

AFBC Co-Firing of Coal and Hospital Waste

Quarterly Report

February - April, 1996

By
James M. Stuart

Work Performed Under Contract No.: DE-FC21-91MC27205

For
U.S. Department of Energy
Office of Fossil Energy
Morgantown Energy Technology Center
P.O. Box 880
Morgantown, West Virginia 26507-0880

By
Donlee Technologies Inc.
693 North Hills Road
York, Pennsylvania 17402

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED



DISCLAIMER

**Portions of this document may be illegible
in electronic image products. Images are
produced from the best available original
document.**

Disclaimer

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

TABLE OF CONTENTS

	<u>Page</u>
I. INTRODUCTION	1
A. Project Objective	1
B. Reporting Period	1
C. Report Layout	1
II. TASK ONE - Design, Specify, Procure, Install and Start-Up Facility	1
A. Subtask 1-A Design	1
B. Subtask 1-B Equipment Purchase and Fabrication	2
C. Subtask 1-C Installation	7
D. Subtask 1-D Shredder System Verification and Testing	9
E. Subtask 1E Start-Up	10
III. TASK TWO - Obtain Permits	11
IV. TASK THREE - Procure Coal, Limestone and Ash Disposal Contracts	11
V. TASK FOUR - Conduct One Year Test Program	12
VI. TASK FIVE - Prepare Final Report	12
VII. PROJECT COSTS	12
VIII. SUMMARY	16

LIST OF TABLES

	<u>Page</u>
Table 1. Lebanon VA Project Equipment/Service Status Report.....	3
Table 2. Lebanon VA Project Subsystem Completion Ratios.....	8
Table 3. Changes to Lebanon VA Project Contract	13
Table 4. Lebanon VA Project Cost-to-Date Reported by Task	17
Table 5. Lebanon VA Project Equipment/Service Costs	18
Lebanon VA Project Schedule	27

I. INTRODUCTION

A. PROJECT OBJECTIVE

The project objective is to design, construct, install, provide operator training and start-up a circulating fluidized bed combustion system at the Lebanon Pennsylvania Veteran's Affairs Medical Center. This unit will co-fire coal and hospital waste providing lower cost steam for heating and possibly cooling (absorption chiller) and operation of a steam turbine-generator for limited power generation while providing efficient destruction of both general and infectious hospital waste. The steam generated is as follows:

- Steam = 20,000 lb/hr
- Temperature = 353 F (saturated)
- Pressure = 125 psig
- Steam quality = ~98.5%

B. REPORTING PERIOD

The reporting period is from February 1, 1996 to April 30, 1996.

C. REPORT LAYOUT

The Progress Reports will show progress and direction for each task and subtask. The Final Technical Report will also provide a coherent chronology of tasks and subtasks throughout the project. Weekly status meetings were held. In part, this report summarizes the primary issues discussed in those meetings relating to the completion of this project.

II. TASK ONE - Design, Specify, Procure, Install and Start-Up Facility

A. SUBTASK 1-A - DESIGN

Progress: Work on the Operation and Maintenance Manual continues.

Three support systems have been designed by Nutec and have been, or will be shortly, installed at the LVA site:

- Steam silencer and support - to be located next to the North side of the facility building.
- Ash conditioner system - supports for the ash screw and the rotary valve and ash conditioner.
- Support to raise the skiphoist approximately two feet above the existing foundation floor. Note this will be done to match the two-foot raised platform to be installed by the building contractor.

During this quarter the structural supports of the interior equipment were evaluated by an outside P.E. firm and upgraded as required. The equipment reviewed included:

- the coal silo structures,
- the limestone bin structure,
- the supports for the combustor and cyclone, and
- the boiler support structure.

The design changes were incorporated into the structures so that they would meet the required codes. In the process, the expansion joint at the bottom of the cyclone was also welded solid to eliminate thermal expansion differences with respect to the combustor. All of the above structures except the boiler are complete. The final changes to the boiler will be completed during May. All of the welds are to be visually inspected or inspected by magnetic particle methods if full penetration welds were used. All welds in the structures other than the boiler and the silencer structure have already passed the inspection.

The shredder system's piping and hose connections have been designed. Hoses and fittings have been purchased. McClure, the ducting and piping contractor, began installing the equipment in late April.

Problems: None

Plans: Continue design and drafting work. The P&IDs continue to be revised to as-built status.

B. SUBTASK 1-B - EQUIPMENT PURCHASE AND FABRICATION

Progress: The status of the major pieces of equipment in the procurement process is shown on Table 1. The fabrication procedure developed for the combustor, boiler, economizer and bins allowed these items to be fabricated by DONLEE.

Problems: None

Plans: Continue with authorized expenditures.

AFBC Co-Firing of Coal and Hospital Waste
 CONTRACT DE-FC21-91MC27205
 Quarterly Progress Report
 (February 1, 1996 - April 30, 1996)
 Page 3

Table 1. Lebanon VA Project Equipment/Service Status

ITEM	EQUIPMENT/SERVICE	VENDOR	PURCHASE ORDER NO.	RELEASE FOR FABRICATION	DELIVERY DATE
1	Air Compressor	C.H. Reed	70054	5/31/94	7/12/94
2	Ash Conditioner	Detroit Stoker	70009	7/27/93	12/31/93
3	Ash Conditioner: Chutes	Detroit Stoker	70062	6/6/94	11/4/94
4	Ash Handling: Storage and Screw	Macawber	13456B/70046/ 70113	7/27/93	3/14/94
5	Bed Material Cooling/Cleaning System	CSI Systems Inc.	70041/70042	5/25/94	8/3/94
6	Bin, Sand (Sand funnel)-Replaces bed material bin estimated @ \$10,000	DONLEE	WO	5/1/94	7/1/94
7	Bins: Ash, Limestone & Coal				
7a	Coal Bins	DONLEE	WO	5/1/94	7/20/94
7b	Limestone Bin - 30 Ton	DONLEE	WO	5/1/94	11/1/94
7c	Limestone Bin - 2 Ton	DONLEE	WO	5/1/94	8/19/94
7d	Ash Bins (2)	DONLEE	WO	5/1/94	11/18/94
8	Boiler & Economizer: Boiler	DONLEE	WO	10/1/93	4/29/94
9	Boiler & Economizer: Boiler Sootblower	Fuel Efficiency	70001	6/28/93	8/2/93
10	Boiler & Economizer: Boiler Sootblower-Engr Only	Fuel Efficiency	41916		8/2/93
11	Boiler & Economizer: Economizer Casing	DONLEE	WO	6/1/94	7/6/94
12	Boiler & Economizer: Economizer Sootblower	Copes-Vulcan	41917B	3/4/94	6/16/94
13a	Stack (Chimney)	Tri Fab, Inc.	41819	2/28/94	10/31/94
13b	Stack (Chimney) - 2nd Design	DONLEE	WO	2/10/95	10/15/95
13c	Stack (Chimney) - Anchoring system	DONLEE/Aycock	70059	11/15/95	12/8/95
14	Circulating Pumps, Feedwater	Chester Pump		6/1/94	7/15/94
15	Coal Storage, Handling & Feeding	Beaumont Birch	13455B	7/27/93	12/15/93
16	Combustor/Cyclone/Cooling Bed Unit -No Tubes	DONLEE	WO	6/10/93	11/1/93
17	Controls Computer Package	Honeywell	42190B	8/16/93	9/1/95
18	Cooling Bed & Economizer Tubes*	Allegheny Boiler Tube	70000	6/15/93	9/15/93
19	Dry Injection Fabric Filter: Baghouse	Aeropulse Inc.	42019B	6/3/94	9/19/94
20	Ducting & Piping	McClure	70085	9/28/94	12/21/94
21	Electrical Equipment & Installation	DBG/Carpenter Engr	70024	2/3/94	2/28/95
22	Emissions Monitoring Equipment	Enertec	14172B	8/2/93	12/20/94
23	Emissions Monitoring Equipment: Oxygen	W. A. Gregory, Inc	70040	6/3/94	7/20/94
24	Expansion Joints	Senior Flexonics	70011	8/8/93	10/28/93
25	Fans & Blowers: ACB & LCB**	Spencer Turbine	41809	3/15/94	6/30/94
26	Fans & Blowers: Primary & ID	Robinson	41811	6/28/93	12/31/93
27	Flyash Reinjection System	DONLEE/Fox Valve	70034	6/6/94	7/15/94
28	Flyash Reinjection System: Bed Material Blowers	R.M Associates	41810	5/25/94	7/20/94
29	Natural Gas line moved	UGI	70028	3/1/94	3/15/94
30	Hospital Waste, Handling & Sub-Systems	Essex Conveyor	41820	3/1/94	9/23/94

