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PROJECT PERFORMANCE ASSESSMENT REPORT

PEOPLE'S REPUBLIC OF CHINA

INLAND WATERWAYS
(LOAN 3910-CHA)

December 5, 2005

Sector, Thematic and Global Evaluation Division
Independent Evaluation Group

Currency Equivalents (annual averages)

Currency Unit = Chinese Yuan Renminbi (CNY)

1995	US$1.00	CNY 8.35
1996	US$1.00	CNY 8.31
1997	US$1.00	CNY 8.29
1998	US$1.00	CNY 8.28
1999	US$1.00	CNY 8.28
2000	US$1.00	CNY 8.28
2001	US$1.00	CNY 8.28
2002	US$1.00	CNY 8.29
2003	US$1.00	CNY 8.29
2004	US$1.00	CNY 8.29

Abbreviations and Acronyms

CAS	Country Assistance Strategy
DWT	Dead weight tons (weight of a ship including cargo)
ERR	Economic rate of return
FIDIC	Fédération Internationale d'Ingénieurs-Conseils
FRR	Financial rate of return
Guangxi Province	Guangxi Zhuang Autonomous Region
GCD	National Electricity Grid
GWh	Gigawatt hours (=1000 KWh)
GXWCDC	Guangxi Xijiang Waterway Construction and Development Corporation
HPCD	Hunan Provincial Communications Department
HXNCDC	Hunan Xiangjiang Navigation Construction and Development Corporation
IBRD	International Bank for Reconstruction and Development
ICR	Implementation Completion Report
IEG	Independent Evaluation Group
IWW	Inland Waterways
MOTC	Ministry of Transport and Communications
PAO	Project Administration Office
PPAR	Project Performance Assessment Report
Rmb	Renminbi; Chinese Yuan (currency)
SAR	Staff Appraisal Report
TEU	Twenty Foot Container Equivalent
ZPPWA	Zhejiang Provincial Port and Waterways Administration

Fiscal Year

Government: January 1 – December 31

Director-General, Evaluation	:	Mr. Vinod Thomas
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IEG Mission: Enhancing development effectiveness through excellence and independence in evaluation.

About this Report

The Operations Evaluation Department assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the Bank's self-evaluation process and to verify that the Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, IEG annually assesses about 25 percent of the Bank's lending operations. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or Bank management have requested assessments; and those that are likely to generate important lessons. The projects, topics, and analytical approaches selected for assessment support larger evaluation studies.

A Project Performance Assessment Report (PPAR) is based on a review of the Implementation Completion Report (a self-evaluation by the responsible Bank department) and fieldwork conducted by IEG. To prepare PPARs, IEG staff examine project files and other documents, interview operational staff, and in most cases visit the borrowing country for onsite discussions with project staff and beneficiaries. The PPAR thereby seeks to validate and augment the information provided in the ICR, as well as examine issues of special interest to broader IEG studies.

Each PPAR is subject to a peer review process and IEG management approval. Once cleared internally, the PPAR is reviewed by the responsible Bank department and amended as necessary. The completed PPAR is then sent to the borrower for review; the borrowers' comments are attached to the document that is sent to the Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

About the IEG Rating System

The time-tested evaluation methods used by IEG are suited to the broad range of the World Bank's work. The methods offer both rigor and a necessary level of flexibility to adapt to lending instrument, project design, or sectoral approach. IEG evaluators all apply the same basic method to arrive at their project ratings. Following is the definition and rating scale used for each evaluation criterion (more information is available on the IEG website: http://worldbank.org/OED/eta-mainpage.html).

Relevance of Objectives: The extent to which the project's objectives are consistent with the country's current development priorities and with current Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, Operational Policies). *Possible ratings:* High, Substantial, Modest, Negligible.

Efficacy: The extent to which the project's objectives were achieved, or expected to be achieved, taking into account their relative importance. *Possible ratings:* High, Substantial, Modest, Negligible.

Efficiency: The extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. *Possible ratings:* High, Substantial, Modest, Negligible. This rating is not generally applied to adjustment operations.

Sustainability: The resilience to risk of net benefits flows over time. *Possible ratings:* Highly Likely, Likely, Unlikely, Highly Unlikely, Not Evaluable.

Institutional Development Impact: The extent to which a project improves the ability of a country or region to make more efficient, equitable and sustainable use of its human, financial, and natural resources through: (a) better definition, stability, transparency, enforceability, and predictability of institutional arrangements and/or (b) better alignment of the mission and capacity of an organization with its mandate, which derives from these institutional arrangements. Institutional Development Impact includes both intended and unintended effects of a project. *Possible ratings:* High, Substantial, Modest, Negligible.

Outcome: The extent to which the project's major relevant objectives were achieved, or are expected to be achieved, efficiently. *Possible ratings:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

Bank Performance: The extent to which services provided by the Bank ensured quality at entry and supported implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of the project). *Possible ratings:* Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

Borrower Performance: The extent to which the borrower assumed ownership and responsibility to ensure quality of preparation and implementation, and complied with covenants and agreements, toward the achievement of development objectives and sustainability. Possible ratings: Highly Satisfactory, Satisfactory, Unsatisfactory, Highly Unsatisfactory.

Contents

This report was prepared by Peter Freeman and Thomas Kennedy, who assessed the project in June 2005. The report was edited by William Hurlbut, and Romayne Pereira provided administrative support.

Principal Ratings

	*ICR**	*ICR Review**	*PPAR*
Outcome	Satisfactory	Satisfactory	Satisfactory
Sustainability	Likely	Likely	Likely
Institutional Development Impact	Substantial	Substantial	Substantial
Bank Performance	Satisfactory	Satisfactory	Satisfactory
Borrower Performance	Satisfactory	Satisfactory	Satisfactory

* The Implementation Completion Report (ICR) is a self-evaluation by the responsible operational division of the Bank. The Evaluation Summary (ES) is an intermediate IEG product that seeks to independently verify the findings of the ICR.

Key Staff Responsible

Project	*Task Manager/Leader*	*Division Chief/ Sector Director*	*Country Director*
Appraisal	Mohammed Rasheed	Richard Scurfield	Nicholas C. Hope
Completion	Toshiro Tsutsumi	Jitendra N. Bajpai	Yukon Huang

Preface

This is the Project Performance Assessment Report (PPAR) prepared by IEG for the **China: Inland Waterways Project** (Loan 3910-CHA). The loan was approved on June 20, 1995 for an amount of US$210 million equivalent. The Chinese Government (central government, provinces, and municipalities) was to provide an additional US$319.3 million and a Chinese bank was to provide a further US$27.5 million. The borrowers were the Departments of Communications of Zhejiang, Hunan, and Guangxi provinces, and their allocations were guaranteed by the People's Republic of China. The date of loan effectiveness was November 29, 1996, and the loan was closed on schedule on June 30, 2001, with US$185.9 million of the funds disbursed. An amount of US$24.1 million was cancelled. The unused portion of the loan resulted from savings due to competitive bidding for power generation units in Guangxi Province.

The project was chosen for assessment because it was the first Bank loan for the inland waterway sub-sector in China and because it is one of only a few such projects funded by the Bank worldwide. The project consisted of separate subprojects in each of the three provinces.

IEG prepared this report based on an examination of the relevant Staff Appraisal Report (SAR), Implementation Completion Report (ICR), legal agreements, project files and archives, as well as other relevant reports, memoranda, and working papers. Discussions were also held with a number of existing and former Bank staff in Washington DC, as well as in China. An IEG mission visited China in June 2005, conducted site visits, and discussed both the project and the effectiveness of Bank assistance with government officials and stakeholders. Their kind assistance is greatly appreciated.

Following standard IEG procedures, copies of the PPAR was sent to relevant government officials and agencies for their review and comments but none were received.

Summary

China has benefited from one of the highest sustained growth rates in the world over the last 25 years, but the pace at which infrastructure can be provided has not always matched this extraordinary growth. Nevertheless, the transport network is extensive and expanding rapidly. Inland waterways are particularly attractive for bulk transportation because they are environmentally friendly, and the **China Inland Waterways Project** (Loan 3910-CHA) was an opportunity to establish a platform for future similar projects elsewhere. An interesting feature is the dual nature of the project - to improve waterway capacity by constructing dams that could also be used for power generation.

