China

Dalian Water Supply System Rehabilitation Project

External Evaluator: Chiaki Nakamura (Global Link Management Ltd.)

Field Survey: October 2005

1. Project Profile and Japan's ODA Loan

Map of project area

A pumping station developed through this project

1.1 Background

Although the demand for water in China has continued to rise due to improvements in standard of living as well as increasingly rapid economic development, as a result of substantial deficiencies in the country's water supply capacity, it has faced problems such as poor water quality, and aging water supply facilities. Dalian City in Liaoning Province, situated in China's north-eastern region, is a large metropolis, covering an area of 12,574km^2 —almost on a par with that of Iwate Prefecture – in which lives a population of approximately 5.9 million, corresponding to 4.3 times that of Iwate. With over 100 years having passed since water supply business first began, facilities were becoming more and more old and worn out. As a result, there were various problems, such as leakages due to corroded water pipes, reductions in water conveyance capacity due to increases in the amount of friction, excessively high energy consumption due to the use of old-style pumps, and noise from the water treatment plant situated in the center of the city. Therefore, improvements to the water supply system became necessary. Furthermore, with Dalian City aiming for economic growth as a Coastal Open City, focusing on the Economic Development Zone, it was forecast that demand for water would exceed supply capacity by 150,000m^3 per day, thereby necessitating a stable water supply through upgrading of facilities, as well as an increase in the water supply volume through construction of a new water treatment plant.

1.2 Objective

To increase the water supply volume to meet the overstrained demand for water in Dalian City, Liaoning Province, through the upgrading of water supply facilities and the construction of a new water treatment plant, thereby contributing to economic growth, and an

improvement in the living environment of the city's residents.

1.3 Borrower/Executing Agency

Ministry of Foreign Trade and Economic Cooperation of the People's Republic of China /Ministry of Construction[1]

1.4 Outline of Loan Agreement

Loan Amount/ Disbursed Amount	5,500 million yen/3,345 million yen
Exchange of Notes Loan agreement	September 1997 September 1997
Terms and Conditions - Interest Rate - Repayment Period (Grace Period) - Procurement	 2.1% 30 years (10 years) General untied
Final Disbursement Date	October 2003
Main Loan Agreement	Local companies, etc.
Consultant Agreement	—
Feasibility Study (F/S) etc.	1998: China Municipal Administration Process Beihua Design Institute, North-East Design Institute

2. Evaluation Result

2.1 Relevance

2.1.1. Relevance of the plan at the time of appraisal

The Ninth Five-Year Plan (1996–2000) laid particular emphasis on the problem of water supply in cities, setting forth a policy of developing water resources and conserving water. By the year 2000, the plan was to have a water supply coverage rate of 98% in cities across the whole of the country, and for the volume of water for domestic use in cities to be 210 liters per capita, per day. As a Coastal Open City aiming for economic growth, Dalian City expected an increase in the demand for water, due to increases in population and economic

[1] From 1999 onwards, the borrower of ODA loans to China changed to the Government of the People's Republic of China (Ministry of Finance). Specific implementation is the responsibility of the Dalian Public Bureau. Operation and maintenance are carried out by the Dalian Water Supply Group.

development in the future. However, Dalian City had problems of water shortages, leakages due to the aging of the existing water supply system, a decline in water conveyance capacity, excessive energy consumption, deterioration of water quality, and noise from the water treatment plant. Therefore, the positioning of this project at the time of appraisal can be judged to have been sufficiently high.

2.1.2 Relevance of the plan at the time of evaluation

Through improvements in city water supply capacity and upgrades to old and worn out water supply facilities, increases in the water supply volume and improvements in water quality were raised as issues in the Tenth Five-Year Plan (2001 – 2005). Focusing specifically on solving Dalian City's water supply problem, the Dalian City National Socio-Economic Development Tenth Five-Year Plan (2001–2005) highlights water resource development through the Yingnahe Dam expansion project[2], the construction of Dalian City's water supply facilities, conserving of water, and implementing projects to improve old and worn out water pipelines, and so creating a stable and reliable water supply system. Therefore, as a response to the issues mentioned above, this project can be judged to still have a high degree of importance in the present day.

2.2 Efficiency

2.2.1 Output

In July 1999, a reappraisal was carried out in this project, as a result of the decision to change the site of the water treatment plant, based on the feasibility study (F/S) evaluated in China in August 1998, as well as the initial designs. There was a request from the Chinese side at the time of reappraisal to the effect that they wished to raise the water treatment capacity from the figure of 350,000m^3 per day at the time of appraisal, to 400,000m^3 per day. However, as a result of discussions, it was decided to divide the project into two phases, with Phase One (200,000m^3 per day), which was particularly urgent from the perspective of demand for water, being eligible for loans, and the construction of Phase Two (also 200,000m^3 per day) being implemented on a self-financing basis[3]. Table 1 shows the major changes in output between the time of the original appraisal in 1997, and the reappraisal in 1999.

[2] Implemented by Dalian City on a self-financing basis, Phase Two of the "Yingnahe to Dalian" water supply project, bringing water from the Yingnahe Dam in the outlying city of Zhuanghe to the Dalian urban district, was completed on 10 July, 2004. As a result, the Dam's capacity has increased from 60.6 million m^3 to 287 million m^3, and Dalian City can now be supplied with 200 million m^3 of water per year.