AFBC Co-Firing of Coal and Hospital Waste
 CONTRACT DE-FC21-91MC27205
 Quarterly Progress Report
 (February 1, 1996 - April 30, 1996)
 Page 4

Table 1. Lebanon VA Project Equipment/Service Status

ITEM	EQUIPMENT/SERVICE	VENDOR	PURCHASE ORDER NO.	RELEASE FOR FABRICATION	DELIVERY DATE
31	Instruments: Pressure Indicators/Transmitters	Dwyer/Honeywell	70055	6/15/94	7/15/94
32	Instruments: Pressure Transmitters	Honeywell	70010	7/27/93	8/25/93
33	Instruments: Pressure Transmitters (Additional)***	Honeywell	70045	6/15/94	7/15/94
34	Instruments: Thermocouples	CGS	70052	6/7/94	7/19/94
35	Insulation Materials & Installation	AC&S	70124	12/20/95	1/31/96
36	Limestone Storage, Handling & Feeding	Macawber	41684B	7/27/93	12/15/93
37	Outside Review of Bldg.-Preliminary/Final	Entech		6/24/93	7/1/93
38	Painting	DONLEE		7/15/94	2/28/96
39	Plant Encl./Site Prep/Foundation: Geotechnical Engr.	Schnabel	70027	2/16/94	7/1/94
40	Plant Encl./Site Prep/Foundation: Bldg. & Foundation****	Arthur Funk	70023	1/24/94	9/30/94
41	Plant Encl./Site Prep/Foundation: Building			9/30/93	4/29/94
42	Plant Encl./Site Prep/Foundation: Design	DBG/Steckbeck		6/10/93	2/15/94
43	Plant Encl./Site Prep/Foundation: Engineer	DBG/Steckbeck	70026	2/16/94	9/30/94
44	Plant Encl./Site Prep/Foundation: Foundation			9/30/93	4/29/94
45	Platforms, Supports and Stairs and Design	BSM, Inc.	70084	9/27/94	12/5/94
46	Refractory Materials & Installation: Installation	DONLEE	WO	11/1/93	5/31/94
47	Refractory Materials & Installation: Materials	J. T. Thorpe	70002	6/28/93	8/30/94
48	Refrigerated Room	Perley-Hallday	70012	7/28/93	8/30/94
49	Scale	B&M Scale	70048	6/8/94	8/30/94
50	Shredder	SSI Shredding Systems			
51	Shredder Blower	Robinson	38764B	8/20/93	12/31/93
52	Shredder: Move from York to Site	DONLEE	70035	11/19/93	7/15/94
53	Slide Gates	Rovalve/Technaflow	70007	7/28/93	2/28/94
54	Soil Borings	Schnabel			
55	Start-up Burner	Eclipse/Yorkaire	70013	9/1/93	1/3/94
56	Start-up Burner (Mod. Motor)	Honeywell	70014	8/20/93	9/30/93
57	Startup Burner Panel	DONLEE	W.O.	12/7/93	6/30/94
58	Steam Silencer	Vibration & Noise Engr.	70070	6/7/94	8/15/94
59	Steelwork or Equipment Support	DONLEE	W/O	11/15/93	5/30/94
60	Sterilization System	DONLEE	70067	6/8/94	8/15/94
61	Sterilization Testing	DONLEE	70049	8/30/94	9/30/94
62	Transformer for Lebanon VA Equipment	Blatt & Meyers	70085	7/31/94	12/1/94
63	Valves & Dampers	IPS	70044	5/31/94	7/26/94
64	Vendor Equipment Installation	Aycock	70059		12/15/94
65	Computerized Portable Analyzers	ECOM America	70030	3/11/94	3/25/94

AFBC Co-Firing of Coal and Hospital Waste
 CONTRACT DE-FC21-91MC27205
 Quarterly Progress Report
 (February 1, 1996 - April 30, 1996)
 Page 5

Table 1. Lebanon VA Project Equipment/Service Status

ITEM	EQUIPMENT/SERVICE	VENDOR	PURCHASE ORDER NO.	RELEASE FOR FABRICATION	DELIVERY DATE
66	Additional payment/performance bonds	TBD			
67	Onsite refractory cure	Hotwork Corp.	70081	10/7/94	4/25/96
68	Bonding and Grounding	TBD			
69	Sump pumps and controls	Grainger	70116/70134	10/27 & 12/28/95	11/1/95 & 1/3/96
70	Steam/Feedwater Valves	IPS	70092	9/1/95	10/1/95
71	Shredder Hydraulic Filter	SSI Shredding Systems	70094	1/24/95	2/15/95
72	Air Cannons	Airmatics	70099	1/6/95	1/20/95
73	Noise Suppression: Motor/Blowers	BRD Noise/Vibration	70096	11/29/94	12/20/94
74	Heatless Air Dryer	Air Flow Co., Inc.	70191	1/25/95	3/10/95
75	Orifices and venturis	C/B/IVES	70093	1/4/95	2/15/95
76	Cart for medical waste	Consolidated Plastic Co.	70102	1/25/95	2/1/95
77	Site trailer rental - 13 months	GE Capital Modular Space	70098	12/20/94	1/23/95
78	Heat Tracing	DONLEE		9/1/95	11/30/95
79	Added Lighting	DONLEE		9/1/95	11/30/95
80	Sump Pump/Controls - Explosion Proof	DONLEE			
81	Cal Gases and Regulators	Scott Specialty		9/1/95	12/15/95
82	Sink/Shower Decontamination Stations	Lab Safety		9/1/95	12/8/95
83	Sand for Beds	U.S. Silica Sand	70080	4/15/96	5/24/96
84	Coal Pit Cover	DONLEE		9/15/95	11/15/95
85	Grizzly Cover	DONLEE		5/28/96	6/14/96
86	Chemical Feedwater System	Nutmeg Technologies	70112	10/31/95	12/15/95
87	Baghouse Ring Gaskets	Aeropulse	66677	8/31/95	9/8/95
88	Compressor Relief Valve	C. H. Reed	20730	9/18/95	9/20/95
89	Compressor Sample Parts	C. H. Reed	70106	10/4/95	10/6/95
90	Burner Parts	Yorkaire	70107	10/10/95	10/11/95
91	Instrumentation Ball Valves	IPS	70109	10/10/95	10/11/95
92	Solenoid	Ives Equipment	70110	10/13/95	10/20/95
93	Shredder Hydraulic/Gear Oils	Industrial Lubricants	70111	10/18/95	10/27/95
94	Dew Point Monitor - Rental	Solomat	70114	10/24/95	10/27/95
95	Pressure Gauges	IPS	70115	10/25/95	10/26/95
96	Sterilization Liquid Mixer	McMaster Carr	70117	10/27/95	11/1/95
97	Baghouse Level Probe	Drexelbrook	70118	10/31/95	11/10/95
98	Limestone 8" Flexible	CSI/Kinergy	70120	11/8/95	11/10/95
99	Pressure Gauges	IPS	70121	11/10/95	11/17/95
100	Instrument Repair	Ametek	66571	10/31/95	11/14/95
101	Sterilization Equipment	M. Glosser	70122	11/18/95	12/20/95

