INNOVATIVE COKE OVEN GAS CLEANING SYSTEM

FOR

RETROFIT APPLICATIONS

QUARTERLY TECHNICAL PROGRESS REPORT NO. 5

FOR THE PERIOD COVERING

JANUARY 1, 1991 TO MARCH 31, 1991

PARTICIPANT

Bethlehem Steel Corporation

Bethlehem, PA

Prepared for the United States Department of Energy

Under Cooperative Agreement No. DE-FC22-90PC89658

[Patents Cleared by Chicago on March 2, 1994]

BACKGROUND

Refer to Quarterly Technical Progress Report No. 1, May 24, 1989 to March 31, 1990.

TECHNOLOGY DESCRIPTION

Refer to Quarterly Technical Progress Report No. 1, May 24, 1989 to March 31, 1990.

PROJECT DESCRIPTION

Refer to Quarterly Technical Progress Report No. 1, May 24, 1989 to March 31, 1990.

PROCESS DESCRIPTION

Refer to Quarterly Technical Progress Report No. 1, May 24, 1989 to March 31, 1990.

SUMMARY

Work on this coke oven gas cleaning demonstration project (CCT-II) this quarter has been focused on Phase IIB tasks, and includes engineering, procurement, construction, and training. Additionally, plans for changes in the operating schedule of the coke plant that affect the demonstration project are described. The project Milestone Schedule and Log is shown in Figure 1.

The potential for cost growth has been recognized and Bethlehem is taking actions to control costs while maintaining the project schedule.

Engineering efforts performed by Davy/Still-Otto are nearly complete. Remaining to be finalized is an assessment of electrical heat tracing/insulation needs for pipe lines, assessment of fire protection requirements, and instrument modifications.

Procurement of all major equipment items is complete, except for possible additions to fire fighting capabilities. Major focus is on expediting pipe and structural steel to the project site.

Civil construction is complete except for minor pads and bases as required for pipe supports, etc. Erection of the hydrogen sulfide and ammonia scrubber vessels is complete. Installation of scrubber vessel internals is underway.

Recent developments in coke plant operations have resulted in a reduction in the expected rate of production of coke oven gas to be processed in the demonstration project.

RWD Technologies, Inc. has developed an interactive computerized operations and maintenance training system.

Engineering Status

Overall engineering is 90% complete. (See Figure 2.) The focus is currently on establishment of a detailed check-out and start-up program. Structural engineering has been completed.

Procurement Status

Procurement of major equipment is complete. (See Figure 3.)

Construction Status

The status of construction is shown as follows:

1. Structural steel delivery and installation is complete. Small bore pipe delivery is 94% complete and 21% installed. Large bore pipe delivery is 90% complete and 32% installed.

2. Except for fire protection and some outstanding miscellaneous pumps and blowers all major mechanical equipment has been delivered and erection is basically complete.

3. Electrical work is substantially complete on 6.9 KV power transmission, new unit substation motor control centers and associated feeders. Electrical and instrumentation work is in progress.

4. A second Electrical Contract was awarded 3/15/91 to Blumenthal Kahn for the electrical/instrumentation installation associated with the Coke Oven Gas Cleaning Demonstration Facility.

5. Plant general repair forces are working on mechanical and piping systems associated with the new tar precipitator and the piping at the light oil storage and loadout facility.

6. Plant laborers continue general clean up.

Training Status

RWD Technologies, Inc. has provided an interactive computerized training system. When implemented by Davy/Still-Otto and Bethlehem's Sparrows Point Plant personnel, the interactive system will facilitate training of the plant operators for system start-up, steady-state operation, and maintenance.

