	2 X 2" FLG	As Per Spec	As Required	Later
Vents -- Tube	2 X ¾" SW	As Per Spec	As Required	Later
Shell	1 X ¾" SW	As Per Spec	As Required	Later
Drain -- Tube	2 X 1" SW	As Per Spec	As Required	Later
Shell	2 X 2" SW	As Per Spec	As Required	Later
Shell Vent Orifice	1 X ¾" SW	As Per Spec	As Required	Later
Pressure Gauge	1 X ¾" SW	As Per Spec	As Required	Later
Temperature Gauge		As Per Spec	As Required	Later
Exceptions		No	No	No

\*Changed as per Yuba e-mail response

\*\* Changed as per Holtec Responses

Attachment 3  
Specification SM-114  
Low Pressure Feedwater Heater  
Mark # CD-HX-005

Description	Specification Requirements	Bidders		
		Holtec International	TEI	Yuba
<b>Heater Performance Data</b>				
<b>Feedwater</b>				
Flow, lb/hr	147,267	147267	147267	147267
Velocity Through Tubes, ft/sec		5.5	5.44	5.7
No. of Passes Through Tubes		4	4	4
Pressure Drop, psi	8 psia max	6.5	6.0	7.5
Temperature In, °F	173	173	173	173.0
Temperature Out, °F	221	221	221	221
<b>Steam</b>				
Operating Pressure, psia	19.2	19.2	19.2	19.2
Operating Temperature, °F	225.8	225.8	225.8	225.8*
Steam Inlet Enthalpy, BTU/lb	1127	1127	1127	1127
<b>Overall Data</b>				
Terminal Temperature Difference, °F	5	4.8	5	4.8
Drain Subcooler Approach °F	10	10	10	10
Total Effective Surface, sq. ft.		588	635	629
<b>Condensing Zone</b>				
Duty, BTU/hr		6,800,000	6,785,000	6,784,252
Effective Surface, sq. ft.		517	569	572
LMTD, °F		19.4	19.5	19.46
Temperature of Feedwater Leaving °F		221**	221	221
Transfer Rates, Clean & Service BTU/hr (sq. ft.) °F		789.7** / 674.8	711/613	704* / 608*
<b>Subcooling Zone</b>				
Steam Pressure Drop, psi		0	Nil	7.47
Duty, BTU/hr		300,000	313,000	313,737

\*Changed as per Yuba e-mail response

\*\* Changed as per Holtec responses

**Attachment 3**  
**Specification SM-114**  
**Low Pressure Feedwater Heater**  
**Mark # CD-HX-005**

Description	Specification Requirements	Bidders		Yuba
		Holtec International	TEI	
Effective Surface, sq. ft.		71	66	57
Effective Tube Length, Ft-in		6'-3"	5'-6"	5'-1"
Subcooling Zone, Pressure Drop, psi	2	0	0.1	0.03
Temperature of Feedwater Leaving Zone, °F		183	175.1	175.13
LMTD, °F		25.0	25.1	25.06
Transfer Rates clean & service BTU/hr (sq. ft.) °F		182.1** / 175.0	210/189	228* / 219*
<b>Heater Construction Data</b>				
<b>Tube Side</b>				
Design Pressure, psig	275	275	275	275
Test Pressure, psig	Per Code	358	Per code	Code
Design Temperature, °F	300	300	300	300
Number of Tubes (U-Tubes)		141	147	137
Tube OD, in		.625"	.625"	.625
Tube Thickness, in. (State if AVG or MIN)	No less Than .035" AVG	.035 AVG	.035" AVG	20 BWG AVG
Average Effective Straight Legth, in		307.44"***	153"	164
<b>Shell Side</b>				
Design Pressure, psig	50	50	50	50
Test Pressure, psig	Per Code	65	Per code	Code
Design Temperature, °F, shell	370	370	300	370
<b>Materials</b>				
Shell	SA-516-70	SA-516-70	SA-516-70	Steel SA-516-70
Shell Cover		SA-516-70	SA-516-70	SA-516-70

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**Attachment 3**  
**Specification SM-114**  
**Low Pressure Feedwater Heater**  
**Mark # CD-HX-005**

Description	Specification Requirements	Bidders		
		Holtec International	TEI	Yuba
Tubes	SA-688 Type 304 (0.05% C max)	304 S.S.	304 S.S.	304 S.S.
Tubesheet	SA-516-70	SA-516-70	SA-516-70	SA-516-70
Support Plates		SA-36	A285	SA-285
Channel	SA-516-70	SA-516-70	SA-516-70	SA-516-70
Channel Cover	SA-516-70	SA-516-70	SA-516-70	SA-516-70
Channel Nozzles	SA-106-GRB	SA106B	SA 105	SA-105
<b>Dimensions</b>				
Overall Heater Length, ft-in	16'-0" Max	15'-7"	16'-0"	16'-0"
Shell OD, in.		24"	25"	26"
Clearance required for removal of shell (or bundle)		14'	9'-6"	13'-4"
<b>Weights</b>				
Shipping				
Full of Water		6000	6000	5900
Tube Bundle		8042	9000	9100
Shell		3300	3000	3900
<b>Relief Valves</b>		2146	3000	2000
Holtec - added	Size, inlet x outlet, in	Shell 3" x 1" Tube 3/4" x 1"	Shell 3", 150# x 4", 150# Tube 3/4" x 1"	Shell 2 x 3 Tube 3/4 x 1
Holtec - added	Manufacturer	Dresser	Consolidated	Consolidated
Holtec - added	Fig No.	Shell - 1900 Tube - 1982	Shell 1905-30-KC Tube 19096MC	Shell 1905-30JC- LA Tube 19096LC-LA

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**Attachment 3**  
**Specification SM-114**  
**Low Pressure Feedwater Heater**  
**Mark # CD-HX-005**

Description	Specification Requirements	Bidders	
		Holtec International	TEI
Valve Body Material		C/S	Steel
Holtec - added			Carbon Steel
Capacity at 110% set press lb/hr at temp-		281°F Shell 129,000 bth/hr	70°F Shell 201,500 Tube 5000
Holtec - added		173°F Tube 2,675 btu/hr	+221°F Shell 137794 Tube 20830
<b>Connections</b>			
Tube side - in.	1 X 6" FLG	As Per Spec.	6" 300# RF
Tube Side - Out	1 X 6" FLG	As Per Spec.	6" 300# RF
Shell Side (Extraction Steam)	1 X 8" BW	As Per Spec.	Type W.E.
Shell Side (From Drain Cooler)		As Per Spec.	As Required
Drain Inlets	N/A	As Per Spec.	As Required
Level Controls	6 X 2" FLG	As Per Spec.	As Required
Chem Cleaning - Shell Side	3 X 2" FLG	As Per Spec.	As Required
Chem Cleaning - Tube Side	2 X 2" FLG	As Per Spec.	As Required
Vents - Tube	2 X 3/4" SW	As Per Spec.	As Required
Shell	1 X 1-1/2" SW	As Per Spec.	As Required
Drain - Tube	2 X 1" SW	As Per Spec.	As Required
Shell	2 X 2" SW	As Per Spec.	As Required
Shell Vent Orifice	1 X 3/4" SW	As Per Spec.	As Required
Pressure Gauge	1 X 3/4" SW	As Per Spec.	As Required
Temperature Gauge		As Per Spec.	As Required
Exceptions		No	No
			No

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