PD-ABE-751

APPENDIX 3A, Attachment 1
Chapter 3, Handbook 3 (TM 3:43)

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT DATA SHEET

1. TRANSACTION CODE: [ ] A = Add, C = Change, D = Delete — Amendment Number: 2 — DOCUMENT CODE: 3

COUNTRY/ENTITY: SOUTHERN AFRICA REGIONAL/MALAWI

3. PROJECT NUMBER: 690.0247.12

4. BUREAU/OFFICE: AFR / 06

5. PROJECT TITLE (maximum 40 characters): REGIONAL RAIL SYSTEMS SUPPORT

6. PROJECT ASSISTANCE COMPLETION DATE (PACD): MM 06 DD 30 YY 95

7. ESTIMATED DATE OF OBLIGATION (Under "B." below, enter 1, 2, 3, or 4)
A. Initial FY 88 B. Quarter [ ] C. Final FY 92

8. COSTS ($000 OR EQUIVALENT $1 =)

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. Total	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. Total
AID Appropriated Total						
Grant	(7290)	( )	(7290)	(10790)	( )	(10790)
Loan	( )	( )	( )	( )	( )	( )
Other U.S. 1.						
Other U.S. 2.						
Host Country			1460			1460
Other Donor(s)						
TOTALS			8750			12250

9. SCHEDULE OF AID FUNDING ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE 1. Grant	C. PRIMARY TECH. CODE 2. Loan	D. OBLIGATIONS TO DATE 1. Grant	D. OBLIGATIONS TO DATE 2. Loan	E. AMOUNT APPROVED THIS ACTION 1. Grant	E. AMOUNT APPROVED THIS ACTION 2. Loan	F. LIFE OF PROJECT 1. Grant	F. LIFE OF PROJECT 2. Loan
(1) SADF	800	824		7290		3500		10790	
(2)									
(3)									
(4)									
TOTALS				7290		3500		10790	

10. SECONDARY TECHNICAL CODES (maximum 5 codes of 3 positions each): 820

11. SECONDARY PURPOSE CODE:

12. SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)

A. Code							
B. Amount							

13. PROJECT PURPOSE (maximum 480 characters)

This Project Data Sheet pertains only to the Malawi portion of the Regional Rail Systems Support Project. The purpose of the project is to strengthen and expand the carrying capacity and operational efficiency of Malawi Railways.

14. SCHEDULED EVALUATIONS: Interim MM 06 YY 92 — MM — YY — Final MM 03 YY 95

15. SOURCE/ORIGIN OF GOODS AND SERVICES: [ ] 000 [X] 941 [X] Local [ ] Other (Specify): SADCC Countries

16. AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a ____ page PP Amendment)

Clearance: Controller, USAID/Malawi: [signature] 12/5/91

17. APPROVED BY
Signature: Carol A. Peasley
Title: Carol A. Peasley, Director, USAID/Malawi
Date Signed: MM 12 DD 06 YY 91

18. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM — DD — YY —

ACTION MEMORANDUM TO THE MISSION DIRECTOR, USAID/MALAWI

From: William R. Brands, PDO, USAID/Malawi

Date: November 22, 1991

Subject: Project Paper Supplement and Authorization Amendment for the Regional Rail Systems Support (RRSS) Project - Malawi Component (690-0247.12)

Action: You are requested to approve the RRSS Project Authorization Amendment and Project Paper Supplement (PPS) to permit:

1. an increase in life-of-project funding from $7,290,000 to $10,790,000 to increase spare parts and equipment procurement, add significant technical assistance and expand training components;

2. an extension of the Project Assistance Completion Date (PACD) to 06/30/95 to allow sufficient time for the implementation of the locomotive overhaul and wagon rehabilitation programs; and

3. changes in the method of procurement from host country contracting to A.I.D.-direct contracting.

Discussion: The RRSS Project - Malawi component was originally authorized on August 16, 1988 at a life-of-project funding level of $7,290,000. Since project authorization, however, the RRSS Project has experienced substantial cost increases and implementation delays.

The increased project cost is due primarily to the fact that the original design significantly underestimated the costs of commodities, especially spare parts, and the need for technical assistance and expanded training activities. An extension of the PACD is needed in order to complete the implementation of the locomotive overhaul and wagon rehabilitation programs. Delays of over two years in the implementation of these programs are a result of Malawi Railways inexperience with complicated procurement procedures under host country contracting, unreliable delivery from suppliers and considerable variations in the quality of parts from different suppliers.

As described in the attached PPS, the objectives of the project are unchanged. The RRSS Project will provide sustained maintenance capacity in Malawi Railways for the general overhaul of 19 Bombardier locomotives, improve capability for repair of 180 wagons and increase efficiency of engineering line support. The supplement, however, makes revisions to the project in terms of contracting methods and technical assistance to accomplish these objectives in a more efficient and cost-effective manner.

New financial, economic and institutional analyzes were conducted as a result of the project cost increases and implementation delays. Despite the significant increases in project costs, the project is still judged to be financially viable and economically sound. Assuming that the contemplated restructuring of Malawi Railways is successful, the USAID investment will have an economic rate of return of 41%. Although the initial PP found the MR's Workshop and Supplies Department/Stores well staffed and productive, a subsequent institutional assessment noted that the original PP vastly underestimated the demands of the A.I.D. program on each of these departments. It was found that outside technical assistance is crucial to complete the locomotive overhaul program and to guarantee that an appropriate inventory control system for spare parts and equipment is utilized.

A second environmental examination required for this amendment was approved by the African Bureau Environmental Officer which is attached as Annex 2 in the PPS. It should be finally noted that all conditions precedent have been satisfied and the project continues to meet all statutory requirements.

Financial Plan: The summary revised plan for A.I.D. inputs is as follows:

1.	Commodities and Renovations	$ 8,895,000
2.	Training	220,000
3.	Monitoring and Evaluation	300,000
4.	Technical Assistance	850,000
5.	Contingency	525,000
	TOTAL	$10,790,000

Authority: You have authority to authorize this Project Amendment pursuant to State 365439 which provides an ad hoc delegation from AID/W for this purpose. (USAID/Zimbabwe is only authorized to redelegate implementation, as opposed to authorization, functions under DOA 551 para. 6E. This however, may be amended as a result of State 232754 dated July 17, 1991.)

Recommendation: That you approve the PP Supplement by (1) signing the PP facesheet and (2) the Project Authorization Amendment.

Attachments: Project Authorization Amendment
Project Paper Supplement

Clearances:	TLofgren, SPDO	Draft	Date: 11/26/91
	RAmin, CONT	Draft	Date: 12/2/91
	KRikard, DD	Draft	Date: 11/26/91
	CBrown, RLA	Draft	Date: 12/2/91

1262C

PROJECT AUTHORIZATION AMENDMENT NUMBER 1

Malawi

Regional Rail Systems Support - Malawi Component
Project No. 690-0247.12

1. Pursuant to the Foreign Assistance Act of 1961, as amended; the Foreign Operations, Export Financing and Related Programs Appropriations Act of 1989, Africa Bureau Delegation of Authority (DOA) 551, as amended; and the ad hoc authority delegated under 88 State 102126, The Regional Rail Systems Support Project - Malawi Component was authorized on August 16, 1988 with a life of project funding of seven million two hundred and ninety thousand United States dollars ($7,290 000) over a two-year period from the date of authorization.

2. Pursuant to 91 State 365439 which provides an ad hoc delegation of authority to the USAID Malawi Mission Director and in accordance with all other terms and conditions of DOA 551, I hereby authorize an additional three million five hundred thousand United States dollars ($3,500,000) in Grant funds for said project for a new authorized life of project not to exceed ten million seven hundred and ninety thousand United States dollars ($10,790,000).

3. The original Authorization, as amended, remain in full force and effect.

Signature: Carol A. Peasley
Carol A. Peasley
Director, USAID/Malawi

Date: 6 December 1991

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I. EXECUTIVE SUMMARY

This project paper supplement (PPS) justifies a $3,500,000 increase in life of project (LOP) funding from $7,290,000 to $10,790,000 to increase spare parts and equipment procurement, add technical assistance and expand training activities. It also extends the project assistance completion date (PACD) from April 30, 1993 to June 30, 1995. Furthermore, the PPS changes the method of procurement from host country contracting to A.I.D.-direct contracting and proposes a waiver to permit sole source procurement of spare parts.

This supplement reaffirms the project objectives of the Regional Rail Systems Support (RRSS) Project Paper of August 1988. The RRSS will provide sustained maintenance capacity in Malawi Railways (MR) for the general overhaul of 19 Bombardier locomotives, improve capability for the repair of 180 wagons, and increase efficiency of engineering line support. The supplement, however, makes revisions to the project to accomplish these objectives in a more efficient and cost-effective manner.

The increased project cost is due primarily to the fact that the original design significantly underestimated the costs of commodities, especially spare parts, and the need for technical assistance and expanded training activities. An extension of the PACD is needed in order to complete the implementation of the locomotive overhaul and wagon rehabilitation programs. Delays of over two years are a result of inexperience with complicated procurement procedures under host country contracting, unreliable delivery from suppliers and considerable variations in the quality of parts from different suppliers. Even though the PACD is extended, the implementation of the overhaul program will be more efficient and cover a shorter period of time than scheduled in the original PP.

As a result of the project cost increases, new financial, economic and institutional analyses were conducted. Despite the significant increases in project costs, the project is still judged to be financially viable and economically sound. Assuming that the contemplated restructuring of Malawi Railways is successful, the USAID investment will have an economic rate of return (ERR) of approximately 41%. Although the initial PP found the MR's Workshop and Supplies Department/Stores well staffed and productive, a subsequent institutional assessment noted that the original PP vastly underestimated the demands of the A.I.D. program on each of these departments. It was found that outside technical assistance is crucial to complete the overhaul programs and to guarantee that an appropriate inventory control system for spare parts and equipment is utilized.

The RRSS Project will improve the maintenance capability of MR and improve its operational effectiveness. These efforts will place MR in a much stronger position of preparedness for the eventual increase in rail transport.

II. BACKGROUND

The war in Mozambique has had a devastating impact on transport costs for Malawi since 1983. Prior to that time, all Malawi's overseas trade was conveyed by rail through Beira (75 per cent) and Nacala (25 per cent) in Mozambique. The war effectively cut both of these links and rendered Malawi's only commercial means of transport unusable. As a result, most trade was diverted to lengthier and more costly routes via South Africa.

A.I.D. and other donors have played and continued to play an active role in alleviating this situation. In 1984, USAID/Malawi initiated the Commercial Transport Project which fostered a Malawian international trucking industry to increase the country's road transport capability. Malawi's truck fleet at present handles 30% of total cargo, up from virtually nothing before 1984.

A.I.D. has also played a major role since 1986 in the Northern Corridor Project. This multi-donor program seeks to provide Malawi with an alternate transport route through Northern Malawi to the Port of Dar es Salaam, Tanzania. Although approximately 13% of Malawi's trade now follows the road routes to Dar es Salaam, the infrastructure supporting the road, rail and lake modes of the Northern Corridor route are scheduled to be completed toward the latter part of 1991. This will provide a secure but still expensive route for Malawi's trade.

Although the Commercial Transport Project and Northern Corridor Project have provided Malawi with greater security and more options in the means of commercial transport available, it has not alleviated the problem of cost. The economic ramifications of the situation reported 3 years ago in the project paper initiating A.I.D.'s third transport project in Malawi, Regional Rail Systems Support, remain basically the same. The additional cost burden of transport continues to drain the country of approximately $US 150 million each year. With the reclosure of the Tete Corridor, the road route through Mozambique to Zimbabwe, in January 1991, the situation has further deteriorated. Transport costs have risen an estimated 40% this year alone which placed Malawi in the unenviable position of having the highest transport costs in the world.

Assistance to Malawi Railways began under the Regional Rail Systems Support Project in 1988. Although Malawi Railways has been underutilized since 1983, the economic need for the railroad is still present (see Annex 1). Usage of the corridors to Mozambican ports by rail, especially Nacala, will be a crucial requirement for alleviating the burden of excessive transport costs. The following 1990 cost figures for transporting one ton of fertilizer by various routes and modes of transport are indicative of this point.

Port	Model of Transport	Cost
Nacala (Very limited rail service began in 1990.)	Rail	MK 110 = $US 36.67
Dar es Salaam	Road	MK 350 = $US116.67
South Africa via Tete	Road and Rail	MK 380 = $US.26.67
South Africa via Lusaka	Road and Rail	MK 560 = $US186.67

With the reopening of a fully operational Nacala rail line envisioned within the next two to three years, Malawi Railways wants to be in a position of preparedness for the increased traffic demands. Since the disruption of the rail routes in 1983, however, relatively no foreign currency was available to purchase the spare parts and materials necessary to adequately maintain Malawi Railways locomotives and rolling stock. Although locomotive availability was still good in 1988 (71.7%), this figure dropped to approximately 60% in 1990 and will continue to drop by an estimated 10% a year until the locomotive overhaul and rolling stock rehabilitation programs funded with spare parts and materials from the RRSS Project actually begins.