In the case of the Hunan and Guangxi provinces the project aimed to improve port facilities and construct ship locks around the dams. Sources of income from the project were expected to include sales of electric power and fees paid by vessel owners for passage through the ship locks. The Bank also supported the expansion of capacity and modernization of the facilities in the Zhejiang province, which had no power generation component. The three provinces were selected because of their potential for economic growth, the expectations of traffic increases along their inland waterways, and the year-round navigability of these waterways. In effect the scheme in each of the three provinces was a separate sub-project, but as the objectives were common it made sense to package the sub-projects into one aggregate project under a single loan.

The project had five specific objectives: to (i) improve inland waterway management through organizational and financial reforms; (ii) expand waterway capacity by constructing dams to increase the water level and deepen channels to improve navigation; (iii) improve connections between waterway and land transport by building new and equipping existing ports; (iv) generate hydroelectric power by using waterway dams (Hunan and Guangxi); and (v) enhance the capabilities of the waterway management entities in the three provinces.

The outcome of the project is rated as **satisfactory**. Construction of all planned infrastructure was completed to a high standard, but traffic to some of the transfer port facilities did not materialize in the volumes expected due to changes in the market following the deregulation of the transport sector. There was also some delay in compensation payments to residents affected by the creation of the reservoir in Guangxi Province, but all of these payment issues have now been resolved. No safeguard contraventions were recorded and a good overall rate of return of 22 percent was achieved for the project. Average vessel size increased and power output from the dams equaled or exceeded projections. The assessment considers the objectives of the project fully achieved.

The institutional development impact is rated **substantial**. The project has led to the development of two corporatized entities responsible for the implementation of the project in Guangxi and Hunan provinces, where a power generation component was included. In Zhejiang Province, the project was implemented by a Project Administration Unit of the Zhejiang Provincial Port and Waterways Administration and the repayment of the loan was effected through the provincial treasury; control systems for quality of work,

timing and payment were in accordance with the Fédération Internationale d'Ingénieurs-Conseils (FIDIC) conditions, and dam safety panels were set up under the project and continue to be used for similar projects of this nature.

The assessment considers the sustainability of the project **likely**. With the improved infrastructure in place, a competitive tariff structure for inland waterway transport as well as a strong income base from sale of electric power, the project enables the provinces to benefit from both these income streams. The training component was also successfully completed, increasing the likelihood of project sustainability. Several progressive ideas and innovative concepts were developed as a result of this training.

Bank and borrower performance are rated **satisfactory**. Preparation of the project took about 31 months. However, the result was a project that was successfully implemented and resulted in a sustainable stream of benefits. The implementation organizations in each province coordinated well with Bank staff and prepared the project consistent with Bank regulations.

Lessons Learned

- *Inland waterways can be an efficient and environmentally friendly transport mode for bulk goods conveyance* where the market demand is strong and when such projects are developed in coordination with the other modes of transportation. *Additional benefits can be derived when dams constructed to deepen water channels are also used for hydro-electric power generation.* In such cases a separate corporate entity is required to operate the facility effectively.

- *A thorough assessment of both the market and the risks in the realization of traffic projections is essential for inland waterway projects.* Traffic forecasts and monitoring indicators should be analyzed carefully and the risks assessed thoroughly during preparation.

- *Inland waterway projects should consider the inclusion of guidelines* to encourage and expedite the modernization process of shipping using the waterways, in order *to help ensure that vessel fleet efficiency keeps pace with the level of service provided by the improved infrastructure.*

Vinod Thomas
Director-General
Evaluation

1. Background

1.1 Since 1980, China has had one of the highest sustained rates of per capita income growth in the world. Per capita GDP (at constant prices) doubled between 1980 and 1990; then doubled again between 1990 and 2000. The sustained stability in China's economy throughout this period of high growth is generally attributed to the gradual approach to reform in China in which institutional changes have preceded or accompanied policy changes.

1.2 Despite these dramatic economic growth statistics, some shortcomings are being urgently addressed by the government as well as through project implementation by international financial institutions. Such shortcomings include inequality of development between regions and environmental degradation. The outcomes of the *China Inland Waterways Project* indirectly relate to both of these issues, although they were not part of the project objectives.

1.3 Strong economic growth has been concentrated primarily in the coastal provinces, as it has been in these regions that economic reforms and strong economic development have taken place during recent years. Many of the inland provinces face rising unemployment and increasing social tensions between the people and the government. This rising disparity in regional growth has adversely affected China's otherwise admirable progress in poverty reduction. Between 1990 and 2000 the number of people living on the equivalent of one dollar a day fell by 170 million; while during the same period the population increased by 125 million. Over the past 20 years, China has accounted for nearly 75 percent of poverty reduction in the developing world.

1.4 With regard to the environment, China's air and water quality are a cause of concern; seven of the ten most polluted cities in the world are located in China. Appropriate investment projects which include economically stagnant regions and which support environmentally favorable transport modes clearly assist the easing of these economic inequalities and help reverse the trend of degradation of the environment.

1.5 China has an extensive transport network of railways, highways, waterways, and ports, but this network remains unable to fully meet all the needs of its rapidly growing economy. Even with recent increases in the country's highway and railway networks, lack of transport capacity continues and a high priority is placed on alleviating congestion.

1.6 Inland waterways, taking advantage of existing large navigable rivers, are an important element of the transport system. They are a cost-effective transport mode for bulky goods such as agricultural products, building materials, coal, and other commodities over medium to long distances. The waterways also have an environmental advantage, with a low fuel consumption rate per unit-kilometer hauled compared with other transport modes. Nevertheless, China's once extensive waterway network has, over time, been reduced from 172,000 kilometers in 1961 to approximately 110,000

kilometers today due to underinvestment, removal of some sections of the network, and construction of dams without ship locks (effectively eliminating waterway transport on some rivers).

1.7 The project assessed in this PPAR was intended to stem the trend towards a diminishing waterway network by expanding capacity and modernizing the waterways of Zhejiang, Hunan, and Guangxi provinces. These provinces were selected for the project because of their potential for economic growth, the expectations of traffic increases along their inland waterways, and the year-round navigability of the waterways concerned. Guangxi has the highest incidence of poverty among the three provinces[1] with nearly 35 percent of its counties designated as "poverty counties". Per capita income during 2004 was Rmb 5,944 in Zhejiang, Rmb 2,838 in Hunan, and Rmb 2,305 in Guangxi.[2] Although the latter provinces were not the poorest areas in China, they had substantial navigable waterways and met the criteria for inclusion. Through this mix of provinces, the project contributed to the government's objective of reducing the development imbalance between the fast-growing coastal provinces and the less prosperous inland regions.

1.8 In Zhejiang, the need to remove waterway bottlenecks had long ago been identified. Some construction projects in nearby Shanghai had been interrupted because of delays in the transportation of construction materials from Zhejiang, while a local power plant had on occasion ceased operations for lack of coal. Both of these key commodities were carried by the inland waterway system. In Hunan and Guangxi, the project was designed to improve shipping channels on the Xingjiang (a tributary of the Yangtze River, and the Xijiang, which flows into the Pearl River to Guangzhou). An interesting feature in these provinces was the dual nature of the project to improve waterway capacity by constructing dams that could also be used for power generation.

1.9 The project aimed not only at improving infrastructure along the waterways but also at improving the organization and management of the waterway network. Market reforms already begun by the government were strengthened and deepened through the implementation of the project.

1.10 The rationale for the Bank's involvement was fully consistent with the Country Assistance Strategy (CAS) for China, discussed by the Board in 1995. This strategy aimed to help alleviate infrastructure bottlenecks, reduce poverty, safeguard the environment, and introduce macroeconomic and structural reforms. Although this was not an explicitly poverty-focused project, the benefits would clearly help to reduce imbalances between Hunan, Guangxi and the better-off coastal provinces.