Table 1. Lebanon VA Project Equipment/Service Status

ITEM	EQUIPMENT/SERVICE	VENDOR	PURCHASE ORDER NO.	RELEASE FOR FABRICATION	DELIVERY DATE
102	Hydraulic Hoses/Fittings	Chester County Hydraulics	70123	11/21/95	11/28/95
103	Propane Heaters - Rental	Rentals Unlimited	70125	11/21/95	11/21/95
104	Oil for Roots Blowers	Leffler	70127	12/4/95	12/5/95
105	Magnehelic Gauges	Dwyer	70128	12/7/95	12/14/95
106	Probe Exchange to 36"	Ametek	70129	12/14/95	1/12/96
107	K Thermocouple Wire	CGS	70130	12/27/95	1/5/96
108	Solenoids	Ives Equipment	70131	12/27/95	1/5/96
109	Sterilization Nozzle, 1/2"	Spraying Systems	70132	12/27/95	1/5/96
110	Pressure Filters	SSI Shredding Systems	70133	12/27/95	1/5/96
111	3" Steam Vent Valve	IPS	70135	1/5/96	1/17/96
112	Rotameters/N.G. Gauge	Dwyer	70136	1/5/96	1/17/96
113	1/4" 304SS Tubing	Penn Stainless	70137	1/5/96	1/17/96
114	Swagelock Fittings	Allentown Valve/Fitting	70138	1/3/96	1/17/96
115	Sample Cooler	Nutmeg Technologies	70139	1/5/96	1/17/96
116	Gas Heaters/ Valves, Regulators	Yorkaire	70140	1/22/96	1/26/96
117	LVA Structural Review	Nutec	70142	1/19/96	2/8/96
118	Limit Switches	Dauphin Electric	70141	1/15/96	1/16/96
119	Supply/Install/Service Emergency Lights	Blatt & Meyers	70143	2/15/96	3/15/96
120	Boiler Trim	McDonnel & Miller/ Ernst Gage	70144/70145/ 70146	2/20/96	2/27/96
121	O&M Manual Binders	Beaverite Products	70147	2/20/96	4/1/96
122	Design Structural Revisions	Nutec Design Assc, Inc.	70148	2/20/96	4/18/96
123	Natural Gas Gauges	Industrial Piping Systems	70149	2/20/96	2/23/96
124	Stack Insulation/Cladding	C&C Insulation, Inc.	70150	2/23/96	3/14/96
125	Stack Testing Protocol	Spotts, Stevens & McCoy	70151	5/1/96	5/1/96
126	LVA Control System	Roth Enterprises	70152	2/26/96	6/3/96
127	Transmitters/Flanges	Honeywell, Inc.	70153	3/1/96	3/29/96
128	Filters/Oilers, Regulators	McMaster-Carr	70154	3/11/96	3/12/96
129	Belden 1064A Multiconductor Cable	York Electric Supply Co.	70155	3/11/96	3/19/96
130	Analyzers - Water Pressure Regulator	Industrial Piping Systems	70156	3/13/96	5/15/96
131	Lightning Protection	Larson Lightning Protection	70157	3/14/96	6/18/96
132	1R Thermocouple K and R Thermocouple Wire 10K Thermocouples	CGS Thermodynamics	70158 70163 70183	3/20/96 4/3/96 4/29/96	5/15/96 4/16/96 5/20/96
133	Structural Changes Sluice Bed Support	Aycock, Inc.	70159 70164	3/19/96 4/1/96	4/19/96 4/19/96
134	Office Trailer Rental - 7 Months	Acton Mobile Industries	70160	3/20/96	3/26/96
135	Pressure Switches for ID Fan and Baghouse	R.M. Associates	70162 70173	4/4/96 4/17/96	4/17/96 4/22/96

Table 1. Lebanon VA Project Equipment/Service Status

ITEM	EQUIPMENT/SERVICE	VENDOR	PURCHASE ORDER NO.	RELEASE FOR FABRICATION	DELIVERY DATE
136	Two Spring Flexible Mounts	BRD Noise - Vibration Control, Inc	70165	4/12/96	5/12/96
137	Ceramic Rope	Hostetter Supply Co., Inc.	70166	4/12/96	4/16/96
138	Weld Inspection	American Testing Laboratory	70168	4/15/96	4/19/96
139	Ash Discharge Chute	Detroit Stoker	70169	4/15/96	4/17/96
140	Ear Muffs & Plugs	McMaster-Carr Supply Co.	70170	4/15/96	4/17/96
141	Limestone/Ash Equipment Checkout and Training	Macawber Systems, Inc.	70172	4/18/96	4/26/96
142	Coal Handling Equipment Checkout and Training	Beaumont Birch Company	70174	4/18/96	5/2/96
143	1/2" Hydraulic Hoses	Chester County Hydraulics	70175	4/18/96	4/29/96
144	Panel Push-Pull Buttons, Timers and Relays	York Electric Supply Co.	70176	4/19/96	4/29/96
145	Pressure Switch at ID Fan and Magnehelic Gauge/Manometers	Dwyer Instruments, Inc.	70177 70182	4/29/96	4/30/96
146	Startup and Calibration of the 2 Coal Weighbelts	Thayer Scale - Hyer Industrials Inc.	70184	4/29/96	5/8/96

C. SUBTASK 1-C - INSTALLATION

Progress: The construction work has been broken into smaller contracts. This allows us to take advantage of smaller constructors who specialize in specific portions of the construction package. The progress in the various work being done on-site is discussed below.

A site trailer was installed on March 26, 1996.

Table 2 shows the completion ratios for each subsystem for January 31, 1996 to April 30, 1996.

Table 2. Lebanon VA Project Subsystem Completion Ratios

Task	System	Completion Ratio 1/31/96	Completion Ratio 4/30/96
01	Building	93%	96%
02	Compressed Air	97%	99%
03	Service Water	98%	99%
04	Gas Lines & Startup Burner	98%	99%
05	Ash Reinjection & Conditioning	87%	99%
06	Limestone	96%	99%
07	Baghouse	93%	99%
08	Stack	83%	99%
09	Coal Handling	98%	99%
10	Combustor & Hot Cyclone	94%	99%
11	Hospital Waste & Sterilization	82%	90%
12	Boiler	92%	96%
13	Analyzer and Sample Lines	12%	99%
14	Main Control System	95%	99%

During this time period a total of 3,025 man-hours of work were performed in the following areas:

Task	System	Man-Hours Reported
01	Building	222
02	Compressed Air	80
03	Service Water	20
04	Gas Lines & Startup Burner	22
05	Ash Reinjection & Conditioning	422
06	Limestone	38
07	Baghouse	20
08	Stack	100
09	Coal Handling	58
10	Combustor & Hot Cyclone	770
11	Hospital Waste & Sterilization	55
12	Boiler	533
13	Analyzer and Sample Lines	247
14	Main Control System	38
15	Startup Assistance	400
TOTAL MAN-HOURS FOR REPORTING QUARTER		3,025

Bakeout of the refractory by Hotwork Corporation was performed from April 23 - 25, 1996 over a 54 hour period. Afterward visual inspection of the refractory and the plastic refractory showed that the bakeout was successful. The cooling bed and lift channel refractory bakeout will be completed during startup since the water-filled coil required to be in these bed areas prevented the refractory from achieving full temperatures. Note that the following schedule of bakeout proposed by J. T. Thorpe was followed extremely closely.

Refractory Bakeout Schedule

	Hours
• Ambient to 200°F @ 50°F/hour	~3
• Hold @ 200°F	3
• 200°F to 250°F @ 50°F/hour	1
• Hold @ 250°F	3
• 250°F to 600°F @ 50°F/hour	7
• Hold @ 600°F	5
• 600°F to 1000°F @ 50°F/hour	8
• Hold @ 1000°F	8
• 1000°F to 1200°F @ 50°F/hour	4
• Hold @ 1200°F	6
• Cool down 100°F/hour maximum. When unit stabilizes, pull burners, seal openings and allow unit to cool down naturally.	~6
Total Hours Firing	54

TASK 07 - INSULATION - Summary Progress Report. Insulation of the outside pipes of the cooling bed and the expansion joints is planned.

TASK 08 - PAINTING - Summary Progress Report. The painting of the structure and the equipment of the facility is in the scope of the Lebanon VA Medical Center.

Problems: None

Plans: The installation continued this quarter and is projected to be completed by late May or early June.

D. SUBTASK 1-D - SHREDDER SYSTEM VERIFICATION AND TESTING

Part of Phase I Contract testing to be done at DONLEE Pilot facility.

Progress: Task completed in June 1992.

Problems: None.

Plans: Task completed in June 1992. The sterilization testing will be completed prior to completion of the installation. This testing uses the top portion of the shredder hopper. The testing nozzles used are those to be used in the actual shredder system to ensure proper design.

E. SUBTASK 1-E - START-UP

Progress: Shakedown, startup and operation will begin after the completion of the equipment and instrument installation. The various subsystems of the facility will be started up one at a time during pre-startup check out. The 14 subsystems are:

1. Building
2. Compressed air
3. Water service lines
4. Gas lines and startup burner
5. Ash system
6. Limestone system
7. Baghouse
8. Stack
9. Coal handling system
10. Combustor and hot cyclone
11. Hospital waste and sterilization system
12. Boiler and steam lines and feed and recirculation water lines
13. Analyzers
14. Main control system

Subsystems 2, 3, 6 and 7 have been fully checked out. Subsystems 1, 4, 5 (all but the ash conditioning system has been checked), 8, 9, 10, 12 and 14 have been partially checked out. The hydraulic lines of the hospital waste and sterilization system (11) will be installed in May. The analyzers (13) will be started up in the next quarter.