III. REVISED PROJECT DESCRIPTION

A. Project Goal and Purpose. Due to the fact that high transport costs and foreign currency shortages continue to be a critical burden to Malawi, the project goal and purpose remain unchanged from the original project paper. The goal and purpose of this Malawi component parallel the two complementary components in Mozambique and Swaziland which together constitute the overall Regional Rail System Support Project. The goal is to support the development of a stronger economic foundation of growth in Southern Africa. The purpose of the overall project is to strengthen and enhance the capacity and operating efficiency of regional rail transport in SADCC countries. With specific application to Malawi, the purpose remains to sustain the maintenance capability of Malawi Railways and improve its operational effectiveness. Although actions have been initiated under the project during the last three years to improve the maintenance capabilities and operational effectiveness of Malawi Railways, the following discussion will demonstrate the need to modify, increase, add and delete certain activities and various elements of the project in order to more completely achieve the primary objectives.

B. Project Objectives. The Regional Rail Systems Support Project still strives to:

1. provide sustained maintenance capacity in MR for the general overhaul of 19 Bombardier locomotives and their periodic maintenance;

2. improve capability for repair of wagon superstructure and consequent increase in availability of serviceable wagons;

3. increase efficiency of engineering support by reducing transit time for workers and supervisors to reach worksites along rail routes;

4. improve skills of supervisors at MR workshops; and

5. provide sufficient storage space for improved materials handling.

Two changes to the objectives are a result of other donors purchasing equipment originally included in A.I.D.'s RRSS Project Paper. Even though the original PP in 1988 noted that A.I.D. would purchase a recovery crane and computers, these items were purchased by other donors. The Government of France provided MR with a new recovery crane in 1990 and ODA provided MR with a main-line computer system in 1991. Even though the objectives of improving the derailment recovery capability and computerized inventory systems for parts and supplies at MR are very important, if not vital, they are no longer a direct function of A.I.D.-financing. It should be noted, however, that A.I.D. will provide other forms of assistance in coordination with ODA to improve supplies management and inventory controls.

C. Problems/Issues. Three years have passed since the initiation of the RRSS Project. Even though the implementation of the majority of aspects of the project are only now beginning, several lessons have already been learned. As the following discussion will note, the issues/problems experienced over the last three years have demonstrated a critical need to redesign and refocus this effort.

The major problems/issues are summarized as follows:

1. Procurement procedures under host country contracting have been cumbersome and extremely inefficient. MR had no former experience with A.I.D. procurement regulations. They also did not have direct experience in purchasing their own supplies as this was handled by a purchasing agent. Enumerable problems and delays of up to two years have resulted with this burden placed on MR's existing staff;

2. Cost estimates in the initial design, especially for spare parts, were vastly underestimated;

3. The initial spare parts list prepared by engineering consultants did not accurately reflect requirements;

4. The original project paper overlooked the critical lack of tools and equipment at MR required to undertake the overhauls;

5. There have been considerable variations in the quality and usefulness of parts from different suppliers;

6. The need for technical assistance and training in general overhauls and supplies management was significantly underestimated; and

7. As noted, coordination between MR, USAID and other donors was lacking in the purchase of certain commodities. Even though the original PP noted that A.I.D. would purchase a recovery crane and computers, these purchases were made by other donors.

D. Proposal. As a result of these issues, this PPS proposes:

1. an increase in LOP funding from $7,290,000 to $10,790,000 to increase spare parts and equipment procurement, add significant technical assistance and expand training components;

2. an extension of the Project Assistance Completion Date (PACD) from 04/30/93 to 06/30/95 to allow sufficient time for implementation of the overhaul program; (It should be noted, however, that this redesign actually envisions a faster and more efficient implementation schedule for the overhauls.) and

3. changes in the method of procurement from host country contracting to A.I.D.-direct contracting.

The following detailed discussions on the status and revisions of various project elements and the revised procurement plan will explain the reasons for these changes in greater detail.

E. Status of Project Element and Proposed Revisions

1. Locomotive Spare Parts. Main line motive power for Malawi Railways is provided by diesel electrical locomotives, 13 British AEIs manufactured in 1963 and 1967, and 19 Bombardiers, 4 of which were acquired in 1972 and 15 in 1980. Bombardier, a Canadian company at the inception of this project, has recently been purchased by General Electric Transportation Systems of the United States.

The RRSS Project specifically addresses the overhaul and maintenance of the Bombardier fleet. Of the $2,800,000 budgeted under the initial PP for spare parts for overhauls and periodic maintenance of all 19 locomotives over a scheduled 4 year period, $3,267,554.13 worth of spare parts have already been purchased from four suppliers.

American Diesel Engineering	$ 240,536.83
Kessler Intl. Corporation	$ 329,107.35
General Electric Transportation Systems	$2,574,731.06
Westinghouse Air Brake Company	$ 123,175.99
	$3,267,554.13

It has been estimated that only five complete overhauls can be undertaken with these purchased parts. As these spare parts are only now beginning to be received in Malawi, the implementation of the overhaul program will begin in early 1992.

The first phase procurement of spare parts and subsequent analyses have demonstrated that the original PP vastly underestimated the costs of spare parts required under the project. The original PP estimated roughly $110,500 per locomotive with an additional $700,000 for parts for periodic maintenance for the entire Bombardier fleet. In a subsequent report prepared by STV Engineers in December 1989, their cost estimate for the overhaul of a locomotive more than doubled to $250,000. (STV estimated a cost of $500,000 per locomotive if the overhaul included installation of a new engine. This was suggested as an option for the four older Bombardiers.) By using actual expenditures from the first phase procurement of spare parts, however, it would appear that $663,000 have been spent per loco. This figure, although indicative of the high costs, is also a result of other factors.

For a three month period in 1991, a consultant with 36 years experience in the overhaul of locomotives carried out a comprehensive review of the initial spare parts procurements and analyzed future requirements. In the process, he also overhauled an ALCO engine from a 1972 Bombardier locomotive from the existing stock of spares. (The engine in question had been salvaged from a seriously damaged Bombardier locomotive that had been removed from the MR fleet. There had originally been 5 Bombardier locomotives purchased in 1972.) This combination of hands-on experience at the MR's workshop in Limbe and his wealth of experience in the U.S. added a high degree of credibility to his findings and recommendations and, therefore, greatly influenced the content of this PPS.

Although the costs of spares were vastly underestimated in the original PP, the actual cost requirements per locomotive are not indicative of the $663,000 figure from the first phase procurement. It was found that:

a) Many unnecessary parts were ordered. Inventory on hand was never taken into consideration. Several items, such as springs, were already in sufficient supply to last beyond the expected life of the locomotives even after general overhauls;

b) Other parts although necessary, were ordered in such large quantities that they will be sufficient to cover the general overhauls of all 19 locomotives and still have, in many instances, huge surpluses on hand. It was estimated that 30% - 40% of the parts ordered during the first procurement will be sufficient to cover the whole program;

c) Approximately 5% to 10% of the parts could have been purchased or manufactured locally, as MR still has an active foundry;

d) Approximately 5% to 10% of the parts were incorrectly ordered; (Suppliers have been notified and the needed changes are being corrected.) and

e) It was finally noted that an absolute cost estimate for future spare parts purchases would have to await the arrival of the spares ordered during the first phase procurement. It is already being found as parts arrive that some items, although correctly ordered, are not compatible with the locomotive.

By taking all these factors into consideration, future spare parts requirements and costs have been re-estimated. The U.S. consultant, in coordination with the chief mechanical engineer, the chief diesel mechanic and key personnel from the Supplies Department, reviewed the inventory on hand and the spare parts actually ordered under the first phase procurement. By using this as a basis, remaining spare parts needs were subsequently identified and suppliers consulted on current prices. Future parts requirements were estimated through an analysis of the locomotive subcomponents, i.e, radiator, cooling fan drive, eddy clutch current, traction motor, main generator, engine, turbocharger, bogies, electrical system, exciter, fuel pump, etc. This allowed for more specificity in the estimates and serves to facilitate greater options in future procurements. It was noted that cost savings could result by not viewing each part in complete isolation.

Estimates from this analysis noted that approximately $200,000 would be necessary per locomotive in order to overhaul the remaining 14 locomotives. Basing costs per locomotive on previous spare parts expenditures and estimated future costs, the cost of spare parts for general overhauls of the 19 locomotives should approximate $6,000,000.

Spare Parts Expenditures	Future Cost Requirement	Total
$3,[illegible]754	$2,800,000	$6,[illegible],554

It was determined that the four 1972 Bombardier locomotives would not require new engines as suggested in the STV report. All 19 locomotives will go through a similar general overhaul program and cost estimates are reflective of this fact.

The revised cost estimate of six million dollars for spare parts to overhaul 19 Bombardier locomotives does not include the $ 00,000 originally budgeted for spare parts for periodic maintenance. This figure has been raised by 35% to one million dollars to reflect the higher than anticipated costs. It is envisioned that the maintenance parts will last for at least the length of the project. Estimated costs for all spare parts will, therefore, approximate seven million dollars.

2. Wagons. The railway wagon situation has remained virtually unchanged since 1988. There are appoximately 900 wagons of all types in the MR fleet. Some 250 are presently unavailable as they continue to be stranded in Mozambique. The remaining 650 wagons are generally in poor condition and have an availability factor of only 60 per cent. Of this number, approximately 100 have already been converted to economically more productive container wagons.

USAID provided funding for the purchase of sheet metal to facilitate a repair program for the wagons, as well as for the repair of the superstructure of several of the Bombardier locomotives. $375,000 of the budgeted $400,000 have been used to purchase 1500 pcs of 3mm thick steel sheeting 950 pcs of 5mm thick steel sheeting, and 1285 pcs of 6 mm thick steel sheeting.

This steel sheeting is deemed sufficient to repair approximately 60 wagons a year over a three year period and refurbish locomotive superstructures where necessary. With the total shipment of steel sheeting already in Malawi or enroute via Nacala, the repair program will begin in early 1992.

3. Equipment. USAID/Malawi completed technical specifications for a recovery crane in 1990. The Mission had every intention of completing procurement of a recovery crane shortly thereafter. The Government of France, however, provided MR with a new recovery crane during this period. It was agreed by USAID/Malawi and MR that a second new recovery crane was not necessary.

While tne $2 million budgeted for the recovery crane was no longer necessary, other equipment not identified in the original PP was deemed crucial to the project. To carry ou the locomotive overhaul program, specialized tools and equipment were required. Lack of foreign currency and a general deterioration of tools over time had left MR without the equipment needed to effectively overhaul the locomotives. An engineering consulting firm identified the list of tools and equipment required. In July of 1990, USAID/Malawi allocated $275,000 from the project's contingency fund to allow for this procurement. The tools and equipment are currently being purchased with delivery expected in early 1992.

Subsequent analyses have also determined that other tools and equipment will also be necessary to improve the efficiency and effectiveness of the overhaul program. Such items as simple socket wrenches, specialized torque wrenches and degreasers will be purchased as well as other items more readily identified once the overhaul program begins. An additional $150,000 will be utilized for required tools and equipment which will raise the total budgeted amount to $425,000 for this type of project input.

4. Storage. The storage facility for Bombardier locomotive parts is a separate building from that of the AEI locomotives. With counterpart funds, a new extension was constructed on the building to act as a receiving bay and storage area for the A.I.D. - financed parts. In addition to this activity, new shelving was purchased by A.I.D. and installed on the second floor of the storage building. As the ground floor shelving is already well stocked with Bombardier parts, the addition and second floor area are sufficient to handle the new parts from the first procurement. The Mission will monitor the situation as the parts arrive to determine if future actions are necessary. The general manager of MR has also issued a directive that A.I.D.-financed parts are to remain segregated and be used solely for the overhaul program. A high-lift fork lift has already been purchased by A.I.D. with delivery scheduled for the latter part of 1991. This forklift will facilitate storage procedures.

5. Civil Engineering Line Support. With inspection gang trolleys over 20 years old and generally inoperable, engineering support services along rail routes were extremely deficient due to the large transit times required for workers and supervisors to reach worksites. The original PP budgeted $240,000 for four - twenty seat self-propelled gang trolleys and two - four seat self-propelled gang trolleys. Subsequent analyses, however, by MR and other engineering support services determined that a different configuration of gang trolleys was both more feasible and readily available from U.S. suppliers.

