FINAL REPORT

PROJECT MANAGEMENT EVALUATION

ASHUGANJ FERTILIZER
AND
CHEMICAL COMPANY LTD.
Ashuganj, Bangladesh

AMMONIA-UREA FERTILIZER COMPLEX

prepared for
AGENCY FOR INTERNATIONAL DEVELOPMENT
Requirements Contract No. AID/OTR-C-1629
JULY 1978

WILLIAMS BROTHERS PROCESS SERVICES, INC.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

ASHUGANJ FERTILIZER AND CHEMICAL COMPANY, LTD.

TECHNICAL AND MANAGERIAL INVESTIGATIVE SERVICES

FINAL REPORT

INDEX

1

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION I

EXECUTIVE SUMMARY

Williams Brothers Process Services, Inc. (WB) was assigned the responsibility under U.S. State Department, Agency for International Development (AID) in behalf of six (6) other project lenders to review the current project status, develop recommendations for improvement in the project execution and forecast the costs at completion for the seven (7) lender financed Ashuganj Fertilizer and Chemical Company, Ltd. (AFCC) Ammonia Urea Complex in the Country of Bangladesh, further defined in Section II and III.

FOREWORD

The project was conceived in December 1974 with a project completion date of July 1978. (IDA Appraisal Report December 18, 1974, Annex 4-7.) Foster Wheeler Limited (FWL) was selected as the General Contractor in late November 1975, seven (7) months beyond the planned schedule. A joint venture James Chemical Engineering (JCE)/Scientific Design Company Limited (SD) was awarded a contract as technical advisor (TA) on 12 February 1974. Valley Nitrogen Producers, Inc. was awarded a management assistance firm (MAF) contract in November 1975. The overall project delay from its conception will be at least two (2) years behind schedule. One objective of this evaluation was to determine if the present schedule is practical.

Williams Brothers provided a six (6) man executive project team of engineers, procurement, construction, estimating and project control specialists over the period from 7 February 1978 to 7 July 1978, more or less on a full time basis to review, study and report recommendations on a dynamic basis as the assignment progressed.

The project study data listed in the "Reference" section of this report was accumulated in several trips to Washington, D.C., three (3) trips to Dacca, Bangladesh and two (2) trips to Foster Wheeler Limited (FWL) Engineering Offices in London and Glasgow.

FINDINGS

The initial visits and interviews with the respective staff members of AFCC, FWL and VNP, review of documentation requested and observations made, developed the following findings related to the project current status during March 1978:

FINDINGS (Continued)

- Positive attitudes of cooperation reaching out to a common goal toward an expeditious plant completion were not being exhibited by the respective parties to the work individually or collectively.

- FWL Monthly Progress Reports do not provide a summary measure of work progress for any activity related to engineering, procurement and especially construction.

- Engineering work, although partially delayed early in 1977 due to questionable soil loading design data for foundations, has reached a satisfactory level of progress consistent with the present construction schedule.

- All major equipment was placed on order with equipment deliveries that could be made in advance of the current required dates in the present construction schedule. An effort must be made to capitalize on this advantage.

- Bulk materials were being placed on order with final order placement schedule dates well within the current construction schedule.

- Underground piping system materials should have been delivered to the site by March 1978 for partial installation prior to the 1978 monsoon season.

- International civil construction subcontracts were not awarded prior to the time the site was available (March 1978) for construction.

- AFCC and FWL had not arrived at a mutually agreeable subcontracting plan.

- Construction equipment and the required initial consumable construction supplies were either not placed on order or were not delivered when the site was turned over to FWL.

- The construction labor training program was not underway for lack of training materials of a kind that are readily available in stock in most parts of the world.

- Detailed construction planning and scheduling had not been started.

6

FINDINGS (Continued)

- Local housing for national construction labor and supervision and increasing numbers of required expatriate housing were not resolved.

- Potable water supply was not available for the increasing number of construction personnel.

- Communications links beyond the site location to the rest of the world do not exist in a manner necessary to conduct the urgent business of a multi-million dollar dynamic construction project. The lack of communications have been contributing to increased project costs.

- Existing emergency evacuation transportation modes are not desirable.

- Project management was not providing the cost consequences of indecision or possible alternative courses of action.

- Project cost reporting and forecasting was totally neglected.

- An updated project control estimate did not exist that was in agreement with approved change orders and current subcontract philosophy.

- Delays in payment to vendors were jeopardizing the receipt of vendor data and in a minor number of cases, material shipments were delayed.

- Monthly forecast of disbursements for the next three (3) months of respective lender funds were never put into practice.

- A materials logistics and shipping plan was not developed, nor were FWL personnel assigned to this work.

- An AFCC-FWL mutually agreed upon revised contractual completion date was not established.

- AFCC and the MAF had not established adequate financial and accounting control systems or operational procedures.

- The management assistance firm presumably was not performing its contracted function, therefore, by direction, was removed from all initiative responsibility.

FINDINGS (Continued)

- The technical advisor JCE/SD was limited at the direction of AFCC to a one (1) man assignment.

- The major FWL and AFCC decisions that must be made that are out in front of the project are material logistics, construction supervision, qualified labor and project management all related to human resources.

- Williams Brothers also finds that the low FWL fixed price fee has not provided FWL with the incentives necessary to fully staff the FWL home office project management team, primarily due to the historical delay costs absorbed by FWL prior to 17 March 1978. In some way, AFCC must contractually restore the FWL incentives to prevent any further unknown delays that may be attributed to project management.

Some of the above problem areas have been in a state of resolution since March 1978. Those that are not being resolved must be implemented to bring the project to a successful completion and start-up on schedule.

WILLIAMS BROTHERS RECOMMENDATIONS

During the course of this evaluation, Williams Brothers published four (4) action recommendation lists included in the "Exhibits" section of this Final Report. The Final Action Recommendations List No. 5 is included in Section VI.

A dynamic and motivated AFCC and FWL project management team can find a way with the many alternative options open, even at this stage of the project, to steer the course of this project to an on time mechanical completion of early June 1980. It is not an impossible task, provided the right courses of action are taken each and every day. A cursory audit of past performance on this project presented many opportunities to improve the schedule, at cost savings, if decisions were made on time or with a sense of urgency. The future open options are not all self evident. The options must be developed, studied, then acted on before the option is no longer available as an alternative course of action to improve the schedule. Any detailed schedule must not be considered as the final plan. Daily study of the scheduling documents will present options to redeploy material and human resources and if found to have prudent merit, must be acted on decisively or the opportunity may be lost.

The above comments are precisely the scope and responsibility of a process industry project management team.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

PROJECT SCHEDULING

The current unilateral (AFCC) project completion date is scheduled for 30 September 1980. Project budgeting should provide for a six (6) month additional project delay cost estimate to 30 March 1981. It is possible to complete the project on 30 September 1980 provided all possible human resources from all parties to the project execute project management techniques that allow actions to be taken in a timely manner. Design decisions are mostly all behind the project except for minor unknown modifications that may develop and are to be expected on a project of this nature.

PROJECT BUDGET

Williams Brothers evaluation of the total project cost at completion including an estimated six (6) months delay cost established the following project capital budget and lenders required foreign currency supplemental financing:

	M US $ EQUIVALENT		
	Foreign Currency	Local Currency	Total
FWL Reimbursable Costs	178,200	32,487	210,687
AFCC Project Costs	53,147	138,563	191,710
Subtotal	231,347	171,050	402,397
Allow Four (4) Mo. Const. Delay	2,180	13,046	15,226
Allow Two (2) Mo. Start-up Delay	404	6,486	6,890
TOTAL PROJECT BUDGET	233,931	190,582	424,513
Less Available Loan Funds	(144,587)		
FOREIGN CURRENCY DEFICIENCY	89,344		

A serious study must be undertaken to assure that the supplemental financing is provided in a timely manner to preclude delays in the project resulting from inadequate funds to commit purchase orders and international subcontracts.

9

MANAGEMENT LENDERS FUNDS

The FWL "Loan Fund Progress Report" does manage the lenders funds. Each month FWL calculates the effect of foreign currency rate of exchange in conversion to $US for the disbursements yet to be made. The actual disbursements are entered based on the rate of exchange in effect the date disbursements are made.

Provided each of the respective lenders have adequate internal controls to assure that overcommitments of the respective loan funds will not be exceeded, when considering foreign exchange rates and FWL purchase and subcontract change orders, then an annual audit of the FWL Loan Fund Progress Report would not be necessary as recommended in Section VII C.3. Entries into the FWL "Loan Fund Progress Report", from AFCC and invoices paid are dependent upon input outside the control of FWL, therefore, an AFCC audit or independent lender audit may be justified when the disbursements reach seventy-five percent (75%) of total loan funds.

PROJECT COST REPORTING

The subject of project cost at completion or the total project capital budget is the sum of FWL reimbursable costs and AFCC project costs presented in Sections IV and XIII. The FWL home office costs, engineering, procurement project management, overheads and profit are provided for in the AFCC/FWL contract as a lump sum fixed price fee. Williams Brothers early findings in the project discovered that both FWL and AFCC did not have an approved project budget nor were costs reported and forecasted to completion on a monthly basis. This single act of non-performance was the gravest mismanagement of both the clients and lenders funds, notwithstanding the fact FWL has both the talent and human resources to execute the FWL proven project budget and schedule control system. On the other hand, AFCC does not have proven and in place project control systems nor were they developed for this project on behalf of AFCC by the MAF or TA. This shortcoming on the part of AFCC must be implemented immediately by retaining additional expertise. In addition to the project control systems, AFCC must retain an outside consulting organization (See Section XIX, Paragraph B.) to establish the company financial and accounting and production control systems before commencement of operations.

FOSTER WHEELER LIMITED

The current FWL status of engineering is reported in Section VIII. Completion of the engineering work and material requisitions are well in advance of the

FOSTER WHEELER LIMITED (Continued)

construction schedule, with the possible exception of any unknown material requisition oversights. Project procurement is reported in Section IX and logistics in Section X. There are certain civil materials and underground piping materials that should be expedited for procurement, otherwise all FWL procurement work is on schedule. Logistics management is all out in front of the project. Only human resources can be brought to bear on this phase of the project to assure that all problems, and there will be many, are adequately resolved in a timely manner.

The current status of construction is reported in Sections XIV, XV, XVI and XVII. The project site was turned over to FWL about the middle of March 1978. Whatever the reasons may have been, Williams Brothers found that construction equipment was not ordered and civil subcontracts were not awarded for actual construction work to commence in March 1978. The construction labor training program was all but non-existent for lack of training materials. Williams Brothers can only speculate there may have been procrastination and/or reluctance on the part of AFCC to approve FWL requisitions for purchase and a FWL project management that did not forcefully expedite AFCC with justifications possibly all due to some lack of confidence by both parties that the dynamic compaction would be completed and accepted on time. Construction is a decision making business, that only creates serious cost overruns when actions and decisions are not taken within the required lead time. There appears to be a new awakening of positive attitudes by all parties to the project.

The prior delays have provided a current advantage, i.e. availability of major equipment that is fabricated awaiting shipment or will be, long before needed at the project site.

The latest promise major equipment fabrication completion item in the Ammonia plant is the desulphurization reactor, purchased in Austria ready for delivery 31 December 1978. The latest item in the Urea plant are several exchangers purchased in India with a 31 December 1978 delivery. The offsite facilities have several pumps purchased in the USA, Germany, Italy and Holland with 1 January 1979 delivery dates. It is possible all major equipment could be delivered to the site complete by 1 April 1979. However, the construction schedule cannot assimilate all the major equipment on its respective foundation or within an elevated structure mounting on or before 1 April 1979. Major equipment is scheduled by FWL for receipt on site from the earliest, 1 March 1979 and the latest 16 November 1979.

A detailed study should be made to close out all delay and storage charges at the earliest possible date.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

FOSTER WHEELER (Continued)

These shipping dates established by FWL for major equipment are extremely conversative and too long, except for the Urea structure equipment, for a project that is driving to complete as soon as possible. Major equipment foundations for all vessels, and grade mounted exchangers, discussed with FWL in London and Dacca, should be immediately scheduled for placement and completion before 1 January 1979. This would allow for all major equipment vessels and grade mounted exchangers to be received on site before 1 January 1979 thereby eliminating delay and storage charges for that equipment. Along with the adjacent pipe stanchions, this order of priority would allow the piping erection work to commence on the project at least three (3) months sooner. Early piping erection work is the key to manpower leveling and schedule completion for this project. Furthermore, an earlier major equipment erection schedule would provide greater flexibility for scheduling heavy lift construction equipment.

A detailed study should be made to close out all delay and storages charges (estimated US $4.5 million) at the earliest possible date, with pumps, turbines, compressors and dynamic equipment considered last in the study.

MANAGEMENT ASSISTANCE FIRM

The MAF has not performed satisfactorily from the standpoint of providing the documented procedures and systems to establish a US $400 million asset based operating company. Section XVIII of this report examines the MAF contractual scope of work with respect to performance to date. Williams Brothers did not assess the qualifications of the present MAF personnel from the vantage point of their capability to perform.

Williams Brothers believes, however, that additional qualified MAF personnel must be called for to fully compliment the MAF staff to perform the contractual scope of work remaining to be completed in the area of establishing a production organization before commencement of operations. The alternative to qualified MAF staff is to have the work performed by qualified AFCC staff or an outside consulting organization.

The AFCC/MAF contract, Appendix A.2 does not provide for adequate job titles to perform the construction supervision of the project during the implementation phase. Williams Brothers was aware at the time of the commencement of their evaluation of the MAF scope of work that AFCC was contemplating renegotiations of the MAF contract to delete the construction supervision scope of work, therefore, that phase was not evaluated from the standpoint of the MAF current performance.

17

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION II

PURPOSE OF ASSIGNMENT

A. GENERAL

Williams Brothers Process Services, Inc. was assigned work order No. 1 under AID requirements contract No. AID/OTR-C-1629 to perform an investigative evaluation of the Ashuganj Fertilizer Project from its current status to completion of construction and commencement of operations for the purpose of developing recommendations for improvement of execution and forecasting of the total project costs at completion.

B. OBJECTIVE

Provide short-term technical and managerial investigative services in order to develop recommendations for improvements in the management, administration, purchasing, subcontracting, and all other procedures necessary to achieve cost effective, efficient, and orderly completion of construction and preparation for commissioning of the Ashuganj Fertilizer Plant in Ashuganj, Bangladesh, bearing in mind cost and time relationships.

C. SCOPE OF WORK

Assist the lenders in their reappraisal of the project cost and schedule.

Interview and work with the various participants in the project to develop an understanding of the current approach to project implementation and of the managerial problems and inefficiencies which are being experienced. Evaluate project management systems and procedures in areas such as planning and scheduling, cost control and cost/time trade-offs, labor and material logistics, construction and management as well as the other aspects which are necessary for the successful implementation of the overall project.

Develop specific recommendations for improving project execution and improving or installing management systems which would enable the project to be managed effectively and completed on schedule in a cost effective and economic manner.

13

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION III

INTRODUCTION

A. THE PROJECT

1. Location

The project site is located about sixty (60) Km northeast of Dacca, the capitol of Bangladesh, south of the village of Ashuganj and the local power station and on the east bank of the Meghna River. The site may be reached by a narrow gauge railway system approximately two and one-half (2½) hours from Dacca or river transportation from elsewhere in the country. Road transportation to the site from Dacca currently does not exist pending completion of roadways from the west and east.

The total area of the project site was built-up and compacted with sandy silt to a level above the highest one hundred (100) year record flood level. An approximate one (1) year delay in the project was incurred in redesign of the foundations and compaction of the site due to postulated settlement and liquefaction of the underlying soil which may occur under seismic disturbances.

2. Project Design Capacity

The Ammonia-Urea fertilizer complex is designed to convert the total nine hundred and twenty five (925) metric ton per stream day capacity of the Ammonia plant into sixteen hundred (1,600) metric tons per stream day of prilled Urea in the Urea plant.

The raw material feed stock for the Ammonia plant is natural gas from the nearby Titas gas fields purchased from Titas Gas Transmission and Distribution Company. The bagged Urea product will be transported from the plant site by barge from the site located jetty at the Meghna River and rail transportation. Marketing of the Urea will be the responsibility of another government corporation.

3. Purpose of Project

The primary purpose of the project is to allow the country of Bangladesh to utilize its natural gas resources, which are not significant for export, to become self sufficient in its fertilizer demands and decrease the imports of fertilizers substantially.

14

B. ASHUGANJ FERTILIZER AND CHEMICAL CO. LTD. (AFCC)

The Government of Bangladesh established this entirely new company with all share capital held by the government. The managing Board of Directors is made up of government officials and company officers who establish the policy within the objectives of the company to implement and operate the project.

Presently AFCC is not fully complimented to manage the implementation phase of the plant construction, nor the business of establishing the systems necessary for managing the operations of the plant upon completion of construction of this $400 million asset based company.

C. THE LENDERS

The project dates back to early 1970 and was reconstructed in its present form in September 1973 when IDA assistance was requested from the Government of Bangladesh to secure the necessary foreign exchange financing. IDA published Report No. 598-BD "Appraisal of Ashuganj Fertilizer Project-Bangladesh" [125] dated December 18, 1974.

All lenders funds for foreign exchange were made to the Government of Bangladesh at concessional terms, who in turn, relent the foreign exchange funds to AFCC at ten percent (10%) interest for a term of fifteen (15) years, including five (5) years grace. The foreign exchange debt/AFCC local currency equity ratio was established in the covenant lender agreements to be 60/40.

The IDA "Memorandum of Agreement Regarding Project Execution, Procurement and Use of Loan Funds" [118], names the lenders and their respective amount of loan funds shown on Table III-A which was equivalent to about US$142 million in November 1974. FWL has maintained the cost control estimates and "Lenders Fund Progress Report" [48] in US$ equivalents based on the foreign exchange rates in effect on 27 September 1976.

Currently the respective lenders are analyzing and arranging for the necessary supplementary financing to increase the foreign exchange funding by about US$95 million equivalent for a total of about US$235 million equivalent from the initial US$142 million.

The present authorized lenders foreign currency funds are expected to be totally committed during June or July 1978. The disbursements against these funds are expected to be about US$60 million equivalent during July 1978.

Supplemental financing is urgently required to preclude another major project delay cost.

TABLE III - A

PROJECT LENDERS

LENDER	CURRENCY OR EQUIVALENT	AMOUNT OF LOAN	27/9/76 RATE OF EXCHANGE	US$ EQUIVALENT 27/9/76	25/4/78 RATE OF EXCHANGE	US$ EQUIVALENT 25/4/78	LOAN TERM YR.	GRACE PERIOD YR.	% INTEREST RATE	FUNDS TIED
Kreditanstalt fur Wiederaufbau (KfW)	DM (Equiv.)	30,000,000	2.47	12,145,749	2.08	14,423,077	50	10	3/4 of 1%	Urea Plant
Government of Switzerland (GOS)	Sfr. (Equiv.)	20,000,000	2.53	7,905,138	1.96	10,204,082	50	10	3/4 of 1%	-
UK Ministry of Overseas Development (ODM)	£	8,000,000	1.68	13,440,000	1.82	14,560,000	65% - 25	7	0	UK
US Agency for International Development (AID)	US$	30,000,000	-	30,000,000	-	30,000,000	40	10	2% Grace 3% Thereafter	US
Asian Development Bank (ADB)	US$ (Equiv.)	30,000,000	-	30,000,000	-	30,000,000	40	10	1%	Ammonia Pl
The International Development Association (IDA)	US$ (Equiv.)	33,000,000	-	33,000,000	-	33,000,000	50	10	3/4 of 1%	-
Government of Iran (GOI)	US$ (Equiv.)	12,400,000	-	12,400,000	-	12,400,000	-	-	-	-
		---		138,890,887		144,587,159				

WILLIAMS BROTHERS PROCESS SERVICES, INC.

D. FOSTER WHEELER LIMITED (FWL)

Foster Wheeler Limited, a wholly owned subsidiary of Foster Wheeler Energy Corporation of Livingston, New Jersey USA, has been established in the UK for over fifty (50) years. A technical staff of over twenty-five hundred (2,500) personnel provide turnkey engineering, procurement and construction of process plants across the world. FWL is primarily noted for their grass roots plants.

Home offices are in Reading, outside of London, with a three hundred (300) member staff engineering office in Glasgow, Scotland. The engineering and drafting services for this project are being performed in Glasgow well within the current overall project schedule.

FWL was one of four prequalified firms selected to competitively bid for the project with proposals that were submitted in February 1975. The agreement [98] between AFCC and FWL was executed on 29 November 1975. The initial contract completion date was agreed to be thirty-eight (38) months after the release date, defined as the date an irrevocable letter of credit is established for the account of FWL.

The current contract completion date is unilaterally scheduled by AFCC[73 & 5] for 30 September 1980, which is about an eighteen (18) month delay from the original schedule.

The turnkey contract including training and start-up assistance provides for a lump sum fixed priced fee and reimbursable costs. The lump sum fixed fee includes the cost of all process licensor fees, all home office costs including project management, engineering, procurement services home office construction, worldwide inspection and shipping coordination services.

The reimbursable costs include all project materials, site related subcontracts, field supervisory expatriate personnel, local labor, training personnel, start-up assistance personnel and construction equipment.

FWL was awarded the project based on the lowest lump sum fixed priced fee. It is precisely this low fee which has caused FWL not to expend fixed fee costs for human resources to expedite the project problems and provide forward planning until FWL was assured that historical delays would not cause duplicating non-reimbursable costs from the fixed fee.

17

FWL is woefully short on home office cost management and project planning and scheduling, notwithstanding the fact that reimbursable personnel could have been assigned to the project site four (4) months in advance of completion of dynamic compaction provided adequate housing was made available.

E. JAMES CHEMICAL ENGINEERING (JCE)/SCIENTIFIC DESIGN COMPANY LIMITED (SD)

These two firms formed a joint venture company to provide the services as the project Technical Advisors (TA)

The Agreement [96] between AFCC and SD/JCE was executed on 12 February 1974. The term of the contract is for a period of forty five (45) months from the effective date or no later than 31 December 1978.

SD Ltd. with offices in London has a parent company, Scientific Design Company, Inc., with home offices in New York that offers process licensing, engineering, procurement and construction services to the petrochemical and synthetic fuels industry.

JCE with home offices in Armonk, New York is a consulting engineering firm that serves the fertilizer industry on a worldwide basis.

The joint venture company was formed to increase the number of available staff to AFCC whereas JCE would provide the Ammonia-Urea technical design review expertise and SD would provide the mechanical-electrical-construction review expertise.

In addition to the role of Technical Advisor to AFCC, the joint venture primary responsibilities were to prepare the bid specifications for general contractor competitive bidding, qualify general contractors, evaluate and recommend the general contractor award, review capital and operating costs, prepare a project report with financing plan, technical review of general contractors scope of work, review and recommend selection of major equipment, review project schedule, assist AFCC in preparing the project capital budget, assist in preparation of spare parts lists, recommend procedures for site fill, provide site resident engineer, provide monthly critical progress review, provide AFCC and lenders a quarterly critical review of costs with respect to cost estimates at time of financing, provide supervision of construction, assist AFCC in operations staffing, and finally, assist AFCC in conducting test runs.

The overall performance of the Technical Advisor, subsequent to Phase I - "Prepare Bid Specifications" and Phase II - "Review General Contractors Engineering and Procurement Scope", i.e. Phase III Construction Planning and Execution and Review of Capital Costs and Project Progress has been deficient, from the standpoint of an ex post facto review of the AFCC/SD Agreement[96] Article IV. "Services to be Rendered by Technical Advisor".

F. VALLEY NITROGEN PRODUCERS INC. (MAF)

Valley Nitrogen Producers, Inc. was selected as the management assistance firm (MAF) as planned in the initial project implementation phase to provide such assistance to AFCC in direct line positions during project implementation and three (3) years after commencement of operations.

Valley Nitrogen is a California cooperative producer of a full range of fertilizers with home offices in Fresno, California.

The MAF clean draft Agreement[97] with AFCC was completed for execution on 8 November 1975. The intent of the Agreement was to assist AFCC with direct line positions to implement the project and provide for assistance during the three (3) year operational phase or until such time that Bangladesh nationals were fulfilling their duties adequately in all positions as a business entity.

During the implementation phase the MAF is responsible for establishing a management organization as a business, operational and maintenance training, develop a detailed program for implementation, review and recommend approval of all contracts, administer the work of the general contractor, direct the work of the Technical Advisor, supervise the construction, maintain budget controls and prepare AFCC job descriptions for the operating organization.

During the operational phase, start-up and operate the facilities, maintain the plant equipment by establishing maintenance procedures, develop production control procedures, maintain cost and budget controls, prepare quarterly financial systems and establish a technical department.

About mid-year 1977, the MAF was relieved of all financial and accounting responsibilities for the project. Currently the MAF is only performing their responsibilities at the direction of AFCC and the MAF does not hold any direct line authority positions within AFCC.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

G. DAMES & MOORE

Dames & Moore were retained by AFCC as soils consultants to monitor the dynamic compaction which was performed by L. Meynard Techniques of France.

The final Dames & Moore Report was not completed in time for review by Williams Brothers. The Dames & Moore report titled "Foundation Design Review" enumerates a number of precautionary measures that must be taken by the general contractor regarding dewatering and construction of the Urea plant, prill tower and Ammonia storage tank foundations.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION IV

PROJECT CAPITAL BUDGET

A. CAPITAL BUDGET

The required project capital budget for project completion including the calculated six (6) month delay cost, (beyond the scheduled 30 September 1980 completion) shown on Tables XIII-G and XIII-H are based on the Williams Brothers estimate consolidated on Table IV-A is as follows:

	M US$ Equivalent
Foreign Currency	233,931
Local Currency	190,582
Total Project Capital Budget	424,513

The Williams Brothers estimate presented in Section XIII is for the purpose of assisting the lenders and AFCC in establishing the estimated foreign currency deficiency and the supplemental financing required which are required in addition to the available lender loan funds equivalent to US $144.6 million based on the 25 April 1978 exchange rates. (Table III-A)

The percentage relationships between foreign currency and local currency with and without the local currency estimates for construction interest and duty are presented below:

	M US$ EQUIVALENT		
	Foreign Currency	Local Currency	Total
Project Capital Budget	233,931	190,582	424,513
% Total	55.11	44.89	100.00
(1) Less Construction Interest	-	(40,000)	(40,000)
(2) Less Duty	-	(36,731)	(36,731)
Total Less (1) and (2)	233,931	113,851	347,782
% Total	67.26	32.74	100.00

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE IV-A

PROJECT CAPITAL BUDGET

BASIS: WILLIAMS BROTHERS ESTIMATE

M US$ EQUIVALENT

	FOREIGN CURRENCY	LOCAL CURRENCY	TOTAL
I. FWL REIMBURSABLE COSTS			
A. Direct Materials	96,181	5,832	102,013
B. Subcontracts	23,595	14,114	37,709
C. Field Costs	29,064	9,419	34,483
Subtotal	148,840	29,365	178,205
D. Escalation	14,120	2,700	16,820
E. Contingency	7,240	422	7,662
F. Currency Adjustment	8,000	0	8,000
Total I	178,200	32,487	210,687
II. AFCC COSTS			
A. Expatriate Contractor Services	34,901	1,894	36,795
B. Local Costs	16,633	33,217	49,850
Subtotal	51,534	35,111	86,645
C. Freight, Marine and Duty	0	36,731	36,731
D. Contingency	493	5,771	6,264
E. Construction Interest	0	40,000	40,000
F. Working Capital	1,120	20,950	22,070
Total II	53,147	138,563	191,710
III. SIX (6) MONTHS DELAY COST	2,584	19,532	22,116
IV. TOTAL PROJECT CAPITAL BUDGET	233,931	190,582	424,513
Less Available Loan Funds (27/9/76 Exchange)	144,587		
Foreign Currency Deficiency	89,344		

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. FOREIGN CURRENCY REQUIREMENTS

The estimated foreign currency deficiency required to complete the project including Williams Brothers estimated costs for a six (6) months project delay beyond the scheduled completion date of 30 September 1980 is approximately US $90.0 million equivalent established as follows:

	M US$ Equivalent
WB Estimate Foreign Currency Requirments	233,931
Less Available Loan Funds Based on 25 April 1978 Exchange Rates (Table III-A)	(144,587)
WB Estimated Foreign Currency Deficiency	89,344

It should be noted that there is a US $8.0 million equivalent currency adjustment allowance to completion of project in FWL and WB estimates that allows the use of the current exchange rates to determine a current foreign currency deficiency or available foreign currency funds at any point in time as the project progresses. FWL estimates are prepared based on the rate of exchange in effect on 27 September 1976.

Williams Brothers has included in this section a Table IV-B which allocates the foreign currency to respective FWL and AFCC categorical line items. As a matter of record, Table IV-B allocates the line items to FWL. October 1977 estimate, April 1978 estimate, commitment to 31 March 1978, indicated total cost, AFCC December 1977 estimate, April 1978 estimate, disbursements to 31 March 1978, indicated total cost and the Williams Brothers' estimates. Table IV-B may be used as a reference document until such time as the first FWL and first AFCC Monthly Cost Reports showing costs to date and indicated total cost are available to track the monthly forecasted total cost at completion.

It should also be remembered that the control estimate for the project is the FWL and AFCC agreed to estimate for FWL reimbursable costs and the AFCC estimate is the control estimate for AFCC costs. Williams Brothers' estimate was prepared only as a guideline to assist the lenders in establishing the amount of required supplemental financing over and above the initial loan agreements with the government of Bangladesh.

Williams Brothers' Monthly Report No. 2 dated 19 May 1978 provides a comparative analysis of FWL October 1977 and April 1978 estimates including variances to the Williams Brothers' estimate.

23

TABLE IV-B

THE ASHUGANJ FERTILIZER AND CHEMICAL COMPANY LIMITED (AFCC)

LENDERS

FOREIGN CURRENCY REQUIREMENTS

M US$ EQUIVALENT

	FWL ESTIMATE OCT. '77	FWL ESTIMATE APRIL '78	FWL COMMITMENTS TO March 31, 1978	FWL INDICATED TOTAL COST	WB ESTIMATE
I. FWL REIMBURSABLE COST ESTIMATE					
A. MAJOR EQUIPMENT					
1. Vessels	6,494	6,444	5,317	6,245	5,600
2. Heat Transfer	19,125	21,244	18,631	19,932	19,932
3. Mechanical Equipment	19,225	19,285	23,041	25,125	25,125
4. Miscellaneous Equipment	3,026	3,281	3,134	4,663	4,663
5. Delay and Storage	4,200	5,000	Inc. Above	5,000	4,200
	52,670	55,254	50,123	60,965	59,520
B. OTHER MATERIAL					
1. Piping	8,003	8,139	2,165	8,405	8,405
2. Instruments	2,648	2,757	2,607	2,738	2,738
3. Electrical	2,277	2,397	1,783	2,397	2,397

TABLE IV-B (Continued

	FWL ESTIMATE OCT. '77	FWL ESTIMATE APRIL '78	FWL COMMITMENTS TO MARCH 31, 1978	FWL INDICATED TOTAL COST	WB ESTIMATE
B. OTHER MATERIAL (Continued)					
4. Insulation and Painting	930	921	0	921	921
5. Civils	5,872	3,986	2,488	4,947	4,947
6. Catalyst and Chemicals	2,000	2,000	0	2,000	2,000
7. Spares	10,000	10,000	Inc. Above	8,133	8,133
	31,730	30,200	9,043	29,541	29,541
C. SUBCONTRACTS					
1. Tank Erection	830	830	830	830	830
2. Refractory Lining	-	1,002	0	1,000	1,000
3. Chemical Cleaning	-	128	0	128	128
4. N.D.T.	-	430	0	430	430
5. Civil	11,330	7,589	5,937	7,589	7,589
6. Compressor House	-	1,800	0	500	500
7. Piping	-	4,320	0	4,320	4,320
8. Instruments	-	2,982	0	2,982	2,982
9. Electrical	-	3,516	0	3,516	3,516

TABLE IV-B (Continued)

	FWL ESTIMATE OCT. '77	FWL ESTIMATE APRIL '78	FWL COMMITMENTS TO MARCH 31, 1978	FWL INDICATED TOTAL COST	WB ESTIMATE
C. SUBCONTRACTS (Continued)					
10. Jetty	1,000	2,300	0	2,300	2,300
	13,160	24,897	6,767	23,595	23,595
D. SHIPPING AND MARINE INSURANCE					
1. Shipping	7,810	7,910	94	7,875	7,875
E. DIRECT LABOR AND TRAINING					
1. Training	3,330	3,330	405	3,330	3,330
F. INDIRECT MATERIAL					
1. Field Indirects	1,520	1,520	4	1,520	1,520
2. Construction Equipment	6,900	8,300	5,703	8,300	8,300
3. Small Tools	210	883	6	883	883
4. Leased Construction Equipment	660	1,200	0	1,200	1,200
	9,290	11,903	5,713	11,903	11,903
G. FIELD SUPERVISION					
1. Start-up	921	990	0	990	990
2. FWL Supervision	9,324	9,266	546	8,383	8,166

TABLE IV-B (Continued

	FWL ESTIMATE OCT. '77	FWL ESTIMATE APRIL'78	FWL COMMITMENTS TO MARCH 31, 1978	FWL INDICATED TOTAL COST	WB ESTIMATE
G. FIELD SUPERVISION (Continued)					
3. Uhde Supervision	195	320	0	320	320
4. Vendors' Engineers	2,074	2,325	0	2,325	2,325
5. Supervision Travel	1,206	1,275	37	1,275	1,275
	13,720	14,176	583	13,293	13,076
Subtotal	131,710	147,670	72,728	150,502	148,840
H. ESCALATION	16,000	16,950	2,832	14,118	14,120
I. CONTINGENCY	4,860	7,240	0	7,240	7,240
J. CURRENCY ADJUSTMENT	-	8,000	5,995*	8,000	8,000
TOTAL FWL-Foreign	152,570	179,860	81,555	179,860	178,200

* Was $7.250MM as of March 7, 1978

TABLE IV-B (Continued)

THE ASHUGANJ FERTILIZER AND CHEMICAL COMPANY LIMITED (AFCC)

LENDERS

FOREIGN CURRENCY REQUIREMENTS

M US$ EQUIVALENT

	AFCC ESTIMATE DEC. '77	AFCC ESTIMATE APRIL '78	DISBURSEMENTS TO 3/31/78	AFCC INDICATED TOTAL COST	WB ESTIMATE
II. AFCC PROJECT COSTS					
A. Land Acquisition	-	-	0	0	0
B. Site Development	13,050	12,896	12,131	12,896	12,896
C. General Contractor Fixed Fee	18,500	19,000	14,730	19,000	19,000
D. Technical Advisor	2,500	2,000	1,897	2,000	2,000
E. Management Assistance	11,950	10,351	2,126	10,351	10,351
F. Construction Equipment	-	900	900	900	900
G. Miscellaneous Equipment	-	182	0	182	182
H. Housing Colony	-	400	0	400	500
I. Factory Civil and Bldgs.	-	(1) 50	0	50	50
J. Construction and Erection	400	3,435	315	3,435	5,435

TABLE IV-B (Continued)

	AFCC ESTIMATE DEC. '77	AFCC ESTIMATE APRIL '78	DISBURSEMENTS 3/31/78	AFCC INDICATED TOTAL COST	WB ESTIMATE
II. AFCC PROJECT COSTS (Continued)					
K. Preoperational Exp.	2,020	220	34	220	220
L. Contingency	1,640	380	0	380	493
M. Working Capital	750	1,120	0	1,120	1,120
Total AFCC-Foreign	50,810	50,934	32,133	50,934	53,147
Total FWL-Foreign	152,570	179,860	81,555 (2)	179,860	178,200
TOTAL	203,380	230,794	113,688	230,794	231,347
Less Available Funds (25/4/78)	(144,587)	(144,587)	(144,587)	(144,587)	(144,587)
Foreign Currency Deficiency (Avail.)	58,793	86,207	(30,899)	(86,207)	(86,760)
Six (6) Months Delay Costs					2,584
WB Estimate Foreign Currency Deficiency					89,344

Note: (1) Foundation Consultant
(2) FWL Reimbursable Commitments

C. ALLOCATION LENDERS FUNDS

An attempt has been made by Williams Brothers to develop an allocation of yet to be committed foreign currency funds in the case of FWL and yet to be disbursed foreign currency funds in the case of AFCC when added to the FWL commitments and AFCC disbursements would equal the total foreign currency requirements of the project. This excercise is summarized on Table IV-C showing the forecasted loan deficiency for each of the five (5) respective lenders. The government of Iran and Switzerland funds are combined with IDA.

All funds yet to be committed in the case of FWL and to be disbursed in the case of AFCC, were committed against the respective lender who has historically funded that phase of the project. Allocations were made to ADB for the Ammonia plant, KfW for the Urea plant, AID for the major international subcontracts and construction equipment, etc. The actual allocations that were made to arrive at Table IV-C are shown on Table IV-D for the convenience of the lenders to restudy funding with respect to the supplemental financing yet to be made.

It would be highly desirable if the lenders would advise AFCC and FWL the results of their studies, such that FWL would be perceptive to any changes to the historical financing plan, thereby assisting FWL in arriving at future bidders lists on uncommitted items.

The source documents that were used to make this allocation to the respective lenders are as follows:

(1) FWL Loan Fund Progress Report
(2) FWL Cost Report of 31 March 1978
(3) AFCC Record of Disbursements through 31 March 1978
(4) FWL Rev. 4a April Estimate
(5) AFCC April Estimate

The reader of this report should note that the "Costs to be Committed" were derived as the difference between the FWL indicated total cost and FWL 31 March 1978 commitments in lieu of the FWL Rev. 4a estimate. Hereafter, all reference should be made to the FWL Cost Report, "Indicated Total Cost" to perform studies related to allocation of lenders funds to "Costs to be Committed".

Williams Brothers accuracy in development of Table IV-C was the time frame struggle between AFCC and FWL disbursements and commitments

C. ALLOCATION LENDERS FUNDS (Continued)

closing period of 31 March 1978 and the FWL Lenders Fund Progress Report with a closing date of 9 May 1978. A common report closure date and the application of commitments (in lieu of disbursements) would have reduced the margin of error in the allocation to within a fraction of a percent.

Nonetheless, Williams Brothers believes these two (2) Tables IV-C and Table IV-D provided the desired information for lenders judgment in arriving at both the supplemental financing and commodity financing decisions.

TABLE IV-C

THE ASHUGANJ FERTILIZER AND CHEMICAL COMPANY LIMITED (AFCC)

SUMMARY REPORT

FORECASTED LOAN DEFICIENCY
(SUBJECT TO LENDER RE-ALLOCATION OF FUNDS)

M US $ EQUIVALENT

	AID	ADB	GOI GOS IDA	KFW	ODM	TOTAL
(1) FWL Costs To Be Committed	30,901	18,750	25,179	11,033	12,169	98,032
(1) AFCC Costs To Be Disbursed	4,531	--	11,136	--	3,134	18,801
Total Lender Funds To Be Committed	35,432	18,750	36,315	11,033	15,303	116,833
(2) FWL Commitments Thru 3/31/78	9,851	26,540	35,760	7,942	1,462	81,555
AFCC Costs Disbursed Thru 3/31/78	8,573	0	13,017	0	10,543	32,133
Total Required Lender Funds	53,856	45,290	85,092	18,975	27,308	230,521
(3) Available Lender Funds	30,000	30,000	55,604	14,423	14,560	144,587
Forecasted Loan Deficiency	23,856	15,290	29,488	4,552	12,748	85,934
Available Lender Funds % Total Lender Funds	20.75	20.75	38.46	9.98	10.06	100.0
Forecasted Loan Deficiency % Total Deficiency	27.76	17.79	34.32	5.30	14.83	100.0

(1) FWL and AFCC Costs to be committed and disbursed respectively derived from Table IV-D.