1.11 Nine previous Bank-funded hydro projects in China have demonstrated the need to enhance implementation quality and accelerate sector and enterprise reform to increase efficiency. Based on previous experience this project provided for technical panels responsible for ensuring dam safety and for assisting in reaching agreement on adequate

1. *Analysis and Evaluation of the Present Situation of Socioeconomic and Rural Roads in China's Major Poverty Stricken Area*, State Development Planning Commission, Beijing, November 1998.

2. *China Statistical Abstract*; 2005.

pricing of power supplied by the project. The panels proved to be highly successful in both Hunan and Guangxi and the concept will be continued for similar projects in the future. The Project

Project Objectives

1.12 The project had five objectives: to (i) improve inland waterway management through organizational and financial reforms; (ii) expand waterway capacity by constructing dams to increase the water level and deepen channels to improve navigation; (iii) improve connections between waterway and land transport by building new and equipping existing ports; (iv) generate hydroelectric power by using waterway dams; and (v) enhance the capabilities of the waterway management entities in the three provinces. The objectives generally apply to project components in each of the three provinces with the exception of Zhejiang Province, where the project did not include dam construction or power generation facilities. It should be noted that, except for the last objective the focus was on outputs rather than outcomes.

1.13 The project financing plan, amounting to US$ 556.8 million, consisted of a US$210 million loan from the Bank, US$319.3 million from government (central government, provinces, and municipalities) and US$27.5 million from a local bank loan; the actual cost was US$592.4 million, or six percent higher than the appraisal estimate, primarily due to increased civil works and resettlement costs in Hunan and Zhejiang provinces.

1.14 The loan from the Bank was to cover the foreign exchange portion of total project cost. Only US$185.9 million of the Bank loan was disbursed, however, primarily because of savings from competitive bidding for the power generation units in Guangxi; US$24.1 million was cancelled.

Sub-Project Components and Costs

Table 1: Inland Waterways Sub-Project Components and Total Costs

Components	***Total Project Costs (US$ millions)***	
	Appraisal	***Actual***
Guangxi: Construction of dam and ship lock at Guiping channel, improvement of the Xijiang channel, and installation of power generation facilities at the dam. Technical assistance, training, land acquisition, and resettlement.	246.4	229.0
Hunan: Construction of dam and ship lock at Dayuandu, channel improvement of the Xiangjiang waterway, installation of hydropower generation facilities at the dam, and expansion of two ports, Hengyang and Zhuzhou. Technical assistance, training, land acquisition, and resettlement.	211.8	237.7
Zhejiang; Improvement of four major waterway channels and construction of three river ports at Huzhou, Jiaxing, and Hangzhou to link with land transport. Technical assistance, training, land acquisition, and resettlement.	98.6	125.7
Total cost	**556.8**	**592.4**

1.15 Three independent sub-project components were separately located in Guangxi, Hunan, and Zhejiang provinces (the percentage shares in component costs are shown in brackets in each case). The *Guangxi* components included construction of a dam, ship lock and channel improvement (51.0 percent), power generation and ship lock equipment (27 percent), technical assistance and training (12.5 percent), and land acquisition and resettlement (9.5 percent). The *Hunan* components consisted of construction of a dam, ship lock, channel improvement and terminals at two ports (55.1 percent), power generation and ship lock equipment (34.0 percent), technical assistance and training (4 percent), and land acquisition and resettlement (6.9 percent). The *Zhejiang* components comprised channel improvements and construction works at three ports (66.0 percent), supply of equipment for port operation (2.7 percent), technical assistance and training (1.9 percent), as well as land acquisition and resettlement (29.4 percent).

1.16 Exogenous events led to unavoidable increases in some project costs. Heavy flooding in the Hunan and Guangxi provinces during 1996, delayed project implementation and required modification of the dam designs to increase reinforcement works and raise the level of the cofferdams. In Zhejiang, the channel design was modified and upgraded to allow passage of larger vessels of 500 dwt and to be consistent with the standards in neighboring Jiangsu Province. Land acquisition and resettlement costs were also increased to add embankment protection that would reduce inundated land in reservoir areas.

2. Results

Zhejiang Province Project (River ports of Hangzhou, Jiaxing and Huzhou)

Objective 1: Improve waterway management by introducing organizational and financial reforms in line with the market economy

2.1 The implementation of the project was the responsibility of a Project Administration Office (PAO) within the Zhejiang Provincial Port and Waterways Administration (ZPPWA). A development corporation similar to that in Hunan and Guangxi provinces was not established in Zhejiang because the Zhejiang project did not include dam and power generation capability.

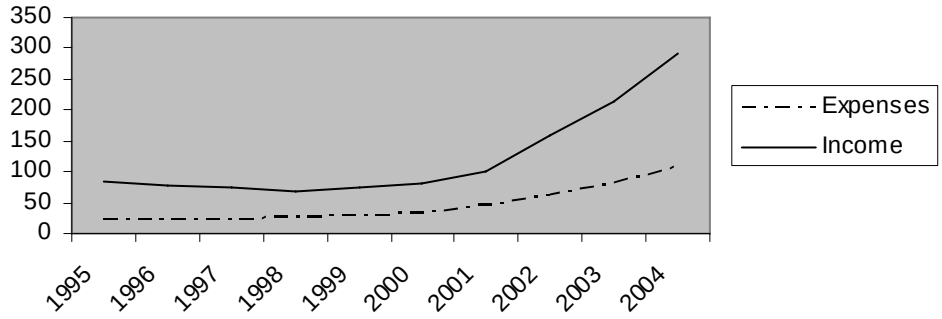
2.2 Income from waterway transport in Zhejiang consists of four elements: (i) waterway maintenance fees (57 percent); (ii) transport management fees (14 percent); (iii) port services fees (18 percent), and (iv) vessel fees (11 percent). Historically, the waterways were subsidized by the province so there was little incentive to collect additional revenue, but the tariff system was radically overhauled and made self-financing under the inland waterways project. Financial management and accounting practices were upgraded to conform with international best practice. By 2004, the total

income had risen to Rmb 290.3 million (about US$35 million). This can be compared with operating costs of the waterways system that amounted to Rmb 108.3 million (about US$13 million), indicating a strong financial performance by the waterways system in 2004 in the province. Proceeds from these charges are collected by the local municipalities and deposited in the general revenue account of the province. Funds needed for the operation and management of the waterways are requested by the Port and Waterways Administration from the provincial treasury and are not directly linked to revenue.

2.3 The overall financial performance of Hangzhou was satisfactory with operating and working ratios within an acceptable range (40-60%). Jiaxing and Huzhou showed less revenue than anticipated and short-term liquidity problems, but profitability was better than expected.

2.4 Figure 1 shows trends in income and expenses of waterway charges on the 190 kilometers of waterways improved under the Inland Waterway Project in Zhejiang. It can be seen that the profitability increased markedly after project completion in 2001.

Figure 1: Zhejiang Province:
Profitability of IWW1 Waterways (Rmb millions)



2.5 The operation of the port facilities in Hangzhou improved under the project is also now the responsibility of a private company, a move in line with both borrower and Bank objectives to increase the role of the private sector in the emerging market-driven economy. Formerly, the Hangzhou Port Services Company Ltd. was partially owned by the government, but in June 2004, with the encouragement of the government, the company became a joint stock company, with 40 shareholders and no government participation. This company is making a profit (annual revenues of about Rmb 50 million and costs of Rmb 40 million) on its operations, including charging full depreciation for assets. Similar options (not part of the project) are under consideration for Jiaxing and Huzhou. The assessment considers this objective to be *fully achieved*.