In addition to changes in the technical configurations of the gang trolleys, prices for such commodities were again vastly underestimated. Approximately $600,000 in project funds were utilized to purchase six self-propelled gang trolleys, four nonpowered 20 seat trailers and appropriate parts and accessories to improve the transport of personnel and materials to work sites. The gang trolleys and trailers were received by MR in May of 1991 and have become thoroughly integrated into the civil engineering line support services of the railway. In addition to gang trolleys, $200,000 was budgeted in the original PP to purchase 10 diesel motor generators with water pumps for use at out-stations which lacked both electricity and water. The purchase of these items were delayed when it was learned that the ODA was also intending to purchase such items. The Mission, in consultation with MR and ODA, will determine how many additional generators and pumps are required after ODA actions are taken. Funds budgeted for these items will, therefore, remain in the project.

6. Training Artisan technical and lower management skills have been taught by on-the-job training supplied by Sri Lankans hired directly by MR. This group of technicians, which numbered 40 in 1983, has been reduced to 10. They are expected to remain until 1995. Long term training has been provided by the ODA.

The only training provided under the project has been of a short-term nature, where three workshop supervisors have received training at the Zimbabwe Railway School in Bulawayo. It is envisioned that this program will be continued in the future. In addition, and depending on fund availability, group field trips for MR mechanics will also be planned to railway workshops in the region.

Training activities in the project will expand to encompass practical applications of locomotive overhauls in the U.S. for two MR mechanics and the chief mechanical engineer. A short-term one month program in the U.S. has been designed in conjunction with Burlington Northern Railways for these individuals to visit and actually work with counterparts on general overhauls of Bombardier locomotives at workshops in Alliance, Nebraska and West Burlington, Iowa. The chief mechanical engineer, who is RRSS project manager, will also meet with top management of Burlington North in Minneapolis, Minnesota. This program will improve technical skills, give Malawi mechanics exposure to the U.S. system and foster possible long-term relationships between MR and a major U.S. railroad. The project will budget $100,000 for this training program.

7. Technical Assistance. Technical assistance at the upper management level has been funded by ODA. The positions of general manager, financial manager and data processing manager are currently being funded by ODA. The position of chief mechanical engineer was funded until 1988.

The original PP did not consider TA as necessary. Recent assessments have changed this line of reasoning. In the first instance, technical assistance was made a project element in 1990 with the allocation of $250,000 of the project's contingency funds. The need for expertise in general overhauls and supplies management was identified by MR management and A.I.D. as critical, especially in light of the major thrust of A.I.D.'s project objectives. Short-term technical assistance has been subsequently funded in these two areas. It is envisioned that the project will continue to utilize short-term TA in these areas for three to six man months per year over the life of the project.

Although several reports have noted the high quality of technical expertise already in place at the MR workshop in Limbe, the need for long-term TA in general overhauls has been identified as a crucial requirement. The present technical staff of MR would be overburdened with the responsibilities for both the overhaul of 19 Bombardier locomotives and the regular periodic maintenance duties of all locomotives. The original PP vastly underestimated the demands of the A.I.D. program. As became evident, the Workshop and Supplies Department/ Stores have both not had experience or sufficient trained manpower on the scale envisioned for this program. Technical assistance will improve the efficiency of operations, increase the technical competence of mechanics and decrease the time of the overhaul program from four to approximately three years. These factors will all lead to actual cost savings for the railroad.

Two long-term advisors will be employed to assist MR overhaul the 19 Bombardier locomotives, improve the storage handling and usage of spare parts stocks and increase the overall capabilities and expertise of shop technicians and foremen. The first advisor would be contracted for a two year period with a third year option. This individual will be responsible for:

(1) direct line supervision of MR mechanics and support personnel undertaking the overhauls of the 19 existing Bombardier locomotives;

(2) developing an efficient system of storing and dispensing spare parts under this program;

(3) working with the senior diesel workshop superintendent from the General Overhaul Division to coordinate the work of the general overhauls with the duties of other divisions;

(4) keeping the chief mechanical engineer appraised of all activities; and

(5) providing ongoing recommendations for improvements to the MR repair, maintenance and overhaul staff capabilities, equipment and procedures.

The second advisor, who will be contracted for a one year period, will share many of the same duties as the first advisor and basically complement the work. Both individuals will be required to have extensive hands-on experience in the overhaul of Bombardier locomotives. The advisor of the initial two-year contract, however, will be the more senior of the two advisors and be in charge of the USAID assistance program. The senior advisor will also be, therefore, required to have former management experience in locomotive overhaul programs. The Mission will strive to contract an individual with at least 20 years of experience in this area.

Of the envisioned three year overhaul program, the senior advisor would begin duties in early 1992, the estimated start-up time of the overhaul program. The one-year advisor will begin work three to six months after the senior advisor. Even though the second advisor would not be in direct charge of the USAID assistance program, the individual will be required to have at least 10 years experience in locomotive overhauls to complement the duties of the senior advisor.

8. Workshop Inventory Systems. In the original PP, USAID was to fund the procurement of three microcomputers (PCs) to facilitate the computerization of the inventory system for the spare parts under the project and to provide training in their use. However, the three microcomputers are no longer required due to the fact that ODA provided MR with a mainline computer in 1991 to handle both these and other needs. The system is to be fully operational in early 1992. The ODA is currently providing training to all departments of MR in the new system.

It was obvious from the advent of the project that management of such large consignments of spare parts required an operationally sound and consistent inventory control system. The manual system in use at MR simply could not handle the literally thousands of new spare parts purchased under the project. USAID has been assured by ODA and MR that the system will include a specialized stock control software package to handle all possible inventory control requirements. The computer system will be managed by the Data Department at Malawi Railways.

Even with a new computerized inventory management system, it is still vital to provide the necessary linkages between the Data Department, which manages the system, the Supplies Department, which provides the inputs for the system, and the MR Overhaul Division, which first identifies and then utilizes the inputs. For this reason, one person from the Supplies Department has already been designated as responsible for inputting into the computer those spare parts financed by A.I.D. and recording the receipt of newly arrived parts. The individual is obtaining on-the-job training in the new system.

USAID/Malawi will also provide short-term TA and possible training to guarantee effective linkages between the various departments. A supplies management specialist with specific expertise in computerized inventory control systems will assist MR for a two to three month period from November - January, 1992. The individual will work directly with the supplies manager to guarantee that the linkages between the various departments exist and that accurate and timely management information on the inventory is provided.

The $80,000 budgeted for the computers and software programs are no longer necessary. However, a modest amount of funds, $50,000, will be made available to purchase office equipment for the Supplies Department to facilitate its work.

E. Summary of Project Elements and Revisions

1. Spare Parts

(a) Supplied spare parts for five locomotive overhauls.
(b) To supply spare parts for remaining 14 locomotives.
(c) To supply spare parts for basic maintenance of 19 locomotives.

2. Steel Sheeting

Supplied steel sheeting for repair of 180 wagons plus required superstructure of Bombardier locomotives

3. Equipment

(a) Will not purchase recovery crane
(b) Supplied specialized tools and equipment for overhauls
(c) To supply additional tools and equipment

4. Storage Facilities

(a) Supplied shelving
(b) Supplied forklift
(c) Constructed addition to storage facility

5. Civil Engineering Line Support

(a) Supplied six self-propelled gang trolleys.
(b) Supplied four nonpowered trailers.
(c) To supply 10 diesel motor generators with water pumps.

6. Training

(a) Trained three workshop supervisors at Zimbabwe Railway School
(b) To train other workshop supervisors at Zimbabwe Railway School
(c) To train three Malawians at Burlington Northern workshops in U.S.

7. Technical Assistance

(a) Provided short-term TA in general overhauls and supplies management.
(b) To provide additional short-term TA in above areas.
(c) To provide long-term TA in general overhauls.

8. Workshop Inventory Systems

(a) Will not purchase computers.
(b) To supply office equipment for Supplies Department
(c) To provide possible training and short-term TA in management information systems and inventory controls.

IV. REVISED COST ESTIMATES AND FINANCIAL PLAN

Since the project was originally authorized in July 1988, the estimated cost of the project has increased by approximately 50% from $7.29 million to $10.79 million.

The primary reason for such large cost increases ($3.5 million) was the vast underestimation of costs for certain commodities, especially spare parts. Although $2.8 million was budgeted for spare parts under the original PP for the overhauls and periodic maintenance of 19 Bombardier locomotives, an estimated $7 million will be required. This marks a 150% increase over originally anticipated costs.

The actual expenditure of approximately $600,000 for the gang trolleys and trailers for engineering line support was approximately 150% higher than the original estimate of $240,000. The budget for civil engineering line support has been increased from $440,000 to $850,000 to accommodate this cost increase and still allow sufficient funds to purchase diesel generators and water pumps.

A second reason for the cost increase to the project is the addition of new project elements and inputs. Although the original PP did not include a provision for technical assistance, the Mission moved $250,000 from the project's contingency fund in 1990 to provide for short-term technical assistance activities. An additional $600,000 has been budgeted to this project element to provide funding for long-term TA Specialized tools and equipment were another input not included in the original PP. As with TA, the Mission again utilized the project's contingency fund in 1990 to budget $275,000 for tools and equipment. An additional $150,000 will be utilized for yet additional tools and equipment which will raise the total budgeted amount to $425,000 for this project input. Equipment for the Supplies Department was a third input not included in the original PP. $50,000 has been budgeted for this purpose to facilitate supplies management and inventory control activities.

Although a training component appeared in the original PP, funds budgeted for training have been increased from $120,000 to $220,000. This increase will allow the training program for three individuals with Burlington Northern Railroad in the U.S.

A final reason for the cost increase, however minor, was the underestimation of costs for project monitoring, evaluation and audit. Of the $100,000 initially budgeted for these services, an additional $200,000 had been moved from the contingency fund in 1991 to provide adequate funding for this purpose. The basic costs of specialized engineering services is much higher than anticipated. (It should be noted that the original contingency fund of $1,250,000 has been depleted by more than half to $525,000 to cover the three activities discussed above.)

Cost increases to the project would have been much greater had not some inputs been removed. The $2 million budgeted for the recovery crane and the $80,000 budgeted for computer equipment have been freed up for other uses. These funds have and will be used to offset the cost increase in other areas.

The following three tables, "Revised Financial Plan", "Revised Summary of A.I.D.'s Contribution" and "Revised Financial Plan By Year Of Disbursement" demonstrate in detail the financial changes discussed above.

TABLE I

REVISED FINANCIAL PLAN

ITEM	ORIGINAL PP ($ US)	PP AS AMENDED ($ US)	NEW BUDGET REVISION ($ US)
1. Commodities and Renovations	5,820,000	6,095,000	8,895,000
2. Training	120,000	120,000	220,000
3. Monitoring, Evaluation and Audit	300 000	300,000	300,000
4. Technical Assistance	0	250,000	850,000
5. Contingency and Inflation	1,250,000	525,000	525,000
TOTAL	7,290,000	7,290,000	10 790 000

1. PIL No. 13 of July 25 1991 - (Budget Realignment for Tools and Equipment at $275,000)

2. PIL No. 17 of January 16, 1991 - (Budget Realignment for Monitoring and Evaluation for $200,000 increase)

3. Grant Agreement Amendment No. 1 and PIL No. 14 of October 30, 1990 - (Provision for Technical Assistance Line Item at $250,000)

TABLE II

REVISED SUMMARY OF AID'S CONTRIBUTION ($US)

ITEM	ORIGINAL PP AS AMENDED	THIS SUPPLEMENT	TOTAL
1 Spare Parts/Steel Sheets for Locomotive Overhauls and Maintenance	2,840,000	4,270,000	7,110,000
2. Wagon Repair/Steel Sheets	360,000	0	360,000
3. Recovery Crane	2,100,000	(2,100,000)	0
4 Tools and Equipment	275,000	150,000	425,000
5 Stores	100,000	0	100,000
6 Civil Engineering Support Fixing Trolleys, Trailers and Generators	440,000	410,000	850,000
7 Training	120,000	100,000	220,000
8. Technical Assistance	250,000	600,000	850,000
9 Computerized Workshop Inventory	80,000	(80,000)	0
10. Supply Management Support	0	50,000	50,000
11 Project Monitoring, Evaluation and Audit	300,000	0	300,000
12. Contingency	525,000	0	525,000
TOTAL	7,290,000	3,500,000	10,790,000

TABLE III

REVISED FINANCIAL PLAN BY YEAR OF DISBURSEMENT (ALL COSTS IN $)

ITEM	FY 88-91	FY 92	FY 93	FY 94	FY 95	TOTAL
1. Commodities and Renovations	4,500	2,000	2,000	350	45	8,895
2. Training	20	100	50	50	0	220
3. Monitoring, Evaluation and Audit	30	0	0	100	0	130
4. Technical Assistance	50	300	300	150	50	850
5. Contingency and Inflation	0	0	200	200	25	525
TOTAL	770	2,400	2,550	850	120	10,790

V. REVISED PROJECT IMPLEMENTATION PLAN

A. Project Management

The Regional Rail Systems Support project is a regional umbrella project comprising three distinct country-specific support and maintenance projects in Mozambique, Swaziland and Malawi. The implementation of these three components is separate but with important linkages. Successful achievement of the objectives of the Mozambican component will enhance and complement the Malawi component by facilitating the haulage of cargo to Mozambican ports. Overall responsibility for the initial design and coordination of the project rested with the Southern Africa Regional Program of USAID/Zimbabwe. This redesign effort of the Malawi project has been the responsibility of USAID/Malawi. The Malawi project is being implemented by USAID/Malawi and the Government of Malawi. The GOM's implementing agency is Malawi Railways. Technical support in areas of engineering, procurement and contracting will continue to be required from REDSO/ESA. Project financing and appropriate payment procedures to suppliers will continue to be handled by the USAID/Malawi controller.