Operator training sessions were held during this quarter to partially meet PA DER requirements, in addition to training the operators:

Date	Training Session
2/2/96	Bed Cleaning Screen and Coal Vibrating Feeder checkouts and training by the vendor representative.
3/29/96	Control System Session with vender representative.
4/25 - 4/26/96	Limestone and Ash Handling Systems with checkouts and training by vendor representative.

Training sessions and equipment checkouts are also planned for the Coal Handling System on 5/1-2/96 and for the weigh belts in the Coal Handling System on 5/7-8/96.

Problems: The Lebanon VA continues searching for a responsible individual who will repair, replace or maintain the Honeywell control system of the CFB facility. However, hiring is currently frozen at the Lebanon VA Medical Center.

Plans: The facility is anticipated to be completed during the Spring of 1996. Work continues on the Training Program and the Operation and Maintenance Manual.

III. TASK TWO - Obtain Permits

Progress: Air Quality DEP inspected the facility during February, 1996. DONLEE met with the PA DEP Solid Waste on April 1, 1996 to discuss the permit requirements. Work has begun to finish the solids waste permit items.

Problems: None. Preparation for the PA DEP site review after construction has started since the installation of the equipment has begun.

Plans: None.

IV. TASK THREE - Procure Coal, Limestone and Ash Disposal Contracts

Progress: Early in the project the coal, limestone and ash disposal contracts could not be finalized because the initial supply date was in question due to NEPA approval related delays. Lebanon VA had received a supply proposal from Naughton Energy for coal, limestone and for ash disposal. During May 1994 the Lebanon VA set up a contract for procuring coal and limestone and for disposing of the generated ash when the facility is operational. Dorenzo Coal Company is the ultimate supplier (subcontractor) of the coal and limestone. A coal shipment was received at the site on April 29, 1996.

Problems: Naughton has a three-year contract (through September 1997) to supply the coal and limestone, and to dispose of the ash generated. The contract started in October 1994. From then until the time that the facility is operational, the right to purchase the coal and limestone and to dispose of ash is lost.

Plans: Limestone and coal shipments have been obtained to do check outs of the coal and limestone systems.

V. TASK FOUR - Conduct One Year Test Program

Progress: This task will be performed after the installation, pre-startup check outs and startup/shakedown of the facility have been completed. Stack testing and biospore testing are required by the Pennsylvania Department of Environmental Protection to demonstrate performance and for the proof of DRE (destruction removal efficiency), respectively. At least one test of each type are required by PA DEP, however, more tests can be required. Due to funding limitations, only about two each of the stack tests or biospore tests can be performed. A test matrix will also be performed to demonstrate the performance and operation limitations of the CFB facility and its emission levels.

Problems: None.

Plans: Spotts, Stevens & McCoy was selected as the stack sampling vendor. Their final costs of the tests have been determined. SSM completed the development of the protocol for the test facility.

VI. TASK FIVE - Prepare Final Report

Progress: None. The report is due 3 months after the test program is completed.

Problems: None. The task is to be completed after the test program is finished.

Plans: Currently information has been gathered concerning the equipment and facility. Preparation is being made to perform a matrix of tests that will demonstrate the performance and operation limits of the CFB system, quantify emission levels, identify problem areas and aid in performing scale-up analyses for future commercial designs.

VII. PROJECT COSTS

Changes to the contract

The following items have undergone price increases during this project. Refer to item numbers on Table 5 LVA Project Equipment/Service Costs.

Table 3. Changes to LVA Project Contract

NO	DESCRIPTION	TABLE 5 ITEM REF.
1.	An air compressor will need to be purchased for the new facility. It was originally believed that the present system would be able to provide sufficient air quantities but the new facilities requirements are larger than originally anticipated. The cost of a 300 cfm air compressor rated at 110 psi was \$21,015 (revised). The air is supplied for the pneumatic transport of limestone and ash, pneumatic slidegates and instrumentation.	1
2.	An ash conditioner needed to be added to the contract. The Solid Waste Division of Pennsylvania's Department of Environmental Resources requires that the ash be conditioned with water before transport. The ash conditioner was supplied at a cost of \$60,156 (revised), including ducts and screw conveyors.	2, 3, 4, 139
3.	The cost of the ash handling storage and screw system has increased to \$152,292 due to purchasing 22 NiHard 45° elbows for pneumatic ash and limestone transport.	4
4.	The bed cleaning system which processes the ash generated from the combustion of the coal, limestone and medical waste currently costs \$26,114.	5
5.	The scope of the sand silo design has been reduced to a sand "funnel," resulting in a cost reduction of \$5,000 to \$10,000. The cost of the sand funnel was \$2925.	6
6.	The total cost of the bins: ash, limestone and coal has increased from \$43,065 to an estimated \$123,663.	Limestone - 2; Coal - 7a thru 7d
7.	The boiler required \$8,111.00 of additions to meet the VA specifications. This number will be revised pending final boiler design.	8
8.	The cost of the economizer sootblower was \$8,784.	12
9.	The redesign of the stack is complete. The total cost of the stack is now \$60,572. This cost includes \$23,200 for installation included in item 64.	13a-13c
10.	The feedwater circulating pump was bought by LVAMC. DONLEE's cost is zero.	14
11.	The coal feeders were originally proposed to be screws. The VA has requested weighing capability. Weigh belt feeders were selected in place of screw feeders. The cost was \$45,690.00.	15
12.	The annunciator panel requested by the VA will be approximately \$8160.00.	17
13.	The cost of the controls computer package has increased from \$83,442 to \$97,001. This cost increase is due to a required increase in the I/O capacity of the control system and for two computer courses.	17
14.	The baghouse and sorbent injection system currently cost \$136,511 (revised).	19
15.	The cost of the vendor doing the ducting and piping has increased to \$409,451(revised).	20
16.	The electrical contractor cost for the facility installation is currently \$259,348 (revised).	21
17.	The emissions monitoring system required \$56,500 above the proposal for the HCl monitoring system and heated sample lines.	22

AFBC Co-Firing of Coal and Hospital Waste
CONTRACT DE-FC21-91MC27205
Quarterly Progress Report
(February 1, 1996 - April 30, 1996)
 Page 14

18.	An oxygen analyzer to be used to measure oxygen at the boiler entrance and to be used to help control oxygen levels in the system was needed at a cost of \$6429.	23
19.	Expansion joints were needed to allow for thermal growth throughout the system at a cost of \$25,862.	24
20.	The cooling bed and lift channel blowers cost \$13,060.	25
21.	The cost to move the gas lines at the facility was originally \$5,500. This cost was deleted by the gas company, UGI, in early February.	29
22.	The hospital waste handling and subsystems (or skip hoist) currently cost \$36,815.	30
23.	The cost of the added transmitters for pressure and flow indication added to the specification, was \$6,674. This cost increase is due to the number of transmitters that have been added.	33, 127
24.	The cost of instruments: K and R thermocouples and thermocouple wire has increased to \$7,865 (revised).	34, 107, 132
25.	The painting currently costs \$12,240 (revised).	38
26.	Geotechnical Engineering Services for the building and foundation have been added to ensure that the facility is constructed properly and safely. The cost is partly offset by the October 1993 budget cost of the building and foundation. The cost of the services was \$9,512.	39
27.	The building and foundation cost is currently \$646,981 due to change order increases.	40
28.	Design Engineering Services have been added to provide independent supervision for the construction. The cost of these services is included in the October 1993 budget cost of the building and foundation. The cost has since been reduced to \$8,911 from \$10,911.	43
29.	The cost of the design and manufacture of the initial platforms, supports and ladders was \$27,000.	45
30.	The refractory, materials and installation by DONLEE is now \$89,388 (revised).	46, 137
31.	The refractory engineering, materials and installation vendor's cost was \$88,007.	47
32.	A refrigerated room is required for the storage of medical waste in the event that the unit is not operating. The cost of the refrigerated room was \$15,407 with freight included.	48
33.	The Solid Waste Division of Pennsylvania's Department of Environmental Resources requires that the medical waste be weighed before disposal. The cost of a scale to be mounted in the loading dock was \$4382.	49
34.	The price of the shredder blower has increased due to a freight charge. The final price was \$3,140.	51
35.	Slidegates were needed for the coal, limestone and ash handling systems at a cost of \$52,665.	53
36.	Soil borings were required to determine soil bearing capacity before the foundation design could be started. It was originally believed that the VA had this information. The cost of the soil borings was \$5850.	54
37.	The start-up burner system, including its panel and motors, for the circulating fluidized bed cost is \$10,792.	55, 56, 57
38.	The cost of the steelwork or equipment support (structure) has increased from \$72,290 to \$143,639 (estimated).	59
39.	The general valves for the circulating fluidized bed system currently cost \$29,018.	63, 70, 91, 111
40.	The cost of the vendor equipment installation, including the platform installation and extras, is now \$544,862 (revised).	64

