LAKELAND ELECTRIC

Farzie Shelton, chE; REM

Manager of Environmental Affairs

Bureau of Air Regulation
Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

February 10, 2004

Attention: Mr. Mike Halprin. P.E.

RE: McIntosh Unit 3 Maintenance Outage

Dear Mike:

I would like to thank you and Jim Pennington for meeting with us on January 21 regarding the upcoming maintenance outage for McIntosh Unit 3. As per our discussion and your request, we are submitting the additional information you requested at the meeting. The information and calculations attached to this letter have been prepared by Mr. Ken Kosky P.E. of Golder Associates. As per our agreement, the maintenance outage will proceed from mid February to mid May 2004 as scheduled and we hope any permitting issues, if any, will be resolved prior to the conclusion of outage.

Lakeland Electric appreciates the opportunity to provide this additional information. Please call or e-mail if there are any questions.

Sincerely,

Enclosures

cc: Ken Kosky
Angela Morrison
Robert Manning

City of Lakeland ◦ Department of Electric Utilities

501 East Lemon Street ◦ Lakeland, Fl 33801-5050 ◦ (863) 834-6603 ◦ Fax (863) 834-8187 ◦ Message System 834-6592

farzie.shelton@lakelandelectri.com

Golder Associates Inc.

6241 NW 23rd Street, Suite 500
Gainesville, FL 32653-1500
Telephone (352) 336-5600
Fax (352) 336-6603

Golder Associates

February 6, 2004

0437514

Lakeland Electric
501 E. Lemon Street
Lakeland, Florida 33801-5079

Attention: Ms. Farzie Shelton, Manager of Environmental Affairs

RE: McIntosh Unit 3 Maintenance Outage

Dear Farzie:

This correspondence presents the additional information requested by Jim Pennington and Mike Halpin at the January 21, 2004 meeting in Tallahassee concerning the work being performed on McIntosh Unit 3 during the upcoming outage. I have also included past actual and future project actual emission calculations.

- **Superheater Tube Replacement:** Tubes are evaluated and repaired and/or replaced every outage. In some cases, surface areas were reduced slightly in an attempt to decrease fly ash erosion due to high velocities. The attached maintenance summary presents the previous maintenance activities conducted in the superheater where it was necessary to replace a portion of the tubes. Replacements were conducted in 1996 and 1998.
- **Burner Replacements:** The air register blades and linkages have been damaged for years. Replacement of the entire burner assembly is necessary since the original burners cannot be repaired. Previously, individual burners were replaced during outages. Attached are drawings of the original burner and the burner manufactured by Power Industrial. The burners are identical except that certain upgrades are being made to minimize warping of back plates. This, along with other damage, made the register linkages inoperable and adversely affected the ability to control NO_x emissions. The only material change that is being made to the burners is at the Outer Register back plate. The material was changed from carbon steel to 309 SS due to the severe warping of this plate. The warping caused limiting/locking of the register blades and boiler tuning was limited. These plates are subjected to the radiant heat of the furnace. The thickness of the back plate was increased to 1/2" from 3/8" for the same reason. The burner design is functionally the same as the original burners, and previous replacements have successfully demonstrated that the NO_x emission levels can be achieved. This outage will replace 16 of the 32 burners in Unit 3. In previous outages, 16 burners have been replaced. It should be noted that the NO_x emissions levels have remained stable and ranged from 0.47 to 0.48 lb/MMBtu over the last 6 years.
- **Condenser Retubing:** The decision to change from copper-based materials to titanium in the condenser was based on damage due to the use of reclaimed water. At the time of original design, there was no operating experience with the chemistry problems associated with this type of cooling water. In 1997, an eddy current inspection of 10 percent of the tubes was conducted, and it was recommended that retubing be conducted as soon as possible due to the depth of tube pitting and the remaining tube wall thickness. This observation was at 15 years of service. In 1998,