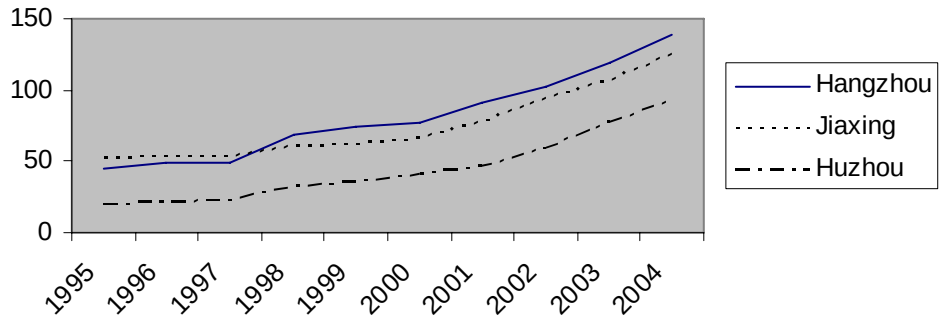
Objective 2: Expand waterway capacity by widening and deepening channels to improve navigation

2.6 A total of 190.3 kilometers of canal channels were reconstructed; 140 kilometers were reconstructed to Class 4[3] and 50.3 kilometers to Class 5.[4] In addition, 49 bridges were constructed.

2.7 Three channels were improved to Class 4 standard: Beijing-Hangzhou Canal, Hangzhou-Shanghai Channel, and the downstream section of the Changxing-Huzhou-Shanghai Channel. Reconstruction was originally intended to be to Class 5 standards, but the standard was upgraded to Class 4 to be consistent with the standards in neighboring Jiangsu Province. Two channels were improved to Class 5 standard: Zhapu-Jiaxing-Suzhou Channel and the upstream section of the Changxing-Huzhou-Shanghai Channel.

2.8 These channel improvements have catalyzed a strong increase in average vessel size on the waterways of the province. Figure 2 shows that the average vessel size has increased steadily since 1995 strengthening the economic benefits of moving bulk goods in large vessels.

Figure 2: Zhejiang Province: Average Capacity of Vessel (net tons)



2.9 At a location between Hangzhou and Jiaxing, a new 3 kilometer-long waterway was also constructed to avoid a low bridge that was limiting traffic on the old channel. The bridge was a historical monument and could not be dismantled, but was the cause of many waterway accidents as the structure narrowed the effective usable portion of the channel. The assessment considers this objective *fully achieved.*

Objective 3: Improve connections between waterway and land transport services

2.10 Port infrastructure was improved in Hangzhou, Jiaxing, and Huzhou to permit more efficient transfer to land transport. These investments were conceived when China

3. Class 4 channel accommodates vessels up to 500 tons carrying capacity.

4. Class 5 channel accommodates vessels up to 300 tons carrying capacity.

had strong central planning in the transport sector, through which traffic was "directed" to each mode. During project implementation, the market changed overnight when each mode became free to compete for traffic. This deregulation affected the usage of the ports and hence the type of facility required.

2.11 In Hangzhou the original intention was to build a bulk materials transfer port primarily for sand. However, during project implementation the ZPPWA realized they should construct port facilities suitable for handling steel products. This modification was carried out (with Bank approval) and the facility handled approximately 1.5 million tons of steel bars in 2004. It was estimated that the steel berth constructed under the project now accounts for about 40 percent of all steel handled at Hangzhou port; the total quantity of steel moved during 2004 was approximately 3.75 million tons, while the SAR estimate was 3.3 million tons by 2000.

2.12 In Jiaxing and Huzhou the funds from the Inland Waterways Project were used to construct coal transfer facilities. The Jiaxing coal facility was later sold, however, following the radical market changes and the government has used the sale proceeds to modify the terminal to handle grain. It will commence operations shortly. In Huzhou, the Bank financed a coal transfer facility, construction of a warehouse, and handling equipment for the transfer of commodities from rail to river and road transport. During 2004 the IEG mission found that a modest 325,000 tons were being handled by the Bank-financed component of which 162,000 tons were coal. The grain terminal was still under construction.

2.13 While the facilities are not now being used in two of the three ports as originally envisioned, they will be used productively in ventures that support increased competition, an important element of the transition of China's market economy. The Borrower and the Bank deserve recognition for their adaptability and resourcefulness in the circumstances. Currently only at Hangzhou are the traffic projections being met in full because of these unforeseen circumstances, but the imminent opening of the grain terminal at Jiaxing and changes in operations at Huzhou are expected to increase traffic handled at these terminals substantially. The assessment therefore considers this objective *modestly achieved*.

Objective 4: Generate hydroelectric power by using waterway dams

2.14 The project in Zhejiang Province did not include a component for dam construction or electric power generation. Therefore the evaluation of this objective is *not applicable* in this province.

Objective 5: Enhance the capabilities of waterway management entities

2.15 Overseas training comprising 121.5 person-months for 141 persons was carried out. This training resulted in several important changes to the ZPPWA approach to the water transport business. Examples include a pilot development of container transport by waterway and the introduction of landscaping along the banks of the waterways.

2.16 Although the container pilot project is still in the initial stages, during 2003 a total of 10,000 containers (TEUs) were already being moved through the ports of Hangzhou, Jiaxing, and Huzhou. Facilities for handling containers at these ports are now under improvement (not part of the Bank-funded project) and it is expected that tonnages will continue to increase in the foreseeable future.

2.17 The landscaping concept has been applied along the banks of the canals in Zhejiang Province and will be continued as part of an inland waterway beautification program. The assessment therefore concurs that training definitely enhanced the capabilities of the ZPPWA significantly and this objective was *fully achieved*.

Hunan Province Project

Objective 1: Improve waterway management by introducing organizational and financial reforms in line with the market economy

2.18 Hunan Xiangjiang Navigation Construction and Development Corporation Ltd. (HXNCDC) was authorized by the Hunan provincial government and established by the Hunan Provincial Communications Department (HPCD) in November 1994. This state-owned corporation is responsible for planning, construction, and operational management of Xiangjiang navigation infrastructure projects. Income from the power generation at the Dayundu hydropower station fully funds the operating costs of the facility, administration expenses, and repayment of the debt. While the project includes the construction of a ship lock to enable waterway traffic to pass the dam site, it is the policy of HPCD not to impose ship lock charges on vessels. The reasoning is to promote waterway traffic on the Xiangjiang and because the power generation provides a good source of income to finance the ship lock construction costs and operating expenses. This strategy was agreed with the Bank during implementation of the project.

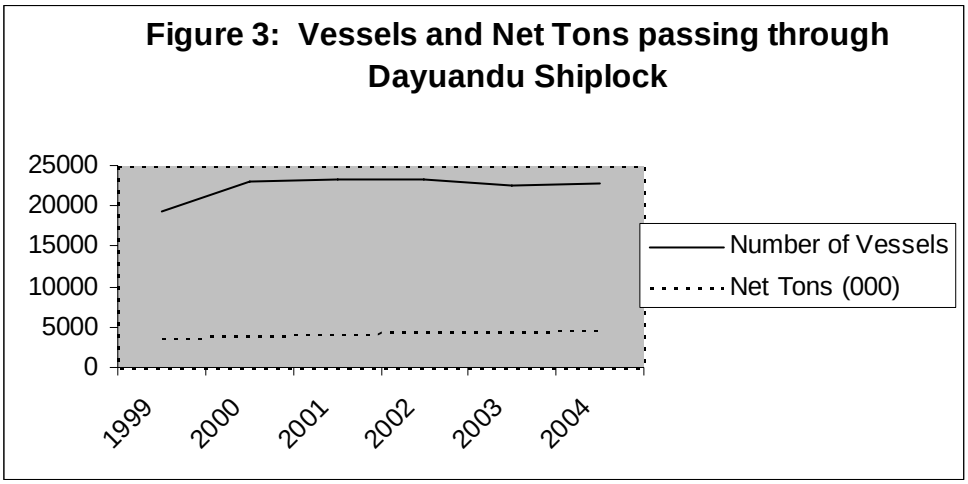
2.19 The HXNCDC's finances have resulted in a profitable position and acceptable operating ratios. The IEG mission reported that the operating ratio has improved consistently since 2000 and that the working ratio has increased slightly; both ratios are within an acceptable range. (See Annex B, Table B1). Financial management and accounting practices conforming to international standards were introduced. The assessment considers this objective *fully achieved*.