41.	The cost of additional payment/performance bonds has been maintained in the individual contracts (vendor equipment installation and ducting and piping). This item as a result is \$0.	66
42.	The additional feedwater and steam valves were ordered at a cost of \$2,313 (revised).	70
43.	Spare shredder hydraulic filters were purchased for \$764.	71, 110
44.	The air cannons were purchased for the coal silos at a cost of \$5,527.	72
45.	The noise control pads and bases for the blowers, fans, compressor and shredder hydraulic unit have been purchased and installed at a cost of \$4,288.	73
46.	A heatless air dryer was purchased to provide air dried to -40 F dewpoint, at a cost of \$7,028 (revised).	74
47.	The orifices and venturis for flow measurement have been designed and cost \$12,932.	75
48.	A cart for medical waste handling was purchased to check out the skip hoist and shredder equipment. The cart cost was \$682. However, this cart was returned when it was discovered that the cart design had changed, and the cart dimensions were too large to be used. Another cart design was chosen by DONLEE and LVA and six or more have been purchased by LVA.	76
49.	The site trailer for an office and storage space was rented for a minimum of 4 months at a cost of \$5,023 for an expected 21 months.	77, 134
50.	The equipment for the chemical feedwater system has been costed at \$1,305.	78

Contract Costs-to-Date:

The Lebanon VA Project Costs-to-Date are shown on Table 4.

Equipment Costs

The equipment costs are shown on Table 5 Lebanon VA Project Equipment/Service Cost Summary. Several of these costs are preliminary and purchase orders have not been released yet.

VIII. SUMMARY

Operating permits will be obtained after construction has been completed.

Structural corrections have been made to make the facility meet the required building codes.

The refractory bakeout was successfully completed during April 23-25, 1996 over a 54-hour period.

Budget problems continued to occur through April.

A current schedule for the project is included with this report.

Table 4. Lebanon VA Project Costs-to-Date Reported by Task

TASK	ACTUAL			QRTL TOTAL	ACTUAL			QRTL TOTAL	TO-DATE CONTRACT COSTS
	Nov-95	Dec-95	Jan-96		Feb-96	Mar-96	Apr-96		
TASK I: DESIGN/BUILD/INSTALL	124,588.91	117,319.29	99,281.73	341,189.93	180,277.66	122,141.84	202,036.26	504,455.76	6,196,073.90
TASK II: PERMITTING									38,030.99
TASK III: OBTAIN COAL, LIMESTONE & ASH CONTRACTS									44,088.29
TASK IV: TESTING									
TASK V: FINAL REPORT									
PROJECT TOTAL	127,198.55	119,627.97	99,281.73	346,108.25	180,277.66	122,301.84	202,076.26	504,655.76	6,599,559.95
COST SHARE	6,593.97	6,637.35	5,642.77	18,874.09	11,146.04	6,346.47	14,160.02	31,652.53	412,373.89
DOE BILLING	120,604.58	112,990.62	93,638.96	327,234.16	169,131.62	115,955.37	187,916.24	473,003.23	6,187,186.06

Table 5. Lebanon VA Project Equipment/Service Costs

ITEM NUMBER	EQUIPMENT/SERVICE	VENDOR	QUOTE/ESTIMATE DATE	OCTOBER 1993 BUDGET	CURRENT COST (Quote/Est.)	ORIGINAL COST (3/25/91)	VARIANCE-Current vs.10/93 cost	PAID TO-DATE	BALANCE
1	Air Compressor	C.H. Reed	6/1/93	\$21,801	\$21,015		(\$786)	\$21,015	\$0
2	Ash Conditioner	Detroit Stoker	7/22/93	\$34,815	\$34,815		\$0	\$34,815	\$0
3	Ash Conditioner: Chutes	Detroit Stoker	5/28/93	\$4,000	\$2,979	\$0	(\$1,021)	\$2,979	\$0
4	Ash Handling: Storage and Screw	Macawber	8/10/93	\$123,985	\$152,292	\$83,200	\$28,307	\$152,292	\$0
5	Bed Material Cooling/Cleaning System	CSI Systems Inc.	9/2/93	\$21,113	\$26,114	\$31,200	\$5,001	\$26,114	\$0
6	Bin, Sand (Sand funnel)-Replaces bed mat'l bin estimated @ \$10,000	DONLEE		\$0	\$2,925	\$0	\$2,925	\$2,925	\$0
7	Bins: Ash, Limestone & Coal			\$0				\$0	
7a	Coal Bins	DONLEE		\$18,948	\$55,805		\$36,857	\$55,805	\$0
7b	Limestone Bin - 30 Ton	DONLEE		\$6,460	\$14,408		\$7,948	\$14,408	\$0
7c	Limestone Bin - 2 Ton	DONLEE		\$2,584	\$4,200		\$1,616	\$4,200	\$0
7d	Ash Bins (2)	DONLEE		\$15,073	\$34,250		\$19,177	\$34,250	\$0
8	Boiler & Economizer: Boiler	DONLEE	5/15/93	\$41,478	\$41,478	\$58,050	\$0	\$41,478	\$0
9	Boiler & Economizer: Boiler Sootblower	Fuel Efficiency	6/18/93	\$5,102	\$5,113	\$0	\$11	\$5,113	\$0
10	Boiler & Economizer: Boiler Sootblower-Engr Only	Fuel Efficiency	6/18/93	\$1,300	\$1,300		\$0	\$1,300	\$0
11	Boiler & Economizer: Economizer Casing	DONLEE	5/15/93	\$6,352	\$8,205		\$1,853	\$8,205	\$0
12	Boiler & Economizer: Economizer Sootblower	Copes-Vulcan	6/9/93	\$7,923	\$8,784		\$861	\$8,784	\$0
13a	Stack (Chimney)	Tri Fab, Inc.	8/3/93	\$21,921	\$19,428	\$9,390	(\$2,493)	\$19,428	\$0
13b	Stack (Chimney) - 2nd Design	DONLEE	2/7/95	\$0	\$7,045	\$0	\$7,045	\$7,045	\$0
13c	Stack (Chimney) - Anchoring system	DONLEE/Aycock	8/7/95	\$0	\$10,899	\$0	\$10,899	\$9,775	\$1,124