B. Revised Procurement Plan

1. Responsible Agency: In the original PP, Malawi Railway was designated as the project procurement entity which would use host country contracting procedures. The design team, however, did not perform an assessment of their international procurement capabilities. It was during the course of the major locomotive spare parts procurement that MR's lack of experience and ability to perform international procurement became evident. It then came to light that MR normally used a local procurement services firm to purchase parts for them off-shore. This avenue was considered. However, the concern arose that the Malawi Government holds sixty percent of the voting stock in the procurement firm, and that USAID should not pay a procurement fee to a parastatal firm. After considering various options and, given the nature of the procurement remaining, USAID/Malawi has determined that the best method to be used would be A.I.D. direct contracting in concert with REDSO/ESA contracting and commodity management personnel.

2. Technical Assistance: The need for long term technical assistance has been identified as a critical element in order to achieve the objectives of the project. It is envisioned that two Personal Services Contracts will be awarded. REDSO/ESA/CON will be requested to handle the contracting as the total estimated costs exceeds the Mission's contracting authority.

Since neither the original PP nor subsequent amendments provided for long term technical assistance, the issuance of the PIO/T cannot be done until this supplement is approved. Notwithstanding, the documentation for recruitment of the 2 PSCs has been prepared.

The requirement will be synopsized in the Commerce Business Daily as well as specialized trade journals such as ENR in order to reach the maximum number of candidates. It is anticipated that the technical advisors will be fielded in early March, 1992. In the event that recruitment of personal services contractors is unsuccessful, the Mission would consider contracting with an institutional or firm.

3. Equipment List:

The original equipment list is revised as follows:

ITEM	ESTIMATED COST
a) Locomotive spare parts for overhaul/maintenance	$ 7,110,000
b) Sheet steel for wagon repair	360,000
c) Shelving and Mobile Equipment for Stores warehouse	100,000
d) Trolleys - Four Gang and two Inspection	650,000
e) Diesel generators and water pumps, 10 ea	200,000
f) Office Equipment for Supply Management Department	50,000
g) Tools and Equipment	425,000
TOTAL REVISED ESTIMATED COST FOR COMMODITIES	8,895,000

4. Procurement Process: Although Host Country Contracting by Malawi Railways was used to procure the initial spare parts, steel sheets, gang trolleys and forklift, the process was quite onerous. Further with the new guidance for assessment of the procuring agency's ability, it is unlikely that the findings would be favourable. Nor would the remaining procurement warrant the use of project resources to provide a technical assistance contract to accomplish these tasks. Only two major spare parts purchases remain to be done. It is also intended to purchase specialized tools, additional workshop equipment, and office equipment consisting of a facsimile machine, electric typewriter and photocopier for the Supply Management Division of MR. To accomplish these procurements Malawi Railways with assistance from a U.S. contractor will provide USAID/Malawi with the list of parts and equipment to be purchased. For the spare parts, USAID/Malawi would prepare a PIO/C with REDSO/ESA CON/CM as the authorized agent. For the office equipment for the Supply Management Division, the authorized agent should be USAID/Malawi (Note: The RCMO can assist if needed). The workshop equipment will be purchased through the REDSO/ESA PSA IQC. Prior to issuance, the workshop equipment specifications should be sent to RCMO for review and refinement and the PSA will be designated for inclusion in

the PIO/C along with RCMO's advice that the specifications are adequate. The following time schedule should be considered when developing the PIO/C's:

Synopsis/Solicitation/Award: 60 - 90 days.

Delivery:

Locomotive spare parts: 120 -- 210 days from award of contract.

Specialized Tool/Equipment: 90 - 150 days from award of contract.

Office equipment: 90 - 120 from receipt of order by vendor.

USAID/Malawi has also determined that the locomotive spare parts shall be procured on a sole source basis. This decision was predicated on the fact that suppliers, other than the manufacturer, have historically provided unusable parts. In addition, it has come to light that the Zambia Railway Project experienced similar if not worse results which are highlighted in a RIG audit report This audit recommended using sole source procurement. For the Malawi Project Component, this will involve contracting directly with WABCO for all brake parts and with General Electric for all remaining locomotive parts. To ensure that the prices proposed by GE and WABCO are fair and reasonable, it is also anticipated that a value engineer will be hired to assist in the proposal evaluations. The USAID/Malawi Mission Director, as head of the procuring activity, can authorize other than full and open competition from a single source up to $10 million pursuant to FAR Part 6.

Given the problems experienced by MR to effect emergency procurements of locomotive spare parts, USAID/Malawi will establish an emergency spare parts procurement fund of approximately $50,000. A PIO/C will be issued with USAID/Malawi as the authorized agent. The Mission EXO will issue either a Blanket Purchase Agreement or unpriced Purchase Order to G.E. and WABCO. These instruments will be used only in extreme and compelling situations, for example, where the failure to obtain a piston ring that is not in stock will halt the overhaul process. The following steps will be taken:

a) MR Supply Management Officer through the SME and GM will FAX or telex a "Request for Emergency Spare Part Purchase" to USAID/Malawi EXO (See Attachment 1).

b) The EXO in consultation with the USAID Project Officer will FAX WABCO or GE requesting current pricing, weight and availability (See Attachment 2).

c) Upon reply, EXO will issue a work order similar to the sample provided in Attachment 3.

d) Supplier would DHL or air freight the part/parts in accordance with the instructions contained in the work order.

The following pages illustrate this process.

FAX

TO: (COMPANY/ORGANIZATION) : EXO/USAID/Malawi

FAX NO. : 730-237

TEL. NO. : 731-632

FROM : D. Mysani, SMO/MR
FAX No. 640-683

THRU : 1) S. Takomana, SME/MR
2) Gillman, GOM/MR

Subject : Request for Emergency Spare Parts Procurement

Please order on an emergency basis the part(s) listed below which is/are critical to the overhaul of locomotive no. _____ Engine no. _____. We hereby certify that without this/these part/parts the timely completion of the overhaul will be jeopardized.

Item No.	Mfr's Name	Mfr's Part No.	Description	Qty	Unit

Attachment 2

TO: (COMPANY/ORGANIZATION)	:	GE/WABCO
ATTENTION	:	_____
FAX NO.	:	_____
TEL. NO.	:	_____
DATE	:	_____
REFERENCE NUMBER	:	PBA/PO No. 612-0247-0-00- 00
TOTAL NUMBER OF PAGES	:	1 (INCLUDING THIS ONE)
NAME OF SENDER	:	
OFFICE	:	EXO
CLEARANCES	:	_____

MESSAGE:

Subject: Request for Quotation for Locomotive Parts - Emergency Procurement Against Ref. PBA/P.O.

1. USAID/Malawi would appreciate receiving no later than _____ a quotation for part/parts listed in para 2 below. Quotation should be CIF Limbe/Blantyre, Lilongwe. Delivery basis is via DHL for parts weighing less than 10 lbs or airfreight for parts in excess of 10 lbs. Note insurance at 110% of C & F value. Please indicate current price, part/parts weight and availability.

2. Part/Parts required is/are:

Attachment 3

EXECUTIVE OFFICE
USAID/MALAWI
DEPARTMENT OF STATE
WASHINGTON, D.C. 20521-2280
TELEX NO. 4627/FAX NO. 265-730-237

Work Order no. _____ entered into under BPA/P.O. NO. _____.

NEGOTIATED PURSUANT TO THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED, AND EXECUTIVE ORDER 11223.

SUPPLIER (Name and Address).

CONTRACTING OFFICE:
Executive Office
USAID/Malawi
Department of State
Washington, D.C.
20521-2280

EFFECTIVE DATE:
Date of Contracting Officer's Signature

ESTIMATED COMPLETION DATE

ACCOUNTING AND APPROPRIATION:
PIO C 612-0247-4-
Appro. no.
3PC:
RESCTLNO:
AMOUNT OBLIGATED:

SUBMIT INVOICES TO:
CONTROLLER'S OFFICE
USAID Malawi
Dept. of State
Washington, D.C.
20251-2280

The United States of America, represented by the Contracting Officer signing this Order, and the Supplier agree that: (a) this Order is issued pursuant to the Blanket Purchase Agreement specified above and (b) the entire Contract between the parties herein consists of this order and any subsequent ones and the Agreement specified above.

(Typed or printed name of USAID Contracting Officer)

BY (Signature of Contracting Officer and Date)

ACCEPTED BY: _____ **DATE** _____
(Signature and Typed and Printed Name)

Page 2 of pages
BPA NO. 612-0247-0-00- -00
Work Order no.

PART/PARTS REQUIRED:

Item No.	Mfr's Part No.	Description	QTY	UNIT	UNIT PRICE	TOTAL PRICE

DELIVERY PERIOD: _____

METH OF SHIPMENT: [ ] Ocean [ ] Air f eight

CONSIGN TO AND MARK FOR:

MARKING REQUIREMENTS: Mark inside and outside of box with BPA/P.O. no. A.I.D. marking requirements apply.

ADVICE OF SHIPMENT: Supplier shall FAX to USAID the AWB number, airline and flight number, date of departure from the U.S. and date of arrival in Malawi.

5. Procurement Source and Origin: The original PP provided that the source and origin would be A.I.D. Geographic Code 941 and a waiver was approved to cover $1 million of locomotive spare parts from Code 935. As the additional funding will come from Development Fund for Africa source which authorizes Code 935, all procurements financed with these monies will use Code 935.

Per Congressional guidelines set forth in the legislation authorizing DFA, all reasonable efforts will be made to maximize U.S. source and origin goods to the extent practicable. The above commodity list has been reviewed by the REDSO/ESA Regional Commodity Management Officer. Only those items not currently manufactured in the U.S. or which because of the very nature of the item(s) cannot be purchased and shipped from the U.S. at a reasonable cost, have been designated as eligible for purchase from Code 935 source/origin.

6. Receipt and Utilization. Malawi Railways will clear goods from customs within 30 days of arrival in Malawi. MR will then conduct an inventory of the goods received and within 45 days of clearance from customs acknowledge in writing to USAID/Malawi receipt of the goods. This receiving report will detail any shortages, overages, damage or discrepancies from that which should have been received and will report or propose any remedial action which has been or will be undertaken by the Railway to correct them.

7. Marking: Any equipment financed by A.I.D. under this component of the project will be appropriately marked with the A.I.D. Clasp Hand Symbol. Major components of spare parts will also be marked. Suppliers will be required to mark goods prior to shipment from the United States.

8. Financing: Since under the Malawi project most of the procurement will be through A.I.D. direct contracts with suppliers from the United States, the payments will be made by USAID/Malawi's Controller directly to the supplier through the Regional Disbursing Office in Paris, France. The following summarizes the contracting and financing methods.

CONTRACTING AND FINANCING METHODS

PROJECT ELEMENT	IMPLEMENTATION METHOD	FINANCING METHOD
1. Commodities, Equipment and Renovations	AID Direct Contract HC Contract	AID Direct Payment/BankLC.* Direct Letter of Commitment
2. Training	HC Contract AID Direct Contract	AID Direct Reimbursement AID Direct Payment
3. Evaluation	IQC or Mission Contract	AID Direct Payment
4. Technical Assistance	AID Direct Contract	AID Direct Payment

*Note: If REDSO/ESA IQC with Procurement Sector Agent is used as method of implementation for procurement of any commodities and equipment, a Bank Letter of Commitment method of financing will be used as it will involve proliferation of invoices from various suppliers. PSA fees will, however, be paid directly to USAID Controller.