Objective 2: Expand waterway capacity by widening and deepening channels to improve navigation

2.20 The primary component of the project was the construction of a dam, ship lock, powerhouse, and dam-crest highway bridge on the Xingjiang at Dayuandu, some 62 kilometers downstream of Hengyang. Behind the Dayuandu dam, the water level was raised, making the channel deeper and wider. With the completion of the Zhuzhou dam by August 2006, the section of the Xiangjiang between Dayuandu dam and Zhuzhou will be wider and deeper as well. This improvement in the river transport system can be seen in the increased average net tons per vessel. From 1999 to 2004, the average net tons per vessel increased by approximately 10 percent, from 176 net tons to 192 net tons. During

the early 1990s, the Xiangjiang south of Changsha could not accommodate vessels greater than 1,000 tons capacity. Now, with the completion of the Dayuandu dam, as well as other river improvements under other projects, vessels of over 1,000 tons can navigate as far south as Henyang.

2.21 A total of 4.38 million tons was moved along the waterway through the ship lock during 2004; traffic in previous years is shown in Figure 3. It can be seen that the completion of the project resulted in a marked increase in the number of vessels. This has held steady during the last few years and there has been a marginal increase in the total net tons carried, a result of the increasing vessel size on the waterway. Major commodities moving through the ship lock are shown in Annex B, Figure B1. The assessment considers the objective *fully achieved*.



Objective 3: Improve connections between waterway and land transport services

2.22 The project included port improvements at Zhuzhou and Henyang, specifically, the addition of one berth at the port of Zhuzhou and two berths at the new port of Henyang. Primary commodities handled at the port of Zhuzhou are containers, and at Henyang, timber and building materials. At both locations, the inland movement of goods is by road transport. During 2004, traffic handled at the Henyang port amounted to 13,750 cubic meters of timber and 6,700 tons of bulk commodities; at Zhuzhou, a total of 8,655 TEUs were handled during the same period.

2.23 The ports of Zhuzhou and Henyang are operated by the administrative entities of their respective municipalities. Funds used for upgrading these ports were from the domestic funding component of the Inland Waterway Project. Included in the Monitoring Indicators of the SAR are year 2000 port tonnages for Henyang and Zhuzhou of 4.3 and 3.3 million tons, respectively. As the HXNCDC does not have full authority over each individual port along the river at these municipalities, the PPAR mission was unable to obtain comparative tonnage data. However, port improvements were completed and the ports are functioning as planned, the assessment therefore considers this objective *substantially achieved*.

Objective 4: Generate hydroelectric power by using waterway dams

2.24 The powerhouse has four through-flow bulb turbine generator units, each with a capacity of 30 megawatts with a total capacity of 120 megawatts, the average annual output is 585 kilowatt hours. Electricity was generated by the new facility beginning in December 1998, six months ahead of schedule. Annual power output and income from the sale of power are shown in Table 2. In the SAR it was projected that by the year 2000, annual power output from the Dayuandu dam would be 430 gigawatt hours (GWh); actual power generation was 404 GWh in 2000 and has grown steadily since (except in 2003). The amount of rainfall, which varies from year to year, affects the output that can be achieved. This objective essentially has been *substantially achieved*.

Table 2: Power Output and Income from Dayuandu Hydropower Junction

	1999	***2000***	***2001***	***2002***	***2003***	***2004***
Output (GWh)	160	404	487	521	458	526
Income (000 Rmb)	32,000	118,660	123,240	140,560	125,230	149,540

Objective 5: Enhance the capabilities of waterway management entities

2.25 During the 90 person-months of overseas training provided for HXNCDC staff, construction techniques of dam and power generation projects were studied in detail. One unique feature of such facilities in China was implemented at Dayuandu: a powerhouse with a removable roof. This design provides easy access to the powerhouse facilities by means of a gantry crane mounted on the dam. This construction technique increased the effective utilization of the facility, as the crane can move along the entire length of the dam to maintain sluice gates during operation as well as to install generator units within the powerhouse. The traditional design of the powerhouse is a high structure, with difficult access. Dayuandu was the first dam in China to include such an innovation and this feature has also been incorporated in the design of the dam and power generation facility at Zhuzhou, due to be completed in 2006.

2.26 The training provided critical instruction and experience for many of the younger engineers of HXNCDC. It resulted in the project being successfully implemented and some innovations in dam construction, as noted above. In fact, the construction project was awarded the National High Quality Award of the People's Republic of China by the Ministry of Construction. The IEG mission commends this development and considers the capability objective to be *fully achieved*.

Guangxi Province Project

Objective 1: Improve waterway management by introducing organizational and financial reforms in line with the market economy

2.27 The Guangxi Xijiang Waterway Construction and Development Corporation (GXWCDC) is a state-owned corporation and was established in 1999 by the Guangxi Provincial Government for the purpose of operating the Guigang ship lock and power

generation facility as well as to undertake future navigation improvement projects on the Xijiang. As a result of the overseas training of GXWCDC staff, a financial system consistent with international accounting standards was established for cost control and to establish procedures for debt repayment, project maintenance, and new project construction. The GXWCDC finances are sound with an (after tax) profit and acceptable operating and working ratios. (See Annex B, Table B1). The IEG mission reported that this positive trend had been maintained through 2004.

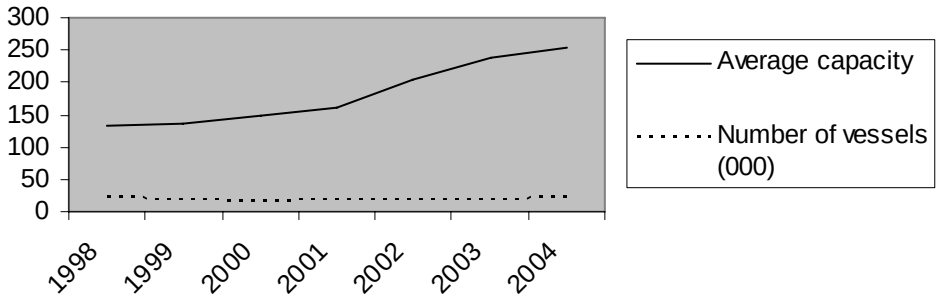
2.28 The primary income of the project is from sales of electric power to the Guangxi power grid from the Guigang power station. Revenue from this power has enabled the GXWCDC to maintain financial self-sufficiency while generating sufficient cash both for operation as well as for loan repayments. This objective is deemed *fully achieved.*

Objective 2: Expand waterway capacity by widening and deepening channels to improve navigation

2.29 The primary focus of the project was construction of a dam, power generation capability, and a ship lock at Guigang, approximately 110 kilometers downstream from Nanning on the Xijiang. Construction of the dam raised the water level upstream to permit vessels of class 3 (1,000 tons). In addition, channel improvements (primarily dredging and reef demolition) were made over approximately 105 kilometers of the river between Guiyang and Nanning. The improvement of this section of the river was an important component in improving the 847 kilometers of the Xijiang between Nanning and Guangzhou. This project complemented a recently completed dam and ship lock at Guiping, 110 kilometers downstream from Guigang.

2.30 Currently vessels must pay a fee of Rmb 0.40 per ton to pass through the ship lock. The annual yield from these charges is about Rmb 1 million, or about US$120,000 (2004). Compared with income from power generation, this is relatively minor and discussion is under way to possibly eliminate this charge in the future. The policy of assessing ship lock charges varies by province — Hunan does not have such charges, but Zhejiang does. The combination of channel improvements and construction of the Guigang dam and ship lock have resulted in steadily increasing average vessel size. For example, in 1998, the average vessel rated capacity passing Guigang was 132 tons; the project was completed in 2001 and by 2004 average vessel size had increased to over 250 tons. Average capacity and number of vessels passing through Guigang ship lock are shown in Figure 4 for 1998 through 2004.

Figure 4: Vessels Passing Through Guigang Shiplock



2.31 A negative aspect of the results in Guangxi is that the traffic volume expected through the Guigang ship lock projected at appraisal of 7.5 million tons by the year 2000 proved overoptimistic. To realize the projected traffic on the river, several independent projects unrelated to the Inland Waterway Project should have been undertaken. Construction of a coal terminal at Baise (with a planned capacity of between 4 and 5 million tons per year) has not been completed, depriving the system of a major intermodal transfer point from road/rail to inland waterway transport downstream. Another uncompleted project is an additional ship lock at Xijing, whose single two-step ship lock and dam facility constructed during the 1960s continues to be a bottleneck. Completion of the Nanning-Kunming railway line in 1997 was expected to bring coal to the river transshipment center for further movement by inland waterway but, though the railway line was constructed the transshipment facility has yet to be built. Consequently, coal traffic that was to have moved by inland waterway is now moved by rail.