Table 5. Lebanon VA Project Equipment/Service Costs

ITEM NUMBER	EQUIPMENT/SERVICE	VENDOR	QUOTE/ESTIMATE DATE	OCTOBER 1993 BUDGET	CURRENT COST (Quote/Est.)	ORIGINAL COST (3/25/91)	VARIANCE-Current vs.10/93 cost	PAID TO-DATE	BALANCE
14	Circulating Pumps, Feedwater	Chester Pump	7/15/93	\$7,000	\$0	\$9,640	(\$7,000)	\$0	\$0
15	Coal Storage, Handling & Feeding	Beaumont Birch	7/21/93	\$291,152	\$297,203	\$265,200	\$6,051	\$297,203	\$0
16	Combustor/Cyclone/Cooling Bed Unit -No Tubes	DONLEE	5/15/93	\$123,355	\$123,355	\$150,230	\$0	\$123,355	\$0
17	Controls Computer Package	Honeywell	4/30/93	\$83,442	\$97,001	\$80,500	\$13,559	\$97,001	\$0
18	Cooling Bed & Economizer Tubes*	Allegheny Boiler Tube	6/9/93	\$29,000	\$29,000	*	\$0	\$29,000	\$0
19	Dry Injection Fabric Filter: Baghouse	Aeropause Inc.	5/20/92	\$130,376	\$136,511	\$161,250	\$6,135	\$136,511	\$0
20	Ducting & Piping	McClure		\$65,292	\$409,451	\$26,570	\$344,159	\$274,938	\$134,513
21	Electrical Equipment & Installation	DBG/Carpenter Engr	2/3/94	\$245,000	\$259,348	\$135,200	\$14,348	\$235,950	\$23,398
22	Emissions Monitoring Equipment	Enertec	8/11/93	\$135,300	\$135,300	\$87,050	\$0	\$111,474	\$23,826
23	Emissions Monitoring Equipment: Oxygen	W. A. Gregory, Inc	9/3/93	\$6,119	\$6,548		\$429	\$6,548	\$0
24	Expansion Joints	Senior Flexonics	7/13/93	\$26,099	\$25,862		(\$237)	\$25,862	\$0
25	Fans & Blowers: ACB & LCB**	Spencer Turbine	11/13/91	\$12,709	\$13,060	**	\$351	\$13,060	\$0
26	Fans & Blowers: Primary & ID	Robinson	7/13/93	\$54,608	\$54,608	\$28,900	\$0	\$54,608	\$0
27	Flyash Reinjection System	DONLEE/Fox Valve	12/5/91	\$14,290	\$9,031	\$41,600	(\$5,259)	\$9,031	\$0
28	Flyash Reinjection System: Bed Mat'l Blowers	R.M Associates	7/27/93	\$10,075	\$10,025		(\$50)	\$10,025	\$0
29	Natural Gas line moved	UGI		\$0	\$0	\$0	\$0	\$0	\$0
30	Hospital Waste, Handling & Sub-Systems	Essex Conveyor	7/15/93	\$31,010	\$36,815	\$72,800	\$5,805	\$36,815	\$0
31	Instruments: Pressure Indicators/Transmitters	Dwyer/Honeywell	9/10/93	\$2,500	\$1,090		(\$1,410)	\$1,090	\$0
32	Instruments: Pressure Transmitters	Honeywell	5/24/93	\$12,569	\$12,569	\$16,490	\$0	\$12,569	\$0
33	Instruments: Pressure Transmitters (Additional)***	Honeywell		\$0	\$4,097	***	\$4,097	\$4,097	\$0

Table 5. Lebanon VA Project Equipment/Service Costs

ITEM NUMBER	EQUIPMENT/SERVICE	VENDOR	QUOTE/ESTIMATE DATE	OCTOBER 1993 BUDGET	CURRENT COST (Quote/Est.)	ORIGINAL COST (3/25/91)	VARIANCE-Current vs. 10/93 cost	PAID TO-DATE	BALANCE
34	Instruments: Thermocouples	CGS	5/26/93	\$4,347	\$5,428		\$1,081	\$5,428	\$0
35	Insulation Materials & Installation	AC&S	12/20/95	\$17,220	\$19,125	\$17,220	\$1,905	\$16,000	\$3,125
36	Limestone Storage, Handling & Feeding	Macawber	5/23/93	\$60,881	\$60,881	\$72,800	\$0	\$60,881	\$0
37	Outside Review of Bldg-Preliminary/Final	Entech		\$5,000	\$926	\$0	(\$4,074)	\$926	\$0
38	Painting	DONLEE		\$15,000	\$12,240	\$31,200	(\$2,760)	\$0	\$12,240
39	Plant Encl./Site Prep/Foundation: Geotechnical Engr.	Schnabel		\$0	\$9,512	\$0	\$9,512	\$9,512	\$0
40	Plant Encl./Site Prep/Foundation: Bldg & Foundation****	Arthur Funk	9/8/93	\$545,700	\$646,981	****	\$101,281	\$606,247	\$40,734
41	Plant Encl./Site Prep/Foundation: Building					\$87,680	\$0	\$0	\$0
42	Plant Encl./Site Prep/Foundation: Design	DBG/Steckbeck	9/1/93	\$25,725	\$29,128	\$0	\$3,403	\$29,128	\$0
43	Plant Encl./Site Prep/Foundation: Engineer	DBG/Steckbeck		\$0	\$8,911		\$8,911	\$8,911	\$0
44	Plant Encl./Site Prep/Foundation: Foundation					\$209,560	\$0	\$0	\$0
45	Platforms, Supports and Stairs and Design	BSM, Inc.		\$4,400	\$27,000		\$22,600	\$27,000	\$0
46	Refractory Materials & Installation: Installation	DONLEE	6/24/93	\$52,915	\$88,799	\$52,915	\$35,884	\$88,799	\$0
47	Refractory Materials & Installation: Materials	J. T. Thorpe	6/24/93	\$76,975	\$88,007	\$77,515	\$11,032	\$88,007	\$0
48	Refrigerated Room	Perley-Hallday	7/19/93	\$14,877	\$15,407		\$530	\$15,407	\$0
49	Scale	B&M Scale	6/7/93	\$4,597	\$4,382		(\$215)	\$4,382	\$0
50	Shredder	SSI Shredding Systems		\$0	\$0	\$0	\$0	\$0	\$0
51	Shredder Blower	Robinson	4/26/93	\$3,019	\$3,140		\$121	\$3,140	\$0
52	Shredder: Move from York to Site	DONLEE		\$5,200	\$5,200	\$5,200	\$0	\$5,200	\$0

Table 5. Lebanon VA Project Equipment/Service Costs

ITEM NUMBER	EQUIPMENT/SERVICE	VENDOR	QUOTE/ESTIMATE DATE	OCTOBER 1993 BUDGET	CURRENT COST (Quote/Est.)	ORIGINAL COST (3/25/91)	VARIANCE-Current vs. 10/93 cost	PAID TO-DATE	BALANCE
53	Slide Gates	Rovalve/Technaflo	7/28/93	\$52,461	\$52,664		\$203	\$52,666	\$0
54	Soil Borings	Schnabel		\$5,850	\$5,850		\$0	\$5,850	\$0
55	Start-up Burner	Eclipse/Yorkaire	8/6/93	\$9,242	\$9,242	\$6,230	\$0	\$9,242	\$0
56	Start-up Burner (Mod. Motor)	Honeywell	8/20/93	\$266	\$266		\$0	\$266	\$0
57	Startup Burner Panel	DONLEE		\$0	\$1,284	\$0	\$1,284	\$1,284	\$0
58	Steam Silencer	Vibration & Noise Engr.	7/12/93	\$3,415	\$3,065		(\$350)	\$3,065	\$0
59	Steelwork or Equipment Support	DONLEE		\$72,290	\$143,639	\$45,430	\$71,349	\$143,639	\$0
60	Sterilization System	DONLEE	12/10/91	\$6,187	\$6,187		\$0	\$1,650	\$4,537
61	Sterilization Testing	DONLEE		\$7,000	\$888		(\$6,112)	\$888	\$0
62	Transformer for Leb VA Equipment	Blatt & Meyers		\$8,000	\$49,400		\$41,400	\$49,400	\$0
63	Valves & Dampers	IPS		\$14,364	\$26,065	\$26,020	\$11,701	\$26,065	\$0
64	Vendor Equipment Installation	Aycock		\$194,930	\$544,862		\$349,932	\$520,900	\$23,962
65	Computerized Portable Analyzers	ECOM America		\$0	\$4,638		\$4,638	\$4,638	\$0
66	Additional payment/performance bonds	TBD		\$0	\$0		\$0	\$0	\$0
67	Onsite refractory cure	Hotwork Corp.	Jul-95	\$0	\$6,950		\$6,950	\$0	\$6,950
68	Bonding and Grounding	TBD		\$0	\$6,000		\$6,000	\$0	\$6,000
69	Sump pumps and controls	Grainger		\$0	\$479		\$479	\$209	\$270
70	Steam/Feedwater Valves	IPS	11/4/94	\$0	\$2,313		\$2,313	\$2,313	\$0
71	Shredder Hydraulic Filter	SSI Shredding Systems	11/3/94	\$0	\$489		\$489	\$489	\$0
72	Air Cannons	Airmatics	11/16/94	\$0	\$5,527		\$5,527	\$5,527	\$0