(2) Subject to reconciliation with FWL 5/9/78 "Loan Fund Progress Report and FWL 4/30/78 Cost/Commitment Report". (Totals agree with AFCC and FWL estimate. However, adjustments may be required to each respective lender funds).

(3) Available lender funds derived from Table III-A for 25 April 1978 exchange rate.

TABLE IV-D

THE ASHUGANJ FERTILIZER AND CHEMICAL COMPANY LIMITED (AFCC)

ALLOCATION OF LENDERS FUNDS

TO BE COMMITTED

M US $ EQUIVALENT

	FWL INDICATED TOTAL COST	FWL COMMITMENTS TO MARCH 31, 1978	COSTS TO BE COMMITTED	AID	ADB	IDA	KFW	ODM
I. FWL REIMBURSABLE COSTS								
A. MAJOR EQUIPMENT								
1. Vessels	6,245	5,317	928		699	94	135	
2. Heat Transfer	19,932	18,631	1,301		919	150	232	
3. Mechanical Equipment	25,125	23,041	2,084		404	1,420	260	
4. Miscellaneous Equipment	4,663	3,134	1,529		131	1,345	53	
5. Delay and Storage	5,000	Incl. Above	4,727		1,746	2,440	541	
	60,965	50,123	10,569	--	3,899	5,449	1,221	--
B. OTHER MATERIAL								
1. Piping	8,405	2,165	6,240		4,312	822	1,106	
2. Instruments	2,738	2,607	131		29	84	18	
3. Electrical	2,397	1,783	614		306	196	112	
4. Insulation and Painting	921	0	921	921				
5. Civils	4,947	2,488	2,459		639	1,770	50	
6. Catalyst and Chemicals	2,000	0	2,000	2,000				
7. Spares	8,133	Incl. Above	8,133		4,310	2,522	1,301	
	29,541	9,043	20,498	2,921	9,596	5,394	2,587	--

TABLE IV-D (Continued

	FWL INDICATED TOTAL COST	FWL COMMITMENTS TO MARCH 31, 1978	COSTS TO BE COMMITTED	AID	ADB	IDA	KFW	ODM
C. SUBCONTRACTS								
1. Tank Erection	830	830	0					
2. Refractory Lining	1,000	0	1,000	1,000				
3. Chemical Cleaning	128	0	128			128		
4. N.D.T.	430	0	430			430		
5. Civil	7,589	5,937	1,652	1,652				
6. Compressor House	500	0	500	500				
7. Piping (Site Welding)	4,320	0	4,320				4,320	
8. Instruments	2,982	0	2,982	2,982				
9. Electrical	3,516	0	3,516	3,516				
10. Jetty	2,300	0	2,300	2,300				
	23,595	6,767	16,828	11,950	---	558	4,320	---
D. SHIPPING & MARINE INSURANCE	7,875	94	7,781	3,000	---	4,781	---	---
E. DIRECT LABOR								
1. Training	3,330	405	2,925	878	---	1,300	---	747
F. INDIRECT MATERIAL								
1. Field Indirects	1,520	4	1,516	1,516				
2. Construction Equipment	8,300	5,703	2,597	2,597				
3. Small Tools	883	6	877	877				
4. Leased Construction Equip.	1,200	0	1,200	1,200				
	11,903	5,713	6,190	6,190	---	---	---	---

34

TABLE IV-D (Continued)

	FWL INDICATED TOTAL COST	FWL COMMITMENTS TO MARCH 31, 1978	COSTS TO BE COMMITTED	AID	ADB	IDA	KFW	ODM
G. FIELD SUPERVISION								
1. Start-up	990	0	990			990		
2. FWL Supervision	8,383	546	7,837					7,837
3. Uhde Supervision	320	0	320			320		
4. Vendors' Engineers	2,325	0	2,325		1,233	720	372	
5. Supervision Travel	1,275	37	1,238					1,238
	13.293	583	12,710	---	1,233	2,030	372	9,075
Subtotal	150,502	72,728	77,501	24,939	14,728	19,512	8,500	9,822
H. ESCALATION	14,118	2,832	11,286	3,632	2,145	2,841	1,238	1,430
I. CONTINGENCY	7,240	0	7,240	2,330	1,376	1,823	794	917
J. CURRENCY ADJUSTMENT	8,000	5,995	2,005	---	501	1,003	501	---
TOTAL FWL-Foreign	179,860	81,555	98,032	30,901	18,750	25,179	11,033	12,169

TABLE IV-D (Continued)

THE ASHUGANJ FERTILIZER AND CHEMICAL COMPANY LIMITED (AFCC)

M US $ EQUIVALENT

	AFCC INDICATED TOTAL COST	DISBURSEMENTS TO MARCH 31, 1978	COSTS TO BE DISBURSED	AID	ADB	IDA	KFW	ODM
II. AFCC PROJECT COSTS								
A. Land Acquisition	---	---	---					
B. Site Development	12,896	12,131	765	463		302		
C. General Contractor Fixed Fee	19,000	14,730	4,270			1,136		3,134
D. Technical Advisor	2,000	1,897	103			103		
E. Management Assistance	10,351	2,126	8,225			8,225		
F. Construction Equipment	900	900	0					
G. Miscellaneous Equipment	182	0	182	182				
H. Housing Colony	400	0	400	400				
I. Factory Civil and Buildings	(1) 50	0	50	50				
J. Construction and Erection	3,435	315	3,120	3,070		50		
K. Preoperational Expense	220	34	186	186				
L. Contingency	380	0	380	180		200		
M. Working Capital	1,120	0	1,120			1,120		
Total AFCC-Foreign	50,934	32,133	18,801	4,531	---	11,136	---	3,134
Total FWL-Foreign	179,860	81,555 (2)	98,032	28,644	18,934	24,221	12,706	13,527
TOTAL	230,794	113,688	116,833	33,175	18,934	35,357	12,706	16,661

Note: (1) Foundation Consultant
(2) FWL Reimbursable Commitments

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION V

POSSIBLE PROJECT DELAYS

V. POSSIBLE PROJECT DELAYS

A. During Construction

Williams Brothers performed an extensive study of possible/potential problems which could delay the completion of construction at the Ashuganj facility. Listed below are some of the more pertinent and realistic situations that could occur during construction. It should be noted that these problems were evaluated with respect to their own individual, and not collective/cumulative, impact. A summary statement may be found at the conclusion of this section regarding the overall assessment and recommendation for allowance in schedule slippage due to possible construction delays:

1. Inclement or Unusally Adverse Weather Conditions

The monsoon periods in Bangladesh could cause extensive slippage in construction, particularly in 1978 when the civil work on compensatory foundations are in progress. Because of the heavy rains during the monsoons, earthwork, i.e. excavation, can be slowed to very little progress. Williams Brothers was at the facility during April, 1978 and witnessed the condition of the site after a moderate rain storm. Partially due to the densification program, rainwater was virtually standing on the surface of some of the site hours after the rain had ceased. Upon inspection of the site where some nominal excavation was in progress trenches were found collapsed and full of water. It is therefore reasonable to conclude that when larger areas of excavation are begun (scheduled during the monsoon season of 1978) significant slippage in schedule and resultant cost increases will occur.

The second monsoon period (1979) will have less effect on construction than the season previously discussed, but the high wind conditions will intermittently delay "high elevation-high structure" work, equipment lifts, unprotected welding, etc. The project work in progress during the monsoon season of 1979 will be equipment installation, steelwork erection, piping installation and other mechanical operations. Much of this work can and will be conducted in covered or element-protected areas on the site. Other operations, however, will be noticeably slowed as a result of the second monsoon period. The third monsoon season may have a delay effect on the completion of final insulation and painting.

V. POSSIBLE PROJECT DELAYS (Continued)

A. During Construction (Continued)

2. Availability of Experienced Manpower

The availability of experienced, qualified personnel in the labor crafts are of serious concern to the successful completion of the construction phase of this project. Williams Brothers views the problems associated with this category as moderately significant, providing that the efforts to staff craft labor positions with local talent is reasonably successful. If expatriate labor is required over and above current forecasts, however, the manpower availability could become critical in a very short period. Expatriate labor is the alternative solution to hold the project schedule. This potential problem bears close scrutiny in the early stages of the construction phase. Training programs must coincide with all construction schedules developed in the field to assure maximum effectiveness of manpower when needed.

3. Inherent Design Changes

This problem is one which lies dormant and is not visable until discovered and is extremely difficult to evaluate in general terms. As in all projects of this nature, there will be field design changes during the construction stage which may have direct impact to the overall end date of the project. The number of design changes cannot be estimated. It would be presumptuous for Williams Brothers to offer a number that could be used as a standard. It is important to recognize that regardless of the number of design changes, the overall amount of delay can be minimized through an effective coordination plan to review, approve and implement the mandatory design changes required for efficient operations. It therefore is mandatory that change control methodologies and procedures be developed and approved as soon as possible so that these changes can be expedited as they occur.

4. Logistics Problems

Since there has been a one (1) year delay of the project due to the requirement for dynamic compaction, most of the equipment and material purchases have been made and do not pose a threat to the scheduled date. However, the problem of logistics (that is, the transportation, delivery and interim maintenance of dynamic equipment) is only partially resolved at this point in time. Arrival of equipment and materials in

V. POSSIBLE PROJECT DELAYS (Continued)

4. Logistics Problems (Continued)

consonance with the construction timetable is truly a critical factor that cannot be overlooked. Essentially, this project can be largely evaluated by this important element, and in turn, can be directly attributed to an effective or ineffective management effort.

5. Current Progress

According to the Foster Wheeler Field Project Manager, progress made thus far in the construction phase of this project has been slow. Managerial delays in obtaining construction equipment as well as spare parts for construction equipment already at the site have had considerable impact to planned performance to date. The civil subcontractor for the compensatory foundations of the Urea structure and Prill tower (Korean Development Company - KDC) has not progressed satisfactorily, and has further been hampered from the lack of his own equipment and materials deliveries. It further appears that KDC may have been overly optimistic in the schedule that was submitted in their proposal to Foster Wheeler, as evidenced by the lack of progress made according to that plan.

Current assessment by Foster Wheeler is that progress at the site is two months behind schedule, including all the delays that have been discussed in the foregoing paragraph. Williams Brothers is not confident that the schedule slippage can be completely recovered, or that additional slippage will be prevented.

SUMMARY

The expected date of completion of the construction phase of this project is difficult to establish. At best, it is arbitrary and can only be estimated based on historical and potential new problems that have been presented. It is because of this arbitrary, and somewhat speculative approach, that Williams Brothers would rather bracket a span of time than to select a most likely time the mechanical completion will occur. Nevertheless, Williams Brothers is obligated to suggest an appropriate date of completion of the construction phase.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SUMMARY (Continued)

The span of time for the probability of completing this phase should be discussed first, however. The cumulative effect of the problems previously identified could result in many months delay in the mechanical completion date. The following input assessment of each of these problems, although arbitrary in nature, are in the opinion of Williams Brothers, reasonable assumptions:

	PROBABLY DELAY		
Possible Problem	Optimistic	Most Likely	Pessimistic
Weather Conditions	1 month	2 months	4 months
Lack of Experienced Manpower	1 month	2 months	3 months
Design Changes	1 month	2 months	6 months
Logistics Problems	1 month	2 months	3 months
Current Progress Delay	1 month	2 months	3 months

Williams Brothers believes that there are three problems out of the five listed that will more readily accumulate delay time:

Weather conditions, design changes and current progress. By looking at these three potential delay areas then, an expected date for completion of the construction can be determined by utilizing the normal beta distribution curve on which the Program Evaluation Review Technique (PERT) methodology is based, the expected time for each of these potential delays can be expressed in the equation: te (expected time) = $\underline{a + 4m = b}$ or,

$$te = \frac{\text{optimistic} + (4)\ \text{most likely} + \text{pessimistic}}{6}$$

The following can be derived using this as a basis of expected delay time:

	DELAY			
	(a)	(m)	(b)	(te)
Possible Problem	Optimistic	Most Likely	Pessimistic	Expected
Weather	1	2	4	2.2
Design	1	2	6	2.5
Current Delay in Progress	1	2	3	2.0
Cumulative	---	---	---	6.7

The date of 6 June 1980 is the current date of mechanical completion. With the 6.7 months expected delay, there is a possibility of mechanically completing this job as late as 31 December 1980. Williams Brothers believes, however, that the three problem areas do not "stand alone" as separate cumulative factors, and as much as fifty percent (50%) time loss of these areas are concurrent. Therefore, it is Williams Brothers' opinion that mechanical completion will most likely occur on/about 30 September 1980, or approximately 3.4 months after 6 June 1980.

SUMMARY (Continued)

It is again pointed out that this assessment is arbitrary, and Williams Brothers can only offer this date, based on the foregoing discussions on situations that may or may not exist in the future for the purpose of allowing delay costs in the capital budget.

B. After Startup

Because the commissioning phase is as yet unplanned, except for a four (4) month span set aside for it, it is difficult to assess what type of potential delays could be considered. Williams Brothers can only suggest some of those possibilities based on historical data taken from similar projects. It must be understood, however, that Williams Brothers is not intimating that these conditions will likely exist, but the possibility of occurrence must be considered when attempting to ascertain the overall potential slippage in the project end date. The following items, then, are those that appear to create the most significant hazards to schedule in the commissioning phase:

1. Operational Spares

Too often on most projects, delays are experienced as the result of the lack of equipment replacement. Care must be taken to identify and categorize those critical, limited and routine spares during the design and construction phases, so that they may be procured and be on hand at the facility to prevent long delays. The classification of these three spares categories can be defined as follows:

a. Critical -- Any item required for the operation of the facility, which in the event of non-availability, would cause non-availability of the facility for plant production.

b. Limited -- Any item required for the operation of the facility, which in the event of non-availability, would only permit the facility to operate at less than the design production rate.

c. Routine -- Any other facility item that is regularly or periodically replaced as a normal preventive maintenance item, and which does not have any appreciable effect on plant production should a malfunction of the item occur.

Spares are only mentioned here as a possible item that could delay activities after start-up.

B. After Start-up (Continued)

2. Operator Training and Operational Documentation

The lack of operators sufficiently trained and the number required could have a serious impact to the project end date. The training program must be closely monitored to ensure both quality and quantity in the training classes. The most well constructed and efficient plant in the industry can be reduced to a low production facility as the result of the lack of operators or inadequately trained personnel.

As a part of this potential problem, the requirement to have adequate documentation in the form of operations manuals, mechanical catalogs, emergency shut down procedures, etc. in a timely manner is absolutely essential to the successful completion of the project and a smooth transition to the operational phase. It is merely sufficient to point out that this information, which is gathered during the design and early construction stages must be available by the time the facility is mechanically complete and ready for plant commissioning.

3. Operational Modifications

Historically Williams Brothers has found that modifications have been necessary after mechanical completion so that a facility or plant can be operated, maintained or serviced more effectively and efficiently than the original configuration. Many of the modifications of this type can only be identified after mechanical completion. The size and scope of these modifications may be very small, but there will doubtless be some that will require extensive rework of existing equipment or hardware. The time impact to schedule then, is also proportionate to the extent of the modification. For purposes of defining those modifications and assessing the impact to the schedule, it would seem appropriate to categorize these modifications into distinct groupings:

a. Operator Considerations - These modifications are the kind that generally require small amounts of time and budget to accomplish, and are incorporated primarily to assist or aid the operations personnel in performing functions more efficiently.

b. Equipment/Material Modifications - It has been found that when the facility has been mechanically completed, there generally is

47

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. After Start-up (Continued)

b. Equipment/Material Modification (Continued)

a piece of equipment or material that is not performing well. It may be operating well within specifications and has stood up under every test, but the equipment is simply not working satisfactorily. A modification of this kind can be extensive in time and money, and can delay operations of a facility considerably.

c. Process Modification - This is the most significant type of change that may occur after start-up. Changes falling within this category are generally extensive, and may involve systems redesign, process and equipment specification changes and equipment replacement, and similar problems. This category is by far the most costly in terms of time and money, and should be carefully watched by all concerned. However, the proven processes selected for this project provide comfort that process modifications would not be required.

SUMMARY - Delays after Start-up

Williams Brothers finds it even more difficult to evaluate delays in this area than those discussed in the construction phase. Very little information regarding the commissioning of the facility has been generated to date, and the four (4) month period set aside for it may be sufficient to perform all activities that are required. Williams Brothers judgment, for purposes of cost allowances in the capital budget, believes that two (2) months delay cost should be adequate after start-up.

43

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION VI

FINAL RECOMMENDATIONS LIST

During the course of Williams Brothers study and evaluation of the project, four action Recommendation Lists have been submitted. For the convenience of the reader, the previous action Recommendation Lists are included in this report as exhibits.

A record of the AFCC implementation action of Williams Brothers recommendations is included in this Report as Appendix "C".

Included in this section is the final Williams Brothers action Recommendation List Number 5, which has been developed as a result of further study of the project.

The previous action recommendations included in the Exhibits section are as follows:

Exhibit I	Urgent Action Recommendations List No. 1 resulting from Bangladesh visit March 1 through 4, 1978
Exhibit II	Action Recommendations List No. 2 resulting from Foster Wheeler Limited visit March 9 through 20, 1978
Exhibit III	Action Recommendation List No. 3 resulting from Foster Wheeler Limited visit in Dacca April 17 through 22, 1978
Exhibit IV	Action Recommendation List No. 4 resulting from AFCC and VNP visit in Dacca April 17 through 22, 1978

WILLIAMS BROTHERS PROCESS SERVICES, INC.

FINAL ACTION RECOMMENDATION LIST NUMBER 5

These recommendations are the results of the study of the many project documents during the course of preparing the Final Report during the period June 5 though July 7, 1978.

1. FWL has the opportunity of making improvements in the project schedule by accelerating the placement of concrete for pressure vessel foundations and grade mounted heat exchangers. Concurrently, FWL must accelerate the scheduled delivery of all pressure vessels and grade mounted heat exchangers which are now ready for delivery for a new earlier scheduled erection date for placement on their foundations on or before 1 January 1979. FWL must calculate the total cubic meters of concrete required for this work and schedule concrete placement with other concrete placement activities. This accelerated concrete placement schedule is justified from the standpoint of increasing the duration of piping erection time and manpower and construction equipment leveling. Also, a rigging plan and sequence for arrival of pressure vessels and exchangers must be developed.

2. FWL must accelerate the installation of underground piping and expediting of that piping material.

3. FWL must eliminate "Delay and Storage Charges" for pressure vessels and grade mounted heat exchangers effective the 1st of August, 1978. Arrange shipment for site storage on concrete foundations or lay out a plan for temporary storage at the site for pressure vessels and exchangers not placed on foundations by 1 January 1978.

4. FWL must establish a clear definition of scope for the remaining planned local subcontracts for foundations and concrete work or perform by direct labor.

5. Effective without delay, AFCC and FWL must issue monthly cost/commitment reports which reflect the costs to complete and variance from the control estimate (budget). A narrative comment should be issued for all line item forecasted at completion variances of five percent (5%) of the control estimate or US $100,000 equivalent, whichever is greater.

6. AFCC and FWL must schedule a joint meeting to review the first issue of the FWL Cost/Commitment Report to create a confidence understanding for the analysis of all future reports. These meetings should continue monthly until the forecasted total FWL reimbursable cost at completion becomes believable by all parties concerned.

45

WILLIAMS BROTHERS PROCESS SERVICES, INC.

FINAL ACTION RECOMMENDATION LIST NUMBER 5 (Continued)

7. FWL shall continue monitoring the dewatering program and take those precautionary measurements outlined by the Dames & Moore reports regarding the construction of the Urea plant, Prill tower and Ammonia storage tank foundations related to settlement.

8. FWL must make an improvement in the FWL "Lenders Fund Progress Report" to group AFCC and FWL foreign exchange costs respectively with subtotals.

9. AFCC must provide FWL in writing with updated order and contract values such as Valley Nitrogen, JCE/SD and Dames & Moore, etc., such that FWL may maintain the "Loan Fund Progress Report" with more accurate commitments and disbursements.

10. AFCC must direct FWL to modify the FWL Monthly Progress Report along the lines of Williams Brothers recommendations stated in Williams Brothers' Monthly Progress Report No. 1, Pages 41 and 42 to provide a meaningful summary that is informative to those on the distribution list.

11. AFCC must establish a formal spare parts inventory control system and warehousing plan that will be in operation when the first spare parts are received.

12. AFCC must establish a spare parts budget control system, including the delegation of that responsibility, to assure that the most essential spare parts are placed on order before exceeding the $10 million budget.

13. AFCC must negotiate with the all risk insurance carrier, Sadharan Bima Corp., that the policy has a magnitude of coverage for the amount at risk for the names insured, AFCC and FWL, consistent with the current control estimate and that the termination date of the all risk policy is compatible with the revised completion date (increased premiums appear to be in order with corresponding increases in the cost at completion).

46

WILLIAMS BROTHERS PROCESS SERVICES, INC.

FINAL ACTION RECOMMENDATION LIST NUMBER 5 (Continued)

14. Lenders must advise AFCC and FWL, subsequent to supplemental financing, the desired source of funds for uncommitted subcontracts and material project costs requiring foreign currency in a format similar to Table IV-D, such that FWL may plan inquiries and vendors lists to the source of funds and lenders procurement procedures.

15. FWL must prepare a separate requisition Index (1963 job code) for local purchased materials and subcontracts to be paid in Bangladesh Taka to assure that all required requisitions are closed with a purchase order.

16. AFCC and the lenders should study the FWL "Loan Fund Progress Report" and direct any practical modifications desired to FWL or accept the report as it is except for Williams Brothers recommendation Numbers 8 and 9 above.

17. AFCC must prepare a monthly consolidated cost/commitment report of the FWL reimbursable costs and AFCC costs to show the forecasted cost at completion and control estimate variances report along the same tabulated FWL format that is manageable.

18. FWL must review continuously the updated shipping and delivery schedule for improvements since many of the planned shipping dates are too close to the required on-site dates.

19. AFCC must find a way to renegotiate the FWL contract to provide FWL with a greater incentive bonus to complete the project earlier or on time in addition to the present bonus/penalty clause. Each month improvement in the schedule provides AFCC about $ US545 M saving in foreign currency and $ US 640 M saving in local currency for a total monthly saving of $ US 1,185M equivalent. Consideration could be given to allow FWL fifty percent (50%) of this saving or $ US 600 M per month up to a maximum of six (6) months bonus or $ US 3,600 M. This additional incentive would reach the attention of FWL top management each and every month the project is not completed whereby FWL top management would insist that the most qualified FWL human resources are assigned and that those assigned are performing with the greatest ingenuity to develop methods for an earlier completion.

When considering the ten percent (10%) construction interest, the AFCC total monthly capital budget depreciable asset savings approaches $ US 3,500 M or up to $ US 21,000 M equivalent in six (6) months. There are serious reservations on the part of Williams Brothers that the project can be completed

47

FINAL ACTION RECOMMENDATION LIST NUMBER 5 (Continued)

six (6) months ahead of schedule. However, at no increase in cost to AFCC, the project would be completed on time. Only FWL can make the determination with their resources that the project may be completed ahead of schedule without imposing a negative cost/benefit. A favorable reaction from FWL may be followed up by letter.

The most serious unfavorable direct cost increase for an accelerated schedule would be additional construction equipment and possible additional expatriate personnel. A request for proposal from FWL would present, in their opinion, the magnitude of the unfavorable direct costs.

Any unfavorable direct cost increases could be applied to reduce the magnitude of the FWL bonus.

In any case the maximum sum of this suggested bonus and the FWL fee is less than the IDA appraisal report estimate dated December 1974 which is $ US 24.6 million.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION VII

PROJECT MANAGEMENT

A. AFCC MANAGEMENT

AFCC from the inception of this project has had basically three (3) primary management roles to play for the implementation of the fertilizer project namely (1) the site preparation, housing complex and support facilities, (2) the fertilizer complex and (3) the organization of an operating company. Each of these respective roles require a very close coordinating interdependent relationship with the others to satisfy the demands of management attention with respect to the overall project budget and schedule.

A qualified Project Manager was, and is now required for each of the respective activities. However, the latter or organization of an operating company should be managed by the Plant General Manager. The first two (2) roles, (1) support facilities and (2) fertilizer complex are project management functions that would not exist when the plant commences operations.

The comments that follow are restricted to the first two (2) roles.

1. There is a need to expedite the activities of Foster Wheeler from a forward planning standpoint. Each of the day-to-day problems require so much management attention that the preventive measures to preclude future problems are either not foreseen or that current problems take up all the time of management that forward planning time is not available.

2. The project has not had a monthly cost forecast at completion report since its inception, prepared in manageable cost reporting format. AFCC and FWL have not established a working session to develop such a format that all parties to the project would accept as a working tool.

3. Notwithstanding, the restrictions if any, in the AFCC-FWL contract, a monthly updated control estimate change should be made each time there is a contract scope change or when the direct hire vs. subcontract philosophy changes, or when materials are made a part of a subcontract.

   The control estimate does not require a change when actual costs exceed the current estimate or when omissions in the estimate are ascertained. Hopefully, the contingency allowance is adequate for omissions and estimating overruns.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. FOSTER WHEELER MANAGEMENT

The primary function of the FWL Project Director is to call upon all the human resources available within the organization namely engineering, procurement, construction, shipping, estimating and cost control to execute the project in a timely fashion targeted to a budget and schedule. The FWL organization has the qualified staff and technical expertise to execute the project.

FWL has the painful experience of executing the project under the duress of time delays that have encroached seriously upon the lump sum fixed fee costs for home office services. The lack of adequate fee may partially be the reason for limiting the number of home office services personnel and activities to a minimum necessity to execute the project.

Currently, delays in placing subcontract and construction equipment purchase orders, whatever the reason, may have delayed the civil construction work by three (3) months or more. Detailed planning for the project is grossly lacking. Delays in the future will surely be incurred due to lack of detailed planning. Detailed planning coordinates the available construction labor resources with the timely delivery of materials. Each simple activity of construction, such as the placement of a foundation, requires detailed planning to assure all materials are on hand by the scheduled date to commence excavation, including construction equipment, labor, consummable supplies, small tools and forming materials. This degree of detailed planning preceding the commencement of construction work is not now evident at the project site.

A single document does not exist that outlines each and every purchase requisition that is designated for local purchase, i.e. purchased in FWL Dacca office from Bangladesh suppliers. The FWL nine hundred and ninety-five (995) page material progress schedule [28-31] does show those purchase requisitions that have been designated for local purchase. Must we have to wade through nine hundred and ninety-five (995) pages to find the local purchase requisitions that have the prefix 1963 (local currency job code)? Furthermore, are there additional requisitions not included in the material progress schedule? The FWL requisition index does indicate those items (1963 job code) which are designated for local purchase. The FWL field procurement office in Dacca needs a more specific list to plan their work on a priority basis.

The communications link between the Ashuganj project site and the FWL Reading Construction Coordinator is by radio to the FWL Dacca office then by phone or telex to FWL Reading. Therefore, the FWL Resident

B. FOSTER WHEELER MANAGEMENT (Continued)

Manager and supervision at the site are not on a direct line of communication to expedite the FWL home office. Close linked communications are a necessity to getting on with a timely completion.

The statements made on Page 1 of Williams Brothers "Monthly Progress Report No. 1"[138] have not changed and should be recited in this Final Report for emphasis.

"Now that the project is moving into an accelerating construction phase, a more positive approach to completing the project in a timely manner is becoming evident.

All previous work relating to project planning, design engineering and procurement has established a lead time far advanced of the current construction schedule. (Except procurement of construction equipment.)

The FWL Reading office will become the center for arranging all logistics, shipping and timely material deliveries closely coordinated with the requirements of the project construction site office at Ashuganj.

An unusual aspect of the overall project, primarily resulting from prior site development delays, has made the major equipment readily available when needed from vendor manufacturers and fabricators. The ready availability of previously ordered major equipment should be turned into a great advantage in project construction planning.

Another unusual aspect of this project, considering present circumstances, places a phenomenal schedule demand upon the completion of all concrete foundations and concrete superstructures preceding the subsequent erection of the major equipment.

The erection of major equipment logically precedes the erection of the piping systems that will determine the ultimate project completion dates.

Daily and weekly construction and logistics planning will be required for the duration of the project to realize the scheduled plant acceptance date of 30 September 1980.

Unavoidable incidents and incremental delays will place burdens of time upon the FWL project management team, and AFCC to develop ingenious alternative plans, that will call upon all their prior experience to resolve yet undefined problems.

B. FOSTER WHEELER MANAGEMENT (Continued)

The schedule is possible, provided the untested national labor resource becomes sufficiently experienced and productive. More of the national labor force on this project will experience their first major process industry construction project."

C. MANAGEMENT LENDERS FUNDS

1. AFCC

AFCC was not able to produce any documents showing the total of the lenders funds being managed on a current monthly basis. Williams Brothers provided AFCC in early March a format that may be applied. The suggested format was improved on by AFCC and reduced to a printed form referenced as Enclosure 22 to AFCC letter to Williams Brothers dated 20 April 1978.[68] A reduced copy of this form is included in the Appendix Section of this report titled Appendix "B".

2. FWL

Williams Brothers was not able to find anyone within AFCC or FWL who had documented instructions for the desired format of a report desired by the lenders to maintain the accounts of lenders funds. Appendix 1 of the AFCC-FWL contract Paragraph A.6. and Paragraph E. require FWL to maintain cash flow, commitment and withdrawal records including estimated disbursements for the next three (3) months.

FWL advises Williams Brothers that the current FWL loan fund progress report format was reviewed by AFCC and the lenders and agreed to.

3. FWL Loan Fund Progress Report

Williams Brothers has studied two (2) issues of the FWL loan fund progress reports dated 7 March 1978 and 9 May 1978.

The matrix columns in the report are labeled (1) vendor name (2) order no. (3) order value (4) invoices approved (5) invoices paid and (6) paid loan. The seven (7) lenders funds are being managed by FWL in fifteen (15) different currencies by a FWL developed computer program. Input data is provided for all foreign currency purchase orders, subcontracts, price variation summaries, invoices and notices from AFCC or the lenders that an amount has been paid. A run may be called at any point in time to assess the status of commitments, disbursements and variances to rate of exchange.

C. MANAGEMENT LENDERS FUNDS (Continued)

3. FWL Loan Fund Progress Report (Continued)

FWL maintains their estimate US $ equivalent prices for the rate of exchange in effect stated in the "Financial Times" 27 September 1976 as follows:

Australian Shilling	16.850	Indian Rupee	8.81
Australian Dollar	0.807	Italian Lira	887.00
Belgian Franc	36.17	Japanese Yen	278.00
French Franc	4.96	Singapore Dollar	2.46
W. German D.M.	2.47	Swiss Franc	2.53
Dutch Guilder	2.48	U.K.Pound	0.585
Hong Kong Dollar	4.66	Swedish Kroner	4.35

Between the two (2) periods 7 March 1978 and 9 May 1978 the loss in foreign exchange rates variances were ($7.257 million) and ($5.995 million) respectively from the base period 27 September 1976 when applying the foreign exchange rates in effect on 21 February 1978 and 25 April 1978 respectively.

The paid loan column for the ADB, IDA and GOI loans are converted to U.S. dollars based on the foreign exchange rate in effect on the date the funds are disbursed. The GOS and KfW funds are converted into their respective currencies accordingly.

All the entries into the report include both AFCC and FWL commitments as they are made. It becomes tedious to extract all AFCC commitments to arrive at the FWL only reimbursable commitments. An improvement to the report should provide for AFCC and FWL subtotals.

Williams Brothers believes the report may require an annual audit to verify its completeness for each individual commitment and disbursement. AFCC would be well advised to provide FWL with revised "Order Values" for the open order commitments such as Valley Nitrogen, JCE/SD and Dames & Moore to report a more accurate total commitment.

Table VII-A which follows provides a record of the foreign currency gain/(loss) for each of the lenders funds.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE VII - A

	US$ GAIN/(LOSS)	
	7 March 1978	9 May 1978
ADB	(4,232,481)	(3,899,065)
AID	-	-
GOI	-	-
GOS	647,493	550,752
IDA	(4,176,224)	(3,003,537)
KfW	504,242	356,813
ODM	-	-
Unfavorable Foreign Exchange Variance	(7,256,970)	(5,995,037)

It was precisely because of this variance in foreign exchange rate and the fact that FWL maintained their cost estimates and cost reporting data in the one (1) currency the US dollar, with a 27 September 1976 base period, that a new contingency item was recommended by Williams Brothers to be provided in both FWL estimates and cost reports. Otherwise, the total indicated costs,each reporting period, would have shown an overrun not within the control of FWL. Finally, FWL provided, and AFCC agreed to, an allowance of US $8.0 million as a foreign exchange contingency. It is beyond the scope or capacity of any party to this project to forecast the foreign exchange rates into the future for the time the disbursements will actually take place. A similar calculation shown in Table VII-A will be performed by FWL monthly on the last Friday of each month, then entered on the monthly cost report.

AFCC and each of the respective lenders should study the FWL loan fund progress report, accept it as it is, or direct the desired practical changes that would provide informative analysis.

Table VII-B, "Summary-FWL Loan Fund Progress Report" dated 9 May 1978, is included in this section and shows the total order value, invoices approved amount and total invoices paid that have been reported to FWL.

Table VII-C, "Status Lenders Funds", as of 9 May 1978 shows an overcommitment of US $3.5 million based on the rate of exchange in effect on 25 April 1978.

Table VII-D summarizes the committed order value as of 9 May 1978 for each respective foreign currency.

54

WILLIAMS BROTHERS PROCESS SERVICES, INC.

D. AFCC - MONTHLY PROGRESS REPORT

The AFCC Monthly Progress Report for the month of March 1978 was not available for review at the time of Williams Brothers departure from Dacca on 28 April 1978.

E. FWL - MONTHLY PROGRESS REPORT

FWL has not modified their Monthly Progress Report in accordance with oral discussions on 20 March 1978 and 9 May 1978 as recommended in Williams Brothers Monthly Progress Report No. 1, pages 41 and 42. AFCC should direct FWL accordingly to provide a meaningful monthly summary of progress that is informative to those on the distribution list.

55

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE VII-B

ASHUGANJ FERTILIZER COMPLEX

SUMMARY

FWL LOAN FUND PROGRESS REPORT

DATED 9 MAY 1978

LOAN FUND	CURRENCY	U.S. $			
		EXCH.RATE 4/25/78	ORDER VALUE	INVOICES APPROVED	INVOICES PAID
AID	US$	-	21,764,981	10,370,011	9,908,199
ADB	Aust.Shilling	15.00	526,886	33,279	33,279
	DM	2.08	18,836,451	5,598,098	2,548,532
	Dutch Fl.	2.22	511,199	12,613	0
	Indian Rupee	8.70	705,715	0	0
	Italian Lira	871.02	4,193,655	359,615	359,615
	Japan Yen	228.57	3,781,458	0	0
	Sterling	1.82	3,200,323	1,003,424	569,966
	US$	-	1,207,841	199,548	0
	Singapore $	2.36	19,352	0	0
	Subtotal		32,982,860	7,206,577	3,511,392
GOI	US$	-	0	0	493,910
GOS	Belg.Franc	32.46	299,720	0	0
	DM	2.08	3,832,787	587,269	587,269
	Italian Lira	871.02	84,922	0	0
	Japan Yen	228.57	152,681	0	0
	Sterling	1.82	2,461,696	101,373	101,373
	Swiss Franc	1.96	394,494	0 ?	47,199
	Subtotal		7,226,300	688,642	735,841

56

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE VII-B (Continued)

LOAN FUND	CURRENCY	EXCH. RATE 4/25/78	U.S. $ ORDER VALUE	U.S. $ INVOICES APPROVED	U.S. $ INVOICES PAID
IDA	Aust. Shilling	15.00	20,895	0	0
	DM	2.08	6,559,930	3,732,083	2,845,073
	Dutch Fl.	2.22	1,302,024	1,302,024	1,302,024
	French Franc	4.63	412,261	74,261	24,140
	Indian Rupee	8.70	1,712,819	0	0
	Italian Lira	871.02	1,093,813	20,665	0
	Japan Yen	228.57	5,555,579	1,443,046	1,443,046
	Sterling	1.82	18,555,864	2,218,077	1,067,284
	US$	-	26,212,918	7,581,850	6,137,808
	Singapore $	2.36	22,924	0	0
	Subtotal		61,449,027	16,372,006	12,819,375
KFW	Aust. Shilling	15.00	334,667	0	0
	DM	2.08	2,260,679	709,719	419,579
	Dutch Fl.	2.22	1,619,123	462,909	462,909
	Indian Rupee	8.70	13,500	0	0
	Italian Lira	871.02	1,661,041	181,114	181,114
	Japan Yen	228.57	2,822,809	43,876	0
	Sterling	1.82	561,081	15,492	0
	US$	-	780,415	0	0
	Singapore $	2.36	38,676	0	0
	Swedish Krona	4.66	56,424	0	0
	Subtotal		10,148,415	1,413,110	1,063,602

51

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE VII-B (Continued)

LOAN FUND	CURRENCY	EXCH. RATE 4/25/78	U.S. $ ORDER VALUE	U.S. $ INVOICES APPROVED	U.S. $ INVOICES PAID
ODM	Sterling	1.82	14,560,000	10,842,000	11,086,428
	TOTAL LENDERS FUNDS		148,131,583	46,892,346	39,618,747
	LESS AFCC COSTS		(27,529,567)	(15,110,288)	(15,082,712)
	LESS FWL FEE		(18,198,271)	(14,271,793)	(13,938,590)
	TOTAL FWL REIMBURSABLES		102,403,745	17,510,265	10,597,445
	FWL REIMBURSABLES 7 MARCH '78 REPORT		80,167,579	11,817,853	5,534,917

58

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE VII-C

STATUS LENDER FUNDS - 9 MAY 1978

	US $ EQUIVALENT		
LENDER	AVAILABLE LOAN FUNDS*	COMMITTED ORDER VALUE*	VARIANCE
AID	30,000,000	21,764,981	8,235,019
ADB	30,000,000	32,982,860	(2,982,860)
GOI	12,400,000	0	12,400,000**
GOS	10,204,082**	7,226,300	2,977,782**
IDA	33,000,000	61,449,027	(28,449,027)
KFW	14,423,077**	10,148,415	4,274,662**
ODM	14,560,000**	14,560,000	- - **
TOTAL	144,587,159**	148,131,583	(3,544,424)

*Rate of Exchange Reported by "Financial Times" 25 April 1978

**These Amounts Are Corrections to Williams Brothers Progress Report No. 2

The estimated MAF and TA contract values at completion included in the "Committed Order Value" column when reduced to actual disbursements provides for a positive variance.