C. Schedule of Events

	Date	Action	
PP supplement completed	Nov. 91	USAID/M	
Grant Agreement signed	Dec. 91	USAID/GOM	
Gang trolleys, tools and equipment, first phase spare parts, steel sheeting and franklift received	Dec. 91	USAID/M	MR
Wagon rehabilitation program begun	Feb 92		MR
Locomotive overhaul program begun	March 92		MR
Long term TA begun	March 92	USAID/M	
U.S. training begun	June 92	USAID/M	MR
Second phase spare parts list submitted	July 92	USAID/M REDSO/ESA	MR
Tools and office equipment list submitted	July 92	USAID/M REDSO/ESA	MR
U.S. training, ended	Sept. 92	USAID/M	MR
Second phase spare parts awarded	Oct. 92	USAID/M REDSO/ESA	
Tools and office equipment awarded	Oct. 92	USAID/M REDSO/ESA	
Tools and office equipment received	Feb. 93	USAID/M	MR
Second phase spare parts received	April 93	USAID/M	MR
Third phase spare parts list submitted	July 93	USAID/M REDSO/ESA	MR
Third phase spare parts awarded	Oct. 93	USAID/M REDSO/ESA	
Third phase spare parts received	April 94	USAID/M	MR
Long-term TA ended (Third year option)	April 95	USAID/M	
Overhaul program ended	May 95		MR
Rehabilitation program ended	May 95		MR
PACD	June 95	USAID/M	MR

VI. REVISED PROJECT ANALYSES

The project paper supplement design team reviewed all original project analyses. Given the type and extent of changes in the project design, the technical, social and environmental analyses were found to be still valid and applicable. The cost increases and expansion of technical assistance activities did, however, mandate new institutional, economic and financial analyses.

A. Revised Institutional Analysis. In comparison to other railways in Africa, MR is well-managed. MR's principal problems continue to be financing stemming from an eight-year string of operating losses which have been funded by grants from the Malawi Government. The losses result principally from significant reductions in traffic as a result of MR's severed international connections through Mozambique.

The primary institutional concern in the initial PP was the need to fill key senior management positions with qualified individuals. This has taken place since that time with the employment of a new general manager and chief mechanical engineer.

Several issues of institutional importance however, have necessitated a reasssessment of two departments at MR. Although the initial PP found both the MR's Workshop and Supplies Department/Stores well staffed and productive, it vastly underestimated the demands the A.I.D. program would place on these departments. In many respects, the program requires full time attention and this proved an impossibility with the existing staff.

Neither department had experience on such a scale as proposed in the program. The Limbe Workshop had never been tasked to undertake an overhaul program for their entire fleet of Bombardier locomotives nor had the Supplies Department the experience in ordering, contracting and handling approximately 3000 new items in their inventory. As the first phase procurement demonstrated, host country procurement actions under A.I.D. guidelines were an extremely cumbersome burden on the existing staff, who had actually little former procurement experience. In both departments, there is neither sufficient trained manpower nor systems to efficiently complete the overhaul and procurement activities in a timely manner.

These factors have led to changes in the project's procurement process, the initiation of technical assistance to each department and the expansion of training activities in general overhauls in the U.S.

B. Summary of Revised Economic and Financial Analysis. The following is a summary of the Economic and Financial Analysis. The complete analysis is found in Annex I.

Despite significant increases in project costs, the project is judged to be financially viable and economically sound. There is reliable economic justification to overhaul all 19 Bombardier locomotives which form the backbone of the MR fleet. It was found that, depending on the scenario, MR required between 17 and 34 locomotives to meet freight haulage requirements after the Nacala rail route becomes fully operational.

These numbers do not take into account the requirements for passenger locomotives. Without the project, MR will not have the capacity to transport the traffic generated by Nacala.

Furthermore, locomotive availability would drop significantly without the project. This has already been demonstrated by the fact that locomotive availability has already dropped from 70% to 60% since the initial PP. Without the project it would continue to drop an estimated 10% a year. As a result of these factors, the level of service possible without the project will be so low that very few shippers will ship their goods over the Nacala line.

Given that MR needs additional tractive power starting around 1993 to meet the demands of the openings of the Nacala line, and the anticipated growth in trafffic, the analysis found that the most cost effective way to provide additional locomotives is by overhauling the Bombardier locomotives now in the MR fleets rather than leasing additional locomotives or purchasing new ones.

Prospects for financial viability of the railroad, even with the rehabilitated locomotives are poor unless major improvement is made in operations, costs and structure, and in the level of service provided to its potential clients. With the restructing currently considered by the GOM and MR, it should be possible to reduce costs and increase revenues sufficiently to ensure a financially viable operation.

Assuming that the contemplated restructuring is successful, the USAID investment will have an economic rate of return (ERR) at about 41 per cent. The GOM and other donors are currently addressing these restructuring issues.

VII. Revised Evaluation Plan

Two formal evaluations of the A.I.D. project are planned in coordination with those of the companion projects in Mozambique and Swaziland under the overall RRSS Project.

A. Mid-Term Evaluation

Mid-term evaluation will be conducted in June 1992 and will focus on the following:

- progress made in implementation of the overhaul program for 19 Bombardier locomotives;

- progress made in improvements to routine maintenance programs and in increasing effectiveness and efficiency of Malawi Railways (MR);

- performance and utilization of gang trolleys and trailers; and

- implementation of the wagon repair and reinforcement program.

The evaluation will also cover implementation matters such as the quality of planned technical assistance, assessment of procurement procedures followed, and project management by MR and USAID. One special concern which will be addressed is MR's capability to meet the demands of the transport situation which exist at the time of the evaluation. MR's capacity to serve changed transport needs, brought about by the planned reopening of the Nacala line and the opening of the Northern Corridor Project route through Dar es Salaam, is uncertain. The evaluation team should provide some assessment of this capacity, and should note any actions MR needs to take to meet present and future transport demands.

The mid-term evaluation will consist of one railway mechanical engineer, one railway management/operations expert and one transport economist. USAID will provide a procurement/commodity management specialist as part of the team. The period of the evaluation will be four weeks.

B. Final Evaluation

The final evaluation will be scheduled for March 199', and will focus on:

- the extent to which MR has developed a sustained maintenance capacity for the 19 Bombardier locomotives over the life of project,

- improvements to capability for repair of wagon superstructures, and consequent increase in availability of serviceable wagons, and

- increased efficiency of rail repair crews and engineering support to rail repair work.

In addition, the final evaluation will review the current international transport situation, including the various open and operational routes. It will assess the transport demands on MR, and its capability to provide the necessary service along these routes.

Finally, the evaluation will document and comment on related topics such as rate charges, frequency of service on specific routes, length of journey times, maintenance turnaround and downtime of equipment, etc., and will consider separately service on international and domestic routes. Overall, the final evaluation will assess improvements in the quality and level of service Malawi Railways is able to provide as a result of project activities.

The team for the final evaluation will consists of one railway mechanical engineer, one railway management/operations expert and one transport economist. USAID will again provide a procurement/commodity management specialist as part of the team. The length of the final evaluation will be three weeks.

VIII. Audit

Sufficient funds have also been budgeted in the project to cover the cost of any mission contracted audits which may be necessary or required during the course of the remaining life of the project.

FINAL DRAFT

July 25, 1991 C.G.V.

FINANCIAL AND ECONOMIC JUSTIFICATION OF THE RRSS (MALAWI) PP AMENDMENT

INTRODUCTION

This section consists of four investigations: 1) What are the locomotive requirements of MR assuming Nacala becomes operational in 1993, and the proposed restructuring of the railway increases the efficiency and financial viability of the railway; 2) is rehabilitation of the Bombardier locomotives the most cost-effective way to provide the tractive power as compared to the alternatives of buying new locomotives, or leasing locomotives, 3) what are the prospects for financial viability of MR, and 4) what is the economic rate of return of the USAID investment taking into account complementary investments required to realize the full potential of the USAID investment.

Findings

It was found that, depending on the scenario, MR requires between 17 and 34 locomotives to meet the requirements of freight haulage after Nacala opens. This does not take into account the requirements for passenger locomotives.

The most cost-effective way, on a present value basis, to provide additional locomotives is by overhauling the Bombardier locomotives now in the MR fleet.

Prospects for financial viability of the railroad, even with the rehabilitated locomotives, are poor unless major improvement is made in operations, costs, and tariffs structure, and in the level of service provided to its potential clients. With the restructuring currently considered by the GOM and MR, it should

be possible to reduce costs and increase revenues sufficiently to ensure a financially viable operation.

Assuming that the contemplated restructuring is successful, the USAID investment will have an economic rate of return (ERR) of about 41 per cent.

LOCOMOTIVE REQUIREMENTS

The requirement for locomotives by MR were analyzed under three scenarios: 1) for 1994/95 traffic with Nacala open, but Beira closed, (2) for 1994/95 traffic with Nacala and Beira open, and (3) for the year 2000 traffic with both Nacala and Beira open. The traffic projections for the first two scenarios were taken from the Transmark report, for the third scenario the traffic projections came from MR (see Tables 1, 2 and 3)

Net tons of freight traffic in the dominant direction for each of ten sections, and as prepared by Transmark and MR, provided the basic input to the analysis. The net ton kilometers (NTKM) in the dominant direction for each section was then calculated by multiplying the net tons by the length of the section. This was then converted to gross ton kilometers (GTKM) by applying the standard 1.54 ratio of gross tons to net tons.

The train operating parameters (see below) of availability, loco utilization, work days per year, gross trailing load, gross tractive power coefficient, were then applied to convert GTKM to train equivalent kilometers (TEKM). The definition of these parameters is as follows:

> **Availability:** The percentage of time a working locomotive is available for work. This is 1 - the fraction of time a locomotive is in the workshop undergoing maintenance. For good operations, where

locomotives are not waiting for parts and where the work is well organized, the availability is generally over 75%. The World Bank in the STC study recommends 75 per cent as a short term performance objective for the railroads, and 85 per cent as a longer term objective.

TEKM: This parameter measures the utilization of a working locomotive in the number of kilometers per day it is actually pulling a train. Thus, the time spent waiting in marshalling yards waiting for a train to be assembled, or the time it spends going empty to a siding to pick up a few wagons detract from utilization. The World Bank recommends a utilization of 300 kilometers per day for MR over the short term, and 400 kilometers over the long term. This may be somewhat ambitious, and MR suggested a utilization of 250 kilometers per day. This is approximately equal to the utilization achieved during the early 70's.

Gross Trailing Load: This is the theoretical total weight of wagons and payload pulled by the locomotive(s).

Gross Tractive Power Coefficient: This is an adjustment factor -assumed at 80 per cent for this study to convert the theoretical gross trailing load to a practical gross trailing load. This variable takes into account factors such as the proficiency of the driver, and the condition of the locomotive and track.

TEKM defines the number of train kilometers per year in the dominant direction required to move the projected gross ton-kms of freight traffic. It is calculated as the GTKM per year divided by the practical trailing load for one train.

The number of trains required is then calculated as two times the TEKM (dominant direction) divided by the kilometers per year for one train. The factor of two enters to account for the trains that must return over the minor direction. The kilometers per year for one train is calculated as the availability times the number of working days per year times the kilometers per day (utilization) for one train.

The loco requirements for operations on level terrain is the same as the number of trains required. To account for operations on hilly terrain, such as encountered in the South, the number of trains must be multiplied by the loco consist, or the number of locos required to pull one train.

Finally, the estimated number of locomotives required for passenger service, ballast work, and maintenance work must be added to the required number of freight locomotives.

Results

LOCO REQUIREMENTS (Excluding passenger traffic)

Traffic projection	Freight	Ballast	Maintenance	Total
Transmark projections (Beira closed, 94/95)	11	3	3	17
Transmark projections (Beira open, 94/95)	21	4	4	29
MR projections (Beira open, yr2000)	26	4	4	34

Note: Nacala assumed open for all scenarios.

ALTERNATIVES FOR PROVIDING TRACTIVE POWER

Given that MR needs additional tractive power starting around 1993 to meet the demands of the opening of the Nacala line, and the anticipated growth in traffic, the question is how to best provide the additional capacity. There at least three alternatives: 1) rehabilitating the existing Bombardier locomotives, 2) lease additional locomotives from Spoornet or other sources, if available, and 3) purchasing new locomotives.