Table 5. Lebanon VA Project Equipment/Service Costs

ITEM NUMBER	EQUIPMENT/SERVICE	VENDOR	QUOTE/ESTIMATE DATE	OCTOBER 1993 BUDGET	CURRENT COST (Quote/Est.)	ORIGINAL COST (3/25/91)	VARIANCE-Current vs. 10/93 cost	PAID TO-DATE	BALANCE
73	Noise Suppression: Motor/Blowers	BRD Noise/Vibration	10/28/94	\$0	\$4,288		\$4,288	\$4,288	\$0
74	Heatless Air Dryer	Air Flow Co., Inc.	12/8/94	\$0	\$7,028		\$7,028	\$7,028	\$0
75	Orifices and venturis	C/B/ IVES	10/20/94	\$0	\$12,932	\$0	\$12,932	\$12,932	\$0
76	Cart for medical waste	Consolidated Plastic Co.	12/15/94	\$0	\$0		\$0	\$0	\$0
77	Site trailer rental - 13 months	GE Capital Modular Space	12/15/94	\$0	\$2,708		\$2,708	\$2,708	\$0
78	Heat Tracing	DONLEE	7/31/95	\$0	\$5,200	\$0	\$5,200	\$0	\$5,200
79	Added Lighting	DONLEE	7/31/95	\$0	\$14,500	\$0	\$14,500	\$0	\$14,500
80	Sump Pump/Controls - Explosion Proof	DONLEE	11/16/94	\$0	\$0		\$0	\$0	\$0
81	Cal Gases and Regulators	Scott Specialty	12/15/94	\$0	\$5,289	\$0	\$5,289	\$0	\$5,289
82	Sink/Shower Decontamination Stations	Lab Safety	7/3/95	\$0	\$1,750	\$0	\$1,750	\$0	\$1,750
83	Sand for Beds	U.S. Silica Sand	9/23/94	\$0	\$2,367	\$0	\$2,367	\$0	\$2,367
84	Coal Pit Cover *****	DONLEE	7/3/95	\$0	\$0		\$0	\$0	\$0
85	Grizzly Cover	DONLEE	7/3/95	\$0	\$10,000	\$0	\$10,000	\$0	\$10,000
86	Chemical Feedwater System	Nutmeg Technologies	10/11/95	\$0	\$1,305	\$0	\$1,305	\$1,305	\$0
87	Baghouse Ring Gaskets	Aeropulse	8/31/95	\$0	\$86	\$0	\$86	\$86	\$0
88	Compressor Relief Valve	C. H. Reed	9/18/95	\$0	\$132	\$0	\$132	\$132	\$0
89	Compressor Sample Parts	C. H. Reed	10/4/95	\$0	\$42	\$0	\$42	\$42	\$0
90	Burner Parts	Yorkaire	10/10/95	\$0	\$122	\$0	\$122	\$122	\$0
91	Instrumentation Ball Valves	IPS	10/10/95	\$0	\$152	\$0	\$152	\$152	\$0
92	Solenoid	Ives Equipment	10/13/95	\$0	\$482	\$0	\$482	\$482	\$0

Table 5. Lebanon VA Project Equipment/Service Costs

ITEM NUMBER	EQUIPMENT/SERVICE	VENDOR	QUOTE/ESTIMATE DATE	OCTOBER 1993 BUDGET	CURRENT COST (Quote/Est.)	ORIGINAL COST (3/25/91)	VARIANCE-Current vs. 10/93 cost	PAID TO-DATE	BALANCE
93	Shredder Hydraulic/Gear Oils	Industrial Lubricants	10/18/95	\$0	\$1,520	\$0	\$1,520	\$1,520	\$0
94	Dew Point Monitor - Rental	Solumat	10/24/95	\$0	\$344	\$0	\$344	\$344	\$0
95	Pressure Gauges	IPS	10/25/95	\$0	\$646	\$0	\$646	\$646	\$0
96	Sterilization Liquid Mixer	McMaster Carr	10/27/95	\$0	\$354	\$0	\$354	\$354	\$0
97	Baghouse Level Probe	Drexelbrook	10/31/95	\$0	\$227	\$0	\$227	\$227	\$0
98	Limestone 8" Flexible	CSI/Kinergy	11/8/95	\$0	\$84	\$0	\$84	\$84	\$0
99	Pressure Gauges	IPS	11/10/95	\$0	\$74	\$0	\$74	\$74	\$0
100	Instrument Repair	Ametek	10/31/95	\$0	\$1,100	\$0	\$1,100	\$1,100	\$0
101	Sterilization Equipment	M. Glosser	11/18/95	\$0	\$3,602	\$0	\$3,602	\$0	\$3,602
102	Hydraulic Hoses/Fittings	Chester County Hydraulics	11/21/95	\$0	\$1,551	\$0	\$1,551	\$1,551	\$0
103	Propane Heaters - Rental	Rentals Unlimited	11/21/95	\$0	\$1,844	\$0	\$1,844	\$1,344	\$500
104	Oil for Roots Blowers	Leffler	12/4/95	\$0	\$25	\$0	\$25	\$25	\$0
105	Magnehelic Gauges	Dwyer	12/7/95	\$0	\$45	\$0	\$45	\$45	\$0
106	Probe Exchange to 36"	Ametek	12/14/95	\$0	\$241	\$0	\$241	\$241	\$0
107	K Thermocouple Wire	CGS	12/27/95	\$0	\$715	\$0	\$715	\$715	\$0
108	Solenoids	Ives Equipment	12/27/95	\$0	\$675	\$0	\$675	\$675	\$0
109	Sterilization Nozzle, 1/2"	Spraying Systems	12/27/95	\$0	\$51	\$0	\$51	\$51	\$0
110	Pressure Filters	SSI Shredding Systems	12/27/95	\$0	\$275	\$0	\$275	\$275	\$0
111	3" Steam Vent Valve	IPS	1/5/96	\$0	\$488	\$0	\$488	\$488	\$0
112	Rotameters/N.G. Gauge	Dwyer	1/5/96	\$0	\$155	\$0	\$155	\$155	\$0

Table 5. Lebanon VA Project Equipment/Service Costs

ITEM NUMBER	EQUIPMENT/SERVICE	VENDOR	QUOTE/ESTIMATE DATE	OCTOBER 1993 BUDGET	CURRENT COST (Quote/Est.)	ORIGINAL COST (3/25/91)	VARIANCE-Current vs. 10/93 cost	PAID TO-DATE	BALANCE
113	1/4" 304SS Tubing	Penn Stainless	1/5/96	\$0	\$192	\$0	\$192	\$192	\$0
114	Swagelock Fittings	Allentown Valve/Fitting	1/3/96	\$0	\$820	\$0	\$820	\$820	\$0
115	Sample Cooler	Nutmeg Technologies	1/5/96	\$0	\$298	\$0	\$298	\$0	\$298
116	Gas Heaters/ Valves, Regulators	Yorkaire	1/22/96	\$0	\$1,394	\$0	\$1,394	\$0	\$1,394
117	LVA Structural Review	Nutec	1/19/96	\$0	\$8,700	\$0	\$8,700	\$0	\$8,700
118	Limit Switches	Dauphin Electric	1/15/96	\$0	\$365	\$0	\$365	\$0	\$365
119	Supply/Install Exterior Emergency Lights	Blatt & Meyers	1/18/96	\$0	\$8,350	\$0	\$8,350	\$5,125	\$3,225
120	Boiler Trim	McDonnell & Miller/Ernst Gage	2/20/96	\$0	\$1,049	\$0	\$1,049	\$1,049	\$0
121	O&M Manual Binders	Beaverite PProducts	2/20/96	\$0	\$808	\$0	\$808	\$808	\$0
122	Design Structural Revisions	Nutec Design Assoc., Inc.	2/19/96	\$0	\$23,900	\$0	\$23,900	\$20,235	\$3,665
123	Natural Gas Gauges	Industrial Piping Systems	2/20/96	\$0	\$84	\$0	\$84	\$84	\$0
124	Stack Insulation/Cladding	C&C Insulation, Inc.	2/22/96	\$0	\$2,913	\$0	\$2,913	\$2,913	\$0
125	Stack Testing Protocol	Spotts, Stevens & McCoy	5/1/96	\$0	\$2,000	\$0	\$2,000	\$2,000	\$0
126	LVA Control System	Roth Enterprises	2/26/96	\$0	\$8,000	\$0	\$8,000	\$1,600	\$6,400
127	Transmitters/Flanges	Honeywell, Inc.	3/1/96	\$0	\$2,577	\$0	\$2,577	\$2,577	\$0
128	Filters/Oilers, Regulators	McMaster-Carr	3/11/96	\$0	\$373	\$0	\$373	\$373	\$0
129	Belden 1064A Multiconductor Cable	York Electric Supply Co.	2/15/96	\$0	\$97	\$0	\$97	\$97	\$0
130	Analyzers - Water Pressure Regulator	Industrial Piping Systems	3/12/96	\$0	\$82	\$0	\$82	\$0	\$82
131	Lightning Protection	Larson Lightning Protection	2/2/96	\$0	\$2,198	\$0	\$2,198	\$0	\$2,198