59

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE VII-D

COMMITTED ORDER VALUE BY CURRENCY
9 May 1978

CURRENCY	FOREIGN CURRENCY	US $ EQUIVALENT*
US $	49,966,155	49,966,155
Aust. Shilling	8,781,932	822,448
DM	67,349,489	31,489,847
Dutch Fl.	8,563,255	3,432,346
Indian Rupee	21,158,809	2,432,034
Italian Lira	6,106,548,859	7,033,431
Japan Yen	2,833,350,682	12,312,527
Sterling	21,623,074	39,338,964
Singapore $	190,820	80,952
Belg. Franc	9,729,750	299,720
Swiss Franc	773,800	394,494
French Franc	1,913,780	412,261
Swedish Krona	263,309	56,424
TOTAL	- - - - -	148,131,583

*Rate of Exchange Reported by "Financial Times" 25 April 1978

60

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION VIII

DESIGN AND ENGINEERING

CURRENT STATUS AND PLAN

A. GENERAL

Data for this Final Report was obtained during a one day meeting in FWL engineering offices in Glasgow on 15 March, 1978 and FWL Reading offices during the periods 13-22 March 1978 and 2-11 May 1978. A one day meeting in Uhde offices at Dortmund,Germany was held on 12 April 1978. Studies were made of the job specifications and standards, equipment specifications, design drawing, FWL document index and material requisition list.

FWL engineering offices at Glasgow performed the design engineering for the Ammonia plant and offsites. Uhde engineering offices at Dortmund, Germany performed the design engineering for the Urea plant.

The FWL and Uhde drawings are of exceptionally excellent quality from the standpoint of legibility, organization, formatting and neatness of lettering. Provided the dimensional accuracy is of equal quality, there should be no increased construction costs due to dimensional errors. Quality control procedures for dimensional control exist in both offices.

B. ENGINEERING SCHEDULE

The scheduled engineering completion date for initial issue for construction of all drawings is late August 1978 with final requisitions for materials and subcontract scheduled within two weeks thereafter.

All engineering data required for material purchase and construction is well ahead of the required construction schedules. Scheduled engineering releases are not a project bottleneck.

C. PROCESS ENGINEERING

The basic process design for the 930 metric ton per stream day Ammonia plant was provided under license from the "Process Subcontractor",

61

WILLIAMS BROTHERS PROCESS SERVICES, INC.

C. PROCESS ENGINEERING (Continued)

Friedrich Uhde GmbH, of Dortmund, Germany who will also provide start-up assistance. FWL is providing the detailed engineering for the Ammonia plant, subject to review by Uhde.

The basic process design for the 1,600 metric ton per stream day of prilled Urea plant is provided by Stamicarbon to the "Process Sub-contractor" Uhde who will also provide start-up assistance. Uhde is providing the detailed engineering for the Urea plant.

The basic process design and detailed engineering for the offsites is provided by FWL.

All process design work is essentially complete except for the operating manuals for the process plants and offsites. Uhde and FWL have completed a draft copy of the Ammonia plant operating manual which was submitted to AFCC for comment by FWL letter dated 26 May 1977. At this writing, the comments have not been received by FWL from AFCC. This same letter submitted an outline form of the FWL "Offsites" operating manual and a draft of the "Ammonia Storage Section" for comment.

A "Marked Up" draft of the Uhde Urea plant operating manual is in the possession of FWL.

FWL has the responsibility of reviewing and organizing all the operating manuals for final submission including the completed process and engineering flow diagrams.

D. MAJOR EQUIPMENT SPECIFICATIONS AND JOB SPECIFICATIONS

All specifications are complete and are available in bound form for the Ammonia plant, Urea plant and offsites. Purchase requisitions have been issued for all major equipment.

E. DESIGN DRAWINGS

The following status for design drawings is based on the period ending 30 April 1978.

67

WILLIAMS BROTHERS PROCESS SERVICES, INC.

E. DESIGN DRAWINGS (Continued)

1. Process-Utility-P&ID Flow Sheets

	No. Dwgs.	Drawings Issued for Const.	% Complete
Ammonia Plant	54	43	97
Offsites	48	0	86
Urea Plant	18	0	97

The final completion is dependent upon receipt of vendor information, now being expedited. The construction release issue of flow sheets is now ready to be made.

2. Plot Plans

	No. Dwgs.	Drawings Issued for Const.	% Complete
Ammonia Plant	2	2	100
Offsites	6	5	84
Urea Plant	1	1	100

3. Pressure Vessel Drawings

	No. Dwgs.	Drawings Issued for Const.	% Complete
Ammonia Plant	26	26	100
Urea Plant	38	0	95
Offsites	14	12	85

4. Civil Drawings

	No. Dwgs.	Drawings Issued for Const.	% Complete
Ammonia Plant			
UG Services & Paving	22	22	76
Foundations	86	46	92
Structural	42	39	97
Buildings	14	0	86

WILLIAMS BROTHERS PROCESS SERVICES, INC.

E. DESIGN DRAWINGS (Continued)

4. Civil Drawings (Continued)

	No. Dwgs.	Drawings Issued for Const.	% Complete
Urea Plant			
UG Services & Paving	0	-	-
Concrete	98	98	100
Structural	5	5	100
Offsites			
UG Services & Paving	16	13	78
Foundations	126	81	83
Structural	42	30	94
Buildings	46	32	89

Purchase requisitions have been issued for all underground services and paving. The underground services drawings have been issued to the field for roads, barditches and firemains.

The foundation drawings not yet released for construction will be completed by June 1978, long before the required early construction date. All bulk purchase requisitions have been issued subject to final clean-up requisitions.

Major shop fabricated structural steel required for the project has been placed on order. Shop drawings are now being reviewed and released for fabrication. Selected onsite and offsite pipe racks should be expedited for delivery to allow work to commence in the field for loading pipe racks as pipefitters are determined qualified from the training school.

The Urea bulk storage building structural steel is scheduled to ship from Italy and India from May to September 1978.

All structural design drawings are scheduled to complete in May 1978 for final purchase requisitions.

The scheduled completion date for the balance of the building drawings is June 1978 including issuing of purchase requisitions.

64

WILLIAMS BROTHERS PROCESS SERVICES, INC.

E. DESIGN DRAWINGS (Continued)

5. Piping Design and Planning Layouts

	No. Dwgs.	Drawings Issued for Const.	% Complete
Ammonia Plant			
Piping Layouts	92	Not required	100
Pipe Racks	22	0	98
Piping GA's	13	0	98
Piping Isometrics	620	*	96
Model	-	-	100
Urea Plant			
Piping Layouts	3	Not required	100
Piping Isometrics	?	*	?
Model	-	-	100
Offsites			
Piping Layouts	35	Not required	100
Pipe Racks	15	0	65
Piping GA's	21	0	65
Piping Isometrics	100	0	10

* 540 piping isometrics in the Ammonia plant have been issued for fabrication and 200 piping isometrics have been issued for fabrication in the Urea plant.

6. Electrical Drawings

	No. Dwgs.	Drawings Issued for Const.	% Complete
Ammonia Plant	73	0	77
Offsites	153	0	66
Urea Plant	38	0	100

Drawing completion scheduled for August 1978 for the offsites with the Ammonia and Urea plant completing in June 1978.

Final bulk material purchase requisitions were scheduled to complete the end of March 1978. The "Intermediate Takeoff" purchase requisition for the offsites is scheduled to complete mid-April 1978.

All engineered electrical gear has been placed on order.

65

WILLIAMS BROTHERS PROCESS SERVICES, INC.

E. DESIGN DRAWINGS (Continued)

7. Instrument Drawings

	No. Dwgs.	Drawings Issued for Const.	% Complete
Ammonia Plant	41	0	93
Offsites	18	0	56
Urea Plant	44	0	97

F. BULK MATERIAL REQUISITIONS

The source document for the current status of requisitions was provided by FWL and Uhde latest issue of the requisition index.

1. Civil Bulk Material

	No. Requisitions	No. Issued For Purchase Order	% Complete
Ammonia Plant	35	35	100
Urea Plant	(All required included with KDC Subcontract)		
Offsites	42	38	90

All other required materials other than sand, aggregate and cement are included in the subcontract bills of material.

2. Piping Bulk Material

	No. Requisitions	No. Issued For Purchase Order	% Complete
Ammonia Plant	301	297	99
Urea Plant	84	79	94
Offsites	260	250	96

The requisitions completed are based on a final material takeoff for the Ammonia plant and Urea plant with an intermediate material takeoff completed for the offsites.

66

WILLIAMS BROTHERS PROCESS SERVICES, INC.

F. BULK MATERIAL REQUISITIONS (Continued)

3. Instrumentation Bulk Material

	No. Requisitions	No. Issued For Purchase Order	% Complete
Ammonia Plant	34	34	100
Urea Plant	34	29	85
Offsites	30	26	87

The requisitions completed are based on a final bulk material takeoff for the Ammonia plant and Urea plant with an intermediate bulk material takeoff completed for the offsites.

4. Electrical Bulk Material

	No. Requisitions	No. Issued For Purchase Order	% Complete
Ammonia Plant	34	30	88
Urea Plant	29	15	52
Offsites	42	37	88

The requisitions completed are based on a final bulk material takeoff for the Ammonia plant and Urea plant with an intermediate bulk material takeoff completed for the offsites.

G. INSULATION - PAINTING SCHEDULES

The insulation and painting schedules and subcontract requisitions are scheduled to be issued to the construction subcontracts co-ordinator of FWL in late August 1978, long before the work will be needed in the field.

H. SUBCONTRACT REQUISITIONS - STATUS

1. International Subcontracts

		Date Planned	Date Actual
1962/3-10009	Compensatory Foundations	July '77	July '77
1962/3-30007	Jetty Construction	28/7/78	10/4/78

WILLIAMS BROTHERS PROCESS SERVICES, INC.

H. SUBCONTRACT REQUISITIONS - STATUS

		Date	
		Planned	Actual
1. International Subcontracts (Continued)			
1962/3-30023	Main Compressor House Ammonia Sub-station Transformer Pads	April '78	
1962-2141	Ammonia Storage Tank	6/8/76	29/10/77 (Rev.1
1962-2710A	Instrument Installation	30/8/78	
1962-2124A	Refractory Lining	15/6/78	
1962-2567A	Chemical Cleaning Piping	-	1/3/78
Misc. Site	Vendor's Representatives	As Required	
1963-2700C	Electrical Power	12/8/78	
2. Local Subcontracts			
1963-2400-99A	Temporary Works	As Required by FWL Dacca	
1963-2400-99B	Boundary Wall	As Required by FWL Dacca	
1963-2400-99C	Workshop & Spares Stores	January '78	January '78
1963-2400-99D	Chemical Store & Repair Shop	January '78	January '78
1963-2400-99E	Roads and Drains-Cable Crossing and Firemains	January '78	January '78
1963-2421-99B	Piling (On-site)	August '77	August '77
1963-2400-99F	Bulk Storage Building	January '78	January '78
1963-2400-99G	Bag Store & Bagging Bldg.	January '78	January '78
1963-2400-99H	Compressor House	January '78	January '78
1963-2400-99J	First Aid and Firehouse	January '78	January '78
1963-2400-99K	Gatehouse	20/4/78	20/4/78
1963-2400-99L	Control Room	Sarm Association	
1963-2400-99M	Administration Building	Sarm Association	
1963-2400-99N	Laboratory	Sarm Association	
1963-2400-99P	Airconditioning		
1963-2400-99R	Substations	26/5/78	
1963-2400-99S	Ammonia Bottling & Comp.	26/5/78	
1963-2400-99T	Hose Houses and Toilets	16/6/78	
1963-2400-99U	Water Treatment Foundations	January '78	January '78
1963-2400-99V	Cooling Tower Basin	March '78	March '78
1963-2400-99W	Neutral & Equalization Basins	March '78	March '78
1963-2400-99X	Reformer Furnace Foundations	January '78	January '78

68

WILLIAMS BROTHERS PROCESS SERVICES, INC.

II. SUBCONTRACT REQUISITIONS - STATUS (Continued)

2. Local Subcontracts (Continued)

		Date	
		Planned	Actual
1963-2400-99Y	Absorber-Desorber Foundations	January '78	January '78
1963-2400-99Z	Misc. Fdns. Dwgs. 118,119,123 and 125	January '78	January '78
1963-2400-99AA	Pipe Racks Dwgs. 127 to 131	March '78	March '78
1963-2400-99BA	Pump Stations & Pkg. Boiler	April '78	April '78
1963-2400-99CA	Prill Cooler & Conveyor Fdn.	April '78	April '78
1963-2400-99DA	Exch. Bank, Air Fin. & Rec. Fdn.	7/4/78	7/4/78
1963-2400-99EA	Ammonia Substation Fdns.	11/4/78	11/4/78
1963-2400-99FA	Dwgs. 112,113 Fdns.	11/4/78	11/4/78
1963-2400-99GA	Onsite Foundations	19/5/78	
1963-2400-99HA	Pipe Rack Dwg. 548	29/3/78	29/3/78
1963-2400-99JA	Diesel Storage Tank	17/4/78	17/4/78
1963-2400-99KA	Offsite Foundations	9/6/78	
1963-2400-99LA	Offsite Foundations	19/5/78	
1963-2400-99PA	Offsite Foundations	16/6/78	
1963-2400-99RA	Offsite Foundations	26/5/78	
1963-2400-99UA	Sewer Outfall	19/5/78	
1963-2400-99VA	Offsite Paving	7/4/78	7/4/78
1963-2400-99WA	Bulk Stg. Steelwork	March '78	March '78
1963-2400-99XA	Paving Onsite	17/4/78	17/4/78
1963-2400-99YA	Drainage Channel Outfalls	20/4/78	20/4/78
1963-2400-99ZA	Dearation Foundations	21/4/78	21/4/78
1963-2400-99AB	Gaso. Storage Tank Fdns.	16/6/78	
1963-2400-99BB	Urea Dissolving Tk. Fdns.	16/6/78	
1963-2141-81C&D	Tankage Erection	14/6/78	
1963-2700A	Road Lighting	14/5/78	
1963-2700B	Lighting & Low Voltage Power	31/8/78	

Notwithstanding the numerous individual requisitions for local subcontracting of foundations, a more detailed planning effort could have been exercised by FWL to coordinate the schedule placement of concrete with a planned arrival of major equipment, by consolidating a group of foundations under one subcontract. This is even now possible to do, since the FWL Resident Manager has the management prerogative to subcontract locally or perform the placement of foundations by use of direct labor.

69

WILLIAMS BROTHERS PROCESS SERVICES, INC.

I. SPARE PARTS REQUISITIONS

FWL has developed a sixteen (16) column spare parts ordering format and a spare parts control log which will assist vendors, AFCC and FWL procurement in contolling the type, number, cost and overall spare parts budget control.

At this writing twenty-six (26) spare parts requisitions have been issued to AFCC for final approval of type and number of spares to be ordered.

Detailed planning has not recorded the actual number of vendors or spare parts requisitions required for the project. There is adequate time to have all spare parts ordered, coded and placed in warehouse storage before commencement of plant operations, provided FWL increases their effort. Spare parts coding is the responsibility of AFCC.

J. VENDORS DRAWINGS

All the project vendor's drawings and data have not been received complete for the project. Serious delays in receipt of vendor data required to complete engineering drawings are being expedited by FWL by visits to vendor's plants.

K. MAINTENANCE MANUALS

Vendor data is being accumulated and filed for compilation and issue after the final issue of the operating manuals.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION IX

PROCUREMENT - CURRENT STATUS AND PLAN

A. PURCHASING - FWL HOME OFFICE

General Comments

An in depth review of FWL Home Office purchasing procedures indicate a high degree of professional expertise and integrity. In-house procedures covering purchasing activities in this project were reviewed and checked against actual day to day activities and it was found that these project procedures were being closely adhered to.

Due to the fact that this was a fixed price on the part of FWL for Home Office procurement services, we do, however, feel that in certain areas tighter controls could have been exercised had this program been systemized on a computer. We found, for example, that FWL encountered many delays in placing purchase orders on major pieces of equipment due to less than expeditious approval on the part of AFCC.

Had this project been computerized with regular monthly or semi-monthly project reports, tighter controls could have been exercised by project management. For example, FWL Purchase Order 41031/1960 - Ammonia Water Tank:

1. Requisition received from Udhe - 2 September 1976
2. Inquiry - 5 October 1976
3. Client approval - 28 October 1976
4. Bid opening - 26 November 1976
5. Recommendation to client for approval - 7 February 1977
6. Client signed approval - 4 April 1977
7. Purchase order placed - 18 May 1977 - - Chiyoda
8. Promised delivery - 18 November 1977
9. Fabrication completed - now negotiating storage conditions

The above time frame is not unusual as many purchase orders were delayed longer due to slow reaction time on the part of AFCC. We reiterate that had this project been computerized, closer tabs could have been kept on the incremental activities of the purchasing cycle.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

A. PURCHASING - FWL HOME OFFICE (Continued)

1. Major Equipment

a. Ammonia Plant

All major equipment items for the Ammonia Plant have been purchased.

b. Urea Plant

All major equipment items for the Urea plant have been purchased.

c. Offsites Facilities

All major equipment items for the Offsites facilities have been purchased.

2. Buildings

Early shipment of certain buildings is being expedited to insure temporary storage facilities for project material and equipment. These are:

a. Bulk Storage Building--(FWL Purchase Order 12004 - Burton Construction) scheduled to be on site September 1978 from U.K.

b. Maintenance Work Shop--(FWL Purchase Order 12017 - V.D. Swami) scheduled to be on site November 1978 from India.

c. Bagged Area Building--(FWL Purchase Order 12024 - O.M. Nova) scheduled to be on site November 1978 from Italy.

3. Bulk Material

These items generally consisting of pipe, valves, fittings, electrical conduit, cable, miscellaneous electrical items, instruments and items such as control valves.

Project philosophy is to ship bulk items to job-site as manufacture is complete.

4. Pipe Insulation and Painting

This material is non-critical and has not been placed on order. It is assumed at this time that this material will be ordered on U.S. supplier.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. PROJECT SPARE PARTS

This category of procurement is definitely lagging and should have been initiated earlier in the project.

No spares had been ordered prior to 30 March 1978 with the exception of spare rotors and a minimal number of start-up spares.

The initial Spare Parts Control Log report was issued 28 February 1978 with only minimal activity shown.

Revision No. 2 of the Spare Parts Control Log dated 12 May 1978 shows only two (2) spare parts purchase orders covering eight (8) line items have been issued as of that date.

A recap by line item of the FWL Spare Parts Control Log is as follows:

1. Number of Spare Parts L sts received from vendors - 165
2. Number of Spare Parts Lists forwarded FWL Engineering for review -155
3. Spare Parts Lists received from FWL Engineering - 51
4. Number of Spare Parts Lists sent to client - 53
5. Number of Spare Parts Lists received from client - 8
6. Number of Spare Parts ordered - 8
7. Spare Parts Lists not received from vendor - 207

C. EXPEDITING

Responsibility for vendor expediting is in the hands of the individual buyers. Reporting delivery status is made on the Material Progress Schedule. There is no separate expediting report issued that would indicate to Project Management any potential problem areas.

The Material Progress Schedule is not issued on a regular basis (as a matter of record, the report has only been issued three (3) times during 1978, i.e. 20 January 1978, 3 April 1978 and 22 May 1978).

We feel this reporting mechanism is issued too sporadically to be a meaningful tool for Project Management to maintain an overview of the status of purchased material.

D. INSPECTION

Vendor inspection and audit is the responsibility of the FWL inspection group. All inspection requirements on a given piece of material or equipment is contained in the Engineering Specifications which generally reference FWL standard inspection requirements.

E. DELAY OF PAYMENT TO VENDORS (Continued)

FWL Purchase Order 21011/1960 (Continued)

4. FWL Dacca requested status of AFCC on this invoice on 15 February 1978.
5. AFCC replied that they were now querying why the invoice was from Norton Chemical and not Hydronyl as originally placed.
6. FWL advised that Hydronyl had changed their name to Norton Chemical and this fact was clearly stated on the invoice.
7. AFCC Dacca approved invoice for payment on 27 February 1978 and forwarded to ADB.
8. Payment was received by vendor 21 March 1978.

F. CONSTRUCTION EQUIPMENT AND TOOLS

An area of immediate concern is spare parts covering the aggregate crushing plant and the concrete batch plant. The following is a recap of chronological events covering the major pieces of equipment and the spare parts for operation:

27 July 1976	Rock crushing and concrete batching plant ordered
9 June 1977	Purchase order revised
September 1977	Major equipment arrived in Bangladesh
12 October 1977	Spare parts recommended by FWL
7 March 1978	Client approved recommendation
11 April 1978	Purchase order date
18 July 1978	To be shipped (ex works)

G. PURCHASING - FWL FIELD OFFICE

The FWL local Dacca Purchasing Office is located in the same building as AFCC Headquarters Office.

The primary purpose of the local Dacca office is to purchase, expedite and inspect materials to be purchased in the country of Bangladesh. FWL Dacca Purchasing Agent reports to the FWL Administration Manager.

The materials designated for local procurements are aggregate, brick, small size rebar and anchor bolts, sheetmetal, available construction consummable supplies, low voltage wire and cable, miscellaneous structural materials, cement and sand all as designated in the FWL Requisition Index and the nine hundred and ninety-five (995) page Material Progress Schedule.

14

WILLIAMS BROTHERS PROCESS SERVICES, INC.

G. PURCHASING - FWL FIELD OFFICE (Continued)

Local procurement procedures are outlined in Reference Item 54.

As discussed in Section VII, Paragraph B, it would help the local FWL Dacca office to have a composite requisition index for local purchase material designated as Project Code Number 1963 (Local Purchase FWL Reimbursable Costs) in lieu of reviewing a multi-page document.

FWL local Dacca procurement is supported by direct hire local national labor. The local Purchasing Office will be inundated in requests from the construction site office to purchase construction consummable supplies and oversights on Project Code 1962 materials, when construction activity moves into the mechanical phase. FWL must monitor this need and, if necessary, be prepared to request additional expatriate buyers.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION X

LOGISTICS AND SHIPPING - CURRENT STATUS AND PLAN

A. PLANNING COORDINATION

There is no overall planning and logistics coordination system available on this project.

A Shipping and Delivery Schedule is prepared by the Project Planning Group and a Release for Shipment is prepared by the Purchasing Coordinator to the Shipping Department. The Shipping Department then advises the individual vendors shipping instructions through the appropriate forwarders.

B. SHIPPING

Shipping responsibility is handled in Reading by a Project Shipping Co-ordinator. As stated above a total shipping plan is not available and releases of material are handled singularly by the Purchasing Coordinator from fourteen (14) different countries to Bangladesh.

C. MARINE INSURANCE

Marine Cargo insurance is being handled by the Bangladesh Insurance Company. It is the responsibility of the FWL Shipping Coordinator to cable Dacca as each vessel sails advising ship name, sailing date, cargo details, and ETA.

D. LOCAL BARGE TRAFFIC

Responsibility for off-loading from vessels to barges is covered by a local contract with the Bangladesh Inland Water Transport Corporation.

There is considerable concern on the part of FWL regarding the sufficiency of the number and timely availability of barges for this project. One delay has already occurred when barges consigned to this project were diverted to the unloading of grain. FWL is attempting to obtain assurances that barges will be available on a priority basis for this project.

E. CUSTOM CLEARANCE SERVICES

A contract has been signed by FWL acting as agent for AFCC with Birds Bangladesh Agencies Ltd. of Dacca for the clearing through local customs of all goods and material consigned to the Ashuganj Fertilizer and Chemical Company job site.

16

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION XI

STATUS OF PROJECT PLANS

A. OVERALL PROJECT TIMETABLE

In the opinion of Williams Brothers, Foster Wheeler has satisfactorily performed the engineering and procurement on the Ashuganj facility, although there would have been serious scheduling problems had there not been a twelve (12) month slippage of schedule (due to the dynamic compaction requirements.) Nearly all of the planning performed by Foster Wheeler has been in the home office at Reading. At the time of this writing, it is Williams Brothers' understanding that additional planning is just beginning at the site. As previously reported, one of the most significant problems in the Foster Wheeler planning effort was the lack of adequately trained personnel on site to perform detailed planning and scheduling functions. It now appears Foster Wheeler may soon have this problem under control.

The current plan for overall completion of the facility is not as clear as what it should be by this time in the program. This is primarily due to the lack of proper project control techniques not "in place" at the appropriate time. (more will be said about this in Section XII - Project Control Systems). At any rate, the only documents displaying overall plans are the CPM Networks and companion computer output. The current plan shows mechanical completion planned for 6 June 1980, with plant commissioning to be completed on 30 September 1980.

Williams Brothers agrees that the plan as presented by the CPM networks and printouts are reasonable, and it is possible that the project could meet both of these milestones. From a practical standpoint, however, Williams Brothers admits that it is unlikely that the project will be as enthusiastically supported as would be necessary to complete both milestones on their currently planned dates.

Additional factors, as discussed in Section V - Possible Project Delays weigh heavily in Williams Brothers' opinion that although the current plan possibly can be achieved, too many problems must be resolved, attitudes adjusted, and cooperation instituted for both milestone dates to be met. This should not be interpreted that Williams Brothers is recommending the establishment of two new milestone dates: On the contrary, the current planning dates should be held just as they are. It is only pointed out that in all likelihood, one or both of the milestone dates will probably be missed.

77

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. MAJOR EQUIPMENT - REQUIRED DATES

It appears that major equipment delivery and shipping dates are not expected to delay the progress of this job. This is highly unusual for most projects of this size and nature have numerous problems with the purchase of equipment. The reason why this project will not experience the bulk of these problems is because of the delay in the overall schedule due to dynamic compaction. It was in this twelve (12) month slippage that many material and equipment problems were resolved. Equipment has been purchased and vendor fabrication has advanced well ahead of progress that one would expect at this point in the project. If there is to be a problem along these lines of material/equipment, it probably would be manifested in the form of complacency. That is, this advanced progress could tranquilize one into a false sense of security, and thereby allow a major piece of equipment to go from a non-critical delivery item to a critical "immediate down time" delivery situation.

The Foster Wheeler Shipping and Delivery Schedule, dated 18 May 1978 (Reference No. 25), indicates that all major items for this project have shipping dates in advance of the required on-site dates. Williams Brothers believes that some of these shipping dates are too close to the required on-site dates. This schedule should be carefully reviewed to determine the advisability of placing the two dates so closely together. This review should be performed by Foster Wheeler as soon as possible after detail planning at the site has progressed into mechanical installation schedules.

78

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION XII

PROJECT CONTROL SYSTEMS

A. FOSTER WHEELER PROJECT CONTROL

1. General Overview

Williams Brothers has stated in earlier progress reports that the Foster Wheeler Project Controls methodology appears to be adequate. Planning and Scheduling and Cost Engineering procedures, formats and approaches have been reviewed to the level of detail Foster Wheeler provided, and this review by Williams Brothers revealed a fairly comprehensive and consistent approach in Project Control techniques.

Unfortunately, the execution of the Foster Wheeler project control elements and application of Foster Wheeler's own procedures in Bangladesh have not been satisfactorily implemented as of this writing. The lack of the project control system to be "in place" at Ashuganj by this time in the construction phase is a serious breach in the Foster Wheeler management philosophy and construction plan.

As a result, there is very little visibility regarding cost or schedule that can be obtained at Ashuganj. Detailed planning, at best, is just beginning, field cost control has not yet started, and trending/forecast reporting is non-existent. Lack of these and other companion elements of project control place an undue strain upon field management to accurately judge where to exert positive action and resolve the more critical problems in the construction phase.

In paragraphs 2 and 3, the Foster Wheeler project control system is discussed and comments by Williams Brothers noted. The methodologies and reports outlined in these following paragraphs have been taken from Foster Wheeler reference document numbers 33, "FWL Cost Control Procedure (Partial)dated July 1977, and 34, "FWL Scheduling Reports/ Formats (Partial)-dated July 1977, which were provided to Williams Brothers as examples of the overall project control techniques used by Foster Wheeler. Williams Brothers knows of no project control procedures having been prepared to handle the peculiarities and specific problems on this job to date, although there should have been a complete Ashuganj project control document already available for the owners and lenders.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

A. FOSTER WHEELER PROJECT CONTROL (Continued)

2. Planning and Scheduling

a) Schedules

The schedules generally submitted by Foster Wheeler to their client include the following:

Overall Construction Schedule
Direct Construction Progress Schedule
Three Month Look Ahead Schedule
Weekly Work List
Manpower Histogram
Indirect Construction Progress Schedule

These schedules are typical examples of the Foster Wheeler planning and scheduling operation. Each schedule is defined as follows:

Overall Construction Schedule is a bar chart displaying the project in weeks, and placed on a single piece of paper. It identifies the entire work scope in approximately fifty (50) activities, and each activity is assigned a schedule start and end date. The schedule is updated monthly, and actual progress and forecast completion date of each activity is shown relative to the original scheduled dates. It shows the overall manpower required each week to execute the scheduled work. When the schedule is updated, the schedule shows the actual number of men that worked in each preceeding week and a forecast number of men required to perform the work in succeeding weeks in order to complete the remaining scope of work. This schedule additionally identifies key events critical to construction completion.

Williams Brothers comment: This schedule has not been produced by Foster Wheeler on this project. The only single document showing the project duration is the Computer Output Report, generated from the Foster Wheeler CPM Networks. This Output Report is not satisfactory to perform the items specified in the Foster Wheeler planning document regarding the Overall Construction Schedule. It is obvious that a schedule of this nature would greatly improve the visibility of the project to all parties concerned and permit management a simple graphic review of the project timetable without having to "wade through" a myriad of details to obtain this overview. This schedule is needed immediately.

80

A. FOSTER WHEELER PROJECT CONTROL (Continued)

2. Planning and Scheduling (Continued)

a) Schedules (Continued)

Direct Construction Progress Schedule is a bar chart schedule for the Ammonia plant, Urea plant and offsites in which the scope of work has been broken into elements, such as:

Drums and Tanks
Pumps and Compressors
Main Compressors and Ancillaries
Civil Work
Steel Work
Pipe Erection
Instrumentation
Electrical
Power Supply
Painting and Insulation

Each element is "weighted", which corresponds to the estimated manhours for the element, expressed as a percentage of the total manhours for all the elements. Progress is assessed for each element based on a measure of physical progress. (Note: Each element has a backup sheet showing precisely the method of arriving at the progress figure).

Williams Brothers comment: This is the area of detail planning that has been sadly lacking in Ashuganj. These schedules serve as the prime movers of the Foster Wheeler construction planning function, and must be completed as quickly as possible in order for Foster Wheeler to achieve the management visibility necessary for the control of the construction phase of this project.

Three Month Look Ahead Schedule is a bar chart schedule that is compatible with the Overall Construction Schedule. It demonstrates that key objectives critical to completion are being met, and that the scheduled progress is attained (as shown on the Direct Construction Progress Schedules). Manpower, as obtained from Direct Construction Progress Schedule is entered on the Look Ahead Schedule to display the amount of manpower that will be required to accomplish those activities identified on the schedule.

81

A. FOSTER WHEELER PROJECT CONTROL (Continued)

2. Planning and Scheduling (Continued)

a) Schedules (Continued)

Williams Brothers comment: This schedule is a forecast or plan that will be continually modified to reflect current progress made. This Three Month Look Ahead Schedule serves to provide the visibility of any "catch back" or "work around" plans at the site, and graphically displays trends, problems and potential problems being resolved over a ninety (90) day period. To date, this schedule is non-existent at the site. Furthermore, it will be impossible for this kind of schedule to be created until the plans/schedules previously discussed in this section are developed and put into operation.

Weekly Work List is a document that is developed to demonstrate that work scheduled for a specific week will produce progress compatible with the Three Month Look Ahead Schedule.

Williams Brothers comment: This document further defines the work plan in more detail. As such, the restriction on the availability of this document is the same as the Three Month Look Ahead Schedule; that is, the detail from the Construction Progress Schedules must be completed before the Weekly Work List can be issued on a regular, timely basis.

Manpower Histogram - A labor histogram (a graph showing manpower requirements versus time) is produced for each trade or group of trades so that manpower can be referenced to the elements on the Construction Progress Schedule. These histograms are updated weekly throughout the construction phase to show the number of men actually working on the project, and of what trades or crafts the "mix" of manpower consists.

Williams Brothers comment: Manpower histograms have been developed by the Foster Wheeler planning group in Reading. These histograms have undergone several revisions to optimize the manpower level of the crafts/trades. Some manpower curves are still considerably higher than what they ought to be, but those instances can be resolved by detail planning options available in the field for manpower leveling.

82

A. FOSTER WHEELER PROJECT CONTROL (Continued)

2. Planning and Scheduling (Continued)

a) Schedules (Continued)

Indirect Construction Progress Schedule - This schedule is prepared to include the following elements:

Move-in and Demobilization Plans
Materials and Transport Inside Bangladesh
Erection of Temporary Facilities Deemed Necessary by Foster Wheeler
Construction Equipment Planning
Other Miscellaneous Areas Associated With the Facility

This schedule follows the same format of the Direct Construction Progress Schedule.

Williams Brothers comment: This schedule has not been generated on the project to date. Temporary facilities have been constructed, limited move-in has been achieved, and miscellaneous work at/around the site has begun. However, there is no way to indicate where Foster Wheeler stands in this area, because of the lack of a schedule and the ability to measure progress against a planned work effort. Williams Brothers recommends that this schedule be completed immediately after the Direct Construction Progress Schedule effort is initially completed.

b) Progress Measurement

In Williams Brothers Progress Report No. 1, a brief overview was presented concerning the methods Foster Wheeler uses to measure progress for the various elements appearing on the Construction Progress Schedule. Williams Brothers believes it is important to further present the Foster Wheeler methods for progress measurement and comment (in general terms) on their application. For purposes of clarity, this discussion will be presented in the format shown on the following pages.

ELEMENT	MEASUREMENT DESCRIPTION	
	GENERAL	PROGRESS & REPORTING FREQUENCY
Civil Work	Progress will be assessed on a physical measure of work completed, together with an acceptance certificate.	The work will be divided into the following major categories of work: On Plot Road, Foundations, Underground Pipe, Trenches, Paving, Buildings, and Control Room. The progress of these major categories, overall progress and manpower planned and actual will be shown on an overall summary sheet. Each major category will have a separate backup sheet showing progress and manpower. Progress will be calculated each week and the information is to be available at the site meetings when progress is being discussed.
Steel Work	A steelwork structure is considered 100% completed when it has been erected, butt listed and accepted.	Progress will be calculated based on an equivalent tonnage, with an allowance for butt listing. In all cases, the weighing factor for platform steelwork will be two (2). The record of progress will be kept on a summary progress form on which will be listed various sections of work throughout the facility, and will fall into three classifications: Structural Steelwork, Platform Steelwork or Cladding. Where appropriate, there will be backup sheets to determine the tonnage erected in each section or sections. Progress will be calculated weekly. The number of manhours used to achieve the weekly progress will be recorded and a weekly and cumulative record will be kept to monitor performance. This may require a breakdown to show manhours expended in each classification of the sections.

ELEMENT	MEASUREMENT DESCRIPTION	
	GENERAL	PROGRESS & REPORTING FREQUENCY
Piping	A pipeline is considered 100% completed when the line is erected, supported, butt listed, tested, and accepted.	The progress will be calculated for three major groups each with the ascribed weighting: % of Pipe Erected = group weighting 80% % of Support Erected = group weighting 12% % of Lines Accepted = group weighting 8% <u>Pipe Erected</u> Progress is calculated based on footage erected in the following categories: ° Large Bore Carbon Steel (high pressure) and Large Bore Carbon Steel (low pressure) This category will use a "equivalent" footage erected by the following calculation: (a) position pipe - 20% (b) secure one end - 40% (c) secure two ends - 40% (NOTE: This is matched with isometric drawing, line number, spool number/length, etc.) ° Small Bore Carbon Steel For this category the equivalent footage erected is equal to the actual footage erected. ° Alloy Pipe - The equivalent footage is broken into large bore and small bore and calculated in the same manner as Carbon Steel Piping.

ELEMENT	MEASUREMENT DESCRIPTION	
	GENERAL	PROGRESS & REPORTING FREQUENCY
		Supports Progress for supports will be based on the number of supports fabricated and erected compared with the estimated total. Testing Piping is butt listed and in most cases, hydro-statically tested and accepted. Progress is based on the number of lines accepted as being completed. Progress is calculated weekly and an overall record of progress is also kept and updated. The number of manhours used to achieve the weekly progress will be recorded and a weekly and cumulative record will be kept to monitor performance.
Equipment Installation/ Erection	The progress will be based on a completion of stages of erection for each category of equipment.	Progress will be shown on the appropriate progress form for each category of equipment. It will show progress for each piece of equipment and the overall progress and manpower, both planned and actual. Each piece of equipment will be ascribed with a weighting which corresponds to the manhours required as a percentage of the total manhours required for all equipment in that specific category. Progress will be reported on a weekly basis and a cumulative record of progress will be kept up to date.

ELEMENT	MEASUREMENT DESCRIPTION	
	GENERAL	PROGRESS & REPORTING FREQUENCY
Instrumentation	The progress assessment will be based on a physical measure of items completed. These will be segregated into two major groups: Control Room "On Plot" Instrumentation Both groups will be ascribed with a weighting which will correspond to the estimated manhours for the group, expressed as a percentage of the total manhours for the two groups.	<u>On Plot Instrumentation</u>: Work will be divided into the following sections for progress purposes: Sect 1. Make stands and mount in position. Sect 2. Mount, connect leads, connect cables and loop check instruments (Sect 3. Install junction boxes Sect 4. Cable runs and j-box hookup Sect 5. Connect and Loop check vendor's instruments Sect 6. Install Cable trays Each section listed will be ascribed with a weighting which will correspond to the estimated manhours for the section expressed as a percentage of the total manhours for all sections. Each section will further be separated into elements which can be progressed by observation as having been completed or not completed. <u>Control Room:</u> The work will be divided into the following sections for progress purposes: Sect 1. Marshalling racks Sect 2. Panels Sect 3. Ducting rack-panel Sect 4. Field cable connection to marshalling rock Sect 5. Connect rack to panel Sect 6. Connect electrical power supply. Progress will be calculated weekly and an overall record of progress will be kept and updated. The number of manhours used to acheive the weekly progress will be recorded and a cumulative record will be kept to monitor performance.

ELEMENT	MEASUREMENT DESCRIPTION	
	GENERAL	PROGRESS & REPORTING FREQUENCY
Electrical	The progress will be based on a physical measure of items installed. These items will be segregated into the following major groups: Power Cables, Earthing and Grounding Substation Equipment, Lighting and Trays (On plot and Building), and Communications	<u>Overall Progress Assessment</u> The progress for each major group will be shown on a progress summary form. This form will show the planned and actual progress for each major group, the weighting and the overall progress. Each group weighting will correspond to the estimated manhours for the group expressed as a percentage of the total manhours for all the groups. The overall planned and actual manpower will also be shown. <u>Detail Progress Assessment</u> Each group will have a backup sheet showing progress and manpower, planned and actual and will be measured in the following manner: ° Power Cables - Measured in meters installed, terminations completed and cables accepted. ° Earthing and Grounding - This group is divided into four sections for measurement: Electrodes installed, Pet Covers installed, Connectors installed and cables run and terminated. ° Substations - Will be divided for measurement into substations in plant and in control room. ° Lighting and Trays - These groups will be segregated into area locations to be determined in the facility, and further divided into the following categories: Distribution Boards,

ELEMENT	MEASUREMENT DESCRIPTION	
	GENERAL	PROGRESS & REPORTING FREQUENCY
		Welding Receptacles, Socket Outlets, Motor Connections, Table Tray, Cable, Light Fittings, Cable Terminations and Testing. ° Communications - will be divided into: Hand Sets Installation PABX Installtion, Install Wiring and Termination/Testing.