an eddy current inspection of 100 percent of the tubes was conducted and determined that the condition of the tubes was bad by industry standards, but immediate retubing was not required. At this time, the decision was made to plug all of the tubes that would likely fail in the immediate future (about 6 percent) and to try to postpone the retubing until the next turbine overhaul. During the last 4 years, an increased number of tube leaks occurred resulting in about 10 percent of the total condenser tubes being plugged. The condenser has 21,000 tubes with approximately 2,100 plugged. Based on the experience on Unit 3 with reclaimed water, titanium condenser tubes were selected for Unit 5. The additional benefit with titanium is the elimination of copper.

- **Past Actual and Future Project Actual Emissions:** Table 1 presents the past actual and future projected emissions for McIntosh Unit 3. The past actual emissions are for the period 1998 through 2003. Emissions for 2003 are estimated since emission information is being finalized. The future projected emissions are based on projected generation using the average emission rate over the period 1998 through 2002. As shown in the table, the amount of generation is not expected to increase over past actual 2-year periods (i.e., 2000-2001 and 2001-2002). The emissions for all pollutants are not projected to increase. The reported PM_{10} emissions in the previous Annual Operating Reports are highly variable since they were based on single stack test data. To estimate past actual and future projected emissions of PM_{10}, the average emission rate during the period 1998 through 2002 was used. Using single stack test data is not appropriate since any calculation would produce calculation artifacts of test variability.

Please call or e-mail (kkosky@golder.com) if there are any questions.

Sincerely,

GOLDER ASSOCIATES INC.

Kennard F. Kosky, P.E.
Principal
Professional Registration Number 14996

SEAL

Enclosures

KK/nav

L020604.doc

Table 1. Past Actual and Project Future Actual Emissions for McIntosh Unit 3

Year	**Generation** (kW-hr)	Annual Emissions (tons/year) PM_{10} Note (1)	PM_{10} Note (2)	SO_2 Note (3)	NO_x Note (3)	CO Note (1)	VOC Note (1)
1998	2,045,000,000	321	283	6,470	4,569	237	4
1999	2,385,970,000	556	330	7,328	5,424	277	3
2000	2,715,800,000	133	376	8,423	7,038	306	29
2001	2,832,660,000	267	392	10,287	7,886	196	32
2002	2,464,360,000	390	341	8,165	6,166	157	28
2003	2,529,060,000	350	350	8,235	6,265	242	19
2004	2,180,851,114		302	7,101	5,402	209	16
2005	2,618,330,307		362	8,526	6,486	250	19
2006	2,511,658,179		347	8,179	6,222	240	18
2007	2,632,083,677		364	8,571	6,520	252	19
2008	2,502,850,075		346	8,150	6,200	239	18
2009	2,407,018,183		333	7,838	5,962	230	18
1998-99	2,215,485,000		306	6,899	4,997	257	4
1999-2000	2,550,885,000		353	7,875	6,231	292	16
2000-01	2,774,230,000		384	9,355	7,462	251	31
2001-02	2,648,510,000		366	9,226	7,026	177	30
2002-03	2,496,710,000		345	8,200	6,215	200	23
2003-04	2,354,955,557		326	7,668	5,833	225	17
2004-05	2,399,590,710		332	7,814	5,944	229	18
2005-06	2,564,994,243		355	8,352	6,354	245	19
2006-07	2,571,870,928		356	8,375	6,371	246	19
2007-08	2,567,466,876		355	8,360	6,360	245	19
2008-09	2,454,934,129		339	7,994	6,081	235	18

Note (1): from Annual Operating Reports. Reported PM_{10} based on single stack test, which resulted in varaible emission rates and annual emissions.

Note (2): based on the average PM_{10} emission rate for 1998 through 2002

Note (3): from EPA Acid Rain Database.