Table 4 presents an analysis including the assumptions that establishes the least cost alternative. Both the rehabilitated and new locomotives will require periodic maintenance at the B, C, D, and E level. For new locomotives, because they are new, the maintenance and running cost are assumed at 20 per cent less than for the rehabilitated locomotives. For leased locomotives, the maintenance cost is included in the price of the lease. Because the leased locomotives can be quite old - the four Spoornet locomotives now on lease date from the early seventies - running costs for the leased locomotives are assumed the same as for the rehabilitated Bombardiers.

The rehabilitation cost of the Bombardier locomotives is assumed at $200,000, which includes $175,000 for parts, and $25,000 for labor.

As shown in the table, the cost for rehabilitation on a present value basis is $1,373,742 for the rehabilitation alternative, $2,597,784 for the "buy new" alternative, and $2,597,784 for the "lease" alternative. The rehabilitation of the locomotives is thus by far the least cost option. In fact, the cost for rehabilitation can increase by about $1,000,000 before it must be rejected.

FINANCIAL ANALYSIS

Before the disruptions in Mozambique that closed the Nacala line and imposed very large additional transport costs on the Malawi economy, Malawi railways (MR) was a financially viable organization. After 1981, however, traffic dried up, costs rose and efficiency went down, and MR suffered large financial losses each year. Though the USAID project of rehabilitating 19 locomotives will restore MR's tractive power, improvements in efficiency are needed if MR is to meet the traffic demands of the opening of the Nacala line. Furthermore, prospects for financial viability of the railroad are poor unless costs, as recommended in the SIC study for MR, are reduced by about 20 per cent and tariffs are raised by about 65 per cent. Without improvement in its operations, costs, and tariffs structure, and in the level of service provided to its potential clients, the USAID investment in rehabilitating the Bombardier locomotives will not be economically viable. There is an urgent need for MR to undertake major restructuring of all its elements including operations, maintenance, staffing, assets, and tariffs to make the railroad competitive, and to enable it to operate on commercial principles.

Background

MR with a route length of only 779 kilometers is the smallest railroad in the SADCC countries. In 1975, one of the peak years for MR, it carried only 252 million net ton kilometers of traffic, or about 6 per cent of the traffic carried by the National Railways of Zimbabwe. The average freight haul for MT is only about 200 kilometers, and even though, in principle, rail is more efficient than road in terms of fuel consumption, the small size of the rail system with consequent high fixed cost relative to larger railroads requires MR to operate at a high level of efficiency to compete effectively with road.

During the 1975 - 1981 time period MR was able to give a good

account of itself despite its small size. Total freight traffic during this time varied between 1.1 and 1.3 million tons per year, and efficiency of operation was adequate. Locomotive utilization averaged around 185 kilometers - though it started dropping toward 1981 - per available locomotive per day, and availability of locomotives was slightly under 70 per cent. MR statistics for this time period indicate that operating ratios remained below 100, showing that MR's revenues covered the costs

After 1981, the political instability in Mozambique forced closure of the Malawi rail links to Nacala and Beira, and at same time the productivity of Mozambique ports dropped sharply. Malawi export and import traffic which amounted to about 800,000 tons annually had to be routed, at great additional expense, through alternate ports in Tanzania and South Africa. For example, shipping from Blantyre via road and rail to Durban is $136 per ton as compared to $34 per ton for Nacala[1], or four times more expensive. Shipping from Blantyre to Dar es Salaam by road costs $176 per ton, and is five times more expensive than shipping to Nacala. It is estimated that the excess transport cost paid by Malawi exceeds $50 million per year, and absorbs over 60 per cent of Malawi's export earning.

The impact of the very expensive re-routing of exports and imports on the Malawi economy and traffic levels of MR was devastating. Though no data are available, the large increase in transportation cost undoubtedly forced many producers and importers out of business, and as can be seen from the fact that traffic levels dropped from their peak of 272 million NTKM in 1975 to a low of 69 million NTKM in 1989. Since this was a period of great uncertainty, MR did not know when traffic on the international routes would be restored to normal operation. MR

[1] STIPA study.

therefore retained all physical assets and staff during this period thereby raising overheads considerably without compensating increases in traffic, and the profitability of MR changed into a loss. The operating ratio, for example, increased to 115, indicating that operating expenses exceeded revenues, and that subsidies from the Government were necessary. Because of the shortage of funds, no provision was made for asset replacement, and maintenance was sharply curtailed. As a result assets such as locomotives are in poor condition, and core stocks of spare parts and basic supplies have been exhausted. The performance indicators of MR also deteriorated: locomotive utilization dropped to 82 kilometers per day per locomotive available in 1989 compared to 250 kilometers per day in 1975.

The large drop in traffic in proportion to the small size of MR, and the drop in performance has caused the railway to suffer large losses. And prospects for the future are not good. Transmark estimates that, by 1994/95, assuming full operation of the Nacala line and a reorganization of passenger and freight traffic but no change in tariffs or costs, the total operating costs (including variable and fixed operating costs, interest, and depreciation of renewable assets at replacement prices) of K 56 million will exceed the revenues of K 31 million by K 25 million (see Table 5). Eliminating all passenger traffic (Table 6) and truncating the network (Table 7) by closing several sections (which may not be wise), offers some improvement in finances, but revenues will still exceed costs for a loss of K 17 million.

The analysis prepared by Transmark is useful is showing that the additional traffic expected from the opening of the Nacala line, by itself, will not sufficiently improve the finances of MR. Rather, the analysis shows that MR will remain in a vulnerable position, and will face a financial crisis that requires urgent action. There is a grave danger that, unless the considerable

assets of MR are managed more effectively, the continued deficit will have a negative impact on the financial health of the Malaw economy.

The reasons for MR's poor financial performance are common to the poor financial performance of most of the other railroads in the in the SADCC region (see the STC report). The reasons are: (i) tariff policies, (ii) operational/management policies, (iii) the physical constraints of poor track conditions, lack of tractive power, etc., and (iv) interruptions of important line segments by armed bandits. Once the political problems in Mozambique are resolved and the Nacala line has been rehabilitated, and MR's locomotives are restored to full productivity, the binding constraints will be the tariff policy, and the lack of an efficient operating policy.

The types of actions required to restore MR's financial viability are now under discussion by the ODA, USAID/Lilongwe, USAID/Harare, the World Bank, the GOM, and MR. In essence, these actions involve a comprehensive restructuring effort aimed at (i) reducing the cost of operation, (ii) more efficient utilization of equipment by scrapping aging assets, (iii) elimination of mixed passenger-freight train service, (iv) adjustment of tariff levels so they cover at a minimum the operating cost including depreciation of renewable assets, and (v) where uneconomic rail passenger service must be continued because of lack of alternative transport, the Government must compensate MR for the shortfall in revenues.

Table 5, 6, and 7 give an indication of the improvement in financial viability that can be expected from a successful restructuring effort. Assuming, as recommended in the STC study, that the average increase in MR tariffs is 65 per cent, and that a successful restructuring effort will reduce operating costs by 20 per cent, MR will experience surpluses for all three cases.

For the case of full service including passenger service, the surplus for 1994/95 is K 3.4 million for the case where passenger service is dropped, the surplus is K 3.1 million. For the final case where passenger service is dropped and the rail network is truncated, the surplus is K 5.7 million . Thus, successful restructuring will enable MR to again be financially viable as it was before the 1981 time period. The breakeven for the amount of increase in tariffs to eliminate deficits is about 55 per cent.

Concern has been expressed that increasing tariffs will cause large losses of rail traffic to road. However, because road transport tariffs are about 2 times the cost of rail, it is believed that increased tariffs within the range discussed above will have little effect on road-rail competition provided that the rail level of service (rail transit time and reliability) can be raised to satisfactory conditions. If the level of service is not improved, tariff increases could indeed lead to significant loss of rail traffic to road.

As the STC report points out, it is absolutely essential for MR to first focus on improving their productivity and level of service before raising tariffs. Great care must be taken by MR to avoid a vicious circle condition where tariffs are raised without an increase in the level of service. This would drive traffic away from the railroad and the lower traffic volumes would increase the cost of operation, thereby requiring even higher tariff levels.

ECONOMIC ANALYSIS

Traffic

MR's freight traffic is dominated by bulk commodities. For international traffic, Transmark projects that by the year 2000

about 84 per cent of the imports and exports over the Nacala line will be bulk commodities such as fertilizer, coal & coke, iron & steel, wheat & flour, pulp & paper, salt, lime & cement, maize, and agricultural export products such as sugar, tobacco, tea, ground nuts, coffee, and cotton. Including local traffic, the proportion of bulk is about 82 per cent. Lilongwe and Blantyre are the largest traffic generators. The predominance of bulk provides assurance that, provided a satisfactory level of service is offered, the majority of MR's traffic is not very vulnerable to road competition.

The rail distance from Blantyre to the port of Nacala is 814 kilometers, as compared to 1204 kilometers on road/rail via Harare to Beira; 2069 kilometers via road to Dar es Salaam; 2318 kilometers on rail/lake/road/rail to Dar es Salaam; and 2639 kilometers via road/rail to Durban. MR and the Nacala line are therefore well placed to carry most of the country's overseas bulk traffic.

Though traffic has been stagnant since the early eighties due to the closure of the Nacala line and subsequent lack of growth in the Malawi economy, Transmark projects a modest 2.2 percent annual growth in traffic after normal operations are restored on the Nacala line. By the year 2010, Transmark projects total overseas traffic at 625,000 tons, and total traffic - including both local and overseas - is projected at 1,299,000 tons by that year.

Project Benefits

The USAID project of rehabilitating the 19 Bombardier locomotives is designed to restore MR's tractive power in time to efficiently carry the increases in traffic expected from the re-opening of the Nacala line expected in 1993. Without the project, MR will not have the capacity to transport the traffic generated by

Nacala. As a result, the level of service possible without the project will be so low that very few shippers will ship their goods over the Nacala line. Instead, they will continue to use the alternative routes to the ports of Dar es Salaam, Beira, and Durban.

The benefits of the project consist primarily in savings in transport cost of bulk products between the 812 kilometer long Nacala rail line (to Blantyre) and the lowest cost alternative of the 2,318 kilometer long Northern Transport corridor. This ignores the benefits - unknown at this time - from the new traffic generated because of the substantial reduction in transport costs. By the year 2000, as shown in Table 4, the land transport cost is projected to go down from $91 per ton from Dar es Salaam to $43 per ton over Nacala, a 53 per cent reduction.

If MR and the CFM choose cost-based tariffs, the cost savings will be fully passed to the shippers who use the Nacala line, most of whom are believed to be large trading firms. However, if the MR and CFM choose to use "value of service" or "fully commercial" pricing where the tariffs are adjusted to what the market will bear, much of the cost savings will accrue to the Malawi and Mozambique economy from where, it is hoped, it may benefit the lower income groups. The issue of what the appropriate tariff level should be is an important concern that should be determined in consultation with other railroads, especially the CFM and the Tazara, and to a lesser extent with the NRZ.

Project Costs

It must be kept in mind that, by itself, the increased tractive power will not be enough to restore MR to an economically and financially viable organization that can significantly reduce the cost of transport to the Malawi economy. As discussed in the

financial analysis section, MR will need to undergo major restructuring before it can offer the level of service needed to attract freight to the Nacala corridor. In addition, because of the losses in traffic since the early eighties, and the poor financial condition of MR, much of the railroad's assets were neglected, and significant catch-up maintenance is required before efficient operations can be restored. It is estimated by MR that this catch-up maintenance will cost K 120,000,000 over ten years, or about $4 million per year.

The economic analysis therefore looks at the larger problem of justifying the investment in locomotive rehabilitation, railroad restructuring, and the catch-up maintenance. The cost of the rehabilitation is estimated by USAID/Lilongwe at not more than $5 million. Restructuring will cost at most $3 million as estimated from the World Bank's experience in French West Africa and other countries. And the catch-up maintenance is estimated by MR at $4 million per year over ten years.

Transport Costs

The economic costs of road and rail transport were taken from the World Bank/SATCC STC study, and from the STIPA study. For the Nacala corridor, the economic cost is estimated at $43 per ton. Of this cost, $37.8 is operating cost including depreciation on renewable assets, $.40 is inventory carrying cost, $2.2 is the cost of transhipment, and $2.2 is the cost of losses and spoilage. For the NTC, the economic cost is estimated at $91 per ton. This is composed of $76.7 operating cost, $1 inventory carrying cost, $8.90 for transshipment, and $4.40 for spoilage and losses. These costs assume efficient operation of the road, rail, and lake systems for both the NTC and the Nacala line.