A. FOSTER WHEELER PROJECT CONTROL (Continued)

3. Cost Control

a) General

Foster Wheeler has established procedures and methods for control of project costs. For the most part, all information obtained by Williams Brothers regarding Foster Wheeler techniques utilized in handling home office activities should be eliminated from discussion, due to the current timing of the project. Williams Brothers believes it is more important to assess/evaluate the techniques that are, or will be used on present and future activities, as opposed to those that were used for control of past activities. Therefore, field cost control will be the main topic of discussion, along with the assessment of those techniques with respect to the current estimates of the project. The relationship of home and field office cost control should be mentioned in passing, however, in order to understand the continuity of the Foster Wheeler Cost Control System. This relationship can best be shown by Figures XII-1 and XII-2, the flow charts for both Home Office and Field Office activities.

b) Field Activities

The Foster Wheeler Senior Cost Engineer is responsible for the recording and monitoring of all commitments, expenditures and forecasts. The Field Cost Engineer is responsible for receiving the budget from the home office and records the detail data on two (2) main source documents: Material Record Sheets and Contract History Sheets.

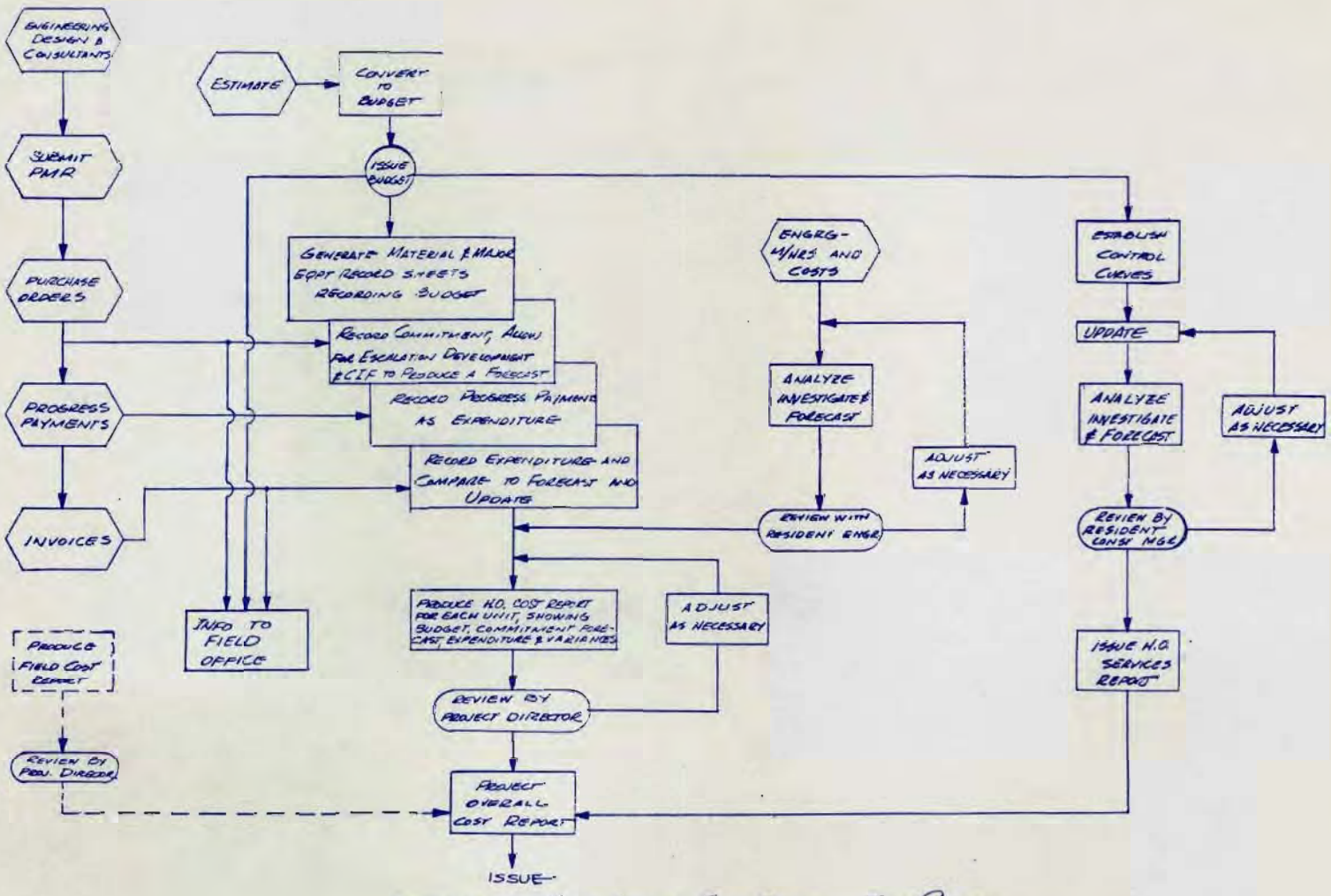


FIGURE XII-1 HOME OFFICE COST CONTROL FLOW CHART

FIGURE XII-1
COST CONTROL - HOME OFFICE

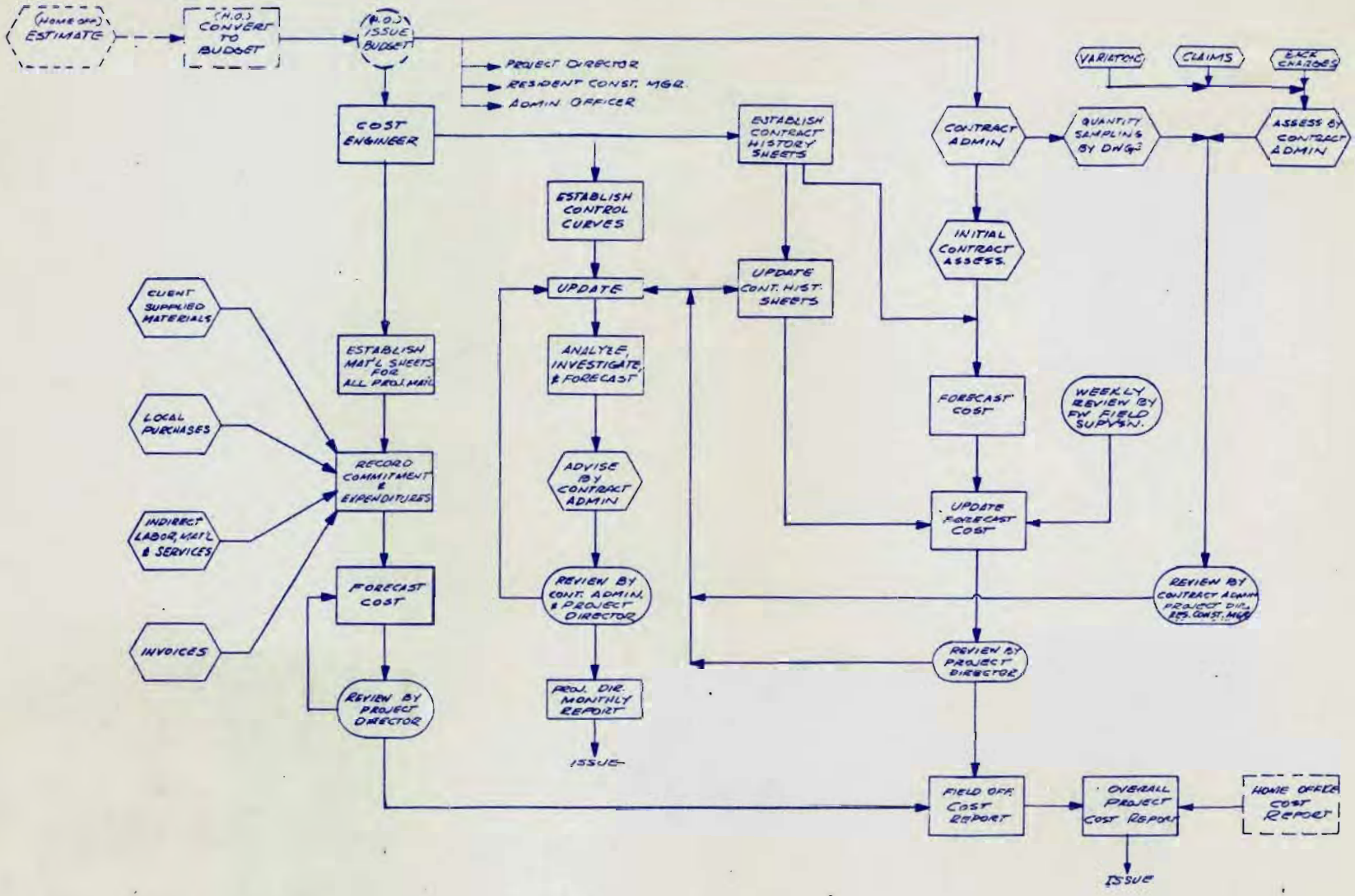


FIGURE XII-2 FIELD OFFICE COST CONTROL FLOW CHART

FIGURE XII - 2

COST CONTROL - FIELD OFFICE

A. FOSTER WHEELER PROJECT CONTROL (Continued)

3. Cost Control

b) Field Activities

The details entered for recording, monitoring and forecasting purposes on these documents include, but are not limited to, the following:

All inland freight, from port of entry to site
All materials purchased locally and for incorporation into the permanent facilities
All materials received from the owner for incorporation into the permanent facilities
All material purchases of an indirect nature for the site
All labor of an indirect nature employed on the site or elsewhere in Bangladesh.
All contracts whether they are for the permanent facilities, of an indirect nature or service/hire agreements
All construction equipment, temporary facilities and tools, which are included in the Foster Wheeler services
All supplies of goods, food, water, fuel, etc.

The purpose of the Material Record Sheets is to record, monitor and forecast the cost of the materials through delivery and payment and record any variance between the projected forecast and the budget (See Figures XII-3 and 4). All materials are cost coded according to the Foster Wheeler 4-digit numeric Code of Accounts. This code is used to capture, classify, and record all cost information related to the material classification, category or equipment type. The code can be further used to:

Relate to all purchases made outside of Bangladesh. These are the international type purchases.

93

FOSTER WHEELER LTD.
PROJECT SERVICES

CLIENT | PLANT | LOCATION

FW CONTRACT | CURRENCY | COST CODE | FORM N° CE F.W.L.

MAJOR EQUIPMENT HISTORY SHEET

EQUIPMENT DESCRIPTION

M.E.S.C. CODE

	SIZE	WEIGHT	DELIVERY
BUDGET			PLANNED
ACTUAL			ACTUAL

EQUIPMENT NUMBER

SHEET OF

LINE	BASE BUDGET	DEV'MT ALL'CE	CONTR'T CHANGE	Nº	ESCAL'N	C.I.F.	CURRENT BUDGET	REQ'N Nº	REV Nº	ORDER Nº	REV Nº	REASON FOR CHANGE	FORECAST COST BASIS: BID PRICE	ORDER PRICE	DEV'MT ALL'CE	ESCAL'N	C.I.F.	TOTAL	EXPENDITURE
1																			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			
26																			
27																			

Figure XII-3

FOSTER WHEELER LTD.
PROJECT SERVICES

CLIENT	P Zone	LOCATION	BULK MATERIAL RECORD	S OF
FW CONTRACT	CURRENCY	FORM N° CE FWL		

LINE	MESC CODE	ITEM DESCRIPTION	BUDGET		REQ'N	REV	ORDER	REV	FORECAST COST BASIS						
			QTY	TOTAL COST	N°	N°	N°	N°	QTY	ORDER PRICE	DEV'MT ALL'CE	C I F	TOTAL	QTY	EXPENDITURE
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															

MATERIAL DESCRIPTION

COST CODE

SAMPLE FORM

Figure XII-4

A. FOSTER WHEELER PROJECT CONTROL (Continued)

3. Cost Control (Continued)

b) Field Activities

Relate to all materials supplied internally
Relate to other material data of concern to the client/owner

Information found on the Material Record Sheets include:

Client, Plant and Location
Foster Wheeler Contract No., Currency of Payment
Cost Code and Material Description
Quantities and Costs

This information founds the basis to which all commitments and expenditures are compared.

The purpose of the Contract History Sheets (Figure XII-5) is to control contract costs. Each contract has one or more history sheet(s), according to the work being performed. The budget is entered on each contract history sheet and amended as necessary for major contract variations, extra work, claims, backcharges, etc. In order to exercise strict control, more than one (1) history sheet is established for larger contracts (e.g. mechanical, electrical, civil) to breakdown the contract into the main Foster Wheeler Cost Centers and Budgets as is practical for the input of contractor invoices.

Monthly, the Field Cost Engineer summarizes each contract history sheet and develops a forecast of completion costs (Figure XII-6). This forecast is a summation of the costs recorded and approved to date, the estimated cost of outstanding work to complete the contract and a development allowance. The allowance for development is based on engineering oversights and other unknown factors likely to affect the final line item costs which have been developed by FWL from Historical Project Cost files. The allowances for development diminishes as the physical completion of the work progresses.

96

F W WHEELER LTD
PROJECT SERVICES

CLIENT | PLANT | LOCATION

F W CONTRACT | SECTION | COST CODE | FORM No F W L No:

CONTRACT HISTORY SHEET

DEVELOPMENT SPLIT							FINAL % BUDGET		TERMS OF PAYMENT	CONTRACTOR		CONTRACT No
	CLAIMS	FIELD EXTRAS	DAYWORKS	OVERTIME	REWORK	SCHEDULE	INC WORKS QTY:	COST AT BID:		PLANNED START / /	PLANNED COMP / /	DESCRIPTION
ORIGINAL										ACTAL START / /	ACTUAL COMP / /	
FINAL							FIN INST'D QTY:	TOT FINAL COST:		OVERALL MTHS.	OVERALL MTHS.	SHEET OF

LINE	1 BUDGET DATA	2 BUDGET VALUE	3 BRIEF DESCRIPTION OF CHANGE	6 PERCENT PROGRESS	7 MONTH	FORECAST COST BASIS 8 CERTIFICATE VALUATION	9 OUTSTANDING WORK	10 DEV'MT.	11 TOTAL	12 CURRENT DEVELOPMENT SPLIT C	FE	DW	OT	RW	SCH.	SC'PE.
1	BASE BUDGET															
2	DEV. ALLOW.															
3	CHANGE No.															
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27	TOT. CURRENT BUDGET															

SAMPLE FORM

Figure XII-5

FOSTER WHEELER (PP) LTD.	CLIENT	PLANT	CONTRACT VARIANCE REPORT
	FW CONTRACT NO.	SECTION	
CONTRACTOR	CONTRACT NO.	LOCATION	COST CODE
			DATE

DESCRIPTION	CURRENT BUDGET	PREVIOUS FORECAST	LATEST FORECAST	VARIANCE ± MANHOURS OR $

SAMPLE FORM

COMMENTS.

DEDUCTION

ACTION

DISTRIBUTION :- PROJECT DIRECTOR
CONTRACT ADMIN.
RES. CONSTRN MANAGER
PLANNING ENGINEER
H.O. COST ENGINEER
FIELD COST ENGINEER FILE

Figure XII-6

WILLIAMS BROTHERS PROCESS SERVICES, INC.

A. FORSTER WHEELER PROJECT CONTROL (Continued)

3. Cost Control

b) Field Activities

Williams Brothers comment: The Foster Wheeler Cost Control System, including the handling of data and preparation of control reports as presented to Williams Brothers appears to be bulky and unwieldy for rapid response to management questions. It is adequate, insofar as the handling of costs are concerned. Improvements could be made to streamline the system and permit an easier method of relating information from one report to the next. However, since this project is already in the construction phase, such improvements to the Foster Wheeler Cost Control System would not appreciably benefit the overall project.

B. FOSTER WHEELER COST/COMMITMENT REPORT

Of the various kinds and types of management visibility reports, the Cost/Commitment Report is one of the two most significant reports generated. (The other document is the Construction Progress Schedule, which has already been discussed.) This Cost Report (Figure XII-7) reflects the budget, the commitment, the estimate to complete, the estimated final cost and the expenditure by item as described in the appropriate column.

The definition for each column of the Cost Report is provided to further stress the importance of this document, and understand the significant figures that appear in this report:

1. The budget column is self-explanatory, in that it reflects the latest approved costs of the item described.

2. The commitment column identifies the amount(s) stated on the purchase orders, contracts or agreements as per the line item.

3. The estimate to complete is the total C.I.F. and development allowances "to go" for that line item.

4. The estimated final cost is the sum total of items 2 and 3 above by line item.

99

FOSTER WHEELER LIMITED

COST REPORT

CLIENT	PLANT
PROJECT Nº	LOCATION

REPORT Nº 1
COSTS TO 23-1-77
REPORT DATE 1-2-77
SHEET 1 OF 5 FORM CE6003

CURRENCY - U.S. DOLLARS

MATERIALS -

FWL 2360

COST CODE	DESCRIPTION	CURRENT BUDGET	COMMITMENT			ESTIMATE TO COMPLETE	ESTIMATED FINAL	- OVER + UNDER ESTIMATE	EXPENDITURE
			LAST REPORT	MOVEMENT	TOTAL				
1130	DRUMS	120,460			132.467	43 348	175.815	- 55355	17.908
1140	TANKS	93,360			-	93.360	93.360	-	-
1100	VESSELS TOTAL	213,820			132,467	136.708	269.175	- 55,355	17.908
1230	AIR FIN EXCHANGERS	336,150			342,508	63.209	405.717	- 69.567	19.519
1240	FLARES	62,040			227,897	34.190	262.087	- 200.047	10.932
1200	HEAT EXCHANGE TOTAL	398,190			570,405	97.399	667.804	- 269.614	30.451
1310	PUMPS	64,590			49.735	3 863	80.598	- 16008	2.423
1320	COMPRESSORS	11,079,710			12.110.700	576 700	12.687.400	- 1.607.690	8.426.493
1330	GENERATORS	45,760			42.707	3.800	46.507	- 747	42.707
1380	MOTORS	-			-	-	-	-	-
1390	MIXERS	-			-	-	-	-	-
1300	MECHANICAL EQPT TOTAL	11,190,060			12,203,142	611.363	12.814.505	- 1,624,445	8.471 623
1430	CIVIL MATERIALS	821,630			29.522	792.108	821.630	-	1.796
1450	COATING & WRAPPING	-			-	-	-	-	-
1460	STRUCTURAL STEELWORK	236,400			30.046	197.431	227.477	+ 8923	20.373
1470	BUILDING STEELWORK	-			-	-	-	-	-
1480	PIPERACK STEELWORK	-			-	-	-	-	-
1490	CRANES	-			8.112	811	8.923	- 8.923	-
1400	CIVIL TOTAL	1,058,030			67.680	990.350	1.058.030	-	22.169

EXAMPLE ONLY

FIGURE XII-72

FOSTER WHEELER LIMITED

COST REPORT

CLIENT		PLANT	
PROJECT Nº		LOCATION	

REPORT Nº 1
COSTS TO 23-1-77
REPORT DATE 1-2-77
SHEET 2 OF 5 FORM CE 6003

CURRENCY - U.S. DOLLARS MATERIALS - FWL 2360

COST CODE	DESCRIPTION	CURRENT BUDGET	COMMITMENT			ESTIMATE TO COMPLETE	ESTIMATED FINAL	- OVER + UNDER ESTIMATE	EXPENDITURE
			LAST REPORT	MOVEMENT	TOTAL				
1510	VALVES	148,970			72.790	76180	148.970	-	22.297
1530	PIPING 26" DIA.& ABOVE	66,210			-	66,210	66,210	-	-
1540	PIPING UNDER 26" DIA.	293,800			14.058	279.742	293,800	-	-
1550	FITTINGS	223,450			20.050	203370	223.450	-	2729
1570	STUDBOLTS & GASKETS	12,420			3.334	9086	12.420	-	369
1590	SUPPORTS & SPECIALS	82,760			6.651	76.109	82.760	-	-
1500	PIPING TOTAL	827,610			116.913	710 697	827610	-	25395
1610	INSTRUMENTS	247,450			90,180	[illegible]	247.450	-	4,476
1620	CONTROL VALVES	513,580			213,417	300.163	513,580	-	8.411
1630	RELIEF VALVES	37,350			-	37.350	37.350	-	-
1640	CONTROL PANEL	18,680			-	18.680	18.680	-	-
1650	PIPING	56,030			-	56.030	56.030	-	-
1660	ELECTRICAL	46,690			-	46.690	46.690	-	-
1670	WEATHERISING	4,670			-	4.670	4.670	-	-
1680	SUPPORTS	9,340			-	9.340	9.340	-	-
1690	MISCELLANEOUS	12,200			-	12.200	12.200	-	-
1600	INSTRUMENTATION TOTAL	945,990			303597	642.393	945.990	-	8.887

EXAMPLE ONLY

FIGURE XII-76

FOSTER WHEELER LIMITED

COST REPORT

CLIENT	PLANT	REPORT Nº	1
PROJECT Nº	LOCATION	COSTS TO	23-1-77
		REPORT DATE	1-2-77
		SHEET 30F 5	FORM CE6003

CURRENCY - U.S. DOLLARS

MATERIALS -

FWL 2360

COST CODE	DESCRIPTION	CURRENT BUDGET	COMMITMENT			ESTIMATE TO COMPLETE	ESTIMATED FINAL	- OVER • UNDER ESTIMATE	EXPENDITURE
			LAST REPORT	MOVEMENT	TOTAL				
1710	UNDERGROUND	6,380			-	6.380	6.380	-	-
1720	POWER EQPT	333,410			215.648	75.564	291.212	+ 42.198	10.910
1730	POWER DISTRIBUTION	288,020			165.661	122.359	288.020	-	136.866
1740	LIGHTING	63,850			18.245	45.605	63.850		1.224
1750	COMMUNICATIONS	14,190			-	14.190	14.190	-	-
1770	SUPPORTS	3,550			3.799	4.901	8.700	- 5.150	3.184
1700	ELECTRICAL TOTAL	709,400			403,353	268.999	672.552	+ 37.048	152.184
1820	INSULATION	11,950			-	11.950	11.950	-	-
1830	PAINT	41,450			-	41.450	41.450	-	-
1840	FIREPROOFING	1,220			-	1.220	1.220	-	-
1890	CATHODIC PROTECTION	-			-	-	-	-	-
1800	PROTECTIVE COVER TOTAL	54,620			-	54.620	54.620	-	-
1910	DEHYDRATION UNIT	313,710			309.640	25.506	335.146	- 21.436	50.621
1910	DEMIN WATER UNIT	-			-	-	-	-	-
1910	AIR COMPRESSOR	61,610			57.126	5.712	62.838	- 1.228	-
1910	FUEL GAS SYSTEM	112,040			-	-	-	+ 12.040	-
1910	INHIBITOR SYSTEM	25,400			-	25.400	25.400	-	-
1910	PIG TRAPS	-			-	-	-	-	-
1900	PACKAGED UNITS TOTAL	512,760			366766	56.618	423.384	+ 89.376	50.621
	TOTAL	15,910,480			14.164.323	3.569.141	17.733.470	- 1.822.990	8.783.238

EXAMPLE ONLY

FIGURE XII-7c

FOSTER WHEELER LIMITED

COST REPORT

CLIENT		PLANT	
PROJECT Nº		LOCATION	

REPORT Nº
COSTS TO 23-1-77
REPORT DATE 1-2-77
SHEET 4 OF 5 | FORM CE 6003

CURRENCY - U.S. DOLLARS — CONTRACTS - — FWL 2360

COST CODE	DESCRIPTION	CURRENT BUDGET	COMMITMENT			ESTIMATE TO COMPLETE	ESTIMATED FINAL	- OVER + UNDER ESTIMATE	EXPENDITURE
			LAST REPORT	MOVEMENT	TOTAL				
2130	DRUMS	12,965			-	12.965	12.965	-	-
2140	TANKS	84,285			-	84.285	84.285	-	-
2100	VESSELS TOTAL	97,250			-	97.250	97.250	-	-
2230	AIR FIN EXCHANGERS	240,970			-	240.970	240.970	-	-
2240	FLARES	70,240			-	70.240	70.240	-	-
2200	HEAT EXCHANGE TOTAL	311,210			-	311.210	311.210	-	
2310	PUMPS	18,370			-	19.370	19.370	-	-
2320	COMPRESSORS	502,470			-	562.980	562.980	- 60510	-
2330	GENERATORS	7,560			-	7.560	7.560	-	-
2380	MOTORS	-			-	-	-	-	-
2390	MIXERS	-			-	-	-	-	-
2300	MECHANICAL EQPT TOTAL	528,400			-	588.910	588.910	- 60510	-
2430	CIVILS	1,113,000			-	1.113.000	1.113.000	-	-
2460	STRUCTURAL STEELWORK	255,020			-	255.020	255.020	-	-
2470	BUILDINGS	-			-	-	-	-	-
2400	CIVIL TOTAL	1,368,020			-	1.368.020	1.368.020	-	-
2500	PIPING TOTAL	2,673,370			-	2.673.370	2.673.370	-	-
2700	INSTRUMENTATION TOTAL	305,810			-	305.810	305.810	-	-
2750	ELECTRICAL TOTAL	458,170			-	458.170	458.170	-	-

EXAMPLE ONLY

FIGURE XII-7d

FOSTER WHEELER LIMITED

COST REPORT

CLIENT | PLANT | REPORT Nº | COSTS TO 25-1-77 | REPORT DATE 1-2-77

PROJECT Nº | LOCATION | SHEET 5 OF 5 | FORM CE 6003

CURRENCY - U.S. DOLLARS | CONTRACTS - | FWL 2360

COST CODE	DESCRIPTION	CURRENT BUDGET	COMMITMENT			ESTIMATE TO COMPLETE	ESTIMATED FINAL	- OVER + UNDER ESTIMATE	EXPENDITURE
			LAST REPORT	MOVEMENT	TOTAL				
2820	INSULATION	78,880			-	78.880	78.880	-	-
2830	PAINTING	474,380			-	474.380	474.380	-	-
2840	FIREPROOFING	30,260			-	30.260	30.260	-	-
2890	CATHODIC PROTECTION	-			-	-	-	-	-
2800	PROTECTIVE COVER TOTAL	583,520				583.520	583.520	-	
2910	DEHYDRATION UNIT	121,020				121.020	121.020	-	-
2910	DEMIN WATER UNIT	-			-	-	-	-	-
2910	AIR COMPRESSOR	39,980			-	39.980	39.980	-	-
2910	FUEL GAS SYSTEM	60,510			-	-	-	+ 60.510	-
2910	INHIBITOR SYSTEM	135,070			-	135.070	135.070	-	-
2910	PIG TRAPS	-			-	-	-	-	-
2910	PACKAGED UNITS TOTAL	356,580			-	356.580	356.580	+ 60.510	-
2950	SCAFFOLDING TOTAL	483,020			-	483.020	483.020	-	-
2960	PRECOMMISSIONING TOTAL	155,190			-	155.190	155.190	-	-
	TOTAL	7,320,540			-	7,320,540	7.320.540	-	-

EXAMPLE - ONLY

FIGURE XII-7c

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. FOSTER WHEELER COST/COMMITMENT REPORT (Continued)

5. The variance (that is, the "Over-or-Under-Estimate") column is the difference between items 4 and 1.

6. The expenditure is that amount which is stated of the line item invoice(s) and expressed in U.S. dollars.

This report must be considered the primary management review tool used to control costs on this project (insofar as FWL is concerned), because all information relating to costs will be summarized from verified detailed data and brought forward to this document.

The key to this formatted report can be found in the columns marked "Estimate to Complete" (E.T.C.) and "Estimated Final". The E.T.C. column amount considers the trending of all costs per line item incurred to date, forecasts the amount required for completion based on the progress factors, and projects those data into the cost figures appearing in the column. This, in turn, is combined with current expenditures/commitments to provide an Estimated Final Cost of each line item and the project. These columns, therefore, are the critical barometers that the lenders should continue to monitor on a monthly basis. There is no need, Williams Brothers believes, that any more detail is required for the lenders than this report insofar as costs are concerned.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

C. AFCC PROJECT CONTROL

1. General Overview

AFCC has suffered in the project controls area, not only as a client/owner, but as a manager of construction as well. That is, AFCC must control costs and schedules on its own work on the project, while monitoring and verifying that Foster Wheeler is performing the project control functions for the balance of the work. Thus far, project control in either area has been lacking in substantive reports and visibility documentation. Further routine reporting requirements, or the passing of data from Foster Wheeler to AFCC has been non-existent at Ashuganj. Lack of AFCC technical project control expertise and appropriate personnel staffing appears to be the most significant problem for the AFCC organization. Report formats, report content and criteria, report frequency, and verification/validity checks on report data are only some of the problems that must be addressed by the AFCC organization. Because AFCC has lacked the appropriate skill and experience levels in the project control service area, immediate steps must be taken to strengthen this discrepancy. The time necessary to train and staff the Project Control services group from within the AFCC organization, in the opinion of Williams Brothers, is beyond consideration. It would take too long to recruit applicants, locate promising candidates, instruct and train those accepted, and return them to perform "in-line" functions without project experience. Therefore, the only avenue available to AFCC in immediately acquiring the project control expertise necessary is to purchase it through a professional organization (company) with the demonstrated ability to supply these abilities.

Because of the immediate need of the AFCC to acquire a practical and working Project Control function, Williams Brothers has outlined the responsibilities, requirements and basic management visibility documents for such a function in the following discussion. This discussion does not detail the items for which Foster Wheeler is responsible, or what items AFCC must directly manage. Instead, it addresses a Project Control function as required by the overall AFCC organization. It is important to the reader only to recognize that reports and requirements are distinctly separated into two (2) main areas:

Foster Wheeler responsibilities

AFCC responsibilities

Separation of these responsibilities has already occurred by virtue of the contract between Foster Wheeler and AFCC.

C. AFCC PROJECT CONTROL (Continued)

2. Requirements of Project Control

The role of Project Control is to provide project status visibility to management through the timely accumulation and interpretation of quantity, cost and schedule information. Project Control further correlates this information with specific construction activities and determines the physical completion of each planned segment of the project. To fulfill this responsibility, it is necessary to maintain control of field costs and construction schedules.

The control of field costs requires three (3) elements:

An accurate identification of costs expended.

An expenditure reference against which to measure the current expenditures. A deviation from the reference warns that a project cost overrun or underrun is likely.

A positive action plan by which change can be brought about to correct expenditure rates if they are excessive.

The control of the construction schedule requires three (3) elements:

An understanding that milestone dates must be viewed as committed dates, and that they serve as the basic schedule criteria.

The ability to measure the status of actual work accomplished against that planned.

A positive action plan by which change can be brought about to recover schedule slippages and renew project schedule integrity.

3. Project Control Responsibilities

It is the responsibility of the Project Controls organization to furnish on a regular basis, detailed project status information which fulfills the visibility requirements of management.

Information furnished to management should include project cost and schedule status as well as detailed monthly expenditures and projected expenditures for the following month. To support this effort, it is

C. AFCC PROJECT CONTROL (Continued)

3. Project Control Responsibilities (Continued)

the responsibility of the Project Control group to gather and compile cost, project and schedule data received from the field, and submit an overall project status evaluation to management. Project Control personnel should actively participate in the following area. (Note: These areas are typical kinds of involvement in which AFCC Project Controls must play a role. The examples used here apply to this Project, although an in depth evaluation would be required to specifically identify total Project Control participation):

a. Contracts/Subcontracts

Be knowledgeable of the terms, conditions and scope of all contracts and subcontracts within individual areas of responsibility.

Assist Contracts Administration with performance and progress evaluations, including progress payments.

Prepare cost estimates and review schedule impacts for change order, extra work orders, bid analyses, and other items as required.

Interface with contractor scheduling, and field construction management to ensure development of detailed schedules for contract activities.

Review and monitor Contractor/Subcontractor schedules to assure alignment with the overall project schedule.

Maintain complete records of contractor dispute, negligence, and unauthorized out of scope work to support later Contractor claim rebuttals.

b. Construction Schedule Development

Ensure the implementation and maintenance of construction summary and intermediate schedules by contract for the Project.

C. AFCC PROJECT CONTROL (Continued)

b. Construction Schedule Development (Continued)

Evaluate contractor supplied construction schedules for project schedule alignment.

Evaluate FWL/AFCC contractors periodic "look ahead" schedules to assure consistency with construction schedules and project schedules.

Assure contractor compliance with construction schedules and notify management of any deviations.

c. Construction Schedule Monitoring

Review and monitor all construction activities delineated on the project schedules.

Obtain detailed explanations of schedule restraints, tasks, manpower requirements, crew-sizes, and duration upon request from management.

Analyze schedule progress and bring all critically impacting items to the attention of management.

Identify and evaluate schedule deviations for input to a manual or computerized schedule monitoring program.

d. Labor Reporting

Provide guidance and instruction to AFCC contractors in the completion of daily timesheets.

Instruct AFCC contractor timekeepers on labor coding requirements and assist in the implementation of precoded timesheets.

Audit daily labor timesheets to assure proper use of activity codes and allocation of manpower.

Provide weekly input of labor expenditures (MH_s) to the Project Control manual or computerized reporting systems.

e. Quantity Reporting and Tracking

Ensure the implementation of procedures for the processing and reporting of installed quantities.

Participate in the maintenance of the field material inventory system for designated materials.

C. AFCC PROJECT CONTROL (Continued)

3. Project Control Responsibilities (Continued)

f. Labor Performance and Progress Monitoring

Ensure provisions are made for the input maintenance of progress monitoring (computerized or manual) systems.

Assist the field management and field supervision in evaluating and monitoring construction progress and labor by preparing exception and performance reports, including weekly analyses of job performance.

Assist the AFCC contractors in the reporting of job progress and labor through verification and approval of submitted actuals.

g. Construction Trends

Monitor the implementation and maintenance of construction input to the Project Control (computerized or manual) Program, including documenting, evaluating, reporting and monitoring all construction activities and trends.

Provide for the analysis of current project construction trends and the resolution of problem areas through the implementation of construction coordination meetings to be attended by management and construction contractors.

h. Material/Equipment Costs and Commitments

Verify commitments, including cost coding, of all purchases and subcontracts.

Monitor costs of material purchases and subcontract payments and report deviations to management.

Collect, review, and monitor contractor equipment use reports to assure efficient and economic utilization of construction equipment and for proper allocation of equipment costs.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

C. AFCC PROJECT CONTROL (Continued)

3. Project Control Responsibilities (Continued)

i. Backcharges

Implement backcharge control procedures in accordance with established standards.

Gather backcharge documentation and develop cost estimates to settle outstanding backcharges.

j. Forecast

Coordinate the efforts of Contractor Project Control personnel, Project Supervision, Procurement, and Project Control in the preparation of project forecasts.

Collect and analyze contractor provided forecasts.

Prepare forecast input for presentation to management.

Review and analyze forecasts and actual contractor performance data to prepare forecast adjustments as required.

k. Other Responsibilities

Prepare special schedules to resolve problem work areas, evaluate schedule impacts of additional work, and provide schedule analysis of contractor/subcontractor bids.

Prepare periodic Project Status Reports, narratives, and special reports as required.

Be available on a daily basis to assist the contractor in the use and interpretation of Project Control procedures.

Provide information as required to update commitments, earned value, and expenditure budgets.

Provide input for the modification of forecasts and/or budgets in a timely fashion as scope, schedules, costs, delivery dates and other project factors change.

C. AFCC PROJECT CONTROL (Continued)

3. Project Control Responsibilities (Continued)

Collect and document all non-cost/non-progress data received from the field (i.e.,photographs, weather conditions).

4. Project Control Reports

The Project Controls group must be in the position and have the responsibility for monitoring cost expenditures and contractor progress, and for highlighting areas which potentially threaten the project plan. To highlight such areas, it is necessary to generate reports detailing the problem areas and present possible recovery plans.

The following list identifies typical reports that should be available from a Project Control System. (Note includes Foster Wheeler reports as well as AFCC documents:

a. Quantity and Progress Reporting

Quantity and progress reports are issued on a daily basis to the Project Control groups for verification and approval. This information is then transmitted for input into the computer (or manual system) for accumulation of installed quantities and quantity and schedule forecasting. Further analysis of this data provides for efficiency assessments and a manual forecast base.

b. Field Labor and Quantity Summary

This report is a supplement to the computerized (or manual) Field Cost Report and is used to record, on a weekly basis, actual labor, cost, and quantity data as received from the contractor. The recording of the data is made at the activity level and allows for the immediate evaluation of activity status. As a part of the Field Labor Detail Report, this report also provides an indication of project trend for use in the preparation of the project forecasts.

C. AFCC PROJECT CONTROL (Continued)

4. Project Control Reports (Continued)

c. Labor Productivity

As a part of the Field Labor Detail Report, the Labor Productivity Report is used to display the efficiency of contractor labor on an activity level. The basis of this report is budgeted and expended manhours per unit of quantity. The weekly comparison of the budgeted and expended rates by the Project Control group provides the necessary base for project labor forecasts. Computerized (or manual) Cost Engineering Productivity Reports are issued on a regular basis for those activities which require close monitoring. Productivity reports are reviewed and assessed by management and Project Control with the contractor.

d. Field Cost Report

The Field Cost Report is a computerized (or manual) report generated by Project Control which provides detailed field cost and progress data by construction activity. The information contained in this report includes activity budgets, expenditures (by report period and cumulative totals), forecasts, and physical completions. Project Control is responsible to provide valid input data for this report and utilizes it in the evaluation of the status of construction activities including budget exceptions, overrun/underrun conditions, and productivity direction.

e. Progress Exception Report

The Progress Exception Report is prepared weekly by the contractor to highlight any significant activity which is behind schedule and to note his plans for schedule recovery. Project Control is responsible to further document the activity and evaluate the magnitude of the schedule deviations and forward such information for input into the Project Control Scheduling System.

f. Construction Trend Program

The Construction Trend Program is a cost and schedule early reporting system designed to monitor and update the project scope of work, project cost, and project schedules. This program will be led by Project Control at the monthly construction coordination meetings. Items concerning quantity changes, productivity overruns,

C. AFCC PROJECT CONTROL (Continued)

4. Project Control Reports (Continued)

f. Construction Trend Program (Continued)

and other impacting items will be discussed to determine the impacts on the costs and schedules and to assess the causes of the problems. The intent is to provide warning of potential cost and schedule problems and allow coordination and communication among all responsible personnel.

g. Progress for Payment Report

This document summarized contractor monthly progress by pay period as defined in the project calendar. Project Control has the responsibility to verify the reported progress and obtain the approval of management. The approved report is to be used to verify and support progress payments submitted by the contractor on the monthly invoice.

h. Out of Scope Work Status Report

This report is used to record and analyze any work items found to be outside the scope of the contract, such as change orders, backcharges, or similar revisions. Documentation of cost, quantity, and progress of each extra work item will serve as detailed support for backcharge reports, change orders and revision impacts. Project Control is assisted by the contractor in the collection of information contained in the report.

i. Project Alert Notices

The Project Alert Notice (PAN) is used to process and record any deviation from the project budget and/or schedules. This notice is to be issued at the first sign of deviation for analysis of impact and status. Such a notice would normally precede the Progress Exception and Field Cost Reports.

j. Action Item Reports

The Action Item Report is a field oriented report for use in the monitoring of critical cost and schedule action items (i.e., PAN items, Progress Exception Report items, low productivity items, etc.). The report is issued weekly by Project Control and is used to evaluate current project status.