EST. SHIPPING WEIGHT
3,400.00 POUNDS

PLANT CODE	UNIT	NO.	DATE	DESCRIPTION	BY
LAKMC1	3			REVISIONS	

CAD GENERATED DRAWING, DO NOT MANUALLY UPDATE

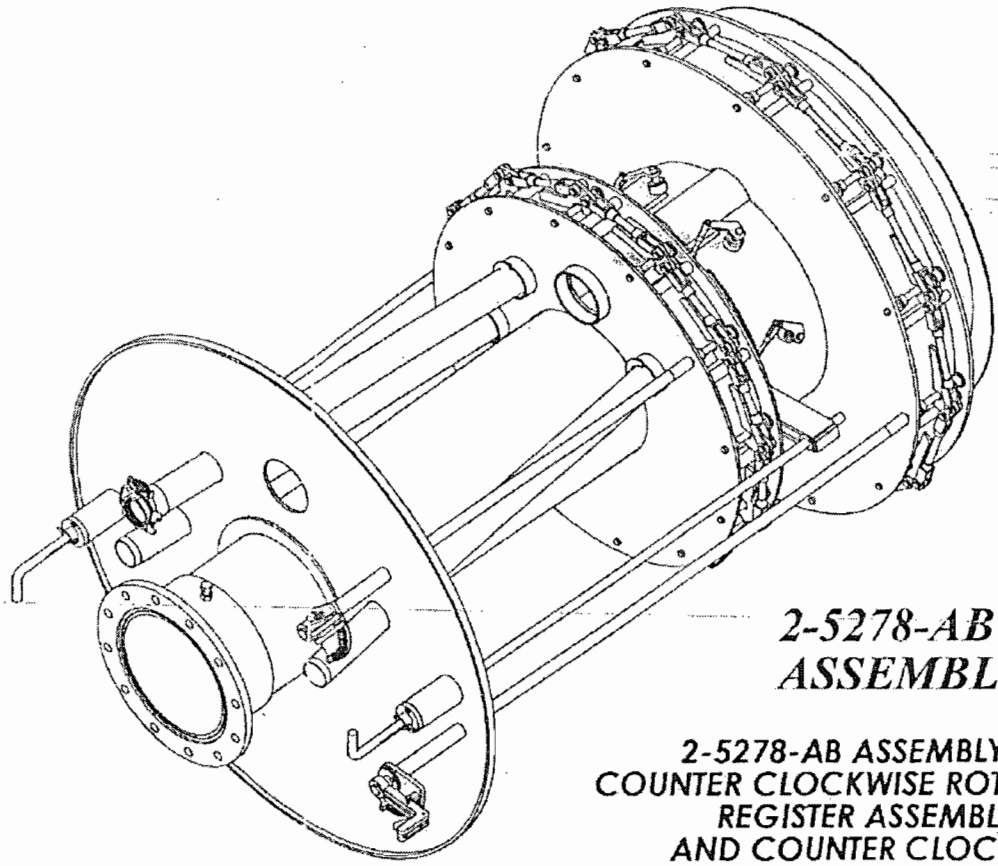
	APPROVED	DATE
DRAWN	SAB	12-21-00
CHECKED		
ENG APPR.		
MFG APPR.		