Coke Plant Production Projection

Raw coke oven gas was to have been provided to the CCT-II demonstration project facility from coke oven batteries Nos. 11, 12, and A. However, an unexpectedly large number of ovens remain out of service, in particular on No. 11 battery, because extensive wall damage has precluded their further operation in an environmentally acceptable manner. As a result, the production projection for the coke plant must be modified and No. 11 battery is expected to be taken out of service before the CCT-II demonstration project facility is completed. The coke oven gas production rates will be lower than those initially anticipated for the demonstration facility. Efforts are underway to identify means that can be incorporated into the evaluation plan (of Phase III) to provide, in a cost-effective manner, a maximum of generically valuable data in the face of the lower gas production rates.

Schedule Status

Emphasis remains on the construction schedule. Status is as follows:

Engineering	Material Ordered	Material Delivered	Construction
90%	99%	95%	40%

The installation of facilities is progressing toward a late-summer 1991 target start-up of the CCT-II demonstration project facility.

Financial Status

Figures 4 and 5 portray actual project costs incurred to date and anticipated project spending. Actual expenditures through March 31, 1991 are higher than planned. Current indications are that the original plans for piping, structural supports, etc., were inadequate, and costs were underestimated. The magnitude of the resultant project cost growth has yet to be determined. Costs for Phase II are likely to total about $45 million, or about

$11.3 million greater than those currently approved. A re-estimate has been received from the mechanical contractor and is under review. Bethlehem is in the process of re-estimating the CCT-II demonstration project costs, and plans to request that the U.S. Department of Energy share in the cost growth.

The original estimate did not properly anticipate the full extent of installation and other fieldwork. Also, the inability of the instrumentation and control systems to adequately control existing facilities was not recognized. Bethlehem is carefully monitoring all areas of the project to minimize any additional project cost increases.

PLANS FOR NEXT QUARTER

Complete re-estimate of project costs.

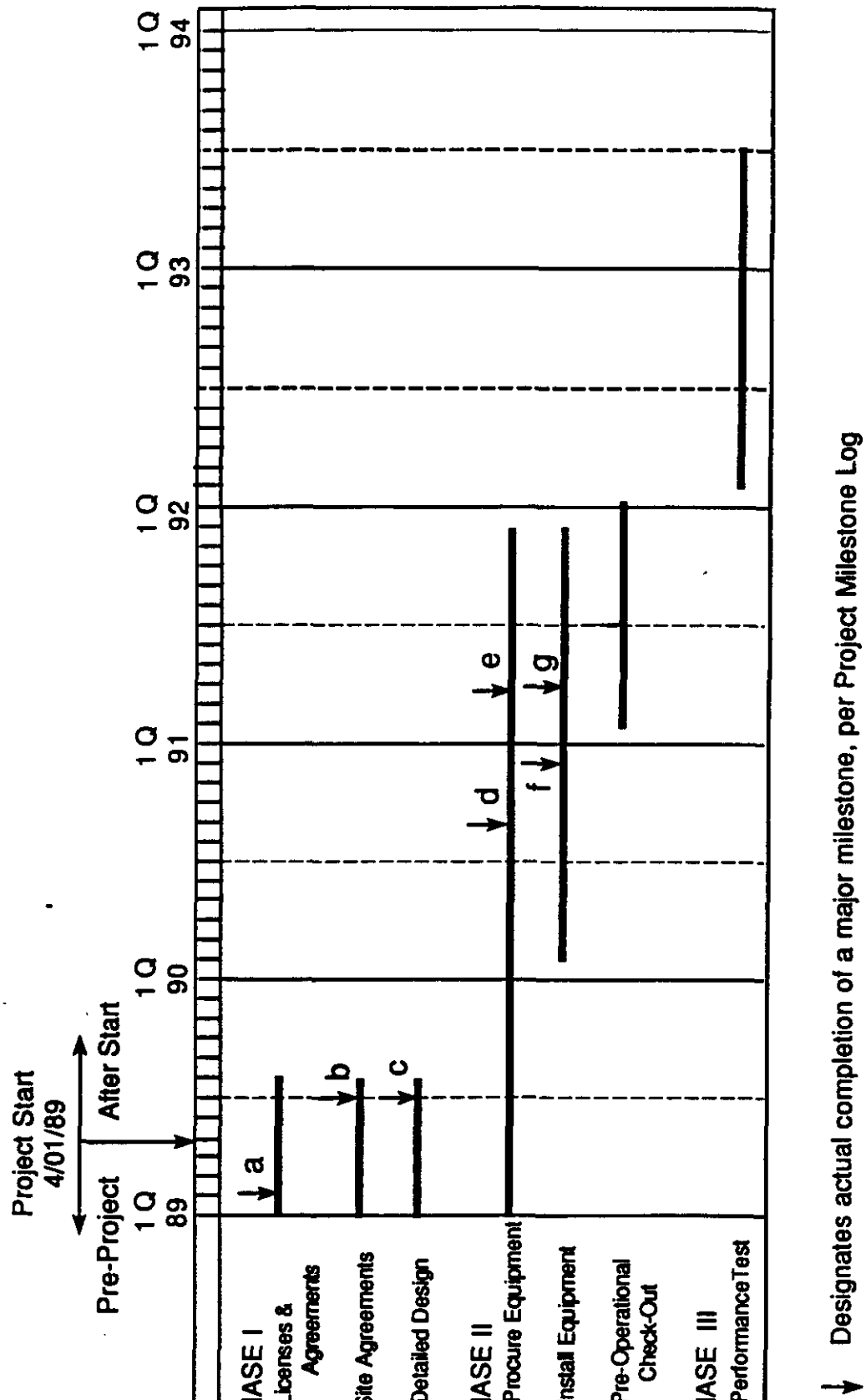
A draft Preliminary Public Design Report will be submitted to U.S. Department of Energy for review.