C. AFCC PROJECT CONTROL (Continued)

4. Project Control Reports (Continued)

k. Field Purchased Material Control

Primarily for reimbursable contracts or extra work items, continual monitoring of field purchased materials is required to ensure efficient material consumption and proper contractor coding. Included in the responsibility is the continual assessment of the cost effectiveness of maintaining facilities, start and release of construction rental equipment and cost evaluation of rental vs. purchase of major items. Project Control has the responsibility to interface with the contractor in the preparation of such studies and to provide detailed reports and assessments to management.

l. Manpower Curves

A manpower curve is the plot of manpower over a specified time frame. The purpose of these curves is to show craft manpower requirement for planning and forecasting purposes. The contractor will supply these curves to the Project Control for evaluation and assessment.

m. Material Status Reports

Loss or productivity and scheduling problems can occur when material shortages are encountered. To minimize such occurrences, the Material Control Coordinator, working with the contractor must initiate a material status system. The system will physically assess the inventory and constantly monitor the action of critical material items. An open interface is maintained with Project Control to assure material needs are being met. Any potential material problems must be reported by Project Control to management to assure prompt resolution.

n. Contractor Schedules

Contractor supplied schedules include a full-term restrained bar chart schedule and rolling "look ahead" construction schedules. The full-term schedules shall be updated periodically by the contractor and submitted to Project Control. It will be assessed by the Project Scheduling Engineer and any critical impacts delineated

C. AFCC PROJECT CONTROL (Continued)

4. Project Control Reports (Continued)

n. Contractor Schedules (Continued)

and resolved jointly with the Contractor. For field control purposes, the "look ahead" schedules provide a detailed evaluation of the construction plan and a forecasting tool to determine contractor ability to meet his plan. These schedules shall be reviewed by Project Control and their status discussed at construction coordination meetings.

o. Backcharge Control

An effective Backcharge Control System consists of the immediate documentation and vendor notification of backchargeable work, the proper authorization to commence before corrective work begins, a conscientious effort to identify and record all costs incurred, and a timely and persistent follow-up billing to recover all costs. Project Control, working with the contractor, has the responsibility to record and document all pertinent information and report regularly on the status of each backcharge.

p. Project Status Reports

Project Status Reports are detailed narratives of the project status, summary level progress evaluation curves, summary level productivity reports, and proposals for the implementation of corrective action. Project Control relies on these reports to accurately define current project status for management level presentation and evaluation.

q. Special Cost/Schedule Studies

Project Control has the knowledge and the tools available to prepare special cost studies, estimates, schedule evaluation, and proposals. These include evaluating proposals to minimize costs or recover schedule slippage, determine cost and schedule impact using new or alternate construction techniques, monitoring and evaluating specific work operations, evaluating bids, and a variety of others which may be prepared upon request.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION XIII

PROJECT ESTIMATING - AFCC AND FWL

A. ANALYSIS - AFCC PROJECT COST ESTIMATES

Williams Brothers has had exposure to several Project Cost Estimates prepared by AFCC. AFCC's second estimate, dated December, 1977[94], was based on the FWL reimbursable cost estimate Rev. 3, dated September, 1977. This estimate was a composite of FWL reimbursable costs and AFCC costs with no definition as to the source. In this estimate new items appeared (expatriate income taxes and compensatory foundation being the largest). The project delay added costs for technical advisors, delay and storage costs, increase in General Contractor fixed fee, Construction Supervision and the housing colony to itemize a few. This AFCC December 1977 estimate indicated the project cost to be $338.67 MM US ($188.16 local currency, $150.51 foreign currency).

The latest AFCC estimate dated April, 1978 is a true AFCC produced cost estimate, exclusive of FWL reimbursable costs, formatted along the categorical line items appearing in the IDA appraisal report estimates. This estimate is for only those project costs that are AFCC's portion of the project cost. This is the type of estimate that should have been produced independently then integrated with the FWL project reimbursable cost estimate to produce the Total Project Cost.

For this latest AFCC April 1978[93] estimate, we can only compare AFCC's portion with their September 1977 estimate which is included as Appendix "A" which was prepared by AFCC showing the comparison between the two (2) estimates.

The major variances between the two (2) AFCC estimates shown on Appendix "A" are as follows:

1. Site Development (Item 2) - actual costs decreased from the September 1977 estimate by $1.191 million or 6.8%.

2. Technical Advisor (TA) and management assistance firm (MAF) (Items 4. & 5.) - decreased by $3.077 million or 18.8%.

3. Banking charges - (which are new items) - have now been recognized as real costs thereby increasing the total costs.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

A. ANALYSIS - AFCC PROJECT COST ESTIMATES (Continued)

4. Housing Colony (Item 11) - costs of facilities and furnishing - are better.

5. Construction and Erection (Item 14.) - Several new subcategories appear now under this line item such as, training of construction labor, school, furniture and appliances for expatriate personnel, temporary facilities for construction labor, AFCC expatriate construction supervision and increase all risk insurance premiums for a total increase of $7.444 million or 1353%.

6. Pre-operational expense (Item 15.) - training costs decreased substantially but overhead costs increased for a total decrease of $1.446 million or 23.8%.

7. Contingency (Item 17.) - decreased by $2.712 million or 40.9%. The foreign currency contingency is now 0.7% and the local currency contingency is 2.4%. Both are too low at this stage of the project.

8. Income Tax for Expatriate and Working Capital (Item 19.& 20.) - increased by $9.361 million or 69.5%.

The latest April 1978 AFCC estimate indicates their portion of the Project Costs are $197.27 ($50.93 foreign currency, $146.34 local currency). This is an increase over the AFCC September 1977 estimate by $18.55 million ($18.43 local currency, $0.12 foreign currency.)

The Project Cost as indicated by the sum of AFCC April 1978 estimate and FWL April 1978 estimate Rev. 4a without duties indicates the Project Cost to be:

AFCC	$146.33 local	$50.93 foreign	$197.26 Total
FWL	31.19 "	179.86 "	211.05 "
	$177.52	$230.79	$408.31

There are several accounts within the AFCC estimate that Williams Brothers believes to be low. Within the foreign currency these are:

1. The Housing Colony potable water treatment facilities. WB estimate is $0.500 MM - an increase of $0.100 MM.

2. An additional $2.00 MM to provide expatriate construction supervision.

118

WILLIAMS BROTHERS PROCESS SERVICES, INC.

A. ANALYSIS - AFCC PROJECT COST ESTIMATES (Continued)

Within the local currency these are:

1. All risk insurance premium for revised project cost will probably increase by $0.40 million.

2. AFCC overhead will probably increase by $.25 MM.

B. ANALYSIS - FWL REIMBURSABLE COST ESTIMATES

Williams Brothers has reviewed the numerous reimbursable cost estimates that FWL has produced. These have been dated:

1. March 1976 called the "90 Day Estimate"
2. July 1976 called the "180 Day Estimate"
3. October 1976 Revised Control Estimate
4. March 1977 Revision 1
5. May 1977 Revision 2
6. September 1977 Revision 3
7. April 1978 Revision 4
8. April 1978 Revision 4a

Detailed analysis will be limited to those that we were furnished details which are Revisions 3, 4, and 4a. When considering the October 1976 as the Control Estimate and using it as base, the cost variations are:

1.	March 1976	+147%	$258,562M
2.	July 1976	+133%	233,603M
3.	October 1976	100%	175,761M
4.	March 1977	+114%	200,153M
5.	May 1977	+112%	196,195M
6.	September 1977	+124%	217,878M
7.	April 1978	+141%	248,409M
8.	April 1978	+140%	246,630M

Detailed analysis will be limited to those estimates that have had details furnished, namely Revisions 3, 4 and 4a.

Revision 3 dated September, 1977 was the updated control estimate in effect when Williams Brothers was given this assignment. After a detailed review, it was apparent that the project construction plan and the estimate were not in phase with each other. Field labor and the extent of subcontracts contemplated, and local vs international subcontracts did not coincide. Local

B. ANALYSIS - FWL REIMBURSABLE COST ESTIMATES (Continued)

labor rates had been imposed at a lower rate than was prevailing and major equipment had been added to the project. At this point, Williams Brothers recommended (Action Recommendations List Number 2) that the FWL reimbursable cost estimate be recast to provide a manageable current budget.

Control Estimate Revision 4 was the recast FWL estimate. This revision contained cost for:

1. Agreed construction philosophy
2. The use of agreed international and local subcontractors
3. Dynamic compaction and compensatory foundations
4. Second turbo alternator
5. Final engineered bulk materials
6. Increased costs for local labor rates
7. Agreed on contract changes No. 1 through 64
8. Adjusted field supervision durations and local allowances

Control Estimate Revision 4 presented an estimated Reimbursable Project Cost of US $248.41 million which included Bangladesh customs duties. In this total was included an estimated amount for variances in foreign currency exchange rates when applying these rates to the total foreign currency requirements at project completion. FWL April 1978 estimate is based on foreign currency rates of exchange in effect on 27 September 1976. Escalation to project costs is also applied from 27 September 1976.

Review with AFCC, Williams Brothers and FWL pointed out duplication, omissions and items requiring adjustments. Major adjustments were:

1. Costs for control house materials moved from foreign to local purchase
2. Internal plant road costs added (omitted in Rev. 4)
3. Control House revised from one story to two story
4. Removal of expatriate income tax costs
5. Revised local freight costs
6. Increased total value of import duty
7. Adjusted subcontract costs for buildings
8. Adjusted construction equipment and small tool costs
9. Deleted the site compaction costs which are AFCC costs

For the first time in this project's duration, a conference type discussion was held concerning the control estimate with both parties having input.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. ANALYSIS - FWL REIMBURSABLE COST ESTIMATES (Continued)

The results of FWL and AFCC review of the Revision 4 estimate created an adjustment (now called Revision 4a estimate) and a joint agreement was reached to use Revision 4a as the project control estimate. This indicated the FWL reimbursable costs to be $246.63MM (FWL estimates includes duty of $35.58MM-AFCC indicates this is underestimated by $1.15MM). These amounts appear in the respective estimates. Therefore, the FWL total estimated reimbursable cost is $246.63MM less $35.58MM or $211.05MM- (note: this adjustment is necessary to obtain the project total cost when the AFCC and FWL estimates are combined for the "Total Project Cost").

Table XIII-A included in this section summarizes the total project costs showing FWL reimbursable costs and AFCC costs expressed in both foreign and local currency.

Table XIII-B develops the basis for calculation of the construction interest applied in Table XIII-F line Item II.-P.

The question has been raised regarding the FWL foreign subcontract wage rate of $6,000 per man month.

FWL sought information from various contractors who might perform the various classes of work. Refractory lining, specialized welding, electrical and instrument installation and the averages were as follows:

Base Labor	£ 4.8/hr	U.S.$8.16/hr
U.K. PR Burden (40%)	£ 1.92	3.26
Supervision (15%)	£ 0.39	.66
Accommodation Travel, etc.	£ 3.55	6.04
Subtotal		$ 18.12
Overhead & Profit (25%)		4.53
Total		$ 22.65/hr

$22.65 X 260 hr/mo = $5,859 used $6,000

121

WILLIAMS BROTHERS PROCESS SERVICES, INC.

C. COMPARATIVE ANALYSIS - APPRAISAL REPORT VS WILLIAMS BROTHERS ESTIMATE

Table XIII C is included in this section to show the variance between the IDA Appraisal Report Estimate and the current Williams Brothers Estimate and identify items included in IDA categories. Item numbers below follow the line items in the appraisal estimate and Table XIII-C.

1. Land Acquisition - Local Taka costs are essentially the same in both estimates - Appraisal Estimate $0.40MM - WB Estimate $0.24MM.

2. Site Preparation - Appraisal Estimate $11.5MM - WB Estimate $35.48MM.

   a. Those items readily identified are:

      1) Fill - Appraisal Estimate $7.82MM - WB Estimate $9.85MM
      2) Railroads - Appraisal Estimate $1.30MM - WB Estimate $2.90MM

   b. The balance of the appraisal estimate consisted of fences, piling and civil works for a value of $2.32MM. The existing construction plan has awarded most of this work now to be sub-constracted so that the WB Estimate values are:

      1) Roads and Housing Colony Boundry Wall $0.80MM
      2) All civil materials $2.41MM
      3) Civil Subcontracts $13.76MM
      4) Dynamic Compaction incl. consultant $5.76MM

3. Process Equipment and Materials - Appraisal Estimate $36.4MM Total - WB Estimate $56.43MM Total

   a. Ammonia Unit - Appraisal Estimate $26.1MM - WB Estimate $39.59MM

      1) Williams Brothers Estimate breakdown:

         a) Process Equipment $30.46MM
         b) Materials (Piping, instruments, electrical, struct. steel, etc.) $9.13MM

   b. Urea Unit - Appraisal Estimate $10.3MM Total - WB Estimate $12.16MM Total

      1) Williams Brothers Estimate breakdown:

         a) Process Equipment $9.62MM
         b) Materials (piping, instruments, electrical, etc.) $2.54MM Total

C. COMPARATIVE ANALYSIS - APPRAISAL REPORT VS WILLIAMS BROTHERS ESTIMATE (Cont.)

c. Catalyst and Chemicals

1) The value of catalyst and chemicals is $2.00MM in both estimates

d. Delay and Storage Charges

1) This is a cost not contemplated in the appraisal estimate. The project delay created by the site problems caused this account to be created in the amount of $2.67MM for the Ammonia and Urea units.

4. Auxiliary and Service Units - Appraisal Estimate $8.30MM Total - WB Estimate $21.76MM Total

a. The following units conform to the breakdown of the appraisal estimate.

1) Power, instrument and plant air, boiler plant and inert gas-Appraisal Estimate $3.10MM - WB Estimate $8.39MM

2) Ammonia storage, refrigeration and bottling - Appraisal Estimate $0.80MM - WB Estimate $1.44MM

3) Condensate stripping, water treatment and cooling towers - Appraisal estimate - $3.00MM - WB Estimate $5.94MM (Note-condensation unit was extracted from FWL Ammonia Unit)

4) Substation, distribution, lighting, etc. - Appraisal estimate $1.10MM - WB Estimate $2.05MM

5) Sewer and effluent treatment - Appraisal Estimate $0.20MM - WB Estimate $0.34MM

b. The FWL-Williams Brothers Estimates have identified additional auxiliary and service units not identified in the appraisal estimate. As a group these are:

1) Fire fighting system, natural gas (excluding metering station), chemical storage and the common to all auxiliary service units materials (Instruments, piping, structural steel, insulation, etc.) WB Estimate for 4.6 is $2.55MM.

123

WILLIAMS BROTHERS PROCESS SERVICES, INC.

C. COMPARATIVE ANALYSIS - APPRAISAL REPORT VS WILLIAMS BROTHERS ESTIMATE (Cont.)

4. Auxiliary and Service Units -(Continued)

c. Delay and Storage Charges

1) This is a cost not contemplated in the Appraisal Estimate

2) For this item the WB Estimate is $1.05MM.

5. Material Handling Equipment

a) Handling Equipment Appraisal Estimate $4.90-WB Estimate $5.88MM
b) Delay and Storage Charges - Not included in Appraisal Estimate - WB Estimate $0.33MM

6. Construction Equipment - Appraisal Estimate $5.30MM

a) WB Estimate totals $11.51MM and consists of the following:

1) Purchased Equipment $9.34MM

2) Small Tools $0.97MM

3) Leased Equipment $1.20MM

7. Miscellaneous Equipment - Appraisal Estimate $1.20MM

a) WB Estimate Totals $3.33MM and consists of the following:

1) Maintenance Machinery $1.23MM

2) Miscellaneous Equipment $1.97MM

3) Delay and Storage Charges $0.33MM

8. Buildings and Structures

a) The finalized construction plan which is using local and foreign subcontractors to erect the project buildings must be tabulated in the following manner:

C. COMPARATIVE ANALYSIS - APPRAISAL REPORT VS WILLIAMS BROTHERS ESTIMATE (Cont.)

8. Buildings and Structures (Continued)

BUILDING	APPRAISAL ESTIMATE COST	W.B. ESTIMATE COST
Administration	$0.43MM	$0.43MM (S/C)
Gate House) Fire Station)	0.009MM	0.03MM (S/C)
Maintenance	0.35MM	-
Workshop/Spares Store	-	0.53MM (S/C)
Chemical Store/Repair	-	0.18MM (S/C)
Laboratory	0.05MM	0.15MM (S/C)
Canteen	0.05MM	-
Control House	0.07MM	0.23MM (S/C)
Urea Bulk Stg.	2.98MM	0.70MM (S/C)
Bagged Urea Stg.	1.84MM	1.21MM (S/C)
Warehouses	0.24MM	-
Pier	1.79MM	3.80MM (S/C)
Housing Colony	2.18MM	15.62MM (S/C)
Housing Colony Furnishings	-	4.86MM
First Aid	0.13MM	Inc. w/Fire Station
Bag Store	0.17MM	Inc. w/Bagged Urea Stg.
Others	0.14MM	-
Compressor House	-	1.80MM (S/C)
Ammonia Bottling	-	0.06MM (S/C)
Hose House/Shelter	-	0.005MM (S/C)
Substations	-	0.18MM (S/C)
Furnished Materials	-	5.35MM
	$10.42MM	$35.25MM

9. Freight, Insurance and Duty

a) Ocean Freight	$6.10MM	$7.91
b) Local Freight	2.30	1.54
c) Duty	28.20	36.77
	$36.60MM	$46.22

C. COMPARATIVE ANALYSIS - APPRAISAL REPORT VS WILLIAMS BROTHERS ESTIMATE (Cont.)

10. Construction and Erection

		Appraisal Est.	WB Estimate
a)	Field Labor	$4.7MM	$3.72
b)	Direct Overhead	0.16	Not included
c)	Local Supervision	0.94	0.65
d)	Field Office Expense	0.21	0.13
e)	Temporary Facilities	2.81	3.99
f)	Const. Labor Training	Not included	5.25
g)	Field Supervision	Not included	14.32
h)	Subcontracts		
	1)Tank Erection	Not included	0.005
	2)Refractory	Not included	1.10
	3)Chem. Clean & ND Test.	Not included	0.56
	4)Piping (Sp. Welding)	Not included	4.75
	5)Instrument Inst.	Not included	3.28
	6)Electrical Inst.	Not included	3.87
i)	Expatriate Income Taxes (Expended-Exemption has now been granted)	Not included	0.76
j)	Insurance	Not included	0.67
	Total	$8.82MM	$43.055

11. Services - Appraisal Estimate $24.6MM - WB Estimate $19.05MM

12. Management/Technical Assistance

		Appraisal Est.	WB Estimate
a)	Management Assistance	$5.6MM	$11.21MM
b)	Technical Advisor	Not included	2.07
c)	Construction Supervision	Not included	3.70
	Total	$5.6MM	$16.98MM

13. Preoperational Expense

		Appraisal Est.	WB Estimate
a)	AFCC Staff Training	$0.96MM	$ 0.27MM
b)	Communications	0.26	Incl. in (d)
c)	Start-up	0.81	0.03
d)	Corporate Overhead	2.02	5.77
e)	General	0.91	Incl. in (d)
	Total (Estimate used $5.00MM)	$4.96MM	$6.07MM

126

WILLIAMS BROTHERS PROCESS SERVICES, INC.

C. COMPARATIVE ANALYSIS - APPRAISAL REPORT VS WILLIAMS BROTHERS ESTIMATE (Cont.)

14. Working Capital — Appraisal Estimate $8.5MM — WB Estimate $22.07MM

15. Contingency — Appraisal Estimate $16.10MM — WB Estimate $13.92

16. Escalation/Currency Adjustment — Appraisal Estimate $38.6MM-WB Est. $24.8MM

17. Interest During Construction — Apraisal Estimate $27.2MM - WB $40.00MM

18. Delay Costs — Not included in Appraised Estimate - WB Est. $22.12MM

19. Total Project

Appraisal Estimate	$249.40MM
WB Estimate	424.51
Appraisal Estimate Under-run	($175.11)

D. PROJECT CHANGE ORDERS (Source-FWL Monthly Report No. 27)

1. FWL Control Estimate, Revision 4, includes Change Orders No. 1 through 64 that have been agreed upon.

   The following change orders have been cancelled:

   No. 10 Cancelled 10/25/76
   No. 18 Cancelled 3/14/77
   No. 20 Cancelled 6/7/77
   No. 21 Cancelled 1/10/77
   No. 23 Cancelled 6/7/77
   No. 28 Cancelled 11/18/77
   No. 30 Cancelled 9/6/77
   No. 31 Cancelled 9/6/77
   No. 41 Cancelled 9/6/77
   No. 45 Cancelled 9/28/77
   No. 55 Cancelled 6/17/77
   No. 59 Cancelled 11/18/77
   No. 60 Cancelled 6/14/77
   No. 61 Cancelled 11/18/77

2. The costs of the following change orders have not been included in the current FWL estimate revision:

127

D. PROJECT CHANGE ORDERS (Continued)

2. (Continued)

a) No. 65 Revision of Urea spillage return filter to single element type - Approved 10/5/77 - Fixed fee +$578 Reimbursable Cost-Nil - Submitted and approved.

b) No. 66 Deletion of 1-33KV feeder and associated circuit breaker. Fixed fee +$11,985 reimbursable cost - Local $23,250 deduct - Foreign $65,000 deduct. Submitted - Not approved.

c) No. 67 Involvement as engineer in AFCC/Menard Contract. Fixed fee +$33,269 reimbursable costs - Nil.-Submitted -Not appr.

d) No. 68 Preparation of new control estimate. Cost unknown at this time as it had not been submitted to AFCC.

3. The approval of FWL Change Order No. 54 "Changes to Materials of Construction of Building" is at this time uncertain. This change order was submitted 6/13/77 and resubmitted 8/1/77. FWL Report No. 27 lists AFCC approval as "To Be Advised". This may be a clerical omission as the nature of this change order is such that the recent review of FWL estimate would undoubtedly have uncovered the exclusion of the building changes.

4. The length of time required for either approval or cancellation of change orders must have had a negative effect on design, procurement and ultimately field scheduling.

Of the sixty four (64) change orders accounted for sixteen (16) received action in one (1) month or less, six (6) in two (2) months, four (4) in three (3) months, eleven (11) in four (4) months, two (2) in five (5) months, four (4) in six (6) months and three (3) in nine (9) months. Twelve (12) of the cancelled change orders had no submission dates. The time required for transmission between FWL Reading and AFCC Dacca is lengthy, but if approvals or rejection of approximately one third (1/3) of these change orders was accomplished in one (1) month or less, the length of time taken for the balance was indeed excessive.

5. Change orders are always a necessity to an engineering construction project. As FWL nears completion of design engineering, few changes should

D. PROJECT CHANGE ORDERS (Continued)

5. (Continued)

be required to amend the fixed fee and the reimbursables. For the remainder of the project, field change orders will affect the reimbursable costs. Their origin can be contractor or owner and should carry a completely different numbering system from those presently used.

The time lapse from issue to approval should only be a day or two. Resolution should be on a person to person or group to group basis to prevent schedule interruption and insure understanding by all parties.

E. WILLIAMS BROTHERS' ESTIMATE

1. Williams Brothers Capital Cost Estimate, Table XIII-F is arranged in the FWL and AFCC format as presented in the Monthly Progress Report No. 2. This estimate has been edited only to include all duties in the AFCC cost portion.

2. The AFCC and FWL Estimate, Table XIII-A and the AFCC Estimate, Appendix A included an allowance of $ 50,000M for construction interest. Williams Brothers has now calculated the construction interest based on the forecasted disbursement schedule all included in Table XIII-B. This amount is now $40,000M.

3. Williams Brothers' Estimate in the Appraisal Report Format is included as Table XIII-C.

4. Table XIII-D is the Williams Brothers Estimate in summary form presented in the Appraisal Report format.

5. Table XIII-E is the Williams Brothers Estimate in detail presented in the Appraisal Report format.

6. Table XIII-F is the Williams Brothers Estimate in summary form similar to Table XIII-A. It should be noted that Section II, AFCC costs, Item O, AFCC Contingencies, has been increased. This increase is based on the amounts yet to be disbursed (Budget less expenditures) and it is our opinion the allowed percentages require being increased to five percent (5%) for both local and foreign currency.

7. Tables XIII-G and XIII-H are the detailed cost calculations for a four (4) month construction delay and two (2) month start-up delay.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE XIII - A

THE ASHUGANJ FERTILIZER AND CHEMICAL COMPANY LIMITED (AFCC)

SUMMARY - CAPITAL COSTS

Basis - AFCC and FWL Estimates*
M US $ EQUIVALENT

		TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY
I.	FWL REIMBURSABLE COSTS			
A.	Direct Materials	129,214	92,609	36,605
B.	Subcontracts	38,236	24,897	13,339
C.	Direct, Indirect and Training Labor	7,713	3,330	4,383
D.	Indirect Materials	18,956	12,658	6,298
E.	Supervision	17,199	14,176	3,023
F.	Escalation	19,650	16,950	2,700
G.	Contingency	7,662	7,240	422
H.	Currency Adjustment	8,000	8,000	0
	Subtotal Including Duty	246,630	179,860	66,770
	Subtotal Less Duty	(35,584)	-	(35,584)
	Subtotal FWL Reimbursable Costs	211,046	179,860	31,186
II.	AFCC COSTS			
A.	Land Acquisition	236	0	236
B.	Site Development	16,409	12,896	3,513
C.	Gen. Contractor Fixed Fee	19,000	19,000	0
D.	Technical Advisor	2,067	2,000	67
E.	Management Assistance	11,216	10,351	865
F.	Bank Charges	522	0	522
G.	Construction Equipment and Tools	1,033	900	133
H.	Miscellaneous Equipment	812	182	630
I.	Housing Colony	15,470	400	15,070
J.	Foundation Consultant	51	50	1
K.	Railway Link	2,900	0	2,900
L.	Construction and Erection	7,994	3,435	4,559
M.	Preoperational Expenses	6,074	220	5,854
N.	Freight, Marine Insurance & Duty	36,732	0	36,732
O.	AFCC Contingencies	3,918	380	3,538
P.	Construction Interest	50,000	0	50,000
Q.	Expatriate Income Tax	761	0	761
R.	Working Capital	22,070	1,120	20,950
	Subtotal AFCC Costs	197,265	50,934	146,331
	Total Project Capital Cost	408,311	230,794	177,517

*The AFCC Costs are based on AFCC April 1978 estimate and the FWL reimbursable costs are based on FWL April 1978 estimate Revision 4a.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE XIII-B

CONSTRUCTION INTEREST CALCULATION

(BASED ON US $231 MILLION EQUIVALENT FOREIGN CURRENCY REQUIRED)

	1976	1977	1978	1979	9 Mo. 1980
1. Already Drawn	-	17	37	87	181
2. Previous Years' Interest	-	.9	2.8	6.5	14.1
3. Opening Debt (1 + 2)	-	17.9	39.8	93.5	195.1
4. Interest on (3) 10%	-	1.8	4.0	9.4	14.6
5. Drawn During Year	17	20	50	94	29.3
6. Interest on (5)	.9	1.0	2.5	4.7	1.1
7. Total Interest (4 + 6)	.9	2.8	6.5	14.1	15.7
8. Assumed Interest During Const.	.9	3.7	10.2	24.3	40.0

The above methodology for construction interest calculation parallels the IDA appraisal report formal annex 5-4.[125] AFCC was required to capitalize the construction interest for only the foreign currency funds.

FORECASTED DISBURSEMENT SCHEDULE

PERIOD	US $ MILLION
At end of 1976	17*
At end of 1977	37*
At end of 1978	87
At end of 1979	181
At end of 1980 (9 Mo-Balance 1981)	210.3
At end of 1981	227.6
At end of 1982	229.8
At end of 1983 (9 Months)	231.0

Actual disbursements thru May 9, 1978 for foreign currency were US $39.6 million equivalent based on FWL loan fund progress report.

* Estimated

131

WILLIAMS BROTHERS PROCESS SERVICES.INC.

TABLE XIII C

ASHUGANJ FERTILIZER PROJECT

SUMMARY

ESTIMATE COMPARATIVE ANALYSIS

IDA APPRAISAL REPORT NO. 598-BD, DECEMBER 18, 1974

VS

CURRENT WILLIAMS BROTHERS ESTIMATE

US $ MILLIONS

		Appraisal Estimate 1974 (1)				WB Estimate April 1978 (2)			
		Local	Foreign	Total	%	Local	Foreign	Total	%
1.	Land Acquisition	0.4	-	0.4	0.2	0.24	-	0.24	0.07
2.	Site Preparation	2.1	9.4	11.5	6.9	14.16	21.32	35.48	10.96
3.	Process Equipment	-	36.4	36.4	21.7	0.61	55.83	56.44	17.44
4.	Auxiliary Equipment	-	8.3	8.3	5.0	0.59	21.17	21.76	6.72
5.	Material Handling Equip.	-	4.9	4.9	2.9	0.02	6.19	6.21	1.92
6.	Construction Equipment	-	5.3	5.3	3.2	0.23	11.28	11.51	3.56
7.	Miscellaneous Equipment	-	1.2	1.2	0.7	0.67	2.66	3.33	1.02
8.	Buildings & Structures	4.0	6.4	10.4	6.2	26.61	8.64	35.25	10.89
9.	Freight, Ins. & Duty	30.5	6.1	36.6	21.8	38.31	7.91	46.22	14.28
10.	Construction & Erection	6.9	1.9	8.8	5.3	12.74	30.30	43.04	13.30
11.	Services	0.6	24.0	24.6	14.7	0.05	19.00	19.05	5.89
12.	Managment Assistance	1.0	4.6	5.6	3.3	1.13	15.85	16.98	5.25
13.	Preoperational Expense	3.4	1.6	5.0	3.0	5.85	0.22	6.07	1.88
14.	Working Capital	7.2	1.3	8.5	5.1	20.95	1.12	22.07	6.82
	Base Cost Estimate	56.1	111.4	167.5	100.0	122.16	201.49	323.65	100.0
15.	Contingency	5.4	10.7	16.1		6.19	7.74	13.93	
16.	Escalation	18.4	20.2	38.6		2.70	22.12	24.82	
17.	Interest	27.2	-	27.2		40.00	-	40.00	
18.	Delay Costs	-	-	-		19.53	2.58	22.11	
19.	Total Project Cost	107.1	142.3	249.4		190.58	233.93	424.51	

Note (1) US $ = TK 7.5
(2) US $ = TK 15.0

132

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE XIII D

ASHUGANJ FERTILIZER PROJECT

SUMMARY

CURRENT WILLIAMS BROTHERS ESTIMATE

US $ Thousands

US $ = TK 15

		Local Currency	Foreign Currency	Total
1.	Land Acquisition	$ 236	$ -	$ 236
2.	Site Preparation	14,160	21,319	35,479
3.	Process Equipment	604	55,825	56,429
4.	Auxiliary Equipment	592	21,168	21,760
5.	Material Handling Equipment	22	6,192	6,214
6.	Construction Equipment	225	11,283	11,508
7.	Miscellaneous Equipment	672	2,661	3,333
8.	Buildings and Structures	26,609	8,642	35,251
9.	Freight, Insurance and Duty	38,307	7,910	46,217
10.	Construction and Erection	12,744	30,302	43,046
11.	Services	50	19,001	19,051
12.	Management Assistance	1,132	15,851	16,983
13.	Preoperational Expense	5,854	220	6,074
14.	Working Capital	20,950	1,120	22,070
	Base Cost Estimate	$ 122,157	$ 201,494	$ 323,651
15.	Contingency	6,193	7,733	13,926
16.	Escalation	2,700	22,120	24,820
17.	Interest	40,000	-	40,000
18.	Delay Costs	19,532	2,584	22,116
19.	Total Project Cost	$ 190,582	$ 233,931	$ 424,513

133

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE XIII E

ASHUGANJ FERTILIZER PROJECT

WILLIAMS BROTHERS ESTIMATE

PRESENTED IN

APPRAISAL REPORT FORMAT

EQUIVALENT - US $ THOUSANDS
US $ = TAKA 15

Appraisal Report Category		Local Currency	Foreign Currency	Total
1.0	Land Acquisition	236	-	236
2.0	Site Preparation			
2.1	Earth Fill	2,018	7,836	9,854
2.2	Roads, H.C. Boundary Wall	800	-	800
2.3	Dynamic Compaction	690	4,610	5,300
2.4	Consultant-Dynamic Compaction	5	450	455
2.5	Railway	2,900	-	2,900
2.6	Civil Materials	1,575	834	2,409
2.7	Civil Subcontract	6,172	7,589	13,761
	Sub Total	14,160	21,319	35,479
3.0	Process Equipment Materials and Spare Parts			
3.1	Ammonia Unit	469	39,119	39,588
3.2	Urea Unit	135	12,031	12,166
3.3	Catalyst and Chemicals	-	2,000	2,000
3.4	Delay and Storage Charges	-	2,675	2,675
	Sub Total	604	55,825	56,429
4.0	Auxiliary Service Equipment, Materials and Spare Parts			
4.1	Power, Instr. & Plant Air, Boiler, Inert Gas	-	8,386	8,386
4.2	Ammonia Stg., Refrig., & Bottling	113	1,322	1,435
4.3	Cond. Stripping, Water Treatment, Cooling Tower	22	5,917	5,939
4.4	Substation, Dist., Lighting	322	1,729	2,051
4.5	Sewer & Eff. Treating	-	342	342

134

WILLIAMS BROTHERS PROCESS SERVICES, INC.

Appraisal Report Category		Local Currency	Foreign Currency	Total
4.6	Firewater, Nat. Gas, Chemical Stg. & Common to all Materials	135	2,419	2,554
4.7	Delay & Storage Charges	-	1,053	1,053
	Sub Total	592	21,168	21,760
5.0	Material Handling Equipment & Spare Parts			
5.1	Material Handling	22	5,855	5,877
5.2	Delay and Storage Charges	-	337	337
	Sub Total	22	6,192	6,214
6.0	Construction Equipment			
6.1	Equipment	142	9,200	9,342
6.2	Small Tools	83	883	966
6.3	Leased Equipment	-	1,200	1,200
	Sub Total	225	11,283	11,508
7.0	Miscellaneous Equipment			
7.1	Maintenance Machinery	-	1,231	1,231
7.2	Miscellaneous Equipment	672	1,295	1,967
7.3	Delay and Storage Charges	-	135	135
	Sub Total	672	2,661	3,333
8.0	Buildings and Structures			
8.1	Materials	2,002	3,357	5,359
8.2	Subcontracts			
8.2.1	Administration	425	-	425
8.2.2	Gate/Fire Station	151	-	151
8.2.3	Maintenance	710	-	710
8.2.4	Laboratory	151	-	151
8.2.5	Control House	231	-	231
8.2.6	Bulk Storage	698	-	698
8.2.7	Bagged Storage	1,206	-	1,206
8.2.8	Pier	1,500	2,300	3,800
8.2.9	Compressor House	1,300	500	1,800
8.2.10	Ammonia Bottling	60	-	60
8.2.11	Hose House and Shelter	5	-	5
8.2.12	Substation	175	-	175
	Sub Total	6,612	2,800	9,412
8.3	Housing Colony	15,070	550	15,620
8.4	Housing Colony Furnishings	2,925	1,935	4,860
	Sub Total	26,609	8,642	35,251

135

WILLIAMS BROTHERS PROCESS SERVICES, INC.

Appraisal Report Category	Local Currency	Foreign Currency	Total
9.0 Freight, Insurance and Duty			
9.1 Ocean Freight	-	7,910	7,910
9.2 Local Freight	1,536	-	1,536
9.3 Duty	36,771	-	36,771
Sub Total	38,307	7,910	46,217
10.0 Construction and Erection			
10.1 Field Labor	3,715	-	3,715
10.2 Local Supervision	647	-	647
10.3 Field Office Expense	110	20	130
10.4 Temporary Facilities	2,493	1,500	3,993
10.5 Construction Labor Training	1,921	3,330	5,251
10.6 Field Supervision	1,245	13,076	14,321
10.7 Subcontracts			
10.7.1 Tanks	5		5
10.7.2 Refractory	100	1,000	1,100
10.7.3 Chem Clean/NDT	-	558	558
10.7.4 Piping	427	4,320	4,747
10.7.5 Instruments	300	2,982	3,282
10.7.6 Electrical	353	3,516	3,869
Sub Total	1,185	12,376	13,561
10.8 Expatriate Income Taxes	761	-	761
10.9 Insurance	667	-	667
Sub Total	12,744	30,302	43,046
11.0 Services			
11.1 General Contractor Fee	-	19,000	19,000
11.2 Consultants	50	1	51
Sub Total	50	19,001	19,051
12.0 Management/Technical Assistance			
12.1 Management Assistance	865	10,351	11,216
12.2 Technical Advisor	67	2,000	2,067
12.3 Construction Supervision	200	3,500	3,700
Sub Total	1,132	15,851	16,983

136

WILLIAMS BROTHERS PROCESS SERVICES, INC.