POWER & INDUSTRIAL

BURNER CELL ASSEMBLY
GENERAL ARRANGEMENT
AND INSTALLATION
DRAWING

SIZE D | DWG. NO. 2-5278-A-INSTALL | REV. 0

SCALE | CAD FILE | SHEET 1 OF 1

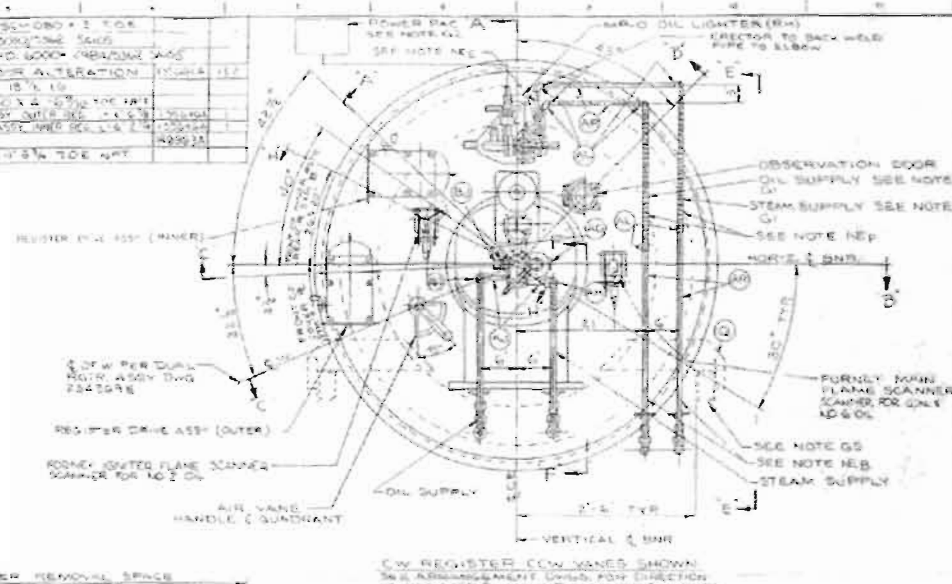


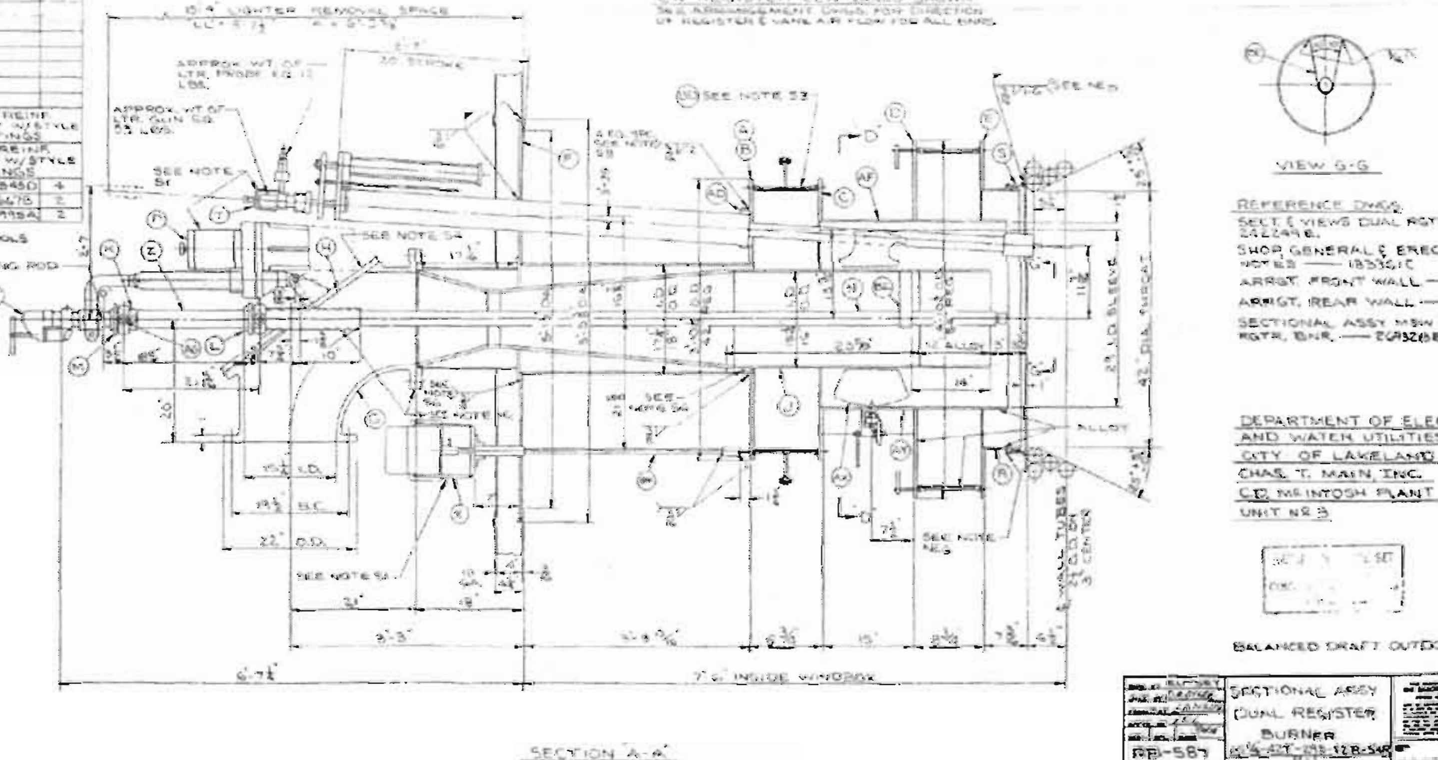
2-5278-AB ASSEMBLY

2-5278-AB ASSEMBLY HAS COUNTER CLOCKWISE ROTATION AIR REGISTER ASSEMBLIES AND COUNTER CLOCKWISE SPIN VANE ASSEMBLY AS SHOWN AND 2-5278-AA ASSEMBLY HAS CLOCKWISE ROTATION AIR REGISTER ASSEMBLIES AND CLOCKWISE SPIN VANE ASSEMBLY NOT SHOWN