Figure 1

PROJECT MILESTONE SCHEDULE

CLEAN COAL II PROJECT

SPARROWS POINT, MD.



PROJECT MILESTONE LOG

	Planned Completion Date	Actual Completion Date
PHASE I		
Licenses and Agreements		
a. (Materials, Licenses)	6/30/89	1/28/89
Site Agreements		
b. (Site Agreements)	6/30/89	6/30/89
Detail Design		
c. (BSC Project Engineering)	6/30/89	6/30/89
PHASE II		
Procure Equipment		
d. (Place General Construction Contract)	7/30/90	8/27/90
e. (All Major Equipment on Site)	1/31/91	3/22/91
Install Equipment		
f. (End Foundation Construction)	11/30/90	11/30/90
g. (End Erection of Vessels and Structural Steel)	8/30/91	3/30/91
h. (End Piping Installation	8/31/91	
i. (End Electrical Installation)	10/31/91	
j. (End General Construction)	10/31/91	
Pre-Operational Checkout		
k. (Begun Cold Commission)	10/01/91	
l. (End Cold Commission)	10/31/91	
PHASE III		
Performance Test		
m. (Plant Operation	5/01/93	
n. (Plant Re-assessment)	5/01/93	
o. Complete Demonstration Operation	6/01/93	
p. Issue Final Report	7/01/93	

Figure 2

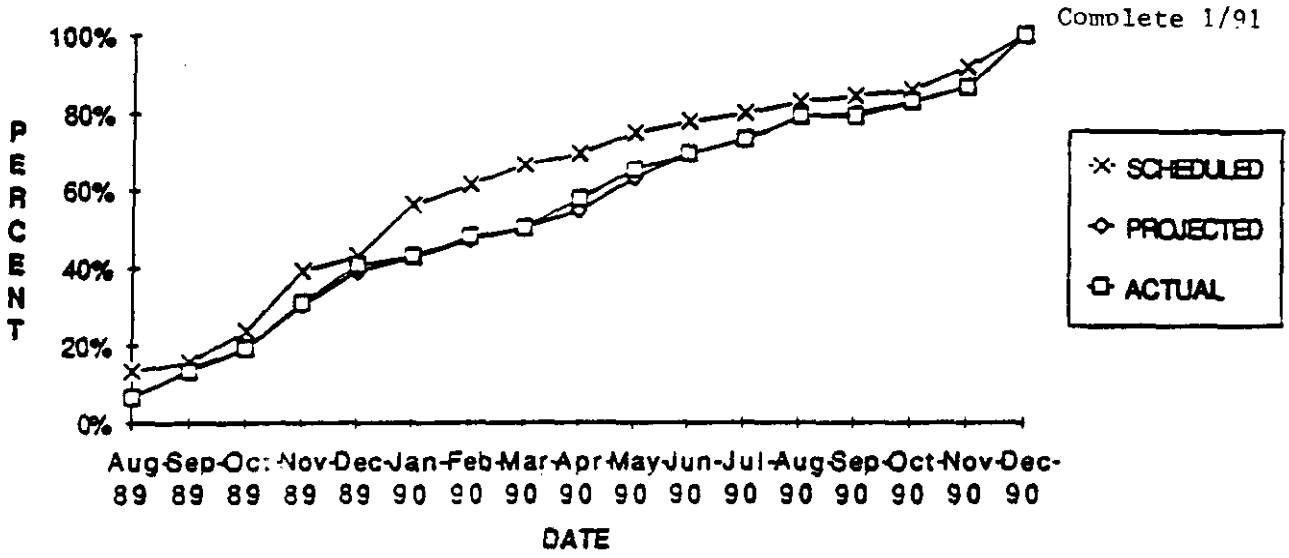
BETHLEHEM STEEL CORPORATION
SPARROWS POINT
COAL CHEMICAL PROJECT

ENGINEERING DRAWINGS AND DESIGN STATUS

DISCIPLINE	ESTIMATED # OF DRAWINGS		# OF DRAWINGS COMPLETED		PERCENT COMPLETE		ENGINEERING MILESTONES- 95 % COMPL
	PREVIOUS	CURRENT	PREVIOUS	CURRENT	PREVIOUS	CURRENT	
1. MECHANICAL & VESSELS	122	122	121	121	99.0%	99.0%	30-Sep-89
2. PIPING	187	187	184	184	98.0%	99.0%	30-Jun-90
3. CIVIL	69	69	68	68	99.0%	99.0%	30-Jun-90
4. STRUCTURAL	58	58	58	58	99.0%	99.0%	30-Mar-90
5. ELECTRICAL	125	126	115	126	95.0%	99.0%	30-Nov-90
6. INSTRUMENTATION	298	298	280	298	95.0%	99.0%	30-Nov-90
TOTAL:	859	860	826	855	96.8%	99.0%	