Appraisal Report Category		Local Currency	Foreign Currency	Total
13.0	Preoperational Expense			
	13.1 AFCC Staff Training	268	-	268
	13.2 Start-up	33	-	33
	13.3 AFCC Overhead	5,553	220	5,773
	Sub Total	5,854	220	6,074
14.0	Working Capital	20,950	1,120	22,070
	BASE COST ESTIMATE	122,157	201,494	323,651
15.0	Contingency			
	15.1 AFCC	5,771	493	6,264
	15.2 FWL	422	7,240	7,662
	Sub Total	6,193	7,733	13,926
16.0	Escalation/Currency Adjustment			
	16.1 AFCC	-	-	-
	16.2 FWL	2,700	14,120	16,820
	16.3 Currency Adjustment	-	8,000	8,000
	Sub Total	2,700	22,120	24,820
17.0	Construction Interest Allowance	40,000	-	40,000
18.0	Delay Costs			
	18.1 Field Labor	2,420	-	2,420
	18.2 Supervision	187	1,676	1,863
	18.3 Indirect Materials	515	908	1,423
	18.4 Construction Interest	16,410	-	16,410
	Sub Total	$19,532	2,584	$22,116
19.0	TOTAL CAPITAL COST	$190,582	$233,931	$424,513

137

TABLE XIII-F

THE ASHUGANJ FERTILIZER AND CHEMICAL COMPANY LIMITED (AFCC)

SUMMARY - CAPITAL COSTS

WB Estimate

M US $ EQUIVALENT

		TOTAL	FOREIGN CURRENCY	LOCAL CURRENCY
I.	FWL REIMBURSABLE COSTS			
A.	Direct Materials	102,013	96,181	5,832
B.	Subcontracts	37,709	23,595	14,114
C.	Direct, Indirect and Training Labor	7,713	3,330	4,383
D.	Indirect Materials	14,671	12,658	2,013
E.	Supervision	16,099	13,076	3,023
F.	Escalation	16,820	14,120	2,700
G.	Contingency	7,662	7,240	422
H.	Currency Adjustment	8,000	8,000	0
	Subtotal FWL Reimbursables	210,687	178,200	32,487
II.	AFCC COSTS			
A.	Land Acquisition	236	0	236
B.	Site Development	16,409	12,896	3,513
C.	Gen. Contractor Fixed Fee	19,000	19,000	0
D.	Technical Advisor	2,067	2,000	67
E.	Management Assistance	11,216	10,351	865
F.	Bank Charges	522	0	522
G.	Construction Equip. and Tools	1,033	900	133
H.	Miscellaneous Equipment	812	182	630
I.	Housing Colony	15,570	500	15,070
J.	Foundation Consultant	51	50	1
K.	Railway Link	2,900	0	2,900
L.	Construction and Erection	9,994	5,435	4,559
M.	Preoperational Expenses	6,074	220	5,854
N.	Freight, Marine Insurance and Duty	36,731	0	36,731
O.	AFCC Contingencies	6,264	493	5,771
P.	Construction Interest	40,000	0	40,000
Q.	Expatriate Income Tax	761	0	761
R.	Working Capital	22,070	1,120	20,950
	Subtotal AFCC Costs	191,710	53,147	138,563
	Six (6) Months Delay Costs	22,116	2,584	19,532
	Total Project Capital Budget	424,513	233,931	190,582

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE XIII-G

DELAY COST CALCULATION
FOUR (4) MONTH CONSTRUCTION DELAY

	US $ Equivalent		
	FOREIGN CURRENCY	LOCAL CURRENCY	TOTAL
1. Field Labor 2,500 Men x 260 Hr/Mo @ Tk 9/15 Tk=$1.US	$	$ 390,000	$ 390,000
2. Local Supervisors 125 Men x 260 Hr/Mo @ Tk 15/15Tk=$1.US		32,500	32,500
3. Indirect Labor 18.8% of Direct Labor		73,300	73,300
4. FWL Supervision 68 Men	300,400		300,400
5. FWL Local Allowance 68 Men x 300 Tk/Day x 30 days/15 Tk=$1.US		40,800	40,800
6. FWL Travel Allowance 68 Men x $810 per mo. average	55,000		55,000
7. Indirect Materials F) Total Field Indirects $1.350MM Tools 2.100MM $ 3.450/19 Mo.	181,600		181,600
L) Total Field Indirects $1.96MM/19Mo.		103,000	103,000
8. Uhde Supervision Total Cost $391,500/40M Mo.	8,000		8,000
Total Cost Per Month	$ 545,000	$ 639,600	$ 1,184,600
Total for four (4) months	$2,180,000	$2,558,400	$ 4,738,400
Construction Interest - $2,622,000 x 4 months	-	$10,488,000	$10,488,000
Subtotal four (4) mo. delay	$2,180,000	$13,046,400	$15,226,400
Total six (6) mo. delay	$2,584,200	$19,531,800	$22,116,000

139

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE XIII-H

DELAY COST CALCULATION
TWO (2) MONTH START-UP DELAY

	US $ EQUIVALENT		
	FOREIGN CURRENCY	LOCAL CURRENCY	TOTAL
1. Field Labor 1,100 Men x 260 Hr/Mo @ Tk 9/15 Tk=$1.US		$ 171,600	$ 171,600
2. Local Supervision 55 Men x 260 Hr/Mo @ Tk/15 Tk=$1.US		14,300	14,300
3. Indirect Labor 18.8% Direct Labor		32,300	32,300
4. FWL Supervision 20 Men	$ 87,100		87,100
5. FWL Local Allowance 20 Men x 300 Tk/Day x 30 days/15Tk=$1.US		12,000	12,000
6. FWL Travel Allowance 20 Men x $810 per mo. average	16,200		16,200
7. Indirect Materials F) use ½ of 4 mo. cost	90,800		90,800
L) use ½ of 4 mo. cost		51,500	51,500
8. Uhde Supervision Total Cost $319,500/40M Mo.	8,000		8,000
Total Cost Per Month	$ 202,100	$ 281,700	$ 483,800
Total for Two (2) Months	$ 404,200	$ 563,400	$ 967,600
Construction Interest - $2,961,000 x 2 months	-	$5,922,000	$5,922,000
Subtotal two (2) month delay	$ 404,200	$6,485,400	$6,889,600

140

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE XIII-1

DEVELOPMENT COSTS

This table presents the experience factor development cost allowances that have been included in the FWL April 1978, Rev. 4a estimate. These development costs were also included in the FWL Rev. 3 estimate.

CODE	ITEM	MATERIAL	SUBCONTRACTS	TOTAL
1121	Reactors and Internals	$42.0M		42.0M
1131	Drums	8.5M		8.5M
1211/31	Exchangers	78.0M		78.0M
1241	Fired Heaters	505.0M		505.0M
1251/7	Generators/Boilers	41.0M		41.0M
1311/9	Pumps	38.4M		38.4M
1321/3	Compressors/Drivers	343.7M		343.7M
1381/9	Pump Drivers	2.3M		2.3M
1400	Civil	0.8M	474.0M	474.8M
1471	Buildings	622.6M	411.8M	1034.4M
1500	Piping	722.9M		722.9M
1600	Instruments	Incl. - Not identified		-
1700	Electrical	" " "		-
		$2405.2M	$885.8M	$3291.0M

141

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION XIV

SUBCONTRACTS - CURRENT STATUS

A. INTERNATIONAL SUBCONTRACTS

1. The compensatory foundations, prill tower and urea structure were committed to Korea Development Corporation on 26 January 1978. The construction schedule in the tender, as well as the clarification of tender, dated 13 January 1978, state completion of Ammonia tank foundation by 1 July 1979, and completion of Urea structure by 1 July 1979. A bar chart schedule by KDC supporting these dates is part of the subcontract. By mid-April, it was apparent this schedule was not being maintained. Problem areas included dewatering, equipment arrival and material delivery (rebar). A meeting was held in FWL's field office on 22 April 1978. As a result, KDC prepared and submitted a revised schedule on 24 April 1978, which indicated no slippage of end dates. This new schedule must be closely monitored and maintained because project schedules indicate any delay in these activities will result in a delay in mechanical completion and startup.

2. The Ammonia storage tank was awarded to Vijay Tanks of Bombay, India. Field erection is scheduled to begin mid-1979. We have no reason to suspect the tank will not be built on schedule, providing the foundation is ready. If erection of the tank commences 1 July 1979, the schedule indicates the tank completed, equipped, piped, instrumented and purged, ready for service by February-March, 1980.

3. Foster Wheeler was awaiting tenders for International Subcontract for the permanent jetty, including river water intake and topside steelwork. It was expected KDC, Vinnell and Raymond, International would respond mid-May.

4. Foster Wheeler requested tenders on 3 May 1978 for the Compressor House. They went to KDC, Raymond, Vinnell and SR Construction and Carriers (India). Estimated cost is $1.5 - $2.0 million (US) which makes it unlikely any International Subcontractor could economically mobilize for this job alone. Combining this scope with the jetty could result in lower cost. However, if KDC, who is already mobilized, were to be awarded the jetty, both AFCC and FWL are apprehensive of giving the entire International Civil Subcontracting scope to KDC until they demonstrate better performance than seen to date.

142

WILLIAMS BROTHERS PROCESS SERVICES, INC.

A. INTERNATIONAL SUBCONTRACTS (Continued)

5. In March, 1978 it was the intent to go to international subcontract for electrical power and local subcontract for electrical lighting. Foster Wheeler has since considered that the power alone may be too small in value to attract the best international subcontractors and recommends combining the packages into one subcontract. AFCC has some objections to this plan, and the differences must be resolved.

6. It is also Foster Wheeler's intention to solicit international subcontracts for instrument installation (including pneumatics), the site welding of high pressure lines, non-destructive testing, chemical cleaning, refractory, cooling tower and airconditioning. AFCC objects to airconditioning which they feel can be done locally.

7. FWL current plans are for subcontracting the following work to international subcontractors:

Compensatory Foundations
Ammonia Storage Tank
Jetty
Compressor House
Electrical
Instrumentation
Site Welding (high pressure lines)
Non-destructive testing
Chemical Cleaning
Refractory
Cooling Tower
Airconditioning

B. LOCAL SUBCONTRACTS

1. Foster Wheeler invited eight (8) prequalified Class I Local Subcontractors to tender foundation work for the repairshop and the chemical store. Seven (7) of these subcontractors purchased tender documents but only one, Yaqub, submitted. An award was made to Yaqub and work is in progress. The excavation is by hand with spoil being carried by head basket to land reclamation area outside of the perimeter wall at the southeast corner of the site.

2. Foster Wheeler invited twelve (12) prequalified Class I Local Subcontractors to tender foundation work for the Urea bulk store. Eleven (11) of these subcontractors purchased tender documents but

143

B. LOCAL SUBCONTRACTS (Continued)

2. (Continued)

only four (4) submitted. This was the best response to seven (7) invitations sent out to date. An award was made to Bashter Shilpi and work is in progress. Excavation is by hand labor with spoil being carried to land reclamation area outside of the perimeter wall at the southeast corner of the site. Construction of a brick, temporary construction building is nearing completion. Straightening, bending and fabrication of rebar is in progress.

3. A total of fifty six (56) invitations to tender civil works have been sent to prequalified local subcontractors for workshop and spares store, boundary wall, reformer foundations, absorber foundations and miscellaneous foundations. Of the fifty six (56) requested, twenty six (26) purchased documents, but only seven (7) submitted, two (2) on the workshop and spares store and two (2) on the reformer foundations and only one (1) each on the others. Foster Wheeler is in the process of investigating this poor response by local subcontractors to determine the cause and correct the matter.

4. FWL current plans for subcontracting civil work to local national subcontractors are as follows:

Boundary Wall
Workshop and Spare Store
Repair Shop and Chemical Store
Roads and Drains
Piling
Urea Bulk Store
Urea Bagging Store
First Aid and Fire House
Gate House
Administration Building
Laboratory
Sub-Stations: Urea & P.D.B.
Hose Houses and Shelters
Water Treatment Plant Foundations
Cooling Tower Basins
Neutralization and Equalization Basins
On-site Piperack Foundations
Urea Piperack & Prill Cooler Foundations
On-site Equipment Foundations
Off-Site Piperack Foundations
Sewer Outfall
Paving
Tank Erection
Generator House

144

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION XV

AFCC CONSTRUCTION - CURRENT STATUS & PLAN

A. CONSTRUCTION PROGRESS

1. Housing Estate

The status of construction in the Housing Estate is shown in Table XV-A, Housing Units and Table XV-B, Support Facilities for the period ending April 30, 1978.

TABLE XV-A HOUSING UNITS

Type Unit	Total Planned	Status
B2	8	Completed
B1	28	Completed
C	80	64 Completed -- 16 to be completed 5-78
D	64	48 under construction -- 32 to be completed 7-78 -- 16 to be completed 10-78
E	320	32 Completed -- 64 to be completed 5-78 -- 96 begin 6-78
F	160	32 to be completed 5-78 -- 32 to be completed 6-78 -- 96 to begin 6-78
Bachelor	20 (10 dbl.)	To be completed 5-78
Apprentice Hostel	40 (Common Bldg.)	Bids received-Construction to begin 4-78
Security Guard	30	
Guest House	6 (Incl. 2 Suites)	Bids awarded 4-78

145

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE XV-B SUPPORT FACILITIES

Facility	Status
Health Center	Completion - 9-78
School	Preliminary design received, not approved. Partial completion scheduled 1-79.
Recreation Complex	Completion scheduled 6-78, except swimming pool which is awaiting filtration equipment scheduled August or September, 1978.
Colony Office Building	Completed and in service, including post office and telegraph office.
Employees Club	Design is approved - in process of bidding.
Shopping Center	Design is completed and bids received. Construction scheduled to begin April, 1978.
Mosque	Design is approved.
Bank	Status is undecided
Perimeter Wall	Construction is underway. Completion scheduled for 11-79. Priority shifted to area of expatriate housing.
Roads	Phase I construction underway, which will complete expatriate section.
Storm Drainage	Construction is completed in expatriate section and part of local national. Design of Phase II in progress.
Domestic Sewer	Phase I completed, including septic tank and piping to all expatriate and portion of local national housing. The leaching field is scheduled to be completed in June, 1978.
Water Supply	Phase I construction is completed, including mains and connection to all units in expatriate section. Phase II is in the design stage.
Water Tower	The need for a water tower is undecided.

146

TABLE XV-B (Continued)

Facility	Status
Gas Line	All present buildings are connected. Temporary main is installed and gas is available.
Electrical Distribution	The eleven (11) KV cable, main substation and two (2) 500 KVA transformers are installed. Temporary lines are laid to all existing units and permanent grid is under construction.

2. Project Roads and Railroads

A nonsurfaced road of good quality has been completed from the Ashuganj Railroad Station to the jobsite and continuing on to the housing estate. A railroad spur is constructed along side the roadway to a point near the northeast corner of the jobsite. Extension of the spur inside the perimeter wall is being deferred at FWL request because of interference with civil works.

3. Site Preparation

The dynamic compaction of the jobsite which consisted of tamping was completed 3 March 1978, and the ironing passes and site surface grading were completed 16 March 1978, all by Menard. Following a review by AFCC and FWL of Dames & Moore report, Menard was allowed to dismantle their equipment and ship it out in early April, 1978.

B. CONSTRUCTION PLANS

1. Housing Estate

Plans are completed for construction of all remaining housing units, which completion dates according to Table XV-A. Design is completed on all support facilities for the housing estate with the exception of the school, the bank, the water tower, and Phase II of water supply. The need for the bank and water tower has not been agreed upon; the preliminary design of the school has been submitted but not approved. Modifications to the preliminary design were commenced in April, 1978. Classes are currently being held in temporary facilities in the housing estate.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. CONSTRUCTION PLANT (Continued)

1. Housing Estate (Continued)

Completion of the entire housing estate is scheduled for November, 1979.

2. Roads and Railroads

Plans were being discussed, but not finalized for paving the roadway to Ashuganj Railroad Station. In question were width and type of surface. Also under consideration, but not agreed upon, were discussions with the national railway authorities, plans for service to jobsite from neighboring communities for the transportation of labor. Assurances were given that these discussions will be pursued and a satisfactory solution sought.

148

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION XVI

FWL CONSTRUCTION - CURRENT STATUS AND PLAN

A. CONSTRUCTION PROGRESS

1. Ammonia Plant

A local subcontract has been awarded for piling of the compressor foundations. Plans were to have test piles installed, but not tested, in May, 1978.

2. Urea Plant

Korea Development Corporation has mobilized on site, sunk a test well, installed piezometers, and installed piping to carry water offsite, all in preparation for tests to establish dewatering system prior to installation of compensatory foundations.

3. Offsites Facilities

Excavation is under way by local subcontractors to install foundations for mechanical workshop, spares store, repair shop, chemical store and bulk Urea storage buildings. Fabrication of rebar for these facilities is also in progress. The construction of the perimeter wall is progressing, using both local subcontract and direct hire labor. Commissioning of crusher and batch plant was nearing completion. The crusher will provide base material for plant roadways, as well as concrete aggregate.

B. CONSTRUCTION RESOURCE PLANNING

1. Local Labor

All construction activity at present is civil, and local labor is predominately unskilled. The supply appears to be adequate and productivity good. A few, twenty (20) or twenty five (25), craft mechanics from the training school were on site. They were having some problems adapting to field versus school shop conditions. These people can be utilized in the welding of roof trusses for buildings, cable and electrical tray, etc., thereby making job progress and increasing their manual skills at the same time.

149

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. CONSTRUCTION RESOURCE PLANNING

2. Local Supervision

There is an apparent shortage of local supervisory personnel for direct hire. By utilizing the maximum output of the training center as early as possible, the plan is to develop the best of these men for promotion to supervisor by the time the manpower requirements for the skilled crafts develop.

3. Expatriate Supervision

As of 28 April 1978, the Foster-Wheeler field staff at Ashuganj and Dacca consisted of:

Resident Manager
Field Superintendent Mechanical
Field Superintendent Civil
Mechanical Superintendent
Civil Superintendent
Piping Superintendent
Civil Engineer
Construction Engineer
Stores Officer
Electrical Supervisor
Batch Plant Operator
Doctor
Project Accountant
Administrative Manager
Senior Subcontract Engineer
Office Engineer
Field Purchasing Officer

The following additional expatriate supervision have been scheduled:

Civil Engineer	late April
Safety Officer	ASAP
Shipping Coordinator (Kuhlna)	late April
Subcontract Engineer	late April
Planning Engineer	ASAP
Material Controller	ASAP
Senior Planning Engineer	ASAP
Senior Cost Engineer	ASAP
Welfare Officer	mid-May
Administrative Accountant	late April

150

B. CONSTRUCTION RESOURCE PLANNING (Continued)

3. Expatriate Supervision

The Senior Planning Engineer was originally scheduled on the jobsite the first of February and their Senior Cost Engineer the first of March. FWL Reading was actively recruiting these positions, but they were as yet unmanned. It was agreed to send a man from the home office to temporarily fill the Planning function for four (4) months and continue the search for a qualified man.

4. Construction Equipment and Tools

The status of Ex Vinnell spares as of 20 April 1978, is as follows in Table XVI-A.

TABLE XVI-A

STATUS OF EX VINNELL SPARES

Description	Total	Operating	Awaiting Spares	
			Minor	Major
Manitowoc Cranes	3 (2-100T) (1- 65T)	3		
Lorrain Cranes	2 - 18T	2		
Payloader	3	2	1	
D-7 Bulldozer	2			2
D-6 Bulldozer	1		1	
Pick-up Trucks	8			8
Ford Bronco	1	1		
Maintenance Truck	1	1		
Flatbed Trucks	2			2
Fuel Truck	1	1		
Water Truck	2			2

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE XVI-A (Continued)

Description	Total	Operating	Awaiting Spares	
			Minor	Major
Dump Truck	10	1		9
Prime Mover	2	2		
High Bed Trailers	2	2		
40-Ton Lowboy	1	1		
Tractor w/backhoe	1	1		
Tractor bare	1		1	
Motor Graders	2	2		
Concrete Mixers	1	1		
900 cfm Compressor	1	1		
250 cfm Compressor	2	2		
Compacting Roller	1	1		
Sheepsfoot Roller	2	2		
Vibratory Roller	2	2		
Water Pump - 10"	1	1		
- 6"	5	2		3
- 4"	3			3
- 1-½"	1	1		
Generator - 100 KW	2	2		
- 50 KW	1			1
- 10 KW	5	3	2	

152

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TABLE XVI-A (Continued)

Description	Total	Operating	Awaiting Spares	
			Minor	Major
Diesel Weld Machines	8	5		3
Electric Weld Machines	6	5	1	
Tugboat	3	3		
Crane Barge	1	1		
Anchor Barge	1	1		
Dumb Barge	4	4		
Speed Boat	1	1		
Pontoon Boat	1	1		
LCM	1	1		
Outboard Motors	3	3		
Lubrication Units	3	3		
Electric Concrete Vibrators	1	1		
Mini Bus	2	2		
Jeep	1		1	
Battery Charges	1	1		
Lathe	1	1		
Power Hacksaw	1	1		
Valve Grinding Machines	1	1		
Bench Drill Press	1	1		
Spring Tester	1	1		
Clam & Drag Buckets		Sufficient for Job		

B. CONSTRUCTION RESOURCE PLANNING (Continued)

4. Construction Equipment and Tools (Continued)

New purchase capital equipment status is discouraging. The earliest equipment scheduled for job is craneage; 2-18/20T hydraulic and 150T crawler shipped 25 March 1978. Three 18/20T hydraulic, 1-35T crawler and 1-50T crawler to ship 1 May 1978. Two 35T crawlers will ship 15 May 1978, and contractual promises for 1-50T crawler and 3-25T hydraulics are early 1978.

More critical concrete handling equipment and site transportation equipment are either being re-inquired for bid summaries or are in preparation. The exception is the batch plant and crusher which are on site. The bulk of the small tools have contractual shipping promises of 3 April and 4 August, 1978.

5. Material Receiving and Storage

A temporary warehouse 180 ft. X 60 ft. is completed and being used for storage. The facility is well managed, neat and orderly. a materials man, officed in the southwest corner of this building, has and maintains necessary purchasing and receiving documentation. The operation appears to be very efficient.

A temporary workshop, also 180 ft. X 60 ft., is completed and presently being used for storage of bagged cement. A sufficient supply of cement is on hand to allow the use of alternate sources, without delay, in case of failure of local supply to meet demand.

An area of land outside the southeast corner of the boundary wall is being reclaimed with material excavated from foundations. This area will be useful for storage of bulk items too large to be stolen.

Because of the relatively small amount of storage space for a job of this magnitude, the construction plan is for delivery of major equipment and construction materials only as it is needed, and erecting it immediately upon delivery. This operation must be monitored and coordinated most carefully, because the potential delays are numerous.

154

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. CONSTRUCTION RESOURCE PLANNING (Continued)

6. Housing

a. Local

Plans were being finalized in late April for the conversion of a group of jute godowns into a labor camp. Provisions for security, catering, housing and sanitary facilities for one thousand two hundred (1,200) local employees are planned in this unit. It is felt that an additional four hundred (400) billets can be located in the area. This will satisfy the near term requirements of the job, but further planning for local housing, transportation from nearby labor markets and the total logistics plan must be developed to meet the ultimate requirements for providing an adequate labor pool for the project.

b. Expatriate

There are seventy six (76) family units allocated to FWL in the Housing Estate: 4-B2, 16-B1 and 56-C. An additional twenty (20) bedrooms of bachelor section will be available 1 May 1978. Assuming the seventy six (76) family units are allocated to seventy-six (76) single status and thirty eight (38) family status and adding twenty (20) bachelor bedrooms, there are accommodations for one hundred and thirty four (134) expatriate personnel. Referring to FWL Histogram of International Sub-Contractors Expatriates, dated 15 February 1978, and Estimated Foster Wheeler and Udhe Expatriate Histogram of 22 February 1978, it is seen that expatriate personnel peak in June, 1979, at two hundred and eleven (211). This would indicate plans must be made for housing an additional seventy five (75) to one hundred (100) expatriates.

7. Transportation

A general statement regarding transportation is that no expedient mode of transportation exists to or from Ashuganj. In the event of medical emergency, this could be a matter of concern and the source of a great deal of unfavorable publicity. A transportation map is included in this section which distinguishes the water, rail, present roadways and future roadways.

The transportation network consists of three (3) elements:

155

B. CONSTRUCTION RESOURCE PLANNING (Continued)

7. Transportation (Continued)

a. Rail

An antiquated rail system, which is in a poor state of repair, serves Ashuganj. The service is slow; the rolling stock is generally unacceptable to western standards, except when a special coach is available. Up until now, the special coaches have not been available on a regularly scheduled and dependable basis.

b. Road

At this time, there is no road to Ashuganj. Following the present monsoon season, it is planned to build a section of roadway to Brahmanbaria, where it will tie in to the existing road network. If current plans are carried out, completion of this section would be in the first or second quarter of 1979. When this link is completed, it ties into a very limited and circuitous network, at best. There would be a tie to Chittagong and another to Dacca via three (3) ferry crossings.

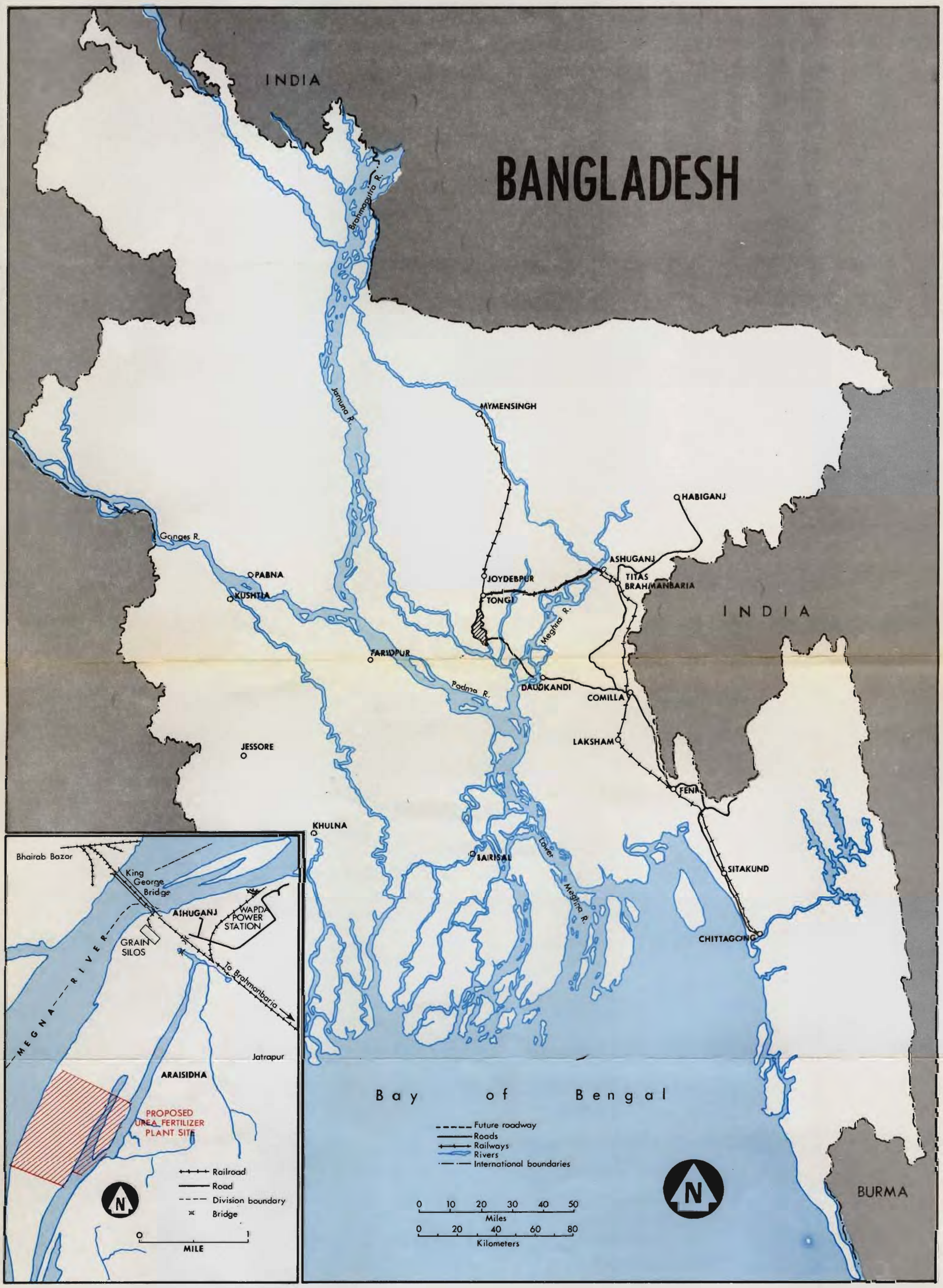
c. River

The primary transportation, in terms of construction material and equipment, is by river from the inland port of Khulna. This concept is acceptable, and no plans exist to change it. Foster Wheeler has a speedboat at the site for somewhat more rapid transit to Dacca than the railroad, but it is only usable during the dry season because of frequent high winds and squalls during the monsoon.

8. Communications

As of 24 April 1978 the only communication between Ashuganj and Dacca was by radio, which proved reasonably dependable. Telephone and telex communication should be established as soon as possible. With this meager communication setup coupled with the transportation network as previously described, the Ashuganj site is isolated, in terms of a project of this magnitude.

156


INDIA
BANGLADESH
Brahmaputra R.
Jamuna R.
MYMENSINGH
HABIGANJ
Ganges R.
ASHUGANJ
PABNA
JOYDEBPUR
TITAS
BRAHMANBARIA
KUSHTIA
TONGI
Meghna R.
INDIA
FARIDPUR
Padma R.
DAUDKANDI
COMILLA
JESSORE
LAKSHAM
FENI
KHULNA
SAIRISAL
Lower Meghna R.
SITAKUND
CHITTAGONG
Bay of Bengal
BURMA
Future roadway
Roads
Railways
Rivers
International boundaries
0 10 20 30 40 50
Miles
0 20 40 60 80
Kilometers
N
Bhairab Bazor
King George Bridge
AIHUGANJ
WAPDA POWER STATION
GRAIN SILOS
MEGNA RIVER
To Brahmanbaria
Jatrapur
ARAISIDHA
PROPOSED UREA FERTILIZER PLANT SITE
Railroad
Road
Division boundary
Bridge
0 1
MILE

157

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION XVII

CONSTRUCTION TRAINING PROGRAM - CURRENT STATUS AND PLAN

Foster Wheeler, Ltd. has established a program for training local unskilled labor in the mechanical crafts to supplement the skilled national and expatriate mechanics. The facilities are located in Dacca, where the German Bangladesh Technical Training Centre has been made available by the Government of Bangladesh.

The facility is staffed with a combination of local and expatriate instructors and a local administrative staff. Training courses have been developed by the expatriate staff and the local staff has been trained to execute the various programs.

The development of the programs appears to have been handled in a completely professional manner, and the training sessions are efficient and effective.

A preliminary group of thirty seven (37) trainees were given eighteen (18) weeks training in various crafts and were sent to the jobsite on 10 April 1978, at which time the first regularly scheduled classes began. These first trainees on the site are fabricating structural steelwork. There was some problem with these men adapting to field (versus shop) conditions. The training staff is modifying some elements of the program to more adequately adapt future trainees to field conditions.

Comprehensive written and manual testing procedures are built into the programs, and remedial training is available to ensure a high rate of completion by trainees and still maintain the outlined standards of mechanical skills.

As of 10 April 1978 the starting date for regular training, tools and materials were on hand in sufficient quantities to assure six months operation. Additional supplies are on order to continue operations after the first six (6) months and should not be a problem.

Figures XVII-1 through 5 show the potential output of five (5) specific programs and the forecasted manpower requirements for the specific crafts. From these, the indications are favorable for pipefitters and marginal to poor on riggers, millwrights, welders and boilermakers. However, it has always been apparent that the project could not be completely staffed by craftsmen having only twelve (12) weeks training. Therefore, the trainees need to be utilized to meet specific needs in supplementing the indigenous labor force and expatriate craftsmen.

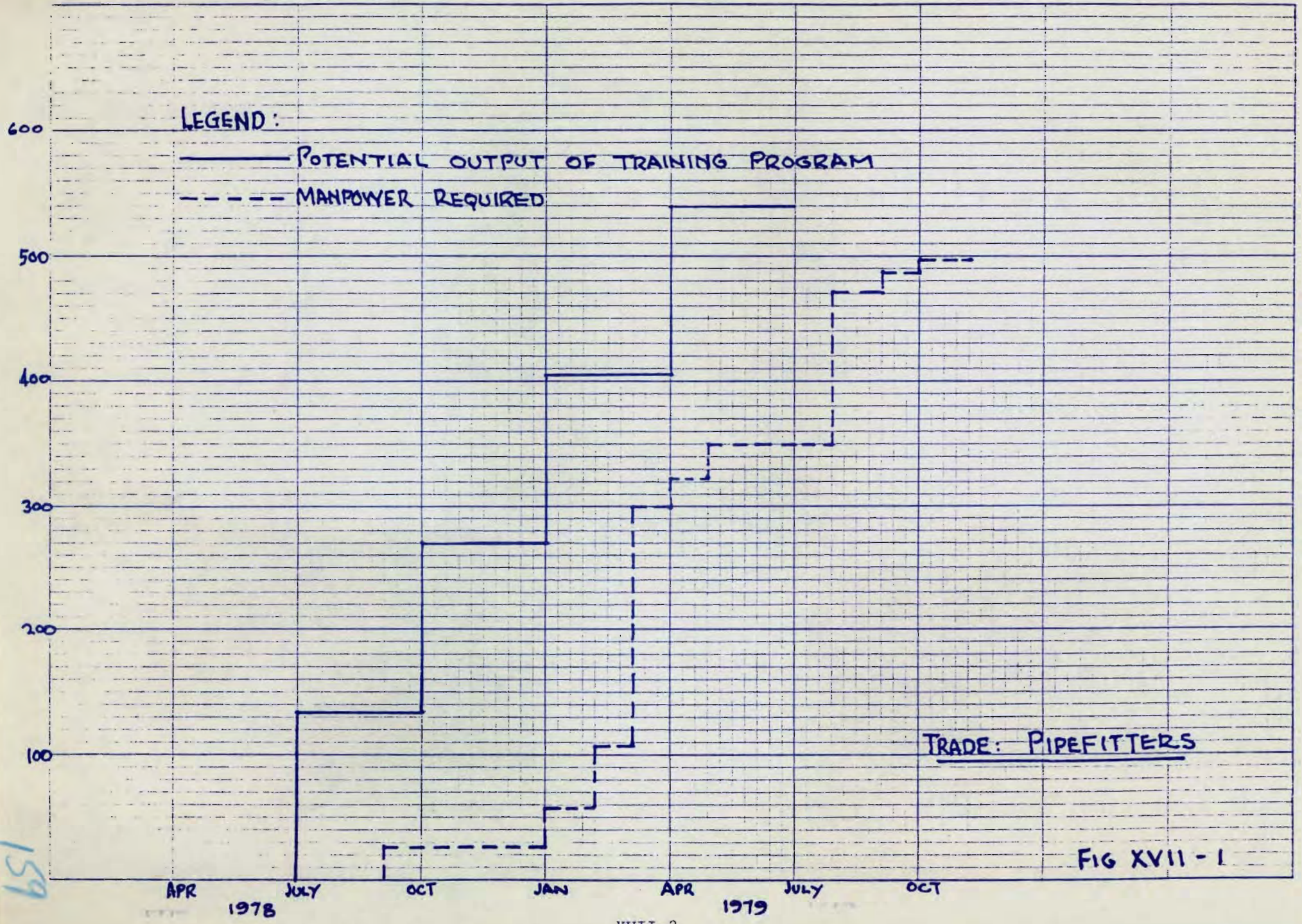

LEGEND:
POTENTIAL OUTPUT OF TRAINING PROGRAM
MANPOWER REQUIRED
600
500
400
300
200
100
TRADE: PIPEFITTERS
APR
JULY
OCT
JAN
APR
JULY
OCT
1978
1979

FIG XVII - 1

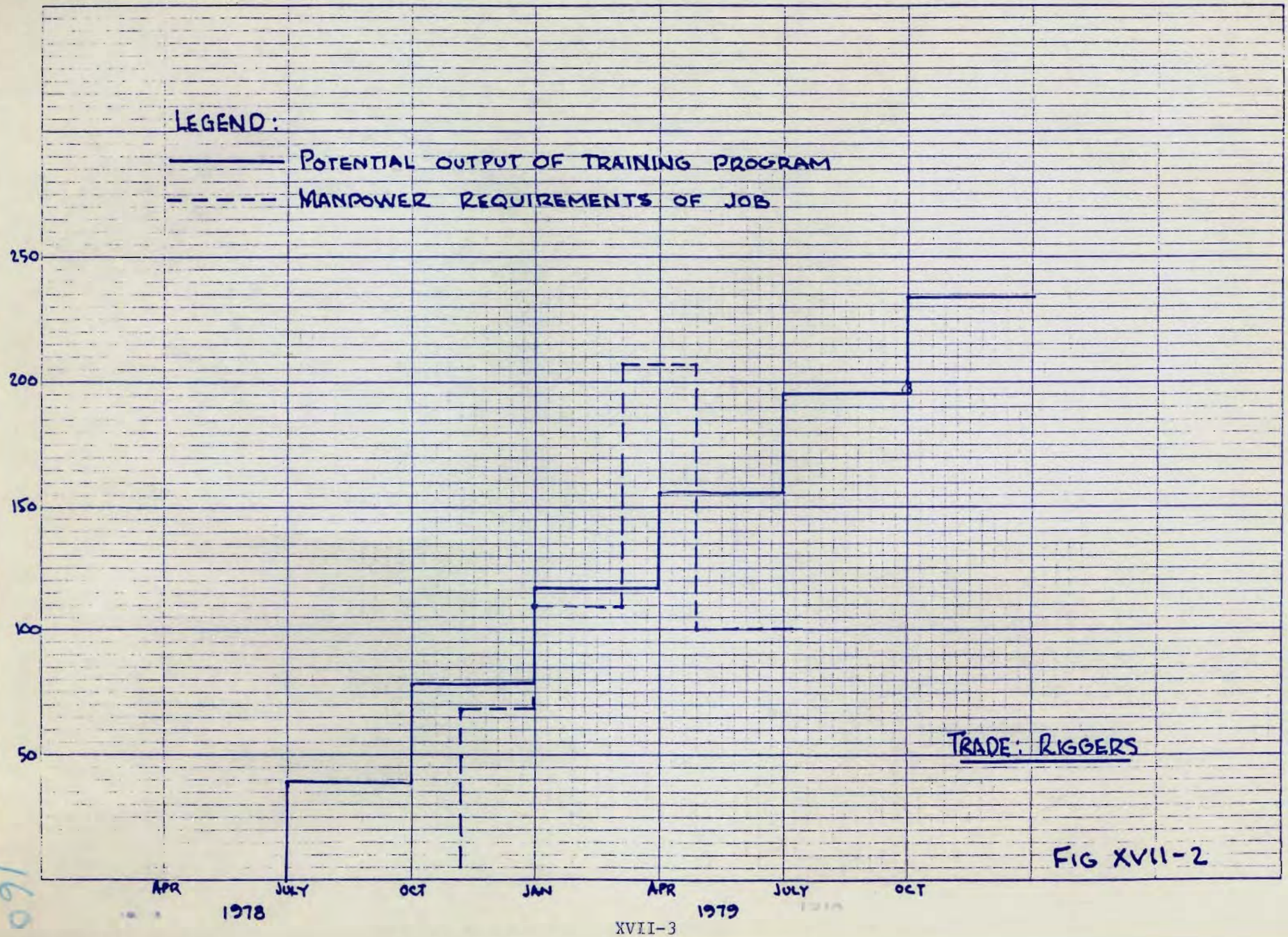

LEGEND:
POTENTIAL OUTPUT OF TRAINING PROGRAM
MANPOWER REQUIREMENTS OF JOB
250
200
150
100
50
APR
JULY
OCT
JAN
APR
JULY
OCT
1978
1979
TRADE: RIGGERS

FIG XVII-2

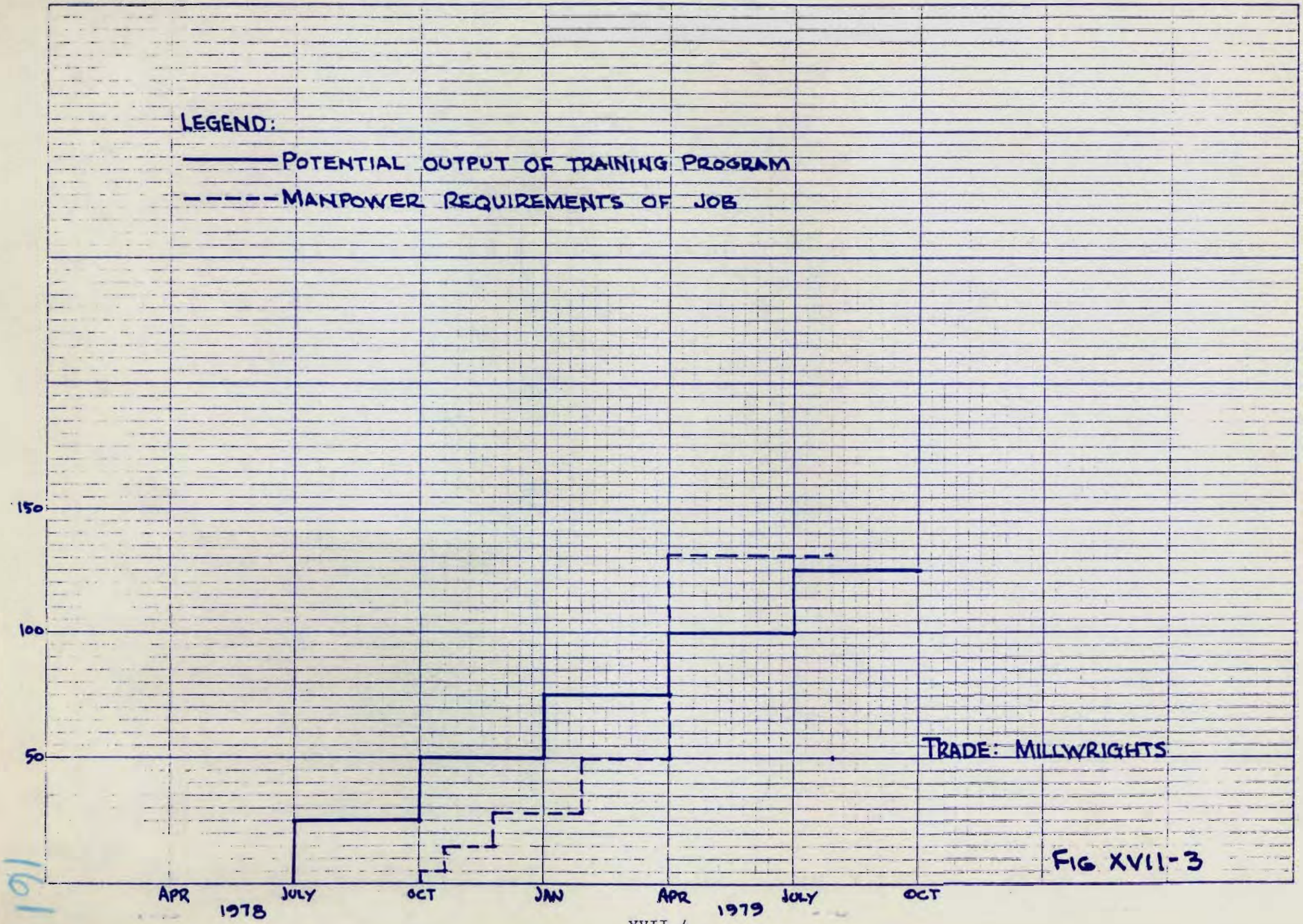

LEGEND:
POTENTIAL OUTPUT OF TRAINING PROGRAM
MANPOWER REQUIREMENTS OF JOB
150
100
50
APR
1978
JULY
OCT
JAN
APR
1979
JULY
OCT
TRADE: MILLWRIGHTS

FIG XVII-3

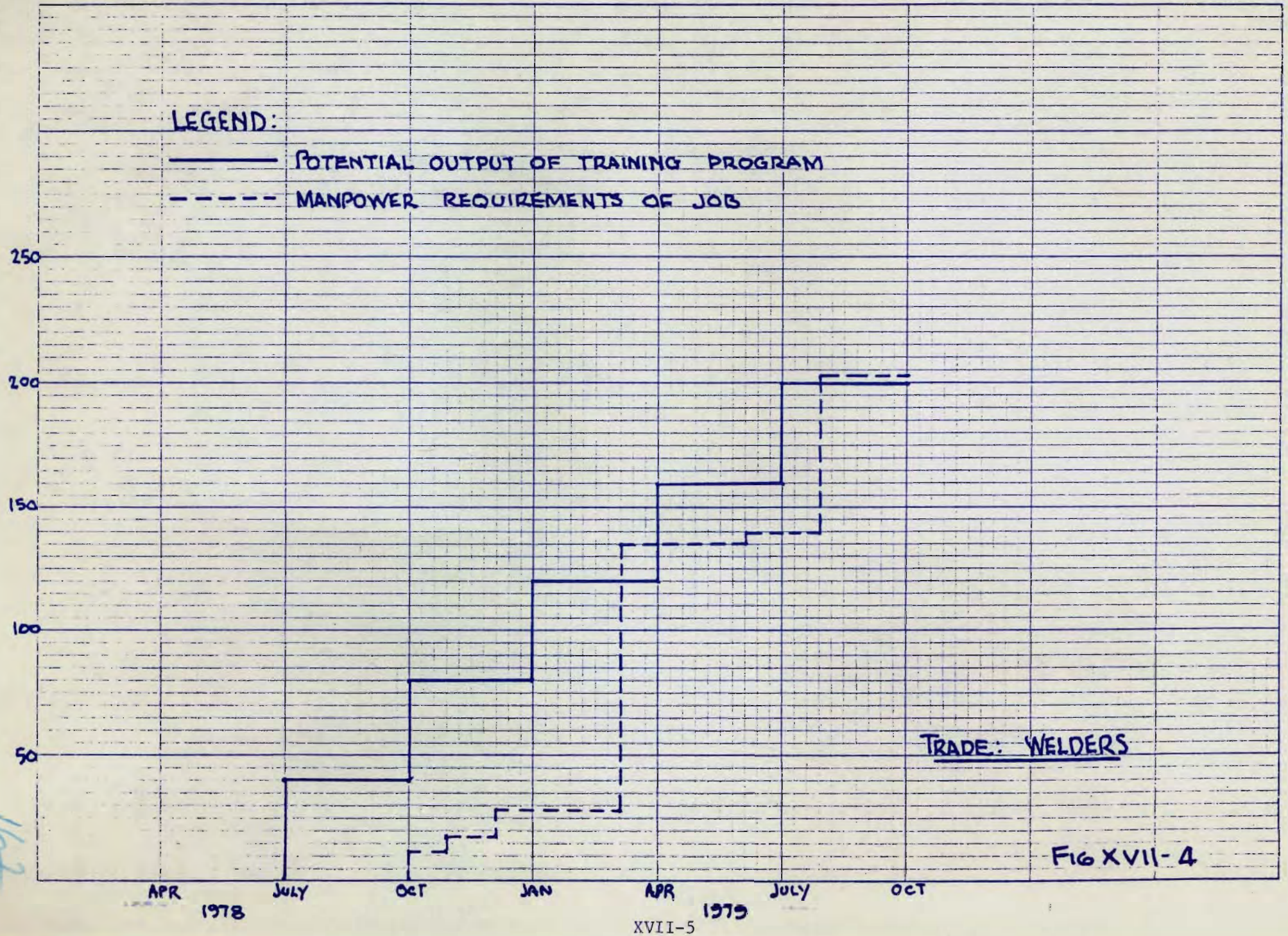

LEGEND:
POTENTIAL OUTPUT OF TRAINING PROGRAM
MANPOWER REQUIREMENTS OF JOB
250
200
150
100
50
TRADE: WELDERS
APR
JULY
OCT
JAN
APR
JULY
OCT
1978
1979

FIG XVII-4

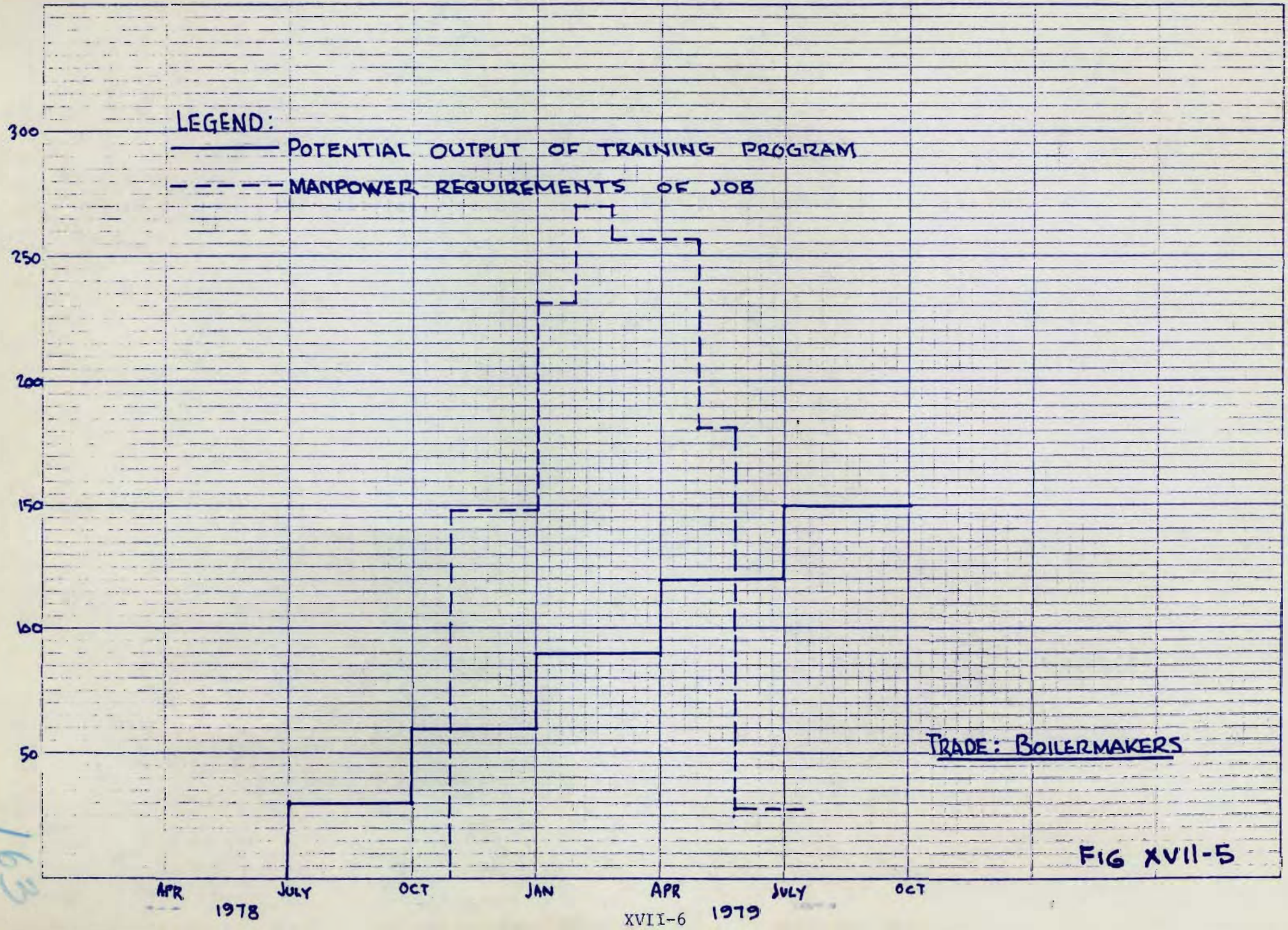

LEGEND:
POTENTIAL OUTPUT OF TRAINING PROGRAM
MANPOWER REQUIREMENTS OF JOB
300
250
200
150
100
50
APR
JULY
OCT
JAN
APR
JULY
OCT
1978
1979
TRADE: BOILERMAKERS

FIG XVII-5

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION XVIII

MANAGEMENT ASSISTANCE FIRM - CURRENT STATUS AND PLAN

The parenthetical number following each respective paragraph description refers to the AFCC-VNP contractual Agreement[97] Article II "Specific Statement of Work" under implementation phase or operational phase. The current status of each respective activity is reported along with plans for completion if they were available.

A. FINANCIAL AND ACCOUNTING (1)

AFCC has assumed all responsibility on or before the middle of 1977 for the MAF Financial and Accounting work scope responsibilities which are included in the Valley Nitrogen Contract[97] except for spare parts recommendations. Therefore, refer to Section XIX of this report for the status of financial and accounting systems.

1. Establish Inventory Control System for Spare Parts, Stores and Supplies (17)

FWL has the responsibility for initiating the spare parts control log documentation from vendor furnished spare part lists, description, part numbers and prices. The spare parts format is submitted to AFCC, with the direct responsibility for assigning AFCC quantities resides with the MAF shop superintendent. As of 10 May 1978, FWL has submitted to AFCC twenty six (26) recommendation lists for spare parts (approximately 350-400 total anticipated).

The MAF has developed a draft inventory control system for spare parts which requires printing of the final formats. At present there is no spare parts coding system developed which would allow expeditious retrieval of any and all spare parts when needed. An inventory control system, (Kardex cards acceptable) need be established to show withdrawal of parts, quantity on hand, and minimum reorder level.

Furthermore, the spare parts system should eventually be coordinated with the Ghorasal plant.

The current spare parts budget has been established at US $10 million equivalent. There was no direct evidence produced that showed on one document the details of the current spares purchased with the initial

A. FINANCIAL AND ACCOUNTING (1) (Continued)

1. Establish Inventory Control System for Spare Parts, Stores and Supplies (17) (Continued)

purchase orders amounting to approximately US $1.9 million, primarily for the compressor and turbine rotors. A continuous log entry of all spare parts purchases must be made, in order to manage the spare parts budget. When fifty percent (50%) of major equipment, instrumentation and electrical specified items are evaluated for spare parts, a reasonable recast can be made to extrapolate the expected cost at completion. The spares cost budget may be managed by restricting the quantity of spares orders.

FWL has purposely over-ordered the piping, instrumentation and electrical bulk materials to allow development of a bulk material spares in stock. There is adequate time to place the spare parts in good order before commencement of operations.

B. AFCC-MAF PREOPERATIONAL PLANNING

1. Establish a Technical Department (9)

Currently the Technical Department consists of one (1) MAF employee two (2) AFCC employees following a peak period when the project design was performed by FWL at Reading and Uhde at Dortmund with the TA.

A formal work plan of the Technical Department organization (for budget purposes) and departmental procedures have not been started by the MAF. Informal plans exist.

A critical observation of all MAF activities to date shows a decided lack of reducing planning and procedures to writing. There seems to be lack of understanding that a new organization such as AFCC needs such materials from a training standpoint, so that they may know what is expected of them in their jobs. Initial procedures are the fostering documents for the development of improved procedures.

2. Establish System to Record all Purchases and Contracts (2)

AFCC maintains a complete central procurement and contract file for those orders placed by AFCC directly for local and foreign currency and for all FWL purchase orders and subcontracts. These files are

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. AFCC-MAF PREOPERATIONAL PLANNING

2. Establish System to Record all Purchases and Contracts (2) (Continued)

maintained by AFCC Commercial Department. Duplicate files are maintained by the AFCC representative located in FWL offices in Reading as well as in MAF offices. A sampling check of a few orders shows that they are complete with all pre-award and post-award documents including payment records. (Open orders should be segregated from closed orders.)

3. Establish Systems for Maintaining all Project Technical Data (14)

A formal procedure does not exist. The AFCC-MAF filing system is based on the FWL coordination procedure outline which is adequate for retrieval.

4. Develop Manpower Requirements (25)

a. Operations
b. Maintenance
c. Administration

Very little preliminary activity or documentation was available prepared specifically by MAF. The AFCC Organization Charts that do exist were prepared by an outside consultant to AFCC.

5. Develop and Implement Personnel Policy Manuals (23)

These have been prepared by AFCC without the assistance of the MAF.

6. Prepare Job Descriptions Defining Authorities and Responsibilites (25)

The non-uniform format of the MAF partial drafts of job descriptions that were available for review are not currently applicable to the AFCC approved organization chart. The MAF is now concentrating on developing job descriptions for the Operating Department staff. The ultimate responsibility for approval of job descriptions is the AFCC Department Managers and Supervisors under the coordination of AFCC Personnel Department. The MAF can only provide the responsibility language for the job descriptions.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. AFCC-MAF PREOPERATIONAL PLANNING (Continued)

7. Develop Operational Quality Control and Testing Procedures (2)

The MAF has developed computer programs for programmable hand calculator application of operational efficiencies.

Formalized quality control and testing procedures, discussed in the operational phase, have not commenced.

8. Develop Production Control Procedures Including Management of Utility Systems and Raw Materials (4)

The MAF, nor AFCC, have commenced these procedures, nor does an outline work plan exist.

9. Develop Maintenance Procedures (3)

Same comment as B.8.

10. Develop and Establish Company Standards for: (8)

a. Safety
b. Environment
c. Engineering

Same comment as B.8.

11. Develop a Plant Security System (5)

The MAF has not prepared an outline, nor draft for a plant security system. The AFCC plant security system designated by AFCC as "Secret" was reviewed by Williams Brothers and in its opinion, this one (1) page document is not adequate to be informative to AFCC staff in the security of the plant assets or safety of operations personnel.

12. Develop Operations, Maintenance and Start-up Training Programs in Coordination with General Contractor, TA and Equipment Vendors (12) (22)

The operations, maintenance and start-up training programs for this project were developed by FWL.[42]

The MAF has provided considerable administrative activity to coordinate the designated AFCC personnel in the participation of the training program which involved travel outside of Bangladesh as well as in-plant training to Bangladesh plants of Bangladesh Fertilizer Chemical and Pharmaceutical Corporation (BFCPC).[100,101]

B. AFCC-MAF PREOPERATIONAL PLANNING (Continued)

12. Develop Operations, Maintenance and Start-up Training Programs in Coordination with General Contractor, TA and Equipment Vendors (12) (22) (Continued)

a. Operations Training

A formalized training program[100] is planned to be ready by 1 October 1978 under the direction of FWL training personnel and technical personnel from AFCC and VNP. At present there are forty-two (42) production personnel on the payroll of AFCC undergoing in-plant training with the following titles: Assistant Production Manager, Board Controller, Chemical Engineer, Assistant Chemical Engineer and Operator. Before commencement of the formal training program, nine (9) additional Assistant Production Managers and five (5) Board Controllers will have to be employed.

Forty (40) of the trained personnel now on AFCC staff are on shift training at the Ghorasal plant.

b. Maintenance Training

Presently fifty (50) maintenance trainees are undergoing both local and overseas training. There will be an additional five (5) maintenance trainees recruited. There is a budget restriction by AFCC and the lenders of US $1,000,000 equivalent presently imposed for foreign exchange costs on overseas training of maintenance personnel.

All maintenance trainees received a five (5) week skills appreciation course, conducted by FWL, which was completed on 29 October 1977. Forty (40) maintenance trainees are overseas and ten (10) are awaiting an overseas assignment. All overseas training is scheduled to complete on a staggered schedule from 1 September 1978 to the end of March 1979, whereupon the trainees will commence a formalized training program now being developed, including actual maintenance work in existing Bangladesh plants.

The overseas maintenance training locations have been held in Germany, Italy, UK, Holland, Japan, USA based on training negotiations conducted by FWL.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

C. GENERAL CONTRACTOR ACTIVITY

1. Develop Procedure for Approvals by General Contractor (10)

These approval procedures have been incorporated in the FWL project coordination procedure.

2. Review and Recommend Approval of all Contracts and Claims by TA, General Contractor and Other Contractors (4)

Currently any required reviews and approvals are processed by AFCC directly with the assistance of MAF only upon request. Prior to February 1978 the MAF performed these functions with recommendations made to AFCC.

3. Develop with TA a List of Contract Drawings and Specifications of a Critical Nature Requiring AFCC Approval (7)

Essentially all approvals of drawings and specifications were completed prior to December 1977, when the model reviews of the Ammonia plant in Glasgow and Urea plant in Dortmund were held. The more critical items which are evident at the moment are (a) the operating manuals and (b) the FWL spare parts recommendation lists and (c) review for completeness the mechanical catalogs when they are available within the next year.

4. Monitor and Direct the Work of TA, General Contractor and Site Preparation (9)

The site preparation work is complete. The TA, JCE/SD have only one (1) full time employee residing in Ashuganj with a planned contract expiration date of 31 December 1978. Currently AFCC is renegotiating the MAF contract to delete from the scope of work the "Monitor and Direction" of the General Contractor except for review of the operating manuals.

5. Monitor Construction of Project (15)

The MAF has been formally relieved of the responsibility since February 1978.

6. Maintain a Schedule for Completion of Project With General Contractor (19)

Same comment as C.5.

169

WILLIAMS BROTHERS PROCESS SERVICES, INC.

C. GENERAL CONTRACTOR ACTIVITY (Continued)

7. Provide Mechanical Acceptance Procedures With General Contractor (16)

Same comment as C.5.

8. Review and Approve All Operations and Maintenance Manuals (13)

The MAF is ten percent (10%) complete, as of 1 May 1978, in the review of the draft Ammonia Plant Operating Manual submitted to AFCC on 26 May 1977.[7] FWL has not submitted the Urea and Offsites Operating Manuals for approval.

The mechanical catalogs are not due from FWL until six (6) months prior to plant commissioning.

9. Establish Testing and Commissioning Procedure with TA and General Contractor, Supervise Mechanical and Performance Tests (16)

The MAF has scheduled these procedures concurrently with the approval of the operating manuals.

The performance tests should be supervised by AFCC with the assistance of the MAF. The mechanical acceptance tests should be supervised by AFCC with the assistance of the implementation contractor, provided the MAF work scope is renegotiated to delete the monitoring of the construction phase of the project.

D. COORDINATION WITH GOVERNMENT AND LENDERS

1. Liaison with All Government Authorities for Efficient Execution of Project (6)

On some occasions the MAF has interfaced with Government, however, the majority of Government liaison is performed by AFCC.

2. Prepare All Submissions Required by Lenders for Approval with the Assistance of TA and General Contractor (5)

Currently all this work is processed directly with lenders by AFCC with the assistance of the MAF and TA.

170

WILLIAMS BROTHERS PROCESS SERVICES, INC.

D. COORDINATION WITH GOVERNMENT AND LENDERS (Continued)

3. Submit to Lenders and Government All Monthly Progress Reports (5)

The major share of the preparation of the monthly progress report is prepared by the MAF.

E. ESTIMATE OF COST TO COMPLETE

Assuming a project commencement of operations date of 30 September 1980, VNP prepared an estimate to complete their contractual scope of work to 30 September 1983.

VNP ESTIMATED COSTS TO COMPLETION

Committed through 31 March 1978		2,295,700
Estimated - April '78 thru 30 Sept. '80		5,820,600
Subtotal		8,116,300
Estimated - 1 October '80 thru 30 Sept. '83		7,316,200
Total	$ US	15,432,500

The AFCC April 1978 estimate has provided a total of US $11.216 million for the total MAF budget. Part of the variance may be attributed to a negotiated reduced scope of work and the elimination of assumed production bonus payable to the MAF if annual capacity exceeds eighty percent (80%) in each of the first three (3) years after operation commences.

171

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION XIX

AFCC ORGANIZATION

The business of AFCC has been the business of establishing a US $400 million asset based company, with management systems that will allow the managers of that organization to produce efficiently the one (1) end product, Urea fertilizer, with the available resources namely human, natural gas and an abundance of water for cooling and transportation.

A. ORGANIZATION

The General Manager of AFCC with a staff of seven hundred and seventy four (774) reports to the Managing Director. The positions reporting to the General Manager with their respective staff complement (number noted in parenthesis) are as follows:

Deputy General Manager Plant	(452)
Administrative Manager	(183)
Deputy General Manager Finance	(95)
Deputy Technical Manager	(31)
Audit Manager	(12)
Deputy Training Manager	(8)

The above positions and all subordinate positions reporting to them are shown on the current AFCC organization charts.[92] A local consulting firm[77] conducted a study for AFCC which provided the basis for the evolution of the current AFCC organization chart. Williams Brothers anticipates there will be further refinement to the organization chart stemming from institutional guidance, availability of experienced human resources and finally, the practical business of developing an efficient business.

There was no evidence to show that documented position descriptions exist or that documented departmental operating procedures are in much more than an informal discussion stage, with the exception of draft procurement and personnel procedures.

All the present AFCC organization, with the exception of the Plant Production Department that is training production and maintenance staff, is heavily involved in the details of the day-to-day business of construction of the plant. More of these available human resources should be directed to establish the business documentation for all departments.

172

WILLIAMS BROTHERS PROCESS SERVICES, INC.

B. FINANCE AND ACCOUNTING

1. The Incumbent Deputy General Manager-Finance provided Williams Brothers with a letter[68] and enclosures numbering twenty eight (28) which also stressed the need for AFCC to retain an outside consultant to establish the Financial Management Systems necessary to control and operate the business.

The outside consultant should preferably be one that serves the fertilizer industry or an organization similar to the USA Big-8 accounting firms that have experience serving the fertilizer industry with management systems installation capability and preferably familiar with the regulations of Bangladesh.

2. Chart of Accounts

The proposed general ledger code of accounts[68] have been reviewed by Williams Brothers. These should be approved, adopted and put into practice with the preparation of monthly balance sheets and monthly income statement even during the present negative income period.

Improvements to the chart of accounts over the next two (2) year period by placing them into practice will smooth out the transition into the operations phase.

3. Control Capital Budget Accounts

AFCC has not developed a company procedure or system for recording after the fact capital budget accounts for the purpose of establishing the fixed asset accounts and depreciation schedules. The above systems are understood to be different from the systems and procedures necessary to control the capital costs before the fact.

4. Operating Budgets

Departmental operational budgets at present do not exist. Now that organizational charts exist, the budgets section in cooperation with Departmental Managers should formalize the operating budgets for the next three (3) to five (5) operating years in addition to the present implementation phase of two (2) years (1979 and 1980). Pro forma operating budgets are used to enhance the decision making process of implementing organization changes. The pro forma operating budget

113

B. FINANCE AND ACCOUNTING (Continued)

4. Operating Budgets (Continued)

should be expanded along the categorical line items of the code of accounts based on the "Detailed Production Costs" attached to AFCC letter dated 11 May 1978.[66] The experience of preparing pro forma operational budgets will provide the cooperative spirit required between the budgets section and the Departmental General Managers who have the direct line authority for controlling operating costs. The Departmental Managers need to think in terms of cost as well as meeting the production quotas established by company operational orders.

5. Reports to Lenders

The IDA "Project Agreement" between IDA and AFCC [119] requires the following reports for the term of the project agreement:

a. Quarterly Balance Sheet
b. Quarterly AFCC Financial Officer statement that no condition of the project agreement is in default
c. Certified Fiscal Year Balance Sheet
d. Certified Fiscal Year Income Statement
e. Fiscal Year Certified Audit of Project Agreement
f. Annual Project Progress Report

A balance sheet, income statement and project agreement audit statement was submitted to IDA for the fiscal year 1977 by AFCC letter dated 24 January 1978[72], expressed in local currency (Taka) without the comparative data for the preceding fiscal year 1976.

6. Project Cash Flow Schedule

A project cash flow schedule maintained on a monthly basis does not exist for either local or foreign currency to project completion.

7. Commercial Department

A one hundred and thirty (130) page draft procurement procedure exists for AFCC to conduct all phases of procurement after the plant commercial operations begin.

174

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SECTION XX

ACKNOWLEDGMENTS

Williams Brothers management and staff assigned to this project wish to express their appreciation and gratitude for the interview time given by members of Ashuganj Fertilizer and Chemical Company Limited, Foster Wheeler Limited, Valley Nitrogen Producers, Inc., Scientific Design Company Limited, Dames & Moore and especially, officials of the Government of Bangladesh who showed a strong and sincere interest in seeing the project through to its completion.

Members and the officials of the International Development Association, US Agency for International Development, and Kreditanstalt für Wiederaufbau are to be given credit for arranging the many project briefing meetings and introductions to those organizations that have a direct interest in the successful completion of the project.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

EXHIBIT I

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TULSA, OKLAHOMA

SUMMARY REPORT

BANGLADESH VISIT

MARCH 1 THRU 4, 1978

URGENT ACTION RECOMMENDATIONS

The recommendations listed below are based on brief but detailed discussions and reviews with the key staff of the Government of Bangladesh, A.F.C.C., F.W.L, V.N.P., Scientific Design and the lenders.

The site is now available for immediate construction implementation. The entire program hereafter is now on the critical path. There is no allowance for any further delay in any activity to meet the June 1980 mechanical completion date.

The recommendations will require some procedural modifications but will incur minimal additional costs to the project since they are mainly related to management decisions and systems. If they, however, are not implemented promptly, we expect that a six month delay could be incurred, causing an additional cost of $20 million plus the necessity for the Government of Bangladesh to import a further 250,000 tons of fertilizer.

The recommendations are as follows:

1. The training program including the supply of training material and instructors must be immediately accelerated. Conditions, wage scales and other incentives must be established to ensure that trained construction personnel remain to completion of the Ashuganj project.

2. The accommodations for local artisan labor, local engineers and expatriates must be significantly improved if the necessary skills are to be attracted to, and retained at the site. Accommodations and facilities at present are either sub-standard or insufficient for the expatriates and non-existent in the case of the construction camp for local labor. The potable water supply requires immediate improvement.

3. F.W.L. must be given freedom to determine the quality, quantity and timely arrival and departure of expatriate personnel required to implement the program.

4. F.W.L. must be given freedom from restraints on construction work hours, in order to meet both schedule and the technical requirements of the project.

5. Decisions on which phases of construction will be subcontracted to foreign contractors must be made immediately. In this respect, particular focus must be directed towards the schedule and quality of work required for complex construction. (See note a.)

6. Road access to the site is presently non-existent. Labor and, to a lesser extent, materials will have to reach the site from neighboring areas such as Brahambahira. Construction of the six miles of all weather road connecting the site with this area and the national highway network must be completed.

7. Suitable railroad transportation must be made available for local construction workers and expatriates.

8. Emergency procedures must be instituted immediately and be maintained for at least six months in order to accelerate the prompt foreign purchase of construction equipment, i.e., F.W.L. be given directions to purchase the required equipment using procedures and funds made available by A.I.D.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

9. Urgent local purchases must be accelerated and approval systems minimized, i.e., the requirements of competitive bidding must be eliminated and normal commercial practices instituted.

10. Financial management and control systems must be improved to correct serious problems existing with vendor letters of credit, vendor payments, allocation of funds, and accountability of money disbursed.

11. Relationships between F.W.L., V.N.P., the Technical Advisor and A.F.C.C. are proving to be a significant restraint on the progress of the project. Urgent measures are required to improve expatriate professional project management and construction services whereby they can function effectively with the confidence of both F.W.L. and A.F.C.C. so that the project can move promptly forward.

It should be recognized that further recommendations will be forthcoming as the Williams Brothers team proceeds to the United Kingdom during the week of March 6 to examine and investigate F.W.L. and other project activities. It is expected the Williams Brothers team will continue its mission in Bangladesh early in April.

Note a: It is understood that key decisions on construction subcontracting have been made subsequent to our discussions and findings in respect to subcontracting.

178

WILLIAMS BROTHERS PROCESS SERVICES, INC.

EXHIBIT II

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TULSA, OKLAHOMA

SUMMARY REPORT

FOSTER WHEELER LIMITED VISIT

MARCH 9 THRU 20, 1978

ACTION RECOMMENDATIONS LIST NUMBER 2

The action recommendations are based on an A.F.C.C. and F.W.L. agreed Mechanical Completion Date of 6th June 1980 and Completed Plant Acceptance Date of 30th September 1980. F.W.L. construction planning schedules show these dates may be met, provided there are no delays imposed by procedures, circumstantial or force majeure. The critical path for the project moves through the Urea Unit.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

ESTIMATE - CURRENT BUDGET

1. F.W.L. must recast the reimbursable cost estimate based on the current planned approach to construction, taking into consideration the planned subcontracts, application of local currency materials and subcontracts and the agreed upon completion dates.

The estimate must be recast to provide a manageable current budget for the Commitment/Cost Report, which includes the estimated cost to complete and the forecasted final cost at completion.

F.W.L. Comment: F.W.L. will provide a recast estimate for an increased fee within four weeks from authorization and direction to proceed.

2. F.W.L. must include in the recast estimate and cost report the following allowances for project materials, subcontracts and field construction costs, differentiating between foreign currency and local currency items:

a) Contingency

b) Escalation

c) Foreign Exchange Allowance.

A special report prepared by F.W.L. Project Cost Accounting shows there is an unfavourable foreign exchange equivalent of U.S.$7,256,970 against the Lenders Funds in the period from 27th September 1976 to 21st February 1978. F.W.L. has no control in the foreign exchange allowance unlike the allocation made for F.W.L. experience factors for contingency and escalation allocations.

The common monetary unit for the Estimate and Cost Report is the U.S. $. Approximately U.S. $100,000,000 in foreign currency has

180

been committed against the project for reimbursable costs and fixed fee based on 7th March 1978 F.W.L. "Loan Fund Progress Report". The unfavourable foreign exchange cost in excess of $7,000,000 is 7% of the current commitments. Based on this fact, this minimum overall percentage allowance should be applied to foreign currency items in the Estimate and Cost Report.

F.W.L. has sufficient information to report a reasonable foreign currency variance on the Commitment/Cost Report as a single line item.

3. F.W.L. shall provide A.F.C.C. with the planned change to the estimated 2,000 man months of expatriate construction supervision to reflect the planned extended work week, including the application of the known escalated monthly rates, for the purpose of a recast Project Control Estimate and Cost Reporting.

Alternatively, A.F.C.C. and F.W.L. should amend paragraph 2.4.2. to provide for Owner prior approval of Resident Manager, Field and Area Superintendents expatriate personnel only and not all field staff personnel.

4. A.F.C.C. should review the national skilled and unskilled labour rates including payroll burdens and overtime rates before 23rd April 1978 for the purpose of assisting F.W.L. to arrive at a realistic control estimate and forecast of costs at completion, before 1st May 1978.

5. A.F.C.C. should review their December 1978 "Revised Project Cost Estimate" item 16d for the application of U.S. $150,000 equivalent in local currency for All Risks Insurance. Should this not be foreign currency, for possibly a greater premium amount?

181

WILLIAMS BROTHERS PROCESS SERVICES, INC.

6. F.W.L. shall resolve the omission of reimbursable costs (foreign-local currency) for contract change orders 14 and 63 Plant Foundation Design and Second Turbo Generator, respectively.

Resolution is being sought for variation between current budget and reimbursable cost at completion.

F.W.L. Comment: The reimbursable costs attributable to change order 14 are included in the September 1977 F.W.L. estimate.

WBPS Comment: Part of the current forecast reimbursable cost overrun is attributable to change order 14.

182

WILLIAMS BROTHERS PROCESS SERVICES. INC.

COST REPORTING

7. F.W.L. must prepare a manageable Commitment/Cost Report for the total of all F.W.L. reimbursable costs including the forecasted cost at completion. This Report should include a breakdown of project materials, subcontracts and field costs, taking into consideration foreign and local currency.

The current four (4) page Summary Commitment/Cost Report No. 3 dated 31st January 1978 only shows the foreign currency permanent project materials, exclusive of commitments that have been made for field costs, construction equipment, local currency materials and reimbursable expatriate and national labour costs.

The F.W.L. Project Accounting Department "Loan Fund Progress Report" dated 7th March 1978, reports that over U.S. $80,000,000 equivalent funds have been committed whereas the Commitment/Cost Report dated 31st January 1978 shows U.S. $52,000,000 equivalent. The variance of U. S. $28,000,000 equivalent is primarily attributable to reimbursable field costs, local currency materials and construction equipment.

The Summary Commitment/Cost Report showing estimated final cost at completion along with the recast estimate must be completed by F.W.L. on or before 1st May 1978 for the Lenders consideration of supplementary financing.

8. F.W.L. Cost Reports should indicate thereon the change orders that have been incorporated in the current budget for reimbursable costs.

9. The F.W. L. Summary Commitment/Cost Report for the total reimbursable costs should be issued monthly to A.F.C.C. through project completion by inclusion in the Monthly Progress Report.

183

WILLIAMS BROTHERS PROCESS SERVICES, INC.

LENDERS FUND

10. The F.W.L. monthly "Foreign Exchange Report" included in the Monthly Progress Report, must be reformated to include commitments to date, disbursements to date and estimated disbursements for the next three months for each of the respective Lenders Funds. A consolidated report should show the U. S. Dollar equivalent of the various loans. "Disbursement to Date" should be defined as the date F.W.L. submits "Approved Invoices" for payment to A.F.C.C. and subsequently to the Lenders.

    This requirement shall not be interpreted to supplant F.W.L. detailed "Loan Fund Progress Report".

11. F.W.L., A.F.C.C. and Lenders, other than A.I.D., should review their payment procedures to shippers and forwarding agents to preclude delays in shipment or offloading at the Bangladesh port.

    F.W.L. Comment: Lenders and A.F.C.C. establish an imprest revolving fund for F.W.L. to pay shippers and forwarding agents promptly.

184

WILLIAMS BROTHERS PROCESS SERVICES, INC.

ENGINEERING

12. F.W.L. Engineering and Purchasing must maintain a current updated list of urgent purchase order and P.V.S. (purchase change order) actions required by A.F.C.C. that affect the completion of detailed engineering which requires vendor drawings and data.

185

WILLIAMS BROTHERS PROCESS SERVICES, INC.

PROCUREMENT

13. A.F.C.C. must maintain a representative in F.W.L. Reading Office, as required by the Contract, paragraph 4.2.3, who shall be authorised to approve bid summaries and purchase orders for award in excess of U.S. $5,000 equivalent until all major equipment and project materials have been placed on order. F.W.L. estimates the duration of this activity will continue until March 1979.

It is absolutely mandatory that approvals for purchase be authorised promptly, to preclude any project delays whatsoever.

14. A.F.C.C. and Lenders shall review their respective time required to approve invoices for payment to foreshorten the historical time for approval and payment to preclude material delivery delays.

Current outstanding F.W.L. reimbursable cost invoices approved and submitted for payment are U.S. $11,800,000 equivalent versus U.S. $5,500,000 equivalent reported paid by the Lenders to A.F.C.C. and F.W.L.

Vendors have begun to make claims for interest charges due to delayed payment of invoices.

F.W.L. Comment: The ADB and IDA "Dollar Limitation Clause" when applied to purchase orders awarded in other than U.S. $ may create delays in shipment, if vendors are not paid in the currency contracted for in the purchase order.

15. A.F.C.C. and Lenders should consider authorizing approval to purchase of bulk material items (i.e. non-engineered items) on the basis of the Inquiry Documents. This would expedite the award and prevent delays. This request is made for purchases greater than U.S. $200,000 and less than U.S. $200,000.

186

WILLIAMS BROTHERS PROCESS SERVICES, INC.

CONSTRUCTION

17. F.W.L. must arrange to have a second or more master mechanics on the site, along with trained national or expatriate mechanics to expedite the restoration of Vinnel Construction Equipment upon the arrival of the now ordered Vinnel repair parts.

18. F.W.L. must establish the priorities of required construction equipment necessary for the placement of concrete within the next sixty day period.

19. F.W.L. shall place an order for, and A.F.C.C. shall approve new orders for additional training materials and tools in anticipation of commencing a continuous and increased tempo of skilled construction labor training operations.

20. a. F.W.L. and A.F.C.C. must finalise the plans for the local labor construction camp in anticipation of continued additions to the required national labor staff.

    b. F.W.L. and A.F.C.C. must immediately resolve the potable water supply problem at the housing colony and construction site.

    c. A.F.C.C. must have forty (40) additional housing colony quarters available for F.W.L. construction supervision personnel, progressively, by year end 1978.

21. F.W.L. shall expedite and A.F.C.C. shall approve, without delay, the required duplicating equipment for construction drawings and specifications.

22. F.W.L. must review the critical path activities to be bar charted to set a maximum time duration of each activity not to exceed thirteen (13) weeks.

187

WILLIAMS BROTHERS PROCESS SERVICES, INC.

Activity 417(I) to 480(J) of 30 weeks for the Urea Unit foundation and activity 430(I) to 431(J) of 34 weeks for the Urea Structure, should be broken down into incremental manageable activities to detect any delays. The project critical path falls through this 64 week (15 month) period.

F.W.L. planned bar charting of each activity at the project site must apply a close monitoring system no less frequently than monthly.

23. F.W.L. must dispatch senior planning and cost engineers to the site immediately to prepare the detailed progress, manhour, cost reporting systems and bar chart planning.

Detailed construction planning has not been performed at the F.W.L. Reading Office. Adequate lead time is mandatory to establish the criteria for early warning detection and applied management corrective action.