REFERENCE LIST (3) DUAL RGTR BNRS) 16 FW - 16 RW			
SYM.	DESCRIPTION	DWG. NO.	SH. NO.
A	DUAL RGTR ASSY 16CW - 16CCW	234569E	1 & 2
B	INNER RGTR FRAME REAR ℄ CUT-OUT 17627C	183857C	1 & 2
C	INNER RGTR FRAME FRT ℄ CUT-OUT 17627C	183855C	1 & 2
D	OUTER RGTR FRAME REAR ℄ CUT-OUT 17627C	183860C	1 & 2
E	OUTER RGTR FRAME FRT ℄ CUT-OUT 17627C	183861C	1 & 2
F	COVER PLATE	242299E	1 & 2
G	COAL ELBOW	51488C	CA
H	ELBOW COVER	116194A	1
J	VENTURI COAL NOZZLE L = 7-11 ⁹⁄₁₆	234578E	1
K	HANDLE	28618	BA
L	ROD & PORT SEAL	149927C	RH
M	ROD SEAL	74650C	
N	REGULATING ROD	55281784	6
P	REGULATING ROD DRIVE 12 STROKE	145557D	
Q	RGTR. SUPPT. BRACKET	135644A	1,2,3,4
R	THROAT SLEEVE	134681B	3
S	THROAT SLEEVE CASING	134682B	3
T	OIL LIGHTER 10 RH & 16 LH W/OVAL CAN	242256E	1 & 2
V	RACER ATOMIZER ASSY	117609D	
W	HANDLE & QUAD ASSY (VANE) L = 5-6	184196C	
X	REGISTER DRIVE ASSY (INNER)	200978D	
Y	REGISTER DRIVE ASSY (OUTER)	200978D	
Z	PIPE SA312 TP304H 2.5 = SCH040S = 2' 3⁷⁄₁₆ LG		
AA	OBSERVATION DOOR ASSY L = 4'-6 ⁷⁄₁₆	105148A	1
AB			
AC	PIPE SA53A TP S 4 IN SCH 040 x 1½		
AD	PIPE SA53A 6 IN SCH 040 x 1½		
AE	AIR VANE ALTERATION	155551B	1,2 & 3
AF	INNER AIR SLEEVE ALTERATION	155549B	1
AG	PLUG SCRD ½ SQ HD [illegible]		
AH	ELB SCRD 90 D ½ 3000# [illegible] SA105		
AJ	PIPE SA106B .75 SCH 080 x 3½ TBE		
AK	PIPE SA106B .75 SCH 080 x 3" TBE		
AL	ELB SCRD 90C ½ 3000# 3411/3142 SA105		
AM	TEE SCRD ½ 3000# 3877/3142 SA105		
AN	PLUG SCRD ½ SQ HD 6000# 2499/3142 SA105		
AP	NIP TBE [illegible] SA106B ½ SCH 080 x 3		
AQ	NIP TOE [illegible] SA106B ½ SCH 080 x 3		
AR	PIPE SA106B .75 SCH 080 x 12'-0 [illegible]		
AS	VLV GLOBE S/W ½ VOGT SW-801 600#		
AT	VLV GLOBE S/W ½ VOGT SW-801 600#		
AV	SUPPLY HOSE ¾ PENFLEX 201-31 57 LG. REINF FULL LGTH. W/16-30 GALV. STL CONDUIT W/STYLE WHN ONE END WUF OTHER END CS FITTINGS		
AW	SUPPLY HOSE ½ PENFLEX 201-31 55 LG. REINF. FULL LGTH. W/16-30 GALV. STL. CONDUIT W/STYLE WHN ONE END WUF OTHER END CS FITTINGS		
AX	AIR VANE	146545D	4
AY	INNER AIR SLEEVE	134647B	2
AZ	THD BAR (VANE LINKAGE)	133995A	2
BA	PIPE SA106B .75 SCH 080 x 3 TOE		
BB	TEE SCRD ½ 3000# 3082/3142 SA105		
BC	PLUG SCRD ½ SQ HD 6000# 2499/3142 SA105		
BD	INNER RGTR AIR DOOR ALTERATION	155494A	1 & 2
BE	BAR TP304 [illegible]		
BF	PIPE A106 3 SCH 080 x [illegible] TOE NPT		
BG	REGISTER DRIVE SHAFT ASSY OUTER REG [illegible]	[illegible]	1
BH	REGISTER DRIVE SHAFT ASSY INNER REG [illegible]	[illegible]	1
BJ	LIMIT SWITCH	409912A	
BK	PIPE A106 3" SCH040 x [illegible] TOE NPT		

TWO (2) SETS OF LIGHTER MAINTENANCE TOOLS
ONE (1) SET PER WALL





REFERENCE DWGS.

SECT. & VIEWS DUAL RGTR. BNR 242249E

SHOP GENERAL & ERECTORS NOTES — 183361C

ARRGT. FRONT WALL — 4535J

ARRGT. REAR WALL — 4536J

SECTIONAL ASSY MSW DUAL RGTR. BNR. — 2G9328E

DEPARTMENT OF ELECTRIC AND WATER UTILITIES
CITY OF LAKELAND
CHAS. T. MAIN, INC.
C.D. McINTOSH PLANT
UNIT Nº 3

BALANCED DRAFT OUTDOOR UNIT

SECTIONAL ASSY
DUAL REGISTER
BURNER

RB-587

242248 E

8

0437514/4/4.1/020604/B&W Dual Reg Burner.pdf

McIntosh Unit 3 Maintenance Summary

I. Unit 3 Boiler Super Heater Components

1) *Platen Secondary Super Heater*

a) Existing Material Specification (Type & Grade)	SA209T1A, SA213T2, Sa213TP304H
b) New Material Specification (Type & Grade)	No Change
c) Surface Area	8,023 sq. ft.
d) Surface Area Replaced	0%
e) Year Replaced/Repaired	Never Replaced // Repairs made on an intermittent basis.

2) *Secondary Super Heater*

a) Existing Material Specification (Type & Grade)	SA213T12, SA213T22, SA213TP304H
b) New Material Specification (Type & Grade)	SA213T22, SA213TP304H
c) Surface Area	21,542 sq. ft.
d) Surface Area Replaced	53%
e) Year Replaced/Repaired	**1998**

Secondary Super Heater

a) Existing Material Specification (Type & Grade)	SA213T12, SA213T22, SA213TP304H
b) New Material Specification (Type & Grade)	SA213T22, SA213TP304H
c) Surface Area	10,117 sq. ft.
d) Surface Area Replaced	47%
e) Year Replaced/Repaired	**2004**(Planned to be replaced in Feb 04')

3) *Primary Super Heater*

a) Existing Material Specification (Type & Grade)	SA209T1A
b) New Material Specification (Type & Grade)	SA213T11
c) Surface Area	111,788 sq. ft.
d) Surface Area Replaced	64%
e) Year Replaced	1996

4) *Reheat Super Heater*

a) Existing Material Specification (Type & Grade)	SA178C, SA213T2
b) New Material Specification (Type & Grade)	No Change
c) Surface Area	28,207 Sq. Ft
d) Surface Area Replaced	0%
e) Year Replaced/Repaired	Never Replaced // Repairs made on an intermittent basis.

Total Super Heat Surface Area	**257,332 sq. ft.**
Total Surface Area This Outage	**4%**
Total Projected Cost For Materials	$609,950.00
Total Projected Cost For Labor	$700,000.00
Total Project Cost	**$1,309,950.00**

II. **Unit 3 Boiler Burners**

1) Existing Burner Drawing #	242248E R8
2) Existing Burner Manufacturer	Babcock & Wilcox
3) Existing Burners Low NOx	**Yes**
4) Existing Burner NOx Guarantee Limit	0.70 #/mmbtu
5) New Burner Drawing #	Fabricated to the B&W # above P&I # 2-5278-A-INSTALL R0
6) New Burner Manufacturer	Power and Industrial
7) New Burner Low NOx	**Yes**
8) Sub Assembly or Full Replacement	**Full In-Kind**
9) **#** Of Burners Replaced	**16**

Total Projected Cost For Materials	$428,000.00
Total Projected Cost For Labor	$160,000.00
Total Project Cost	**$588,000.00**

III. **Unit 3 Air Pre-Heater Baskets**

1) Original Material Specification	Carbon Steel and Corten
2) New Material Specification	Carbon Steel and Enameled C.S.
Total Existing Cold end Basket Surface Area	32,199 sq. ft.
Total Existing Hot end Basket Surface Area	101,528 sq. ft.
Total Existing Basket Surface Area	133,727 sq. ft.
Total New Basket Surface Area Replaced	**100%**
Total Projected Cost For Materials	$260,902.00
Total Projected Cost For Labor	$220,000.00
Total Project Cost	**$480,902.00**

IV. **Unit 3 Condenser Tubes**

1) Original Material Specification (Type & Grade)	7/8" OD, 20 BWG 70-30 CU-NI
2) New Material Specification (Type & Grade)	7/8" OD, 22 BWG Titanium (ASTM B338 Gr. 2)
3) Total # Tubes / Surface Area	195,813 Sq. Ft.
4) Total # Tubes / Surface Area Replaced	195,813 Sq. Ft.
5) # of Times Complete Change Out Has Occurred	**0**

Total Projected Cost For Materials	$ 1,590,922.00
Total Projected Cost For Labor	$ 949,030.00
Total Project Cost	**$ 2,539,952.00**

V. **Unit 3 Circulating Line Re-Coating**

1) Existing Material Specification (Type & Grade)	Carbon Steel w/ Coating
2) New Material Specification (Type & Grade)	Carbon Steel w/ Coating
3) Total Surface Area	69,164 Sq. Ft.
4) Total Surface Area Re-Coated	100%
Total Projected Cost For Materials	$ 281,000.00
Total Projected Cost For Labor	$ 330,000.00
Total Project Cost	**$ 611,000.00**