Figure 3

BETHLEHEM STEEL CORPORATION
COAL CHEMICAL PROJECT
PROCUREMENT PROGRESS



Rev 6/22/94

Figure 4

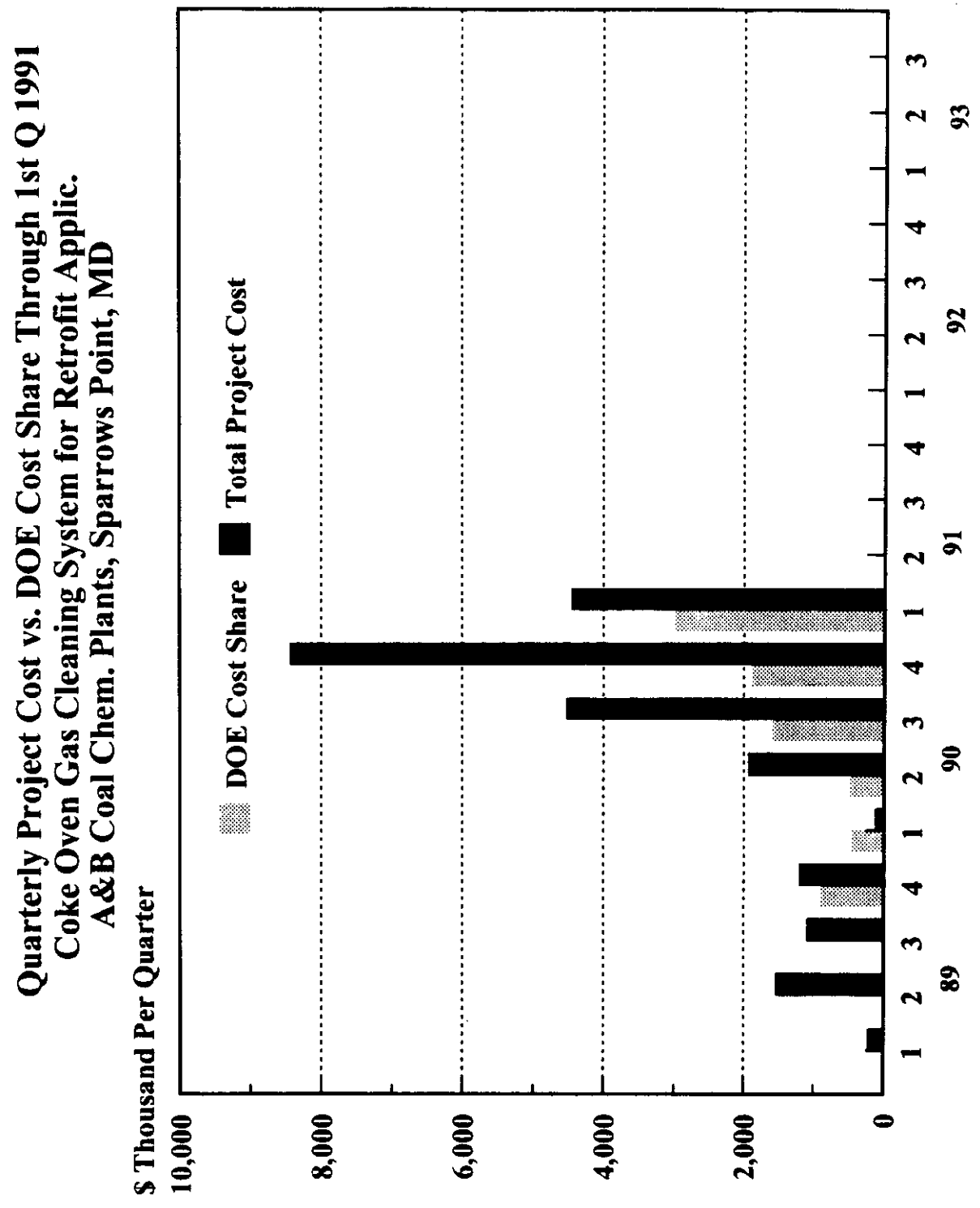
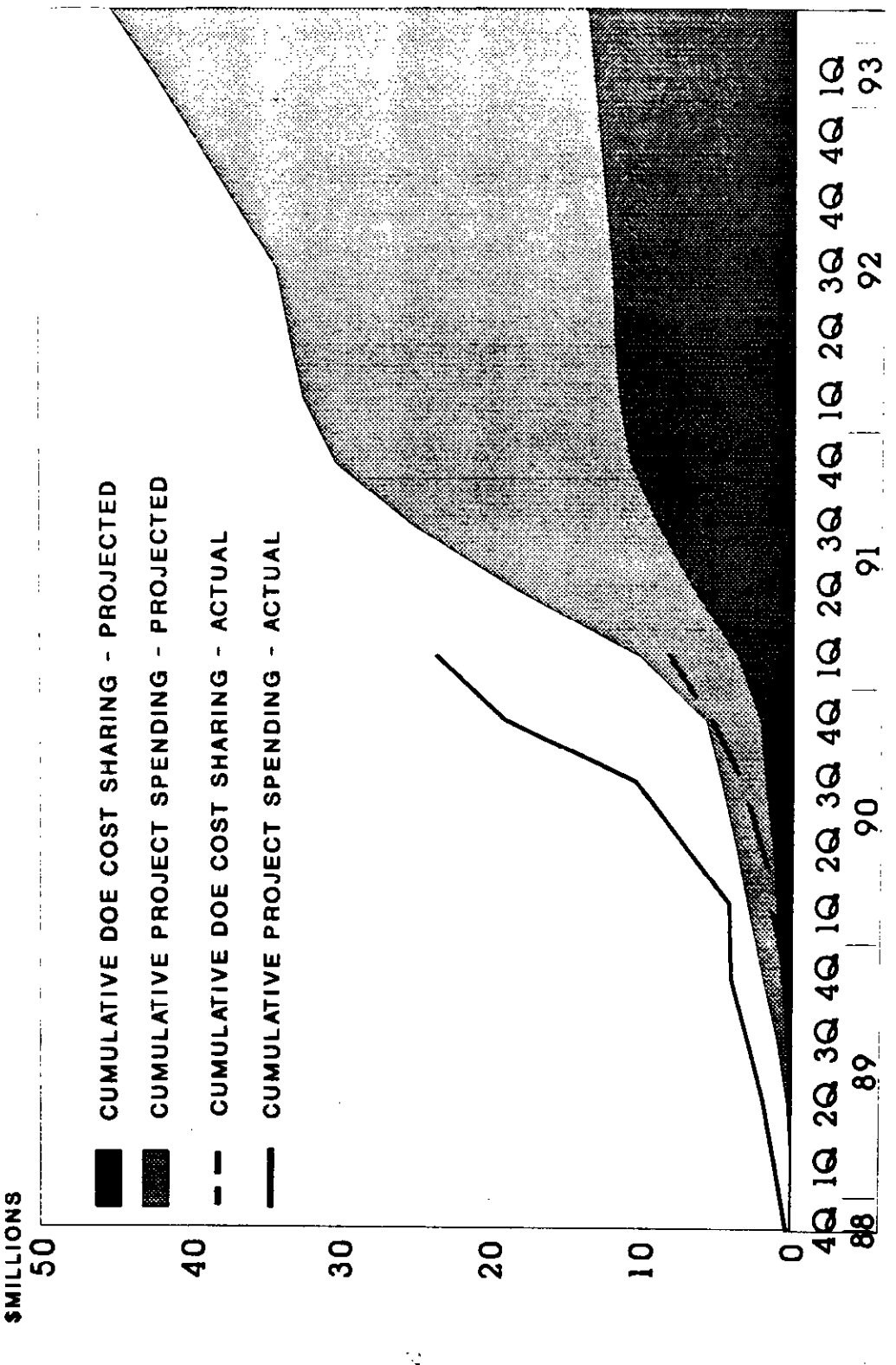

Quarterly Project Cost vs. DOE Cost Share Through 1st Q 1991
Coke Oven Gas Cleaning System for Retrofit Applic.
A&B Coal Chem. Plants, Sparrows Point, MD
$ Thousand Per Quarter
10,000
8,000
6,000
4,000
2,000
0
DOE Cost Share
Total Project Cost
1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3
89
90
91
92
93

Figure 5


CUMULATIVE PROJECT COST
COKE OVEN GAS CLEANING SYST. FOR RETROFIT APPLIC.
A&B COAL CHEM. PLANTS, SPARROWS POINT, MD.
$MILLIONS
50
40
30
20
10
0
CUMULATIVE DOE COST SHARING - PROJECTED
CUMULATIVE PROJECT SPENDING - PROJECTED
CUMULATIVE DOE COST SHARING - ACTUAL
CUMULATIVE PROJECT SPENDING - ACTUAL
4Q 1Q 2Q 3Q 4Q 1Q 2Q 3Q 4Q 1Q 2Q 3Q 4Q 1Q 2Q 3Q 4Q 1Q
88 89 90 91 92 93