Table 5. Lebanon VA Project Equipment/Service Costs

ITEM NUMBER	EQUIPMENT/SERVICE	VENDOR	QUOTE/ESTIMATE DATE	OCTOBER 1993 BUDGET	CURRENT COST (Quote/Est.)	ORIGINAL COST (3/25/91)	VARIANCE-Current vs. 10/93 cost	PAID TO-DATE	BALANCE
132	1 R Thermocouple K and R Thermocouple Wire 10 K Thermocouples	CGS Thermodynamics	3/20/96 4/3/96	\$0	\$2,803	\$0	\$2,803	\$1,787	\$1,016
133	Structural Changes / Sluice Bed Support	Aycock, Inc.	3/19/96 4/1/96	\$0	\$51,345	\$0	\$51,345	\$0	\$51,345
134	Office Trailer Rental - 7 Months	Acton Mobile Industries	3/19/96	\$0	\$2,325	\$0	\$2,325	\$0	\$2,325
135	Pressure Switches for ID Fan and Baghouse	R.M. Associates	4/4/96 4/17/96	\$0	\$374	\$0	\$374	\$374	\$0
136	Two Spring Flexible Mounts	BRD Noise - Vibration Control, Inc.	4/12/96	\$0	\$156	\$0	\$156	\$0	\$156
137	Ceramic Rope	Hostetter Supply Co., Inc.	4/12/96	\$0	\$589	\$0	\$589	\$589	\$0
138	Weld Inspection	American Testing Laboratory	4/11/96	\$0	\$320	\$0	\$320	\$320	\$0
139	Ash Discharge Chute	Detroit Stoker	4/15/96	\$0	\$342	\$0	\$342	\$342	\$0
140	Ear Muffs and Plugs	McMaster-Carr Supply Co.	4/15/96	\$0	\$654	\$0	\$654	\$654	\$0
141	Limestone/Ash Equipment checkout & training	Macawber Systems, Inc.	4/17/96	\$0	\$2,345	\$0	\$2,345	\$0	\$2,345
142	Coal Handling Equipment checkout & training	Beaumont Birch Company	4/17/96	\$0	\$1,150	\$0	\$1,150	\$0	\$1,150
143	1/2" Hydraulic Hoses	Chester County Hydraulics	4/18/96	\$0	\$388	\$0	\$388	\$388	\$0
144	Panel Push-Pull Buttons, Timers & Relays	York Electric Supply Co.	4/19/96	\$0	\$1,038	\$0	\$1,038	\$1,038	\$0
145	Pressure Switch at ID Fan & Magnhelic Gauge/ Manometers	Dwyer Instruments, Inc.	4/19/96 4/29/96	\$0	\$397	\$0	\$397	\$111	\$286
146	Startup Calibration of the 2 Coal Weighbelts	Thayer Scale-Hyer Industries, Inc.	4/17/96	\$0	\$1,944	\$0	\$1,944	\$0	\$1,944
PROJECT EQUIPMENT TOTALS				\$2,822,612	\$4,219,573	\$1,889,040	\$1,396,961	\$3,808,793	\$410,780

Table 5. Lebanon VA Project Equipment/Service Costs

ITEM NUMBER	EQUIPMENT/SERVICE	VENDOR	QUOTE/ESTIMATE DATE	OCTOBER 1993 BUDGET	CURRENT COST (Quote/Est.)	ORIGINAL COST (3/25/91)	VARIANCE-Current vs. 10/93 cost	PAID TO-DATE	BALANCE

NOTES:

* The cost of the cooling bed tubes was originally included in the combustor/cyclone/cooling bed cost of \$150,230 (Item 16). The economizer tube cost was originally included in the boiler cost of \$58,050 (Item 8)

** The cost of these blowers was originally included in the fans and blowers cost of \$28,900 (Item 26).

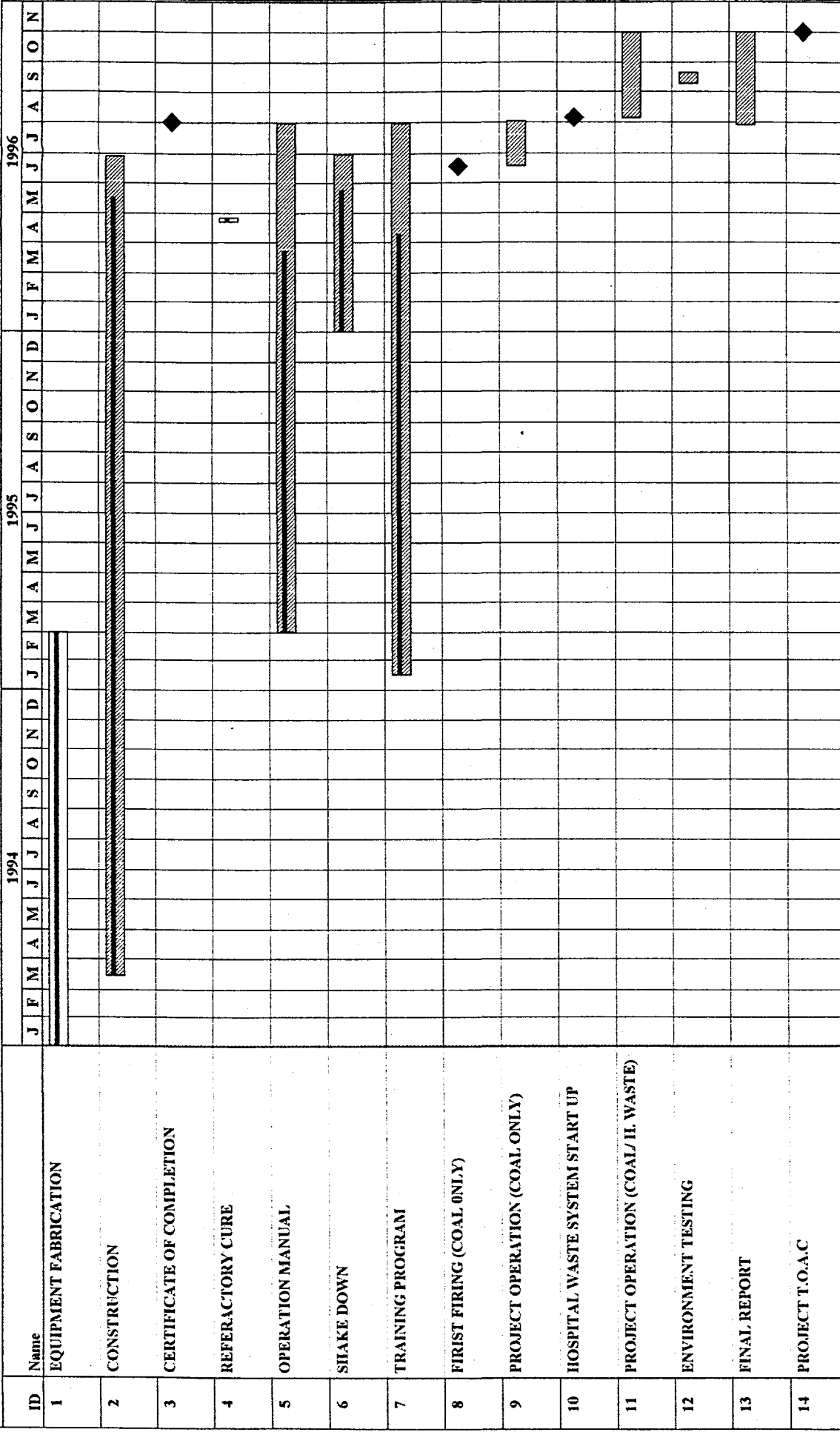
*** The cost of the additional pressure transmitters is included in Item 32.

**** The cost of the building and foundation originally included Items 41 and 44 at a cost of \$297,240.

***** The cost estimate of the Coal Pit Cover (Item 84) is \$3,200. This cost is included in Item 64 Vendor Equipment Installation.

- 1) Items 1-28 and 30-64 were all part of the original October 1993 Budget.
- 2) Item 29 was added in March 1994 prior to the start of the foundation.
- 3) Items 20, 45 and 62 have been modified and approved after the equipment installation started.
- 4) Item 64 was formed from two previous items: "Vendor Equipment Installation" and "Vendor Equipment Installation - Rentals, etc."

LEBANON VA MEDICAL CENTER PROJECT REV. 2



Critical
 Noncritical
 Progress
 Milestone
 Summary
 Rolled Up

Project: LVA MEDICAL CENTER
Date: