REPUBLIC OF NAMIBIA

MINISTRY OF WORKS, TRANSPORT AND COMMUNICAT

DEPARTMENT OF TRANSPORT

FEASIBILITY STUDY ON THE NORTHEI RAILWAY EXTENSION FOR NAMIBIA

EXECUTIVE SUMMARY

MAY 1999

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Africon Namibia

This report was funded by the US Trade and Development Agency (TDA), an export promotion ag States Government. The opinions, findings, conclusion, or recommendations expressed in this docum author(s) and do not necessarily represent the official position of TDA.

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1. BACKGROUND

A major goal of Government is to expand the economy and improve living conditic Part of this effort is being directed toward the northern Regions where over 40% population live, but per capita income is only two-thirds the average for all of Namibia been limited commercial and industrial development.

One logical means to improve conditions in the Oshikoto, Ohangwena, Oshana Regions (the Four O Regions) and strengthen economic and social ties with the rest of expand the transportation network by constructing a railway. A railway into this ar enhance commercial relations with Angola.

2. PROJECT OBJECTIVES

The basic purpose of the study was to determine the overall feasibility of a new railw Tsumeb with Ondangwa, Oshakati and Oshikango. Key elements of the project were t

- Identify the route segments to be built and the optimum alignment
- Prepare preliminary plans and profiles for the proposed line
- Forecast freight and passenger traffic and revenue
- Develop an operating plan and estimate operating and maintenance expenses
- Determine rolling stock and facility requirements and associated costs
- Estimate infrastructure capital costs and prepare a construction schedule
- Make a financial and economic analysis of the proposed line
- Identify social, non-financial and other secondary benefits
- Recommend financing options

3. TRAFFIC DEMAND FORECAST

Traffic forecasting started with review of a 1995 road traffic survey conducted for N Consultants then interviewed over 40 current and potential rail shippers, as w forwarders, trucking firms and port officials at Walvis Bay to assemble the base traffi Four O Regions and southern Angola.

An analysis of this information was then made to determine the total corridor traffic bet and Ondangwa, Oshakati and Oshikango. The total traffic was estimated to be annually.

Potential diversion of traffic to rail was forecast based on two sets of assumptions:

Scenario 1

- Service similar to current NamRail practise
- Minor rate adjustments

Scenario 2

- Selective service improvements
- Significant rate reductions on competitive commodities
- Very aggressive marketing

The freight traffic that would be attracted to rail and the resulting revenue from these are shown in Table 1 for the first year of the analysis period.

TABLE 1

FREIGHT TRAFFIC

ANNUAL TONNAGE AND REVENUE

Scenario	Tonnage	Revenue (N$)
1	135,500	18,806,400
2	253,500	35,445,800

Traffic forecasts after the first year were escalated by 3% per year to account for exp This is a conservative estimate considering that the area population growth is anticip per year.

A factor that should be noted is that over 95% of the freight traffic identified would be Any industrial development resulting from the availability of rail transportation will nc the area, but will lower railway unit costs as well by creating a more balanced traffic flo

Passenger service would be an extension of the three days per week schedules no Tsumeb and possibly an expedited weekend return trip between Windhoek/Wa Ondangwa, but revenue would be insignificant.

4. ENGINEERING

The route was located to pass as near as possible to town centers and built-up are generally adjacent to the Tsumeb – Oshivelo – Ondangwa, Ondangwa – Oshakati and Oshikango trunk and main roads (TR1/10, TR1/11 and MR 92). However, the line w enough away from the roads to minimise relocation of homesteads and business

reserve. North of Oshivelo, the line swings to the east and borders the east side power line easment and passes to the northeast of Ondangwa. From Ondangwa tc line is somewhat north of MR 92 and, between Ondangwa and Oshikango, the alig 300 - 500 m west of TR1/11. A plan indicating the proposed alignment is shown on pa

The line is designed for 100 kph maximum speeds and 18.5 tonne axle loads. Concre sleepers and welded 48 kg/m rail will be utilised. The lengths of the line segments are

Phase 1 : Tsumeb - Ondangwa: 248 km

Phase 2 : Ondangwa - Oshakati: 40 km

Phase 3 : Ondangwa - Oshikango: 62 km

The entire line would have only 6 significant bridges over rivers and 4 road over rail cı terrain is flat and construction would be relatively easy. The main engineering conc providing for adequate water flow in the oshanas.

Freight and passenger facilities would be provided at Oshivelo and Ondangwa and v are constructed during subsequent phases, at Oshakati and Oshikango. A fully equip terminal would be located at Ondangwa. Additional passenger halts would be provide determined in consultation with community leaders. Passing loops will be approxim between Tsumeb and Oshivelo, and Oshivelo and Ondangwa.

5. CAPITAL COSTS

Capital costs in current dollars for the three phases are shown in Table 2.

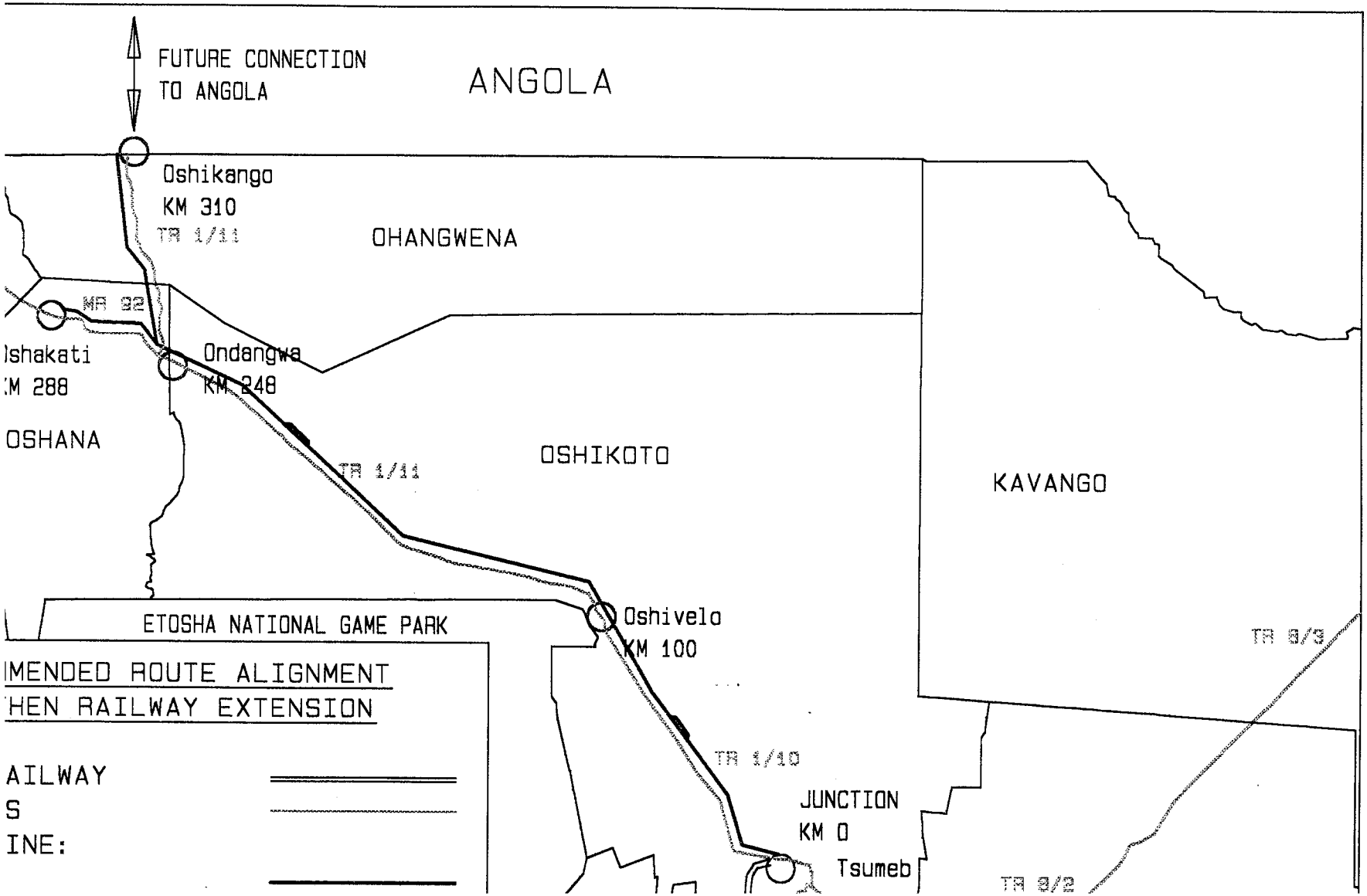
In addition to the infrastructure a small number of freight wagons and containers w acquired, as well as container handling equipment for the depot at Ondangwa.

TABLE 2

CAPITAL COSTS

Category	Phase 1 Tsumeb – Ondangwa (MN$)	Phase 2 Ondangwa – Oshakati (MN$)	Phase 3 Ondangwa - Oshikango (MN$)
Land Acquisition	5.18	2.00	3.00
Infrastructure	274.65	50.50	66.55
Rolling Stock and Equipment	8.25	0	0
Employee Relocation	0.26	0	0
TOTALS	**288.34**	**52.50**	**69.55**

Note: Infrastructure cost is based partially on the use of good quality relayer rail with a remaining life expectancy to reduce initial expenditures


FUTURE CONNECTION
TO ANGOLA
ANGOLA
Oshikango
KM 310
TR 1/11
OHANGWENA
MR 32
Ondangwa
KM 248
OSHANA
OSHIKOTO
KAVANGO
TR 1/11
ETOSHA NATIONAL GAME PARK
Oshivelo
KM 100
TR 1/10
JUNCTION
KM 0
Tsumeb
TR 8/3
TR 8/2
IMENDED ROUTE ALIGNMENT
HEN RAILWAY EXTENSION
AILWAY
S
INE:

6. PROPOSED TRAIN OPERATIONS

At the start of operations one train six days per week co-ordinated with the presen Tsumeb will be required. Three days per week these trains will carry passenger coac an extension of the service NamRail now provides as far as Tsumeb. An experime weekend passenger service between Windhoek/Walvis Bay and Ondangwa h proposed.

7. OPERATING AND MAINTENANCE EXPENSE

The extended line would be operated as an integral part of the entire NamRail sys keep incremental costs to a minimum. Infrastructure maintenance expense will because traffic will be light and the track and facilities new. Few additional staff wi only an estimated 25 to 30 positions - as most station staff will be present employe from Tsumeb and relatively few train crews and permanent way maintenance per required. Estimated annual operating expenses are shown in Table 3 for the Tsume segment (Phase 1).

TABLE 3

ANNUAL OPERATING AND MAINTENANCE EXPENSE

Expense Category	Scenario 1 (N$)	S
Locomotive Operation	6,261,900	
Wagon Operation	902,500	
Coach Operation	77,700	
Train Crews	418,400	
Rolling Stock Hire	357,400	
Station Operations	370,000	
Station Staff	175,000	
Infrastructure Maintenance Labour	652,000	
Infrastructure maintenance Material and Equipment	207,000	
TOTALS	**9,421,900**	

8. FINANCIAL AND ECONOMIC ANALYSIS

Incremental revenue and operating expense comparisons for the Ondangwa - Ondangwa - Oshikango line segments showed that neither would, at this time, cover c traffic sources or societal needs develop, these lines may be required, but at this tim large margin to be financially or economically viable. Therefore, these routes h considered in more detail.

The railway extension was evaluated over a 20 year period, including the 3 yea planning and construction. Three key measures of the financial and economic Internal Rate of Return (IRR), Net Present Value (NPV) and Benefit Cost Ratio measures reflect the flow of funds over time and return to the investor.

The analysis was based on a 10% discount rate, a 43% depreciated value at the end evaluation period and constant dollars (no inflation considered).

Financial and economic analysis of an investment under consideration are conside The major points of each are:

A **financial** analysis is how a banker or other investor would look at the proposal. actual dollar costs to construct the railway, what are the costs to operate and maintain is the revenue and what is the depreciated value after 20 years? When the costs a totaled and discounted the result is the **financial** rate of return.

Instead of simply comparing the revenue accruing to the railway, the **econon** considers the overall savings in resources resulting from the diversion of traffic railway, which are offset against the costs. Major adjustment factors are transfer pay taxes, reductions in road maintenance and social benefits including the reduction of ur

Financial analysis

The results for the financial analysis of Scenarios 1 and 2 are shown in Table 4.

TABLE 4

FINANCIAL EVALUATION OF SCENARIO 1 AND 2

Scenario	IRR (%)	NPV (MN$)	BC
1	2	-126.6	0.62
2	6	-72.6	0.89

As can be seen, neither option produces outstanding financial results although bot operating expenses and Scenario 2 would provide enough of a surplus to amortis capital investment if funding could be obtained at low interest rates.

Sensitivity tests were made to determine what the results would be with higher and lc expenses and in no case did the project fail to cover operating expenses.

Economic analysis

The results of the economic analysis of Scenarios 1 and 2 are displayed in Table 5.

TABLE 5

ECONOMIC EVALUATION OF SCENARIO 1 AND 2

Scenario	IRR (%)	NPV (MN$)	BC
1	6	-50.9	0.86
2	12	26.2	1.26

Even on an economic basis, Scenario 1 fails to meet reasonable standards of feasib 2, on the other hand, has a 12% IRR and an NPV of N$ 26,2 million which are respe especially for a project that has extensive social benefits for the Regions and the Natio

9. PHASING AND IMPLEMENTATION

It is proposed that the extension be built in three sections:

Phase 1 from Tsumeb to Ondangwa should be started as soon as possible with

Phase 2 from Ondangwa to Oshakati and

Phase 3 from Ondangwa to Oshikango to be built later when traffic or other consider these lines.

Phase 1 could be completed in 36 months from the date of Government approval. months would be needed for the environmental assessment, design and mobilisation, 30 month construction period. Phases 2 and 3 could be built in 9 and 7 months, respe

The critical elements in construction would be obtaining rail and manufacturing sleeper

To the maximum extent possible, construction will be done using labour based r average of over 700 jobs, mostly unskilled labourers, will be needed during tl construction period.

10. ENVIRONMENTAL AND SOCIAL ISSUES

From an environmental standpoint the project will cause no ecological impacts that ca mitigated.

The most sensitive social issues will be equitable compensation for land purchase an homesteads and businesses in both commercial and communal areas. Members of should be involved in the planning and kept informed of progress. A concerted educa should be instituted to make the local population, especially children, aware of the pot of railway operations to ensure adequate safety for people and livestock.

11. FUNDING OPTIONS

Major funding options include:

- Private sector funding
- A concessionary arrangement of some sort
- Governmental funding
- International agency loans or grants
- Foreign government donors

All of these sources are being actively pursued, but given the relatively low financi doubtful that private or concessionary financing can be obtained to fund the entire proj

In addition to the funding sources noted above NamRail and rail using industries will b new line and should, at a minimum finance rolling stock, equipment and some support

In any event, it is clear that Government, with or without international assistance mus of the funding.

12. POSITIVE EFFECTS ON THE EXISTING NAMRAIL SYSTEI

The Northern Railway Extension would provide at least five significant long term benefits to Na

- Lengthen hauls to the north and increase revenues
- Broaden the traffic base, contribute to fixed costs and lower system unit costs
- Make greater and more efficient use of now under-utilised assets: infrastructure and staff
- Help prevent almost certain staff reductions in the future if NamRail cannot red costs and effectively compete with road transport

13. SOCIO ECONOMIC BENEFITS

The proposed railway extension has the support of the people in the Region and number of significant socio economic benefits that will:

- Help integrate the region into the mainstream of Namibia both socially and comm
- Reduce heavy truck traffic and lower road maintenance costs
- Improve road safety by reducing heavy vehicle traffic
- Provide competition to trucks that will help hold down transportation costs
- Make available a low cost form of transportation for many commodities
- Provide safe and low cost of transportation for passengers
- Improve the possibility of commercial development in the region
- Enhance trade with Angola
- Increase the use of Walvis Bay for cargo (mostly containerised) destined for Ang rail movement to the border at costs lower than truck
- Provide over 700 construction jobs for the 30 month construction period
- Provide about 25 – 30 new permanent staff positions on the railway
- Help create jobs in commercial enterprises that would not have located in the railway did not exist

Although these are general and for the most part non-quantifiable, they are importa should be considered, along with financial and economic measurements when evalua of the project.

14. CONCLUSIONS

The construction and operation of the proposed Northern Railway Extension is techn and would form a useful addition to the transport infrastructure of the Four O Regions. traffic density in the route corridor is light and at least over the short term, the revenue returns generated would be limited.

For the foreseeable future the line would not carry enough traffic or generate sufficie be a commercially viable project. It would, however, even with less traffic than forec construction cost or operating expense at least cover all operating expenses with sc amortise some of the capital costs.

On the positive side there are three possible developments that could cause a maj traffic and revenue and significantly increase the line's rate of return. These potential

- Major population growth, currently estimated at 6% annually, in the area increasi consumer products.
- Increased commercial activity creating more transport of materials and products.
- Stabilisation of the political situation in Angola resulting in increased traffic flows.
- A connection between NamRail and CFM

None of these events is a certainty, but they all are reasonable expectations.

The economic benefits would, however, be immediate and far reaching creating em during the construction period and after as commercial development occurs.

One very important factor is that business activity in the Four O Regions has reached the whole development philosophy is changing from a basic commerce and trade industrial development. This will inevitably result in heavier traffic of raw materials, fin and passengers, all of which must be transported by road if the rail line is not built. I traffic, more accidents and higher maintenance costs will be the end result. The goods and people by rail can, to a large extent, prevent these problems.

While it is forecast that the new line, at least as far as Ondangwa, would be able to revenue to cover operating expenses and provide some surplus, the surplus would be offset the entire capital cost of the project if financed at commercial rates.

Therefore, the new line could not be financed on a commercial basis and it is extreme build-operate-transfer scheme could be developed that would attract a concession major Government investment or involvement by some international lending agency or

15. RECOMMENDATIONS

The extension will generate enough revenue to cover operating costs and partially capital costs. The economic returns will be quite good and, considering the wide r benefits, the line should be built.

At this time, only Phase 1 between Tsumeb and Ondangwa should be considered a insufficient traffic and revenue to even cover operating costs for Phases 2 and 3 to Oshikango.

All possible sources of funding should be explored, including participation by co Government, international lending agencies and foreign donors.

Tenders should be requested from concessionaires to at least partially finance, build participate in the operation of the extension. Government financial assistance will u needed and tenderers advised in advance the amount likely to be available.

Calculations indicate that Government would have to fund about 55% of (N$157.6 million) to provide a 15% return to a concessionaire who would finance the r

Participation in capital costs on a private basis by NamRail and major industrial cus be explored

The socio economic development of the Four O Regions and further industrialis greatly enhanced by a railway. The cost benefits to the national economy also we the new line.

The Ministry of Lands, Resettlement and Rehabilitation should be asked to rese proclaimed towns and localities identified for proclamation for the necessary rail right

Tenders should be solicited for a sleeper manufacturing facility at Tsumeb. Also, a quality relayer rail should be located as soon as possible as this is a critical element ir

The Northern Railway Extension would be economically and socially beneficial Regions, Namibia as a whole and NamRail. The first step to be carried out in the n mobilise the necessary resources to start the project.

WILBUR SMITH ASSOCIATES

ENGINEERS • ECONOMISTS • PLANNERS

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21 September 1999

Ms. Pat Smith
US Trade and Development Agency
1621 North Kent Street, Suite 200
Arlington, VA 22209-2131

RE: Namibia Northern Railway Extension, # 335600

Dear Ms. Smith:

In response to your call today:

1. I confirm that the only companies involved in the study were Wilbur Smith Associates as the prime and Africon Namibia as the local subcontractor.
2. Nothing contained in the report is confidential.
3. Enclosed a list of potential US suppliers of railway equipment and services.
4. Enclosed are three additional copies of Volumes 1, 2, and 3 and the Executive Summary. I understand you already have one copy and that the enclosed fulfills our delivery requirements.

I believe the above is the final information required under the contract and understand you will be releasing the final payment shortly. Please let me know if you need additional information.

Very truly yours,

WILBUR SMITH ASSOCIATES

David R. Danforth
Regional Vice President

POTENTIAL U.S. SUPPLIERS OF RAILWAY EQUIPMENT AND SERVICES[1]
Namibia Northern Railway Extension
Wilbur Smith Associates
20 September 1999

Locomotive Parts

Electro Motive Division, GM
9301 West 55th Street
La Grange, IL 60525
Tel: (708) 387-6000

GE Transportation Crankshaft Co.
2901 East Lake Road Systems
Erie, PA 16531
Tel: (814) 875-2234

Precision National Corporation
P. O. Box 789
1100 Shaner Street
Mt. Vernon, IL
Tel: (800) 851-4941; (618) 204-0405

Chrome Crankshaft Co.
6010 West 55th Street
Chicago, IL 60638
Tel: (312) 586-3030

Motor Power Industries
1200 Reedsdale Street
Pittsburgh, PA 15233
Tel: (412) 237-2250

Alco Locomotive Company
908 Shawnee Street
Mount Vernon , IL 62864
(618) 241-9270

Track Maintenance Machinery

Plasser American
P. O. Box 5464
Cheasapeake, VA 23324
Tel: (757) 543-3526

Pandrol Jackson
200 S. Jackson Road
Ludington, MI 49431
Tel: (616) 843-3431

Fairmont Tamper
P. O. Box 20
Cayce-West Columbia, SC 29171
Tel: (803) 822-9160

[1] This list of potential U.S. suppliers of railway equipment and services is provided for information onl and is not necessarily comprehensive. The presence of names on this list does not constitut endorsements of the companies shown, and the absence of names on this list does not constitut negative endorsements.

Track Testing and Measurement

Sperry Rail Service
46 Shelter Rock Road
Danbury, CT 06810
Tel: (203) 791-4500

Holland Company
1020 Washington Ave.
Chicago Heights, IL 60411
Tel: (708) 756-0650

Plasser American
2001 Myers Road
P. O. Box 5464
Chesapeake, VA 23324
Tel: (757) 543-3526

Rail Track Materials

L. B. Foster Company
415 Holiday Drive
Pittsburgh, PA 15220
Tel: (800) 255-4500; (814) 823-6101

Omni Products, Inc.
(Rubber Railway Crossing Systems)
3911 Dayton Street
McHenry, IL 60050
Tel: (815) 344-3100

Signalling
(Track Warrant systems)

GE-Harris Railway Electronics, LLC
P. O. Box 8900
407 N. John Rhodes Blvd.
Melbourne, FL 32902
Tel: (407) 242-4000

General Railway Signal
150 Sawgrass Drive
Rochester, NY 14620
Tel: (716) 783-2000

Radio Systems

Safetran Systems
4650 Main Street NE
Minneapolis, MN 55421
Tel: (612) 586-3202

Seaboard
40 Pong Park Road
Hingham, MA 02043
Tel: (800) 966-4075; (617) 740-8111

Motorola
1303 E. Algonquin Road
Schaumburg, IL 60196
Tel: (847) 576-5000

David Clark Company
360 Franklin Street
Box 15054
Worcester, MA 01615
Tel: (508) 751-5800

Contractors with International Experience

ABC Rail Systems
421 S. Nine Mound Rd.
Verona, WI 53593
(608) 845-8777

Chemetron Railway Products, Inc.
8021 National Turnpike
Louisville, KY 40209
(502) 368-6562

D. H. Blattner & Sons
10640 N. 28th Drive, Suite B206
Phoenix, AZ 85029
(602) 866-1852

Georgetown Rail Equipment Co.
701 E. University
Georgetown, TX 78626
(800) 582-1803

Herzog Contracting
600 South Riverside Road
St. Joseph, MO 64502
(816) 233-9001

Holland Co.
1000 Holland Drive
Crete, IL 60417
(708) 672-2300

L & K Industries
9325 Mason Dixon Highway
Salisbury, PA 15558
(814) 662-2585

Loram Maintenance of Way
P. O. Box 188
Hamel, MN 55340
(612) 478-6014

MEC Rail
11151 Palmer Avenue
South Gate, CA 90280
(562) 904-3601