2.32 The primary reason for delaying the construction of the Baise coal terminal is the outstanding requirement to prepare an environmental impact assessment, in accordance with the Chinese regulations. This study has not yet been undertaken. The Xijing ship lock is under the authority of the national electricity grid and GCD has no authority to enforce more strict operating conditions at the ship lock. On average, the Xijing ship lock is opened about five times per day; the Guigang ship lock, however, is opened 10-12 times per day. This means the waiting time is much longer at the Xijing facility. While the traffic projections for the year 2000 were not achieved, the assessment finds no element of the project implementation or design that could have prevented this situation. The assessment therefore considers this objective *modestly achieved.*

Objective 3: Improve connections between waterway and land transport services

2.33 The project provided an improved waterway system that enhanced accessibility within the region and complimented the existing land transport links in the region, including the newly completed (1997) Nanning-Kunming railway and the Tanlou-Baise highway (an expressway to the northwest of Nanning funded with an Asian Development

Bank loan approved in 2005). While there were no specific infrastructure improvements as part of the Inland Waterway Project to facilitate intermodal linkages, the existence of the improved waterway, with increased capacity, with other port improvement projects will in time make the Xijiang corridor a multi-modal link in southwestern China.

2.34 The assessment considers this objective *not applicable* to the specific components of the project in Guangxi, though in combination with other port improvement projects this objective likely will be achieved in the future.

Objective 4: Generate hydroelectric power by using waterway dams

2.35 A hydropower station with a capacity of 120 megawatts and an annual power output of 600 GWh was constructed including a 60 kilometer-long power transmission line[5]. In the SAR, the target for power generation during the year 2000 was 555 GWh; actual power production during that year from the Guigang facility was 560 GWh. During 2004, power production was 544.5 GWh, while during 2003 it reached 645.7 GWh. Annual actual power production is variable and subject to the availability of the amount of rain resulting in high water levels; during years of lower rainfall, generating capacity of the facility is decreased. Taking into account the monitoring indicators identified in the SAR, and the power production data during recent years, the assessment considers this objective *fully achieved*.

Objective 5: Enhance the capabilities of waterway management entities

2.36 The project included 1,228 person-months of training (506 person-months of domestic training and 722 person-months of overseas training), covering policy support, implementation support, and institutional strengthening. This training proved to be self-sustaining, as the persons trained are now training other GXWCDC staff.

2.37 Moreover, the training was instrumental in equipping the GXWCDC management for the transition to working as a corporatized entity. An important aspect of the training was the introduction of strong financial management. Internationally accepted accounting principles were applied to the GXWCDC and enhanced the level of both financial reporting and cost control.

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5. The price paid by the power transmission organization to the GXWCDC is 30 fen per kilowatt hour. This price resulted from negotiations between the power supplier and transmission company. However, such negotiated prices must be approved by the Provincial Pricing Bureau and Reform Development Commission. Prices approved by these organizations are the result of submissions by the power producing organization demonstrating their cost of production, as well as the political realities in the region of establishing a particular price for energy. There is not a uniform selling price of electricity to the power transmission company in Guangxi. For example, with the recent increase in the price of coal, thermal power generating units have had higher prices approved. In addition, some foreign joint venture enterprises have also had higher rates approved, on the basis that foreign loans must be repaid.

2.38 A further impact of the technical training led to a redesign of the pressure oil pump in the power generation facility. The original design included continuous running of the pump, resulting in high temperatures and the need for frequent water cooling to prevent overheating. A pump system that included intermittent running, which greatly reduced the need for cooling water, was implemented (the cost of providing this cooling water was reduced by two-thirds). The capabilities of waterway management in Guangxi were enhanced as a result of the project and therefore the assessment considers this objective *fully achieved*.

3. Ratings

Outcome

3.1 The aggregate outcome of the entire project (which comprises three sub-projects) is rated **satisfactory**. While the five project objectives did not apply uniformly in each of the three provinces, construction of all civil works were completed, and in some cases standards exceeded those indicated in the original project specifications. Although the objectives are stated in output rather than outcome terms, reduced transport costs, relative to the alternatives of road and rail, were clearly a major outcome. This reduction was derived from lower transit time at ship locks and port terminals as well as economies of scale from the use of larger vessels. Table 3 summarizes the achievement of all the objectives for each of the sub-projects.

Table 3 Summary of the Achievement of Objectives in the Inland Waterways Project

Sub-Project	***Obj1***	***Obj2***	***Obj3***	***Obj4***	***Obj5***
Type	*Reform*	*Capacity*	*Connections*	*Generation*	*Training*
Zhejiang	Substantial	Full	Modest	Not Applic.	Full
Hunan	Full	Full	Substantial	Substantial	Full
Guangxi	Full	Modest	Not Applic.	Full	Full
Overall	Full	Full	Modest	Substantial	Full
Outcome: Satisfactory					

Relevance

3.2 The relevance of the project objectives is **high**. The infrastructure improvements coupled with the organizational and financial reforms included in the objectives are fully consistent with the Bank's Country Assistance Strategy (CAS) and Government of China's commitment to transition to a market economy. The Bank's strategy in the transport sector was to alleviate infrastructure bottlenecks, reduce poverty, safeguard the environment, and introduce macroeconomic and structural reforms. The project is consistent with this strategy by (a) improving and expanding transport and power generation infrastructure where supply constraints existed; (b) increasing transport

efficiency by improving inter-modal linkages; (c) introducing financial and organizational reforms in the inland waterway sub-sector aimed at commercialization of operations and financial independence; and although not direct project objectives, (d) focusing 79 percent of project investment in two relatively poor provinces and (e) promoting an environmentally preferable type of transport.

Efficacy

3.3 The efficacy of the project is rated **substantial.** Most major elements of each objective have been achieved in each province, resulting in increased power generation capability, larger vessel sizes and a more productive inland waterway system. There were differences in the structure of the implementing organizations: in Zhejiang Province, a Project Administration Unit within the existing Zhejiang Provincial Port and Waterways Administration while in Hunan and Guangxi, corporatized entities were created. The assessment finds these two different types of organizations for implementation both worked according to the prevailing circumstances in each case and did not affect the quality of implementation. In Zhejiang Province investments in coal transfer facilities (rail-river transfer) at Huzhou and Jiaxing were not fully utilized because of the impact of ongoing reforms in China's transport sector. Overall, however, waterway traffic increased in Zhejiang Province and because the average size of vessels increased, the realization of project benefits was achieved.

3.4 In terms of achievement of power generation targets as set out in the monitoring indicators at appraisal, Hunan Province is close to target (SAR estimate 430 GWh by 2000, actual production was 404 GWh), while the Guigang Dam in Guangxi exceeded the appraisal estimate (SAR estimated 555 GWh, actual production was 560 GWh) during 2000. Generation potential, however, is variable depending on the rainfall.

3.5 Average vessel size on the waterway systems in each province increased, though actual traffic on the waterways was slightly lower than projected during the early years of the project (particularly in Guangxi). In Zhejiang, average capacity per vessel at all three project ports (Hangzhou, Huzhou, and Jiaxing) increased from less than 50 tons to well over 100 tons from 1996 to 2004. In Hunan average vessel capacity increased from 176 tons in 1999 to 192 tons by 2004. In Guangxi average vessel capacity increased from less than 150 tons in 1998 to over 250 tons in 2004. The forecasts of inland waterway traffic in Guangxi were dependent upon the completion of other projects that subsequently were not realized. This risk could have been more fully explored during project preparation.