184

WILLIAMS BROTHERS PROCESS SERVICES, INC.
A Resource Sciences Company

RESOURCE SCIENCES CENTER | 6600 S. YALE AVE. | TULSA, OKLAHOMA 74136
PHONE (918) 496-5000 | TELEX 49-7493 WBEC-TUL

EXHIBIT III

FOSTER WHEELER LIMITED

VISIT IN DACCA - APRIL 17 THRU 22, 1978

ACTION RECOMMENDATIONS LIST NUMBER 3

1. Action to ensure a suitable potable water supply to the housing estate must be undertaken immediately. F.W.L. should be instructed to obtain the necessary outside technical expertise to resolve this matter as quickly as possible.

2. The government of Bangladesh fixed the price of medicines two years ago. Some medicines are not now available at these prices. Purchasing restrictions must be waived to allow the Medical Officer to immediately procure the medicines required to treat industrial accidents incurred by expatriate and local nationl workers.

3. A requisition for medical equipment has been approved for local purchase. Only two tenders were received, neither responsive. One stated no delivery date, the other 7 to 8 months. This requesition must be approved for international purchase.

4. The evacuation of serious medical cases is of great concern. Water evacuation during the rainy season is very hazardous due to sudden squalls and cyclonic winds. The highway system will not be completed until cometime into the next dry season. Then it is a long route and dependent on two ferry crossings. The railroad is only useful for medical evacuation when the tourist coach is on, which is once day, and then the ride is too rough for people with serious internal injuries. It is, therefore, our recommendation to lease and/or purchase a STOL type aircraft to land on the road between the housing estate and jobsite. This aircraft can double in service as personnel transport, hauling fresh foodstuffs to site and transporting small critical items of construction from Dacca airport to jobsite.

5. Due to frequent power failure at Ashuganj it is recommended that one 100 kw emergency generation be set up in the housing colony to service security lighting and two large freezer units.

6. As previously mentioned in Recommendation List #2, Item 23, there is an immediate need for a senior planning and a senior cost engineer at the site. If no candidates are available at this time, a task force composed of Home Office personnel must be immediately dispatched to begin site planning and scheduling and cost engineering functions.

189

WILLIAMS BROTHERS PROCESS SERVICES, INC.
A Resource Sciences Company

RESOURCE SCIENCES CENTER | 6600 S. YALE AVE. | TULSA, OKLAHOMA 74136
PHONE (918) 496-5000 | TELEX 49-7493 WBEC-TUL

EXHIBIT IV

VALLEY NITROGEN PRODUCERS, INC. (MAF)
Visit in Dacca - April 17 thru 22, 1978

ACTION RECOMMENDATIONS LIST NUMBER 4

These recommendations are based on a preliminary review of documents and data presented to Williams Brothers in response to requests for data during a series of meeting with AFCC and MAF.

A continued study of data supplied will result in an account of these studies in the Williams Brothers April Report and Final Report.

The primary study was based on the current status of MAF work scope outlined in the AFCC-MAF Contract Document.

FINANCIAL AND ACCOUNTING

Since financial and accounting work scope responsibilities of MAF were assumed in total by AFCC the middle of 1977, the set of recommendations under the above heading are to be taken under consideration by AFCC only.

1. AFCC should take under advisement and seek out a qualified consulting organization to develop a complete financial and accounting system from the development of a pragmatic chart of accounts to an acceptable management reporting system including financial statements. The consulting organization must have current and prior experience with fertilizer companies. The complete system should be approved and in operation on a pro-forma basis six months before scheduled Ashuganj Plant start-up.

2. A work plan outline and schedule for item 1, above should be completed in the next three months for the development of company manuals for accounting, budgeting, financial reporting and procurement.

An alternate plan should be considered to develop a data base for machine accounting.

190

3. A current pro-forma operational budget should be prepared and kept current quarterly to assist management in making cohesive planning decisions in all AFCC departments.

4. A capital asset project cash flow schedule for Local and Foreign currency must be prepared by AFCC monthly with the assistance of FWL for their respective reimburseable costs.

5. a) AFCC must assign a man to work with Mr. Ray Reedy of MAF to develop the spare parts ordering and inventory control system in conjunction with AFCC overall inventory control system for stores and supplies.

b) AFCC must expedite FWL in an accelerated submission of priced spare parts list recommendations for AFCC approval to expedite the purchase of spare parts.

AFCC-MAF PRE-OPERATIONAL PLANNING

6. Expedite MAF to submit a work plan with schedules which provides for completing job descriptions showing qualifications, responsibilities and authorities within one year of commencing operations. All job descriptions should be approved within six months of plant start-up.

7. MAF must establish a separate unencumbered qualified cadre of personnel to establish plans and the drafting of all required AFCC company manuals, standards and procedures except financial. (The present staff is encumbered with pre-operational duties.)

8. MAF must establish a work plan and schedule for developing mechanical acceptance procedure and formats within the guidelines of the AFCC approved FWL Plant Completion Procedures.

AFCC GENERAL CONTRACTOR ACTIVITY

9. Expeditiously activate and implement a field resident engineering staff which will monitor, expedite and provide timely approvals of all FWL construction activities in Bangladesh within prescribed limits of authority and coordination with AFCC upper management.

191

10. Establish weekly scheduled construction progress meetings at the project site with FWL in an organized format and consistent responsible attendees.

11. Hold more frequent special meetings on outstanding substantive matters between AFCC and FWL to preclude Reading grave problem matters in surprise letters. (comments applies to both parties.)

12. MAF should expedite approval of FWL Draft Ammonia Plant operating manual and outline of offsites operating manual submitted to AFCC by FWL on May 26, 1977.

13. AFCC must expedite the on site arrival of FWL Senior Planning Engineer(s) for the purpose of detail job work planning, scheduling, and progress reporting, provided this work has not started in Reading prior to 22 April, 1978.

AFCC PORTION OF PROJECT COST

Figures in millions (1 US$ = Tk 15.00 for LC)

ITEMS	SEPTEMBER 1977 ESTIMATE			APRIL 1978 ESTIMATE		
	FE, $	LC, Tk	Total $	FE, $	LC, Tk	Total $
1. Land Acquisition	-	3.450	0.230	-	3.540	0.236
2. Site Development						
a. Earth Filling	7.940	45.900	11.000	7.836	30.260	9.854
b. (i) Approach Road & HC Boundary Wall	-	12.000	0.800	-	12.000	0.800
d. Dynamic Compaction	4.610	10.350	5.300	4.610	10.350	5.300
e. Consultant for Dynamic Compaction	0.500	-	0.500	0.450	0.075	0.455
	13.050	68.250	17.600	12.896	52.685	16.409
3. General Contractor's Fixed Fee	18.500	-	18.500	19.000	-	19.000
4. Technical Adviser	2.500	8.250	3.050	2.000	1.000	2.067
5. Management Assistance Firm	11.950	20.555	13.310	10.351	12.972	11.216
6. Ammonia Unit						
f. Bank Charge	-	-	-	-	3.278	0.219
7. Urea Unit						
e. Bank Charge	-	-	-	-	0.957	0.064
8. Offsites						
A. Auxiliary						
f. Bank Charge	-	-	-	-	1.410	0.094
B. Material Handling						
e. Bank Charge	-	-	-	-	0.329	0.022
					1.739	0.116

/...

ITEMS	SEPTEMBER 1977 ESTIMATE			APRIL 1978 ESTIMATE		
	FE, $	LC, Tk	Total $	FE, $	LC, Tk	Total $
9. Construction Equipment & Tools						
a. Equipment	-	-	-	0.900	1.500	1.000
c. Tools	-	-	-	-	0.500	0.033
d. Bank Charge	-	-	-	-	0.630	0.042
				0.900	2.630	1.075
10. Misc. Equipment						
a. Equipment	-	9.450	0.630	0.182	9.450	0.812
d. Bank Charge	-	-	-	-	0.211	0.042
		9.450	0.630	0.182	9.661	0.859
11. Housing Colony	-	183.000	12.200	0.400	226.000	15,470
12. Factory Civil Works & Buildings						
E. Consultancy for Foundation Work	-	-	-	0.050	0.015	0.051
13. Railway Link	-	43.500	2.900	-	43.500	2.900
14. Construction & Erection						
f. Training of Construction Labour	-	-	-	-	1.500	0.100
h. Personnel Facilities *	0.400	-	0.400	1.935	43.871	4.860
i. Temporary Facs. for Const. Labr.	-	-	-	-	10.000	0.667
k. AFCC Expatriate Construction Supervision	-	-	-	1.500	3.000	1.700
l. Insurance	-	2.250	0.150	-	10.000	0.667
	0.400	2.250	0.550	3.435	68.371	7.994

* (School, furniture & appliances for Expatriate Personnel)

ITEMS	SEPTEMBER 1977 ESTIMATE			APRIL 1978 ESTIMATE		
	FE, $	LC, Tk	Total $	FE, $	LC, Tk	Total $
15. Pre Operational Expenses						
a. Training of AFCC Staff	1.800	18.300	3.200	-	4.017	0.268
b. Start-Up	-	-	-	-	0.500	0.033
c. Overhead	0.220	61.500	4.320	0.220	83.300	5.773
	2.020	79.800	7.520	0.220	87.817	6.074
16. Freight, Marine Insurance Duty & Taxes, Port Clearance etc.						
b. Import Duties and Taxes	-	563.400	37.560	-	550.975	36.732
d. Bank Charge	-	-	-	-	0.580	0.039
	-	563.400	37.560	-	551.555	36.771
17. A. Contingencies						
I. AFCC	1.640	74.850	6.630	0.380	53.070	3.918
18. Interest	-	668.550	44.570		750.000	50.000
19. Income Tax for Expatriate Personnel	-	0.900	0.060	-	11.419	0.761
20. Working Capital	0.750	189.900	13.410	1.120	314.250	22.070
TOTAL	50.810	1916.100	178.720	50.934	2194.709	197.270

ENCLOSURE – 22

ASHUGANJ FERTILIZER & CHEMICAL CO. LTD.

LENDERS FUND REPORT

Form–1

Sheet No. _ _ _ _ _

ALLOCATION

Sl. No.	Equipment/Commodity Items	Purchase Order No.	DESCRIPTION	Purchase Order Value	Share (%) Cost	COMMITMENTS						DISBURSEMENTS						OUTSTANDING BALANCE OF COMMITMENTS						Variance or decrease in the amount of allocation if any to be made Accordingly	REMARKS
						Beneficiary's Currency			Equivalent Converted in Lenders Currency			Beneficiary's Currency			Equivalent Converted in Lenders Currency (Amount Received by Lenders as per Disbursement Advice)			Beneficiary's Currency			Lenders Currency				
						D.P.	L.C.	Total	D.P.	L.C.	Total	D.P.	L.C.	Total	D.P.	L.C.	Total	D.P.	L.C.	Total	D.P.	L.C.	Total		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
			Sub Total																						
			Funds Available																						
			Excess Liability to Date at Exchange																						
			Budget, Subject to Supplemental Funding																						

APPENDIX "C"

ASHUGANJ FERTILIZER AND CHEMICAL COMPANY LIMITED
" ELLAL CHAMBER "
11, MOTIJHEEL COMMERCIAL AREA,
DACCA-2,
BANGLADESH.

IMPLEMENTATION OF ACTION RECOMMENDATIONS OF WILLIAMS BROTHERS PROCESS SERVICES, INC.

Williams Brothers Process Services, Inc. (WBS), Management Consulting Team retained by the Lenders, in the course of their review of the Ashuganj Fertilizer Project, made some action recommendations from time to time about the Project. As of 12th June 1978, four sets of recommendations have been received from them. Most of the points covered therin were already in the process of implementation when the review was made. This brief report states what action has been taken on the various points or what their present status is, stated serially as they appear in the recommendations.

197

Action Recommendations No. 1

1. The training programme of construction labour started at the Bangladesh-German Technical Training Centre (BGTTC) at Mirpur in March 1978 under the direction of Foster Wheeler Limited (FWL). FWL received the necessary training materials. FWL was authorised by AFCC to bring the required number of instructors. AFCC agreed to the programme of training of the construction workers made by FWL. AFCC also agreed to the wage scales recommended by FWL for these workers.

2. AFCC has made arrangement for accommodation of 156 expatriate personnel, considering half of them to be married, and half bachelors, in the housing colony of AFCC. This does not include the South Koreans for whom AFCC has made separate arrangement also in the colony. The number of South Koreans is expected to go upto 32. The number 156 expatriate personnel was furnished by FWL in 1977. This was confirmed again in February, 1978. This number was about 120 in 1976. Recently it appears FWL wanted to increase this number further. AFCC asked for justification which FWL has not furnished yet. It should be realised that it is not possible to make quick arrangement for accommodation of any number of expatriate at Ashuganj. It takes time to build houses. So far the houses have been built according to the programme of manpower given by FWL.

   AFCC has hired accommodation for 2000 labour at Ashuganj. The place is presently being renovated by FWL.

   FWL does not still know how many local supervisory personnel would be employed by them. At one stage FWL wanted accommodation for 6 such persons which AFCC agreed to provide in the colony. Later it was raised to 80 which was also agreed by AFCC. Recently it is understood that FWL estimated this number to be 300. AFCC has already made available to FWL accommodation for 32 such persons

Contd.....

198

in the colony. AFCC can provide upto 80 in the colony, all to live as bachelors. For the number exceeding 80, AFCC has made arrangement with the Power Development Board to provide land near the Ashuganj Power Station, where FWL may build temporary accommodation for nearly 200 persons.

What is meant by substandard accommodation is not understood. The houses for the expatriates have been built and furnished in the same manner, or even better than similar houses used by the expatriates in Dacca.

AFCC made several attempts so far to produce water in the colony area which would be acceptable to FWL. But all the attempts failed. As decided in the last meeting a Belco representative from the U.S.A. visited Ashuganj. It was his recommendation to use river water after treatment. His proposal has been accepted by AFCC.

3. FWL has been given freedom, in relaxation of the contractual term, to determine the quality, quantity and timely arrival and departure of expatriate personnel engaged by them.

4. There was no restraint on the construction work hour. At a time when there was no work at the site, FWL used to send overtime bill to AFCC in respect of their personnel at the site. There was hardly any justification for it. Now that construction of the plant has started FWL personnel can work overtime as per terms of the contract. A schemative procedure for controlling the overtime has also been agreed with FWL.

5. AFCC and FWL have already agreed which phases of the work will be done by subcontractors and which phases by FWL direct labour, and also the breakup of phases into foreign and local subcontract.

Contd.....

199

6. A road access to the Site was not conceived at the time of project appraisal. It was however recognised subsequently that building the six-mile road link between Ashuganj and Sarail would help in project implementation. The matter as such was taken up with the Roads and Highways Department of Bangladesh Government who have given topmost priority to it. Apart from earthwork and carpetting, two bridges and four culverts have to be constructed for completing the road which is now scheduled to be ready in the beginning of 1979.

7. A coach now runs almost regularly six days a week between Dacca and Ashuganj mainly for the expatriate. This is adequate for the time being. In view of the shortage of coach, Railway has been approached to convert one economy class compartment suitable for expatriate use.

   Since the construction labour is going to reside in Ashuganj, there will be no need to transport workers by Railway daily.

8. Construction equipment, tools and spares required on emergency basis have been already procured and airfreighted. Another batch of airfreight is expected soon. According to FWL Construction Department at Reading, this is adequate for the present purpose. The rest of the equipment is being shipped by sea.

   A procedure has been drafted in consultation with USAID and FWL for operating an imprest fund of $ 250,000, upto a maximum of $ 1 million for emergency purchases by FWL.

9. After the local procurement system was stream-lined in February 1978, there has been no problem in this area — no complaint has been received from FWL.

Contd.....

200

10. Financial management and control systems are being improved as detailed in the subsequent action recommendations. Problems of letters of credit and vendor payment have been resolved in consultation with the Lenders concerned.

11. The details for reorganisation of the management of AFCC and implementation of the project are still to be sorted out and agreed with Lenders, in order that management contract can be renegotiated and or new contract signed.

Action Recommendations No. 2

1. FWL was authorised by AFCC to prepare the revised cost estimate, which they did in April'78.

2. The FWL estimate takes into consideration, among other things, contingency, escalation, and foreign exchange allowance.

   The estimate of FWL is under examination of AFCC. AFCC is also reviewing its own portion of cost. The total final revised cost of the Project, as done by AFCC, will be made known to Lenders shortly.

3. FWL has not yet provided AFCC with the plan for change of man-months in excess of 2000 man-months.

4. The review of the national skilled and unskilled labour rates was made and FWL intimated early in April 1978.

5. The earlier figure was a typographical error. The present estimate is $ 667,000 in Taka equivalent.

6. Action by FWL already completed.

7. FWL promised to submit Cost Report No. 4 within 60 days of May 10, 1978.

8. Same as 7 above.

9. FWL's monthly statement of reimbursable cost to AFCC is not regular. It is however expected to improve.

Contd.....

202

10. AFCC has already introduced a new proforma to record commitment, disbursement and availability of Fund.

FWL is being requested to reformat its monthly progress report as recommended by Williams Brothers.

11. Payment procedure has already been reviewed by AFCC with FWL and Lenders, and major improvements have been made in making quick payments to Vendors. At present there is no case for interest charges for delayed payment.

12. Action from FWL is still awaited.

13. AFCC has a representative (Mr. M.A. Hamid) at FWL's Reading office who has been given authority to approve bid summary and purchase order and authorise payment upto $ 200,000. This means bulk of the procurement proposals are decided in Reading without reference to Dacca.

14. AFCC has already agreed to establish a Revolving Fund with FWL to make emergent purchase of construction tools and equipment. The recommendation to make bulk purchase of non-engineered items is being discussed with Lenders and FWL.

The dollar limitation clause was discussed with Lenders jointly by AFCC and FWL. It was stated by the Lenders that there will be very rare case where this clause will have any affect in making payment to Vendors. AFCC considers that Vendors will get their due payment even if this dollar limitation clause exists.

15. AFCC has received no proposal from FWL of this nature. In any case AFCC representative in Reading is authorised to approve upto $ 200,000.

Contd.....

203

16. There is no item 16 in the WBS Action Recommendations No. 2.

17. A second master Mechanic arrived at Site by end of April 1978.

18. FWL is understood to have done it.

19. AFCC has been already approved additional training materials and tools.

20. a. Repeatition of item 2 of Action Recommendation No. 1

    b. Potable water supply problem has been given to FWL. Belco representative visited AFCC site. A proposal has been given to FWL We are awaiting FWL comments on this and action. We have instructed our representative Mr. M.A. Hamid to accord necessary approval.

    c. Already covered in item 2 of Recommendation No. 1. FWL has not furnished AFCC any phased programme yet for the accommodation.

21. Duplicating equipment including 2 Zerox Machines were approved by AFCC two months back.

22. Action FWL.

23. FWL have already deputed Senior Planning Engineer and Cost Engineer to Site.

Action Recommendations No. 3

1. FWL has already been instructed by AFCC to obtain necessary outside assistance to solve the water problem.

2. AFCC has already waived the restriction for procurement of medical supplies at price fixed by the Government. In fact FWL procured a bulk of the medicine in March 1978.

3. AFCC approved in early May'78 the FWL proposal to procure medical equipment through international purchase.

4. The scheme prepared and worked by previous contractors at Ashuganj for emergency evacuation was to use speed boat and car combination which used to take 2 to 2½ hours for the injured person to reach a hospital in Dacca. If a speed boat can not work in bad weather, so also a small plane. Therefore, a STOL is not an improvement. Besides its maintenance will be a problem. On the other hand the local flying club may help for such evacuation provided there is an agreement with them. FWL will have to explore this. In the same connection it may be stated that AFCC has already approved FWL proposal to buy an ambulance and a river craft/launch.

5. FWL have at their disposal 9 generators of assorted sizes taken over by AFCC from Vinnell and some of those can be used.

6. FWL has brought one Senior Planning Engineer and one Senior Cost Accountant at Site during the last fortnight.

205

Action Recommendations No. 4

FINANCIAL AND ACCOUNTING

1. AFCC has already agreed to hire a consultant to develop Financial and Accounting system. This was verbally communicated to IDA and a telex request was sent from Dacca to consider this aspect in the meeting of the Lenders' held in Washington on 23rd May 1978. AFCC has been waiting for the outcome of the meeting of 23rd May in this connection from IDA, if any.

2. An operational budget proforma has been prepared and this is being reviewed for further modification.

3. A cash flow proforma (for local and foreign currency) has been developed. This is being reviewed for further modifications.

4. AFCC has taken steps to hire qualified accounts personnel to assist the management in the maintenance of proper financial records and to control expenditure.

5. a) Mr. F. Rahman, Sr. Stores Officer of AFCC along with an Assistant have been assigned to work with Mr. Ready of MAF for the spare parts ordering and inventory control. A Sr. Engineer in addition will be provided shortly.

   b) AFCC has already approved a number of spare parts lists and for others asked FWL to submit the list along with the catalouge and drawings.

Contd.....

206

AFCC-MAF PRE-OPERATIONAL PLANNING

6. Job descriptions of all managerial and supervisory personnel have been prepared and presently being reviewed.

7. Action MAF.

8. MAF is taking action on it. It will take 12 months to do the job as per Mr. R.E.O. Heath of VNP.

AFCC GENERAL CONTRACTOR ACTIVITY

9. AFCC has assigned a number of Field Engineers consisting of one MAF Civil Engineer (Mr. S. Hewick), one Chief Civil Engineer (Mr. A. Haque), Mr. H. Rahman, Dy. Chief Engineer and three other Junior Engineers for the purpose of monitoring, inspecting and approving FWL works at the Site. They work under the direction of General Manager. Efforts are being made to recruit more Engineers for site activities.

10. Arrangement has been made with FWL to organise site meetings which will be attended by responsible persons from AFCC side including General Manager, MAF Acting Project Director, Mr. A. Haque, and Mr. Hewick.

11. AFCC recognises that regular meetings with FWL management will help solve many problems, and avoid writing surprise letters.

Contd.....

12. MAF is working on the approval of draft FWL ammonia manual and outline of offsite manual. It will take 6/8 weeks time to complete the job.

13. FWL's Planning Engineers are already working at Site.

Mr. B.E. Manders, Sr. Planning Engineer arrived on 30.5.78.

Mr. P. Taylors, Planning Engineer arrived on 22.5.78.

208

WILLIAMS BROTHERS PROCESS SERVICES, INC.

REFERENCES

FOSTER WHEELER LIMITED

LETTERS

1. FWL to AFCC dated 13 March 1978 - Minutes of meetings held in Dacca week ending 4 March 1978.

2. FWL to AFCC dated 3 March 1978 - Request for US $250,000 AID revolving fund to expedite purchase of construction tools.

3. FWL to AFCC dated 24 February 1978 - Schedule of witnessing tests for CO_2 compressor and syngas compressor through 12 June 1978.

4. FWL to AFCC dated 8 February 1978 - End use purpose of FWL construction equipment.

5. FWL to AFCC dated 5 October 1977 - Revised proposal for contract fee and schedule changes.

6. FWL to AFCC dated 22 July 1977 - Proposed contract cost and language changes.

7. FWL to AFCC dated 26 May 1977 - Transmitting ammonia plant operation manual (provisional) for approval.

8. FWL to AFCC dated 5 January 1977 Re: Request for parties to project to submit a consolidated list of queries on the October 1976 control estimate.

9. FWL to AFCC - Ltr. #R.3.1.578 - Recommendation to negotiate compressor house and compressor block foundations with Korea Development Corporation.

209

WILLIAMS BROTHERS PROCESS SERVICES, INC.

TELEX

10. FWL to AFCC dated 21 March 1978 - Re: Airfreighting of critical construction equipment.

11. FWL to AFCC dated 21 March 1978 - Re: Airfreighting of critical construction spares.

FWL INTEROFFICE CORRESPONDENCE

12. FWL interoffice memo 6 April 1978 - Re: Forecast of personnel assignments to Ashuganj.

13. FWL interoffice memo 28 February 1978 - Re: Current status - Dacca training centre operation.

14. FWL notes prepared for 27 February 1978 AFCC/Lenders meeting in Dacca.

FWL SUBCONTRACTS

15. Agreement for "Customs and Clearing Services" with Birds Bangladesh Agencies Limited - not executed as of 10 May 1978.

16. Agreement for "Barge Services" with Bangladesh Inland Water Transport Corporation - not executed as of 10 May 1978.

ESTIMATES

17. FWL reimbursable cost estimate Dated October 1976

18. FWL reimbursable cost estimate Rev. 3 Dated September 1977

210

WILLIAMS BROTHERS PROCESS SERVICES, INC.

ESTIMATES (Continued)

19. FWL reimbursable cost estimate Rev. 4 Dated April 1978.

20. FWL reimbursable cost estimate Rev. 4 (A) Dated May 1978.

SCHEDULES AND PROCEDURES

21. Equipment List - Ammonia Plant	Rev. 6 - 23 January 1978
22. Equipment List - Urea Plant	Rev. 5 - 14 January 1978
23. Equipment List - Offsite Facilities	Rev. 7 - 2 September 1978
24. Bulk Material Schedule	Rev. "A" - May 1978
25. Shipping and Delivery Schedule (Equipment)	Rev. 0 - 18 May 1978
26. Manpower Histograms (16)	Rev. "A" - May 1978
27. Construction Control Curve ("S" Curve)	Rev. 0 - 22 May 1978
28. Material Progress Schedule - Ammonia Plant (376 pages)	Rev. 17 - 22 May 1978
29. Material Progress Schedule - Urea Plant (132 pages)	Rev. 17 - 22 May 1978
30. Material Progress Schedule - Offsite Facilities (230 Pages)	Rev. 17 - 22 May 1978

211

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SCHEDULES AND PROCEDURES (Continued)

31. Material Progress Schedule - Construction Equipment (257 pages) Rev. 17 - 22 May 1978

32. FWL Worksheet - Planned man-hours for equipment erection by unit number - Dated October 1976.

33. FWL Cost Control Procedure (Partial) - Dated July 1977.

34. FWL Scheduling Reports/Formats (Partial) - Dated July 1977

35. FWL Computer Output Report - Dated 28 April 1978.

36. FWL CPM Networks

No.	Title	Latest Revision
PS-1021	Ammonia Plant - Area 1	27 April 1978
PS-1022	Areas 3,4,5,6,7,8 and 9	27 April 1978
PS-1023	Urea Plant - Area 2	27 April 1978
PS-1024	Compressor House - Area 1	27 April 1978
PS-1025	Administration Bldg. and Workshops	27 April 1978

37. FWL Plant Start-up Sequence Network (PS-1028) - Dated 20 April 1978.

38. FWL Civil Construction Schedule (PS-1033) - Dated 3 May 1978 (Two Sheets).

39. FWL Flow Chart for Planning and Scheduling (Undated) Received March 1978.

40. FWL-Subcontractor-Korea Development Company (KDC) Planning Schedule for Civil Work - Urea Structure - Prill Tower and Ammonia Tank Foundations (Undated) Received April 1978.

212

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SCHEDULES AND PROCEDURES (Continued)

41. FWL-Subcontractor-Korea Development Company Schedule Comparison Planned Schedule vs Contract Schedule - Dated May 1978.

42. FWL - "Overseas Training Schedule - Maintenance Staff" - Rev. 1 - March 1978 Prepared by FWL - Training Manager B.Fenwick.

REPORTS

43. FWL Monthly Progress Report No. 23 - November 1977.

44. FWL Monthly Progress Report No. 24 - December 1977.

45. FWL Monthly Progress Report No. 26 - February 1978.

46. FWL Monthly Progress Report No. 27 - March 1978.

47. FWL Loan Fund Progress Report - 7 March 1978.

48. FWL Loan Fund Progress Report - 9 May 1978.

49. FWL Cost Report No. 3 - 31 January 1978.

50. FWL Cost Report Unnumbered - 31 March 1978.

51. FWL Recommended Spare Parts Control Log - Status 30 April 1978.

52. FWL "Proposed Training Arrangements for Construction Labour" (No Date).

53. FWL "Construction Operations" Planning Document (No Date).

54. FWL "Study on Procurement of Equipment Including Disbursement Shipping and Inspection Procedures" Rev. 2 - October 1976.

213

WILLIAMS BROTHERS PROCESS SERVICES, INC.

FWL DRAWINGS

55. 1961-0-01-101 Rev. "L" 14/3/78 Ammonia Unit Plot Plan

56. 1961-0-01-103 Rev. "B" 14/1/78 Compressor House Plot Plan

57. 1961-0-01-301 Urea Unit Area

58. 1961-0-01-501 Rev. "J" 14/3/78 Overall Plot Plan

59. 1961-0-01-503 Rev. "A" 7/3/78 Water Treatment Area Plot Plan - Area 5

60. 1961-0-01-504 Rev. "A" 7/3/78 Cooling Tower Area Plot Plan - Area 3

61. 1961-0-01-505 Rev. "A" 6/3/78 Chemical Storage Area Plot Plan - Area 6

62. 1961-0-01-506 Rev. "A" 6/3/78 Ammonia Storage Area Plot Plan - Area 4

63. FWL - Requisition Index

64. FWL - Document Index (Drawings)

214

WILLIAMS BROTHERS PROCESS SERVICES, INC.

ASHUGANJ FERTILIZER AND CHEMICAL CO. LTD.

LETTERS

65. AFCC to FWL Dated 11 May 1978 Re: Comments to FWL estimate and acceptance of Rev. 4 estimate as the control estimate.

66. AFCC to World Bank Dated 11 May 1978 Re: Transmitting AFCC disbursement schedule by fiscal year, AFCC project cost estimate and production cost estimate.

67. AFCC - "AIDE-MEMOIRE" Dated 27 April 1978 Re: Lenders approval of AFCC proposed organization chart for the project implementation unit and modifications of Valley Nitrogen Producers Contract.

68. AFCC to Williams Brothers Dated 20 April 1978 Re: Suggestions for improving financial reporting, accounting systems and company procedures.

69. AFCC to World Bank Dated 14 April 1978 - Re: Transmittal of FWL minutes of meeting in Dacca 3 April 1978 to discuss proposed amendments to IDA payment procedures and a draft master letter of credit for expeditious payments.

70. AFCC to World Bank Dated 25 February 1978 Re: AFCC organization.

71. AFCC office order No. 27 Dated 13 February 1978 Re: Reorganization of project management.

72. AFCC to World Bank Dated 24 January 1978 Re: Transmittal AFCC balance sheet and trial balance for period ending 31 December 1977.

73. AFCC to FWL Dated 28 December 1977 Re: Plant construction, scheduled completion dates, construction philosophy, training and subcontracting.

74. AFCC to World Bank Dated 24 November 1977 Re: Transmittal AFCC balance sheet and capital asset accounts for period ending 30 June 1977.

215

WILLIAMS BROTHERS PROCESS SERVICES, INC.

LETTERS (Continued)

75. AFCC to World Bank Dated 29 July 1977 Re: Proposal to restrict the scope of work within an assigned budget for the AFCC-TA agreement.

76. AFCC to scientific design Dated 10 May 1977 requesting a budget cost for services through 31 December 1978.

77. AFCC to World Bank Dated 25 January 1977 Re: Transmitting "Report on Organization Study" Dated January 1977 prepared for AFCC organization by Baybasthapana Shangsad Limited.

78. AFCC to FWL Dated 31 December 1976 Re: Comments to FWL October 1976 control estimate.

79. AFCC to FWL Dated 8 December 1976 Re: IDA comments to FWL October 1976 control estimate.

TELEX

80. AFCC to FWL Dated 19 April 1978 Re: Procedure for reviewing FWL Rev. 4 reimbursable cost estimate.

81. AFCC to FWL Dated 3 April 1978 Re: Completion date of 25 April 1978 for revised reimbursable cost estimate.

82. AFCC to FWL Dated 31 March 1978 Re: Direction to recast the reimbursable cost estimate based on current known costs and planned construction sub-contracting.

83. AFCC to FWL Dated 17 March 1978 Re: Expediting procurement of construction equipment and establishing AID revolving fund in amount of US $250,000.

216

WILLIAMS BROTHERS PROCESS SERVICES, INC.

REPORTS AND PROCEDURES

84. AFCC Monthly Progress Report No. 28 - April 1977

85. AFCC Monthly Progress Report No. 30 - June 1977

86. AFCC Monthly Progress Report No. 32 - August 1977

87. AFCC Monthly Progress Report No. 35 - November 1977

88. AFCC February 1978 Monthly Report to Bangladesh Government project financials and percent complete.

89. AFCC March 1978 Monthly Report to Bangladesh Government project financials and percent complete.

90. AFCC-Procedure for handling local purchase requisitions.

91. AFCC-Procedure for handling local procurement bid summary.

92. AFCC-"Organization Charts of the Ashuganj Fertilizer Plant" prepared by Baybasthapana Shangsad Ltd.

93. AFCC-"Revised Cost Estimate of AFCC Expenses" Dated April 1978 showing December 1977 estimate and expenditures to 31 March 1978.

94. AFCC-Revised total project cost estimate (US $338.67MM) Dated December 1977.

95. "Medical Report for Ashuganj Project" Dated November 1977.

217

WILLIAMS BROTHERS PROCESS SERVICES, INC.

CONTRACTUAL AGREEMENTS

96. AFCC/Joint Venture Scientific Design Co. Ltd. and James Chemical Engineering for Technical Advisory Services Dated 12 February 1974 (Originally executed with Bangladesh Fertilizer Chemical and Pharmaceutical Corporation, Dacca).

97. AFCC/Valley Nitrogen Producers Inc. for Management Assistance and Training - negotiated clean draft.

98. AFCC/Foster Wheeler Limited for General Contractor Services Dated 29 November 1975.

99. All Risk Insurance Policy effective 29 June 1976 in behalf of the names insured AFCC and FWL issued by Sadharan Bima Corporation of Dacca.

218

WILLIAMS BROTHERS PROCESS SERVICES, INC.

VALLEY NITROGEN PRODUCERS, INC.

LETTERS

100. VNP Interoffice Memo Dated 20 April 1978 Re: "Operations Training Report".

101. VNP Interoffice Memo Dated 20 April 1978 Re: Maintenance Training Program - Current and Projected.

102. VNP to Williams Brothers - Handwritten memo Dated 19 April 1978 - Review estimated total "Cost of VNP Contract".

103. VNP to AFCC Dated 12 July 1977 Re: VNP organization.

104. VNP to AFCC Dated 5 July 1977 Re: VNP organization

105. VNP "Contractual Work Plan Schedule" Dated May 1977 for preparation of systems and procedures.

106. VNP Flow Chart "Procedure for Handling Spare Parts" (No Date).

219

WILLIAMS BROTHERS PROCESS SERVICES, INC.

INTERNATIONAL DEVELOPMENT ASSOCIATION

LETTERS-MEMOS

107. The World Bank to Deutsche Bank AG Dated 22 February 1978 Re: "Dollar Limitation Clause".

108. The World Bank to AID Dated 11 January 1978 Re: Project estimates and project management.

109. IDA - Office memorandum Dated 6 January 1978 Re: "Review of Construction Industry - Bangladesh".

110. IDA - Office memorandum Dated 27 December 1977 Re: Back-To-Office Report - Supervision mission 2-14 December 1977.

111. The World Bank/AFCC AIDE MEMOIRE Dated 13 December 1977.

112. The World Bank to Government Iran - Dated 21 July 1977 Re: Disbursment of Iran Loan Funds.

113. IDA - Office memorandum Dated 27 September 1976 Re: Back-to-Office Report London and Dacca last half August 1976.

114. IDA - Office memorandum Dated 21 May 1976 Re: Supervision Report - Visit Bangladesh 26-30 April 1976.

TELEX

115. The World Bank Washington D.C. to The World Bank Dacca Dated 28 March 1978 Re: AFCC request to direct FWL to recast estimate.

116. The World Bank Washington D.C. to The World Bank Dacca Dated 16 February 1978 Re: Williams Brothers itinerary in Dacca.

117. The World Bank Washington D.C. to The World Bank Dacca Dated 1 July 1977 Re: Justification for 2nd Turbogenerator.

220

WILLIAMS BROTHERS PROCESS SERVICES, INC.

DOCUMENTS

118. The World Bank "Memorandum of Agreement Regarding Project Execution, Procurement and Use of Loan Funds" Ashuganj Fertilizer Project, Dated 6 December 1974.

119. IDA/AFCC Project Agreement (Credit Number 527 BD) Dated 11 February 1975.

120. IDA/"Instructions for the Preparation of an Application for Reimbursment". Procedure I 9/71.

121. IDA/"Instructions for the Preparation of an Application to Withdraw Funds for Payments to be Made for Goods or Services. Procedure III 9/71.

122. IDA/"Instructions for the Preparation of an Application Requesting the Irrevocable Agreement of the IDA to Reimburse Commercial Banks for Payments Made Under Letters of Credit". Procedure V 6/74.

123. IDA/"Instructions for the Preparation of an Application Requesting the Qualified Agreement of the IDA to Reimburse Commercial Banks for Payments Made Under Letters of Credit". Procedure VI 6/74.

124. ADB "Details of Contracts Awarded as of 15 April 1978" showing amounts in foreign currency and US $ equivalent.

125. "Appraisal of Ashuganj Fertilizer Project - Bangladesh" Report No. 598-BD Dated 18 December 1974 1 BRD-IDA.

221

WILLIAMS BROTHERS PROCESS SERVICES, INC.

AGENCY FOR INTERNATIONAL DEVELOPMENT

LETTERS AND MEMOS

126. USAID-Dacca to USAID Washington D.C. memorandum Dated 30 December 1977 Re: Project Management.

127. USAID to The World Bank Dated 13 May 1977 Re: Government of Bangladesh proposal for dynamic compaction of the plant site.

128. USAID Washington D.C./Williams Brothers requirements contract No. AID/OTR-C-1629.

TELEX

129. USAID-Dacca to USAID Washington D.C. Dated 25 March 1978 Re: Status of Williams Brothers Action Recommendation List Number 1.

130. USAID-Dacca to USAID Washington D.C. Dated 17 March 1978 Re: AFCC Report for $250,000 Revolving Fund.

131. USAID-Dacca to USAID Washington D.C. Dated 20 December 1977 Re: Action items required resulting from Lender's meeting in Dacca 13 December 1977.

132. USAID-Dacca to USAID Washington D.C.Dated 20 December 1977 Re: Report on meeting in Dacca by Lenders and text of AIDE MEMOIRE of 13 December 1977.

222

WILLIAMS BROTHERS PROCESS SERVICES, INC.

SCIENTIFIC DESIGN COMPANY LTD/JAMES CHEMICAL ENGINEERING

LETTERS

133. SD/JCE to AFCC Dated 15 June 1977 Re: AD/JCE work program through December 1978 at request of AFCC.

134. SD/JCE to AFCC Dated 31 December 1976 Re: Comments to FWL October 1976 estimate and AFCC project capital cost estimate.

DAMES & MOORE

LETTERS

135. D&M letter to USAID Dated 23 September 1977 Re: Site visits 1-5 September 1977 and progress of soils compaction work by Menard.

136. D&M letter to USAID Dated 3 February 1978 transmitting "Report-Foundation Design Review Proposed Ammonia/Urea Plant- Ashuganj, Bangladesh.

GOVERNMENT OF BANGLADESH

LETTER

137. Ministry of planning letter to The World Bank-Dacca Dated 3 January 1978- Mr. Syed Aminur Rahman, Deputy Secretary to Mr. Denness, Chief of the Mission Re: Request for supplementary financing and transmittal of a total project estimate of US $338 Million.

WILLIAMS BROTHERS PROCESS SERVICES, INC.

REPORTS

138. Monthly Progress Report No. 1 Dated 31 March 1978.

139. Monthly Progress Report No. 2 Dated 19 May 1978.