Economic Evaluation

Tables 8a, 8b, and 8c present the economic evaluation. The project evaluation period is taken as 20 years, the expected useful life of the rehabilitated bombardier locomotives, and no residual values are assumed for the investments. Traffic projections are very conservative in that only 48% of Malawi's overseas traffic is assigned to the Nacala corridor. The commodity classification of "other goods" is assumed to be high-value traffic that will still go by road via Durban or Dar es Salaam, at substantially greater cost but with increased reliability. This assumption is conservative in that the level-of-service on the Nacala line may well be sufficient to attract that traffic. It is also assumed that the remaining 30 per cent of the overseas traffic is split 65% - 35% between Nacala and other Mozambique ports, as per the bilateral agreement between Malawi and Mozambique.

As shown in Table 8a, the NPV of the project is $36,945,000 with an IRR of 41.5 per cent. The project is therefore economically feasible.

In Table 8b, a ten year lag is assumed for the buildup of traffic on the Nacala line. Thus, only 10 per cent of the potential traffic is realized in 1993, 20 per cent in 1994, etc. until the full potential traffic is realized by the year 2003. The NPV of the combined investment in locomotive rehabilitation, restructuring, and catch-up maintenance is $15 million, and the ERR of the project is estimated at 18.6 per cent.

Table 8c shows the impact of raising costs on the Nacala line by 25 per cent, while leaving the transport costs over the NTC unchanged. The NPV of the project drops to $6.1 million, and the ERR is 14.8 per cent, and the project remains viable.

APPENDIX

It has been suggested that, because of the currently marginal operation of MR, the railroad should be abandoned. It is said that the truck transport sector could accommodate the traffic now carried by MR. The calculations shown below indicate that it may not be easy for the trucking sector to accommodate MR's traffic.

The potential traffic to be moved by MR is about 700,000 tons per year at an average length of haul of 200 kilometers, for a total work load of 140,000,000 net ton-kms per year.

The productivity of a 15-ton truck at a utilization (payload) of 70% and 60,000 kilometers per year is 630,000 ton-kms per year. Thus, to carry the MR's work load, 222 15-ton trucks will be required. This is double the current inventory of Malawi's truck fleet.

The investment cost for these trucks is about 222 x K 250,000 = K 55 million, or about $ 20 million. In addition to the investment in trucks, additional maintenance and road investment will be required for the roads used by these trucks. The variable cost for road maintenance is about K .002 per ton-km, and the road investment cost is about K .117 per ton-km, for a total of K 12 or $.044 per ton-km. Thus, the additional annual maintenance cost will be 140,000,000 x $.044 = $6 million.

A valid question at this time is how well the Malawi truck transport sector can accommodate the doubling of fleet size and the doubling of the work load. Though there are efficient operators, the average efficiency of the Malawi trucking sector is low, and the new trucks may not be operated at levels of efficiency exceeding that of MR (before restructuring). Thus, there may be little advantage in replacing rail transport by road transport.

TABLE 1: LOCOMOTIVE REQUIREMENTS: 1994/96 - EXCLUDING PASSENGERS, BEIRA CLOSED

			NCHIM LIL	LIL SAL	SAL CHIP	CHIP BALA	BALA NKAYA	NKAYA NAMA	NAMA LIMBE	LIMBE SAMK	SAMK BORDER	NKAYA NAYUCI
FREIGHT												
Heavy Direction Traffic (Million Net Tons)												
		1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1.3	1995	0.003	0.132	0.139	0.144	0.200	0.200	0.292	0.016	0.002	0.187
		2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Route Length (km)			105	111	37	128	25	36	60	138	92	92
NTION (mill)												
		1990	NA	NA	NA	.A	NA	NA	NA	NA	NA	NA
	86.1	1995	0.32	14.70	3.75	18.43	5.00	7.21	17.51	1.75	0.21	17.21
		2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gross/net			1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
GTION (dom.dir., mill)		1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	132.6	1995	0.50	22.64	5.78	28.39	7.70	11.11	26.96	2.69	0.33	26.51
		2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Availability			0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
TEION (tons/engine/day)			250	250	250	250	250	250	250	250	250	250
work days/year			365	365	365	365	365	365	365	365	365	365
Gross trail. load (tons)			700	700	700	700	700	700	700	700	700	700
Gross tractive power coeff.			0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Pract. gr. trail. load (tons).			560	560	560	560	560	560	560	560	560	560
TEION Dom. Dir. (mill train-kms/year)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			0.001	0.340	0.010	0.051	0.016	0.020	0.048	0.005	0.001	0.047
			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freight locos,level terrain	1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1995	6.9	0.0	1.2	0.3	1.5	0.6	0.6	1.4	0.1	0.0	1.4
	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Loco Consist			1	1	1	1	2	2	2	2	2	2
		TOTAL										
Freight locos required	1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1995	10.8	0.0	1.2	0.3	1.5	0.8	1.2	2.8	0.3	0.0	2.8
	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TOTAL FREIGHT LOCOS	11
BALLAST LOCOS	3
MAINTENANCE LOCOS	3
	17

Source: Transmark Traffic Projections

TABLE 2: LOCOMOTIVE REQUIREMENTS: 1994/95 - EXCLUDING PASSENGERS, BEIRA OPEN

			MCHIN LIL	LIL SAL	SAL CHIP	CHIP BALA	BALA NKAYA	NKAYA KAMA	KAMA LIMBE	LIMBE SAMK	SAMK BORDER	NKAYA MATUCI
FREIGHT												
Heavy Direction Traffic (Million Net Tons)												
		1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2.21	1995	0.016	0.232	0.241	0.253	0.236	0.243	0.373	0.253	0.238	0.123
		2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Route Length (km)			105	111	27	128	25	56	60	108	92	92
NTKM (mill)												
		1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	163.89	1995	1.70	25.73	6.50	32.42	5.89	8.74	22.40	27.28	21.92	11.09
		2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Gross/net			1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
GTKM (dom.dir.,mill)		1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	252.39	1995	2.63	39.63	10.02	49.92	9.08	13.46	34.50	42.01	33.76	17.39
		2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Availability			0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
TEKM (kms/engine/day)			250	250	250	250	250	250	250	250	250	250
work days/year			365	365	365	365	365	365	365	365	365	365
Gross trail. load (tons)			700	700	700	700	700	700	700	700	700	700
Gross tractive power coeff.			0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Pract. gr. trail. load (tons).			560	560	560	560	560	560	560	560	560	560
TEKM Dom. Dir. (mill train-kms/year)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			0.005	0.071	0.018	0.089	0.016	0.024	0.062	0.075	0.060	0.031
			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freight locos,level terrain	1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1995	13.2	0.1	2.1	0.5	2.6	0.5	0.7	1.8	2.2	1.8	0.9
	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Loco Consist			1	1	1	1	2	2	2	2	2	2
Freight locos required	1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1995	21.0	0.1	2.1	0.5	2.6	0.9	1.4	3.6	4.4	3.5	1.8
	2000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TOTAL FREIGHT LOCOS	21
BALLAST LOCOS	4
MAINTENANCE LOCOS	4
TOTAL	29

Source: Transmark Traffic Projections

TABLE 3: LOCOMOTIVE REQUIREMENTS: YR 2000 - EXCLUDING PASSENGERS, BEIRA OPEN

			MCHIN LIL	LIL SAL	SAL CHIP	CHIP BALA	BALA NKAYA	NKAYA NAMA	NAMA LIMBE	LIMBE SANK	SANK BORDER	NKAYA NAYUCI
FREIGHT												
Heavy Direction Traffic (Million Net Tons)												
		1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2.881	2000	0.015	0.289	0.317	0.319	0.313	0.427	0.534	0.216	0.213	0.238
Route Length (km)			105	111	27	128	25	36	60	108	92	92
NTKM (mill)												
		1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	203	2000	1.58	32.08	8.56	40.83	7.83	15.37	32.04	23.33	19.60	21.90
Gross/net			1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
GTKM (dom.dir.,mill)		1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
		1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	313	2000	2.43	49.40	13.18	62.88	12.05	23.67	49.34	35.93	30.18	33.72
Availability			0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
TEKM (kms/engine/day)			250	250	250	250	250	250	250	250	250	250
work days/year			365	365	365	365	365	365	365	365	365	365
Gross trail. load (tons)			700	700	700	700	700	700	700	700	700	700
Gross tractive power coeff.			0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Pract. gr. trail. load (tons).			560	560	560	560	560	560	560	560	560	560
TEKM Dom. Dir. (mill train-kms/year)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
			0.004	0.088	0.026	0.112	0.022	0.042	0.088	0.064	0.054	0.060
Freight locos,level terrain	1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2000	16.3	0.1	2.6	0.7	3.3	0.6	1.2	2.6	1.9	1.6	1.8
Loco Consist			1	1	1	1	2	2	2	2	2	2
Freight locos required	1990	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1995	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2000	26.0	0.1	2.6	0.7	3.3	1.3	2.5	5.1	3.7	3.1	3.5

TOTAL FREIGHT LOCOS	26
BALLAST LOCOS	4
MAINTENANCE LOCOS	4
	34

Source: Malawi Railways Traffic Projections

Table 4: EVALUATION OF THREE ALTERNATIVES FOR PROVIDING TRACTIVE POWER

Maint. Cost =	0.51	$/km		
Run Cost =	2.60	$/km	NPV1	1,419,385 (Rehab)
Maint. cost over new =	1.20		NPV2	2,736,230 (Lease)
Run. cost over new =	1.20		NPV3	2,597,784 (New)
lease cost =	2,100	R/day		
Gen.Ov. New/Rehab =	0.80			

YEAR	KMS	CUMULATIVE KMS	REHABILITATE Rehab Cost	Gen.Over plus E	Maint cost	Run Cost	Total Cost	LEASE Lease cost	Run Cost	Total Cost	BUY Cost New	Gen.Over plus E	Maint Cost	Run Cost	Total Cost
			250,000		$		250,000	$		$	1,800,000		$		1,800,000
1990	48,000	48,000			10,969	149,760	160,729	255,500	149,760	405,260			8,775	124,800	133,575
1991	48,000	96,000			10,969	149,760	160,729	255,500	149,760	405,260			8,775	124,800	133,575
1992	48,000	144,000			10,969	149,760	160,729	255,500	149,760	405,260			8,775	124,800	133,575
1993	48,000	192,000			10,969	149,760	160,729	255,500	149,760	405,260			8,775	124,800	133,575
1994	48,000	240,000		15,043	10,969	149,760	175,772	255,500	149,760	405,260			8,775	124,800	133,575
1995	48,000	288,000			10,969	149,760	160,729	255,500	149,760	405,260		12,034	8,775	124,800	145,609
1996	48,000	336,000		168,147	10,969	149,760	328,876	255,500	149,760	405,260			8,775	124,800	133,575
1997	48,000	384,000		15,043	10,969	149,760	175,772	255,500	149,760	405,260			8,775	124,800	133,575
1998	48,000	432,000			10,969	149,760	160,729	255,500	149,760	405,260		134,518	8,775	124,800	268,093
1999	48,000	480,000			10,969	149,760	160,729	255,500	149,760	405,260		12,034	8,775	124,800	145,609
2000	48,000	528,000		15,043	10,969	149,760	175,772	255,500	149,760	405,260			8,775	124,800	133,575
2001	48,000	576,000			10,969	149,760	160,729	255,500	149,760	405,260			8,775	124,800	133,575
2002	48,000	624,000			10,969	149,760	160,729	255,500	149,760	405,260		12,034	8,775	124,800	145,609
2003	48,000	672,000		168,147	10,969	149,760	328,876	255,500	149,760	405,260			8,775	124,800	133,575
2004	48,000	720,000		15,043	10,969	149,760	175,772	255,500	149,760	405,260			8,775	124,800	133,575
2005	48,000	768,000			10,969	149,760	160,729	255,500	149,760	405,260			8,775	124,800	133,575
2006	48,000	816,000			10,969	149,760	160,729	255,500	149,760	405,260		134,518	8,775	124,800	268,093
2007	48,000	864,000		15,043	10,969	149,760	175,772	255,500	149,760	405,260		12,034	8,775	124,800	145,609
2008	48,000	912,000			10,969	149,760	160,729	255,500	149,760	405,260			8,775	124,800	133,575
2009	48,000	960,000			10,969	149,760	160,729	255,500	149,760	405,260			8,775	124,800	133,575
2010	48,000	1,008,000		15,043	10,969	149,760	175,772	255,500	149,760	405,260		12,034	8,775	124,800	145,609
				84,074			244,802					67,259			280,084
				12.00%		NPV1 =	1,419,385		NPV2 =	2,736,230				NPV3 =	2,597,784

Maintenance cost: Every 48,000 kilometers, ten B Level, one C Level and one D level maintenance need to be applied = 10,969

B Level maintenance consists of $ 50 parts and 148 hrs labor @ K9.28 per hour =	$559	
C Level maintenance consists of $ 150 parts and 330 hrs labor @ K9.28 per hour =	$1,284	
D Level maintenance consists of $ 200 parts and 1134 hrs labor @ K9.28 per hour =	$4,098	
General Overhaul consists of $150,000 parts and 5280 hrs labor @ K9.28 per hour =	$15,044	
	$168,148	

Running Cost: Locomotive consumes 63 litres fuel per hour. Fuel costs K1.80 per liter - K.3639 refund = K1.44 per liter.
Fuel cost per hour = 63 x K1.44 = K90.7 per hour. Assuming an average speed of 20 kilometers per hour, the fuel cost = K4.5 per km.
For labor, assume 130 kilometers per 8.2 hour day @ K10 per hour, and two loco crew members.
Labor cost therefore is 2*8.2*K10/130 = 1.262 per kilometer.
Double this to account for overtime results in K2.523 per kilometer, or $.93 per kilometer. Total running cost therefore is $.93 + $1.67 = $2.61 per kilometer.