Efficiency

3.6 The efficiency of the project is rated **substantial**. The ERR for the project as computed at appraisal was 22.1 percent, with most benefits derived from transport cost savings from user larger vessels and from power generation. In the ICR, the ERR was recalculated based on actual shipping volumes and power sales, and was estimated to be 22.3 percent; In the ICR, the ERR for the Hunan project was 16.8 percent, nearly identical to that in the SAR. Zhejiang showed a stronger return based on the charges on

vessel traffic through the ship locks rather than the performance of the individual port facilities, while Guangxi showed a poorer performance due to unrealistic demand forecasts. The assessment concurs with the revised project ERR results presented in the ICR. (See Annex B, Table B2).

3.7 River traffic in Guangxi has not reached the levels projected in the SAR and the assessment finds that the traffic projections were overoptimistic. The reason that projected traffic did not materialize was because other projects were not implemented. This was a risk in the traffic forecasts for Guangxi and should have been highlighted in the SAR. In this early transport project the selection of indicators retroactively was rather weak since they were not really outcome orientated. This detracted from the ability to undertake effective monitoring and evaluation as implementation proceeded. The absence of indicators concerning environmental and resettlement progress is unfortunate.

3.8 On most provincial waterways, both traffic and vessel sizes have increased, resulting in an increase in payments by the vessel operators. Some examples of decreasing vessel operating costs per ton kilometers as vessel size increases are shown in Annex B, table B3.

3.9 Receipts from sales of power generated from the project represent a significant income source for repayment of the project loan. In Zhejiang, the loan repayment was made from the provincial treasury.

Institutional Development Impact

3.10 The institutional development impact is rated **substantial**. The project has led to the development of autonomous state-owned enterprises in both the Guangxi and Hunan provinces which were responsible for the implementation of the project, while in Zhejiang Province, the project was implemented by a Project Administration Office (PAO) within the Zhejiang Provincial Port and Waterways Administration. The Hangzhou Port Services Company, a privately owned company, is operating the steel berth that was constructed with project funds.

3.11 Where the project included dam construction (Hunan and Guangxi provinces), a Dam Safely Panel was established for the purpose of (i) reviewing the adequacy of the design construction procedures of the dam and associated structures; (ii) preparing a detailed plan for construction and quality assurance, instrumentation, operations and maintenance, and emergency preparedness; and (iii) carrying out periodic safety inspections after completion. The Dam Safety Panel consisted of members with expertise in hydraulic structures, engineering geology, hydropower, resettlement, and port and waterway engineering. All costs of the Dam Safety Panel are borne by local government. Dam safety panels continue to be used in Hunan and Guangxi for similar projects and dam safety has not been an issue in this project.

3.12 The Environmental Action Plans and Resettlement Action Plans were for the most part followed and implementation was generally satisfactory. There was even an increase in resettlement costs due to added bank protection works, which resulted in a

reduction in the amount of land inundated in the reservoir areas and was welcomed by the affected communities. More care could have been taken, nonetheless, to give more information on these non-engineering issues. Although the SAR states that the project as proposed involved the relocation of 2,295 persons there is no information offered in the ICR on this matter. There is also no evidence to show that the monitoring agencies were satisfied with the resettlement process other than to observe that it had been "satisfactorily handled". Moreover, there was a temporary difficulty with the compensation payments to residents affected by the creation of the reservoir in Guangxi Province, because in the preliminary design, the number of residents affected and the costs of relocation were underestimated, which meant that the payment amount to each affected resident had to be increased during project implementation. However, the IEG mission confirmed that all relocation payments have now been made satisfactorily and the relocation process completed. The institutional capability of all agencies was strengthened though training to handle environmental and resettlement issues in line with international practice. A note of caution is appropriate here, however, since an OED background paper for the China Country Assistance Evaluation[6] observed that there was little evidence to support the ICR assertion that there was an adequate level of cooperation between the various authorities responsible for power, water and transport.

Sustainability

3.13 The assessment rates the sustainability of the project **likely**. With the improved infrastructure in place, a competitive tariff structure for inland waterway transport, as well as a strong income base from the sale of electric power, the project enables the province to benefit from both of these important streams of income. The training component was also successfully completed, and several specific applications of innovations developed as a direct result of the training have been implemented.

3.14 The Inland Waterway Project is significant because it paved the way for the implementation of subsequent projects and created a platform for a long-term program of sustainable inland waterway improvements. One aspect that will require future attention, however, is the modernization of the shipping fleet itself, which has not been upgraded in keeping with the infrastructure improvements; this, however, was not part of the project. Sustainability has been substantially enhanced by a set of generic reforms which have significantly improved the framework within which the project inland waterways now operate. The first was the adoption of financial and accounting procedures in line with international best practice. The second was the deregulation of transport tariffs which were deregulated step by step. At first, the tariff was fully regulated, then it became negotiable within a range of 20 percent of the tariff at the start of the project and, finally, full deregulation was accomplished. The last umbrella reform was introduced by the Ministry of Power and ensured that the price of power was gradually adjusted until it reflected the true market price.

6. The World Bank and China's Environment, 1993-2003; OED Background Paper for the China Country Assistance Strategy, 2003.

Bank Performance

3.15 Bank performance is rated **satisfactory**. Preparation of the project was fairly lengthy at 31 months from the identification through appraisal, but this was the first project of this type for the Bank in China. A good mix of team members was achieved with wide specrum of specialized skills. The project was as a result successfully implemented and yielded a sustainable stream of benefits.

3.16 Since the Bank had been active in the railway sub-sector in China and had been promoting the implementation of market reforms to enable the railway to actively compete for profitable traffic, the redundancy of inter-modal terminals at Huzhou and Jiaxing probably should have been foreseen during the identification phase of the project.

3.17 The Bank monitored implementation appropriately, and ensured conditionality and safeguard compliance. It also ensured that competitive tendering procedures were followed and that the FIDIC conditions and supervision system were used. Ensuring compliance was made easier because the same core team was retained throughout from preparation to completion and this enabled the team to build trust with the client agencies. Seven separate supervision missions in 1998, however, does appear excessive and it may have been more efficient to have combined some of these visits.

3.18 During the PPAR mission in Guangxi, an issue was raised by the Deputy Director of GXWCDC regarding procurement regulations under Bank projects. The existing regulations specify that payments are made for procurement based on 10 percent prepayment, 80 percent upon delivery and 10 percent upon completion. The Deputy Director made the comment that many suppliers in China have other financiers that pay on more favorable terms (i.e., more money in the early stages of the procurement process). An alternative payment schedule of 10 percent advance payment; 20 percent after design; 20 percent upon purchase of materials; 40 percent upon delivery and 10 percent upon completion. This proposal was discussed briefly with Bank procurement staff in Beijing.[7]

7. The procurement office generally agreed that some modifications to the payment schedule for the supply and manufacturing of heavy machinery were possible. The payment schedule suggested by the Bank was 10 percent upon contract signing and submission of performance security; 20 percent upon design approval and placement of orders for materials; 10 percent upon starting of manufacturing of main components; up to 40 percent additional to be paid prior to delivery with the remainder paid upon delivery. The Bank procurement office asks that such requests for payment schedule modification be made in writing for consideration. Such modified payment schedules will be considered, providing they reflect the actual cash flow of the supplier/manufacturer.

Borrower Performance

3.19 Borrower performance is rated **satisfactory**, as the implementation organizations in each province coordinated well with Bank staff and prepared the project consistent with Bank regulations.

3.20 The implementation agencies complied with the conditions and requirements of the legal agreements. Both the Environmental Action Plan and the Resettlement Action Plans were subsequently implemented appropriately. The borrower has furthermore begun to develop guidelines to encourage the modernization of vessels using the waterways because this aspect had not been considered in the original project design and the services and the quality of the ships provided was not on a par with the standard of the port facilities that have now been established.

4. Conclusions and Lessons

Inland waterway transport and tariffs

4.1 Where there are large navigable rivers inland waterways should be encouraged to thrive because they provide an extremely environmentally friendly form of transport. However, the tariffs must be set to ensure that such waterways are self-financing and there should be a level playing field whereby all competing modes of transport are deregulated.

Organizational models

4.2 In two of the three sub-projects the improvement of the waterways was coupled to a hydro-electric generation facility and the whole complex was managed as an autonomous development corporation or state enterprise. This model was successful both technically and financially and can be replicated elsewhere. However, the project also showed the provincial model was effective as a waterway authority without the hydro-electric component, while the waterway port was operated successfully and efficiently by the private sector. In other words, it is important to customize the component according to local prevailing circumstances and requirements.

Targets and projections

4.3 The assessment concludes that the financial, power output, vessel size and volume targets of the monitoring indicators have been fully achieved under the project. Traffic to individual port facilities, however, sometimes did not always materialize in the volumes projected. This was due, in part, to other facilities not being constructed, but whose traffic contribution was included in the forecast methodology. The forecasts were thus optimistic. While both Bank and the implementing agencies are to be commended for their flexibility in addressing such problems, there was clearly inadequate risk analysis during preparation as the deregulation of the railways was clearly on the government’s agenda.

River shipping

4.4 The improvements in the waterway infrastructure threw into sharp contrast the inadequate state of the existing river vessels; this could be addressed as part of a future project. It is clear that guidelines are necessary to encourage the modernization process of shipping using the waterways.

Lessons Learned

4.5 The following lessons may be derived from this project:

- *Inland waterways can be an efficient and environmentally friendly transport mode for bulk goods conveyance* where the market demand is strong and when such projects are developed in coordination with the other modes of transportation. *Additional benefits can be derived when dams constructed to deepen water channels are also used for hydro-electric power generation.* In such cases a separate corporate entity is required to operate the facility effectively.

- *A thorough assessment of both the market and the risks in the realization of traffic projections is essential for inland waterway projects.* Traffic forecasts and monitoring indicators, should be analyzed carefully and the risks assessed thoroughly during preparation.

- *Inland waterway projects should consider the inclusion of guidelines* to encourage and expedite the modernization process of shipping using the waterways, in order *to help ensure that vessel fleet efficiency keeps pace with the level of service provided by the improved infrastructure.*

Annex A. Basic Data Sheet

Inland Waterways Project (Credit 3910-CHA)

Key Project Data *(amounts in US$ million)*

	Appraisal Estimate	*Actual or current estimate*	*Actual as % of appraisal estimate*
Total project costs	517.5	592.4	114.5
Loan amount	210.0	185.9	88.5
Cofinancing	-	-	-
Cancellation	-	24.1	-

Project Dates

	Original	*Actual*
Board approval	06/20/95	06/20/95
Signing	08/31/95	08/31/95
Effectiveness	11/29/95	11/29/95
Closing date	06/30/01	06/30/01

Staff Inputs *(staff weeks)*

	Actual/Latest Estimate	
	No. Staff Weeks	*US$ ('000)*
Identification/Preparation	136.4	324.2
Appraisal/Negotiation	74.3	161.5
Supervision	134.1	340.2
ICR	2.4	7.1
Total	347.2	833.0

The supervision cost figures include the cost of trust funds.

Mission Data

Stage of Project Cycle	*Date (month/year)*	*No. of persons*	*Specializations represented*	*Performance rating*	*Rating trend*
Identification/ Preparation	4/93	2	1 Financial Analyst, 1 Port/Maritime Engineer		
	4/93	6	1 Financial Analyst, 1 Port/ Maritime Engineer, 1 Economist, 1 Operations Officer, 1 Environment, 1 Organizational Expert		
	4/94	7	1 Financial Analyst, 2 Port Engineers, 1 Economist, 1 Operations Officer, 1 Organizational and Management Expert, 1 Environment		
Appraisal/Negotiation	11/94	11	2 Financial Analyst, 1 Port Engineer, 1 Economist, 2 Environment, 1 Operations Officer, 1 Organizational and Management Expert, 1 Resettlement, 1 Procurement, 1 Staff Assistant		
Supervision	9/95	6	1 Financial Analyst, 1 Port Engineer, 1 Resettlement, 1 Institutional Reform, 1 Project Officer, 1 Procurement	S	S
	5/96	4	1 Port Engineer, 1 Economist/Financial Analyst, 1 Environment, 1 Resettlement	S	S
	11/96	1	1 Port Engineer	S	S
	4/97	2	1 Port Engineer, 1 Economist/Financial Analyst	S	S
	10/97	3	1 Port Engineer, 1 Environment, 1 Resettlement	S	S
	3/98	2	1 Port Engineer, 1 Environment	S	S
	5/98	1	1 Economist/Financial Analyst	S	S
	5/98	1	1 Economist/Financial Analyst	S	S
	6/98	1	Port Engineer	S	S
	7/98	1	1 Environment		
	7/98	1	1 Resettlement		
	9/98	2	1 Port Engineer, 1 Economist/ Financial Analyst	S	S
	1/99	3	3 Resettlement (Thematic)		
	6/99	4	1 Port Engineer, 1 Economist/Financial Analyst, 1 Resettlement, 1 Environment	S	S
	12/99	3	1 Port Engineer, 1 Economist/Financial Specialist, 1 Environment	S	S
	1/00	1	1 Resettlement		
	1/00	1	1 Resettlement		

Stage of Project Cycle	*Date (month/year)*	*No. of persons*	*Specializations represented*	*Performance rating*	*Rating trend*
	8/00	1	1 Port Engineer	S	S
	9/00	1	1 Resettlement		
	12/00	1	1 Port Engineer, 1 Environment,1 Economist/Financial Analyst	S	S
	5/01	1	1 Resettlement		
ICR	8/01	2	1 Port Engineer, 1 Economist/Financial Analyst	S	S

Annex B. Project Statistics

Table B1 Achievement of SAR Monitoring Indicators

Indicator	Projection for 2000	Achievement for 2000
Traffic:		
Zhejiang:		
Hangzhou (dry bulk)	3.2 million tons	3.2 million tons
Huzhou (public berths)	1.1 million tons	10.8 million tons (total port) [8]
Jiaxing (public berths)	1.5 million tons	5.1 million tons (total port) [9]
Hunan		
Henyang	4.3 million tons	n/a
Zhuzhou	3.3 million tons	0.083 million tons
Dayuandu ship lock	4.2 million tons	3.7 million tons
Guangxi		
Guigang ship lock	7.5 million tons	1.4 million tons
Power Output		
Dayuandu Dam	430 GWh	404 GWh
Guigang Dam	555 GWh	560 GWh
Financial Ratios		
Zhejiang;		
Working ratio	57%	61%
Operating ratio	70%	53%
FRR	-	4%
Hunan		
Working ratio	26%	8%
Operating ratio	61%	77%
FRR	-	5%
Guangxi		
Working ratio	26%	11%
Operating ratio	40%	50%
FRR	-	8%
Overall FRR	-	6%

Sources: Staff Appraisal Report; ICR; PPAR mission. Note: Only a portion of year 2000 tonnages for Henyang and Zhuzhou ports was available. There are many individual ports along the river at these locations and the HXNCDC does not have full access to all port data, making a direct comparison with the monitoring indicators difficult.

8. Detailed breakdown for the various districts of Huzhou port was not available during PPAR mission, but 162,000 tons of coal was handled in 2004.

9. For the portion of Jiaxing port that was the focus of Inland Waterway Project improvement (installation of coal transshipment equipment) there were no throughput tons, resulting in the disposal of the equipment.

Table B2 Inland Waterway Project ERR Summary

SAR			*(percent)*	*ICR*			
Guangxi	*Hunan*	*Zhejiang*	*Total*	*Guangxi*	*Hunan*	*Zhejiang*	*Total*
21.1	16.9	30.1	22.1	9.9	16.8	37.4	22.3

Table B3 Operating Costs of Inland Waterway Vessels in China

	Vessel Operating Costs (US cents/t/km)					
	50 dwt	**100 dwt**	**300 dwt**	**500 dwt**	**1000 dwt**	**3000 dwt**
Economic Cost	10.85	9.31	5.12	2.80	1.45	1.17
Financial Cost	10.12	9.87	5.59	3.15	1.70	1.69

Source: China: An Inland Waterways Strategy; November 1999

Figure B1: Commodities Moving through Dayuandu Shiplock Hunan Province