Rehabilitation cost: parts = $150,000, freight = $50,000, labor = $50,000

TABLE 5: 1994/95 Revenues and Costs
K 000
Original Network, With Pass. Service

	Existing Tariffs and Existing Costs	Cost-based Tariffs and Reduced Costs
Passenger Revenue	6,310	6,310
Freight Revenue	25,484	42,049
Total Revenue	31,794	48,359
Working Expenses	26,193	20,954
Surplus	5,601	27,404
Rolling Stock Capital Recovery	12,570	10,056
Track and signalling Capital Recovery	17,461	13,969
Profit/(loss)	(24,430)	3,379

Source: Tables 4.5 and 4.6, Transmark Study

TABLE 6: 1994/95 Revenues and Costs

(K 000)

Original Network, No Pass. Service

	Existing Tariffs and Existing Costs	Cost-based Tariffs and Reduced Costs
Passenger Revenue	0	0
Freight Revenue	25,484	42,049
Total Revenue	25,484	42,049
Working Expenses	20,136	16,109
Surplus	5,348	25,940
Rolling Stock Capital Recovery	11,107	8,886
Track and signalling Capital Recovery	17,461	13,969
Profit/(loss)	(23,220)	3,085

Source: Tables 4.5 and 4.6, Transmark Study

TABLE 7: 1994/95 Revenues and Costs

K 000

Truncated Network, No Pass. Service

	Existing Tariffs and Existing Costs	Cost-based Tariffs and Reduced Costs
Passenger Revenue	0	0
Freight Revenue	22,932	37,838
Total Revenue	22.932	37,838
Working Expenses	18,575	14,860
Surplus	4,357	22,978
Rolling Stock Capital Recovery	10,473	8,378
Track and signalling Capital Recovery	11,136	8,909
Profit/(loss)	(17,252)	5,691

Source: Tables 4.5 and 4.6, Transmark Study

TABLE 8A: COST/BENEFIT ANALYSIS ASSUMING INSTANTANEOUS BUILDUP OF TRAFFIC ON NACALA.

FOR IMPORTS AND EXPORTS

IRR 41.5%
NPV (000) $36,945

Year	POTENT. EXP/IMP TONS (000)	ACTUAL EXP/IMP TONS (000)	COST PER TON, US$ VIA DAR NTC	VIA DAR SEA	VIA NACALA LAND	VIA NACALA SEA	SAVINGS US$ (000)	REHAB COST US$ (000)	OTHER COST US$ (000)	NET SAVINGS US$ (000)
1993	374	180	99	79	44	96	7,181	(5,000)	(4,444)	(9,444)
1994	381	183	98	78	44	91	7,521		(4,444)	2,736
1995	388	186	97	78	44	88	7,869		(4,444)	3,377
1996	395	189	96	77	44	85	8,225		(4,444)	3,425
1997	401	193	94	76	43	83	8,588		(4,444)	3,781
1998	408	196	93	75	43	80	8,959		(4,444)	4,144
1999	415	199	92	75	43	77	9,337		(4,444)	4,515
2000	474	228	91	74	43	74	10,921		(4,444)	6,893
2001	481	231	91	74	38	74	12,244		(4,444)	6,477
2002	489	235	91	74	38	74	12,630		(4,444)	7,800
2003	496	238	91	74	38	74	12,615			12,630
2004	503	242	91	74	38	74	12,801			12,615
2005	510	245	91	74	38	74	12,987			12,801
2006	518	249	91	74	38	74	13,172			12,987
2007	525	252	91	74	38	74	13,358			13,172
2008	532	256	91	74	38	74	13,543			13,358
2009	540	259	91	74	38	74	13,729			13,543
2010	626	300	91	74	38	74	15,925			13,729
2011	626	300	91	74	38	74	15,925			15,925
2012	626	300	91	74	38	74	15,925			15,925
										15,925

Assumes 20% of total overseas traffic (non bulk) diverted to NTC.
Assumes 35% of remaining traffic diverted to Beira per regulation.
In total, 1-.8*.65 = 48% remains for Nacala corridor.
Economic cost by rail = $.034 per ton km
Economic cost by road = $.081 per ton km
Economic cost by lake = $.025 per ton km

Table 8B: COST/BENEFIT ANALYSIS ASSUMING SLOW BUILDUP OF NACALA TRAFFIC.

FOR IMPORTS AND EXPORTS

IRR 18.6%
NPV (000) $15,099

Year	POTENT. EXP/IMP TONS (000)	ACTUAL EXP/IMP TONS (000)	COST PER TON, US$ VIA DAR NTC	VIA DAR SEA	VIA NACALA LAND	VIA NACALA SEA	SAVINGS US$ (000)	REHAB COST US$ (000)	OTHER COST US$ (000)	NET SAVINGS US$ (000)
								(5,000)	(4,444)	(9,444)
1993	374	180	99	79	44	96	718		(4,444)	(3,726)
1994	381	183	98	78	44	91	1,504		(4,444)	(2,940)
1995	388	186	97	78	44	88	2,361		(4,444)	(2,084)
1996	395	189	96	77	44	85	3,290		(4,444)	(1,154)
1997	401	193	94	76	43	83	4,294		(4,444)	(150)
1998	408	196	93	75	43	80	5,375		(4,444)	931
1999	415	199	92	75	43	77	6,536		(4,444)	2,092
2000	474	228	91	74	43	74	8,737		(4,444)	4,292
2001	481	231	91	74	38	74	11,020		(4,444)	6,575
2002	489	235	91	74	38	74	12,430			12,430
2003	496	238	91	74	38	74	12,615			12,615
2004	503	242	91	74	38	74	12,801			12,801
2005	510	245	91	74	38	74	12,987			12,987
2006	518	249	91	74	38	74	13,172			13,172
2007	525	252	91	74	38	74	13,358			13,358
2008	532	256	91	74	38	74	13,543			13,543
2009	540	259	91	74	38	74	13,729			13,729
2010	626	300	91	74	38	74	15,925			15,925
2011	626	300	91	74	38	74	15,925			15,925
2012	626	300	91	74	38	74	15,925			15,925

Gradual buildup of Nacala traffic assumed over 10 years, e.g., 10 % of potential traffic first year, 20 % second year, etc.
Assumes 20% of total overseas traffic (non bulk) diverted to NTC.
Assumes 35% of remaining traffic diverted to Beira per bi-lateral agreement.
In total, 1-.8*.65 = 48% remains for Nacala corridor.
Economic cost by rail = $.034 per ton km
Economic cost by road = $.081 per ton km
Economic cost by lake = $.025 per ton km

TABLE 8C: COST/BENEFIT ANALYSIS ASSUMING NACALA TRANSPORT COSTS INCREASED BY 25 PER CENT.

FOR IMPORTS AND EXPORTS

IRR 14.8%
NPV (000) $6,136

Year	POTENT. EXP/IMP TONS (000)	ACTUAL EXP/IMP TONS (000)	COST PER TON, US$ VIA DAR NTC	VIA DAR SEA	VIA NACALA LAND +25%	VIA NACALA SEA	SAVINGS US$ (000)	REHAB COST US$ (000)	OTHER COST US$ (000)	NET SAVINGS US$ (000)
1993	374	180	99	79	55	94	521	(5,000)	(4,444)	(9,444)
1994	381	183	98	78	55	91	1,103		(4,444)	(3,924)
1995	388	186	97	78	55	88	1,751		(4,444)	(3,341)
1996	395	189	96	77	54	85	2,465		(4,444)	(2,694)
1997	401	193	94	76	54	83	3,248		(4,444)	(1,980)
1998	408	196	93	75	54	80	4,103		(4,444)	(1,196)
1999	415	199	92	75	54	77	5,032		(4,444)	(342)
2000	474	228	91	74	54	74	6,780		(4,444)	567
2001	481	231	91	74	48	74	9,045		(4,444)	2,336
2002	489	235	91	74	48	74	10,202			4,600
2003	496	238	91	74	48	74	10,354			10,202
2004	503	242	91	74	48	74	10,506			10,354
2005	510	245	91	74	48	74	10,659			10,506
2006	518	249	91	74	48	74	10,811			10,659
2007	525	252	91	74	42	74	10,964			10,811
2008	532	256	91	74	48	74	11,116			10,964
2009	540	259	91	74	48	74	11,268			11,116
2010	626	300	91	74	48	74	13,071			11,268
2011	626	300	91	74	48	74	13,071			13,071
2012	626	300	91	74	48	74	13,071			13,071

Gradual buildup of Nacala traffic assumed over 10 years, e.g., 10 % of potential traffic first year, 20 % second year, etc.
Assumes 20% of total overseas traff : (non bulk) diverted to NTC.

SECOND ENVIRONMENTAL EXAMINATION

PROGRAM DATA

Program Location	Malawi
Program Title:	Regional Rail Systems Support - Malawi Component
Funding:	$3,500,000 increase in LOP funding to $10,720,000
Life of Project:	7 years
EE Prepared:	William R. Brands Project Development Officer USAID/Malawi
Environmental Action Recommended:	Categorical Exclusion for Technical Assistance and Training Negative Determination for Spare Parts and Equipment

Approval: Carol A. Peasley, Director
USAID/Malawi

Date: November 22, 1991

Concurrence: John J. Gaudet
Bureau Environmental Officer

Approved: ✓

Disapproved. _____

Clearance: GC/AFR _____ Date: _____

Date 11/26/91

Clearances:

TLofgren, SPDO _____ Date 11/22/91

KRikard, DD _____ Date _____

CBrown, RLA _____ Date _____

Discussion

USAID/Malawi has recently prepared a project paper supplement (PPS) to the Regional Rail Systems Support (RRSS) Project - Malawi Component. The PPS reaffirms the basic objective of the project to provide sustainable maintenance capacity in Malawi Railways for the general overhaul of 19 Bombardier locomotives. It also justifies a $3,500,000 increase in life-of-project (LOP) funding to increase spare parts and equipment procurement, add significant technical assistance and expand training activities. This increase in project cost is due primarily to the fact that the original design underestimated the costs of commodities, especially locomotive spare parts, and the need for technical assistance and training.

Spare Parts and Equipment

The need for sufficient spare parts and tools required to complete the locomotive overhauls is an inherent aspect of the project. The PPS team, however, found that initial cost estimates for spare parts were underestimated by 150%. It was also found that the initial PP completely overlooked the fact that MR did not have sufficient tools and equipment required to complete the overhauls. Additional funds provided in the PPS will rectify these underestimations. The initial environmental examination approved by the Bureau Environmental Officer on March 31, 1988 (see State 246317) did not envision any major environmental impact from locomotive and rolling stock rehabilitation, workshop equipping and supply of spare parts. Due to the fact that the activities to be funded under the project with this supplement are identical to those originally designed, a negative determination is again recommended.

Technical Assistance and Training

Although the initial PP found the MR's Workshop and Supplies Department well staffed and productive, a subsequent institutional assessment noted that the initial PP vastly underestimated the demands of the A.I.D. program on each of these departments. It was found that outside technical assistance is crucial to complete the locomotive overhaul program and to guarantee that an appropriate inventory control system for the A.I.D-financed spare parts and equipment is utilized. For this reason, the PPS justifies an increase in project funds to provide technical assistance in the above areas. It also provides sufficient funds for training activities for MR mechanics in the U. S. These technical assistance and training activities of the project qualify for a categorical exclusion under the provision of Reg. 16.

Recommended Environmental Determination

Based on the above discussion, a Categorical Exclusion is recommended for the technical assistance and training for Malawi Railways and a Negative Determination for the supply of spare parts and equipment for the locomotive overhauls.

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