[3] In this evaluation report, although only Phase One was considered regarding the evaluation of efficiency, both Phase One and Phase Two were considered regarding the evaluation of relevance, effectiveness, impact, and sustainability.

Table 1. Major Changes in Output

	Time of appraisal (1997)	1999 Time of reappraisal (changed aspects only)
(1) Expansion of pumping station facilities	Expansion of facilities at the Wazidian No. 5 Pumping Station, conveying water from Wazidian to Xi Jiao Water Treatment Plant	Expansion of facilities at the Wazidian No. 5 Pumping Station, conveying water from Wazidian to Shahekou Water Treatment Plant
(2) Distribution facilities	Laying of water pipeline from the Wazidian Pumping Station to Xi Jiao Water Treatment Plant, rehabilitation	Laying of water pipeline from Wazidian Pumping Station to Shahekou Water Treatment Plant and rehabilitation (500-900mm diameter steel pipe cancelled)
(3) Treatment facilities	Construction of Xi Jiao Water Treatment Plant, treatment capacity of 350,000m^3 per day, rapid filtration method, new construction of transverse-style sedimentation basin	Construction of Shahekou Water Treatment Plant, treatment capacity of 400,000m^3 per day (only Phase One, 200,000 m^3 per day component eligible for ODA loan), rapid filtration method, canted pipe sedimentation basin
(4) Supply facilities	Laying of main water supply pipeline from Xi Jiao Water Treatment Plant to the city water supply pipeline network, 600-1400mm diameter steel pipeline, 18.5km	Laying of main water supply pipeline from Shahekou Water Treatment Plant to the city water supply pipeline network, 600-1400mm diameter steel pipeline, 15.5km
(5) Others	Development of 4 small-scale water sources (total: 95,000m^3 per day), central automatic control system, water quality inspection facilities, procurement of vehicles for construction and maintenance	Development of small-scale water sources cancelled

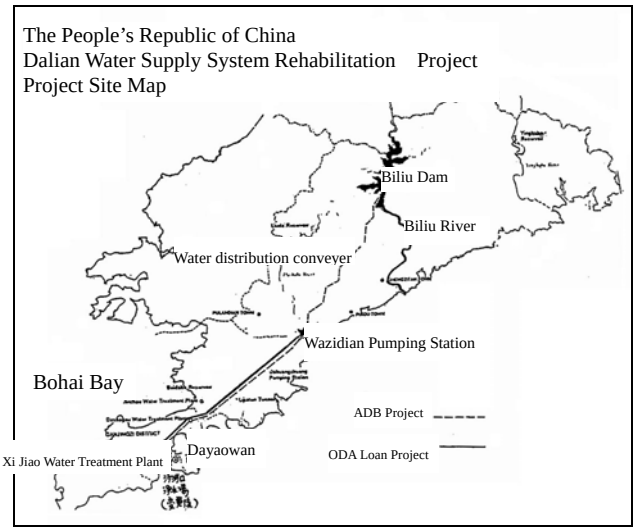
Subsequently, in November 2001, the executing agency requested a change to procurement content and this received approval in February 2002. The details of the changes are shown below.

- Distribution facilities: a distribution pipeline connected to the main pipeline (9km)/new distribution pipeline in order to connect with existing facilities (22km)
- Distribution pipeline valve
- Work equipment for distribution facilities

- Shahekou Water Treatment Plant equipment (automatic control apparatus, electrical devices, cable, water distribution bridges and pipelines, fans, pumps)

Note that the project content relating to this project, including the additional procurement, has been implemented almost exactly as planned at the time of the reappraisal. A map giving a general overview of the project area for this project is shown in Figure 1[4].

Fig. 1 General Overview Map of Project Area



2.2.1 Project period

In the initial plan at the time of reappraisal, Phase One of the project was due to run for 52 months, from September 1997 until December 2001 (from signing of the loan agreement until completion of the works). However, the actual period was 74 months (142% compared to the plan), from September 1997 until October 2003. As some of the equipment for procurement and additional output procurement in the project comprised non-standard products, the delay was due to the fact that following issuing of the procurement agreement, the designs, manufacturing process and delivery of the equipment required more time than had been envisaged. Operations at the Shahekou Water Treatment Plant started up in January 2002.

2.2.1 Project cost

At 8,056 million yen (of which Japan's ODA loan portion made up 3,345 million yen), Phase One project costs have come in at approximately 53% of the initial projected amount at the time of reappraisal (15,238 million yen). This is due to the substantial reductions in overall project costs achieved as a result of purchasing steel through international competitive

[4] Based on the assumed increase in raw water supply capacity as a result of the ADB Dalian Water Supply Project, and through the expansion of water distribution pumping stations and pipelines, as well as the construction of new water treatment plants etc., this project was implemented with the aim of increasing water supply capacity. Approved in 1994, the ADB Project was a comprehensive water supply improvement plan, completed in 1999 with a total project cost of US$308 million. Through this evaluation study, it was confirmed that the raw water supply system has been operating smoothly since ADB Project completion.

tendering (60 million yuan was saved on approximately 60,000 tons of steel pipes). Furthermore, due to the fact that water treatment plants in the project were built on the site of existing water treatment plants, acquisition of new land was not necessary.

Although there were delays in the implementation period of this project, due to output being almost exactly as planned at the time of reappraisal and project costs being kept within the initial projected figure, one can say from the above that generally speaking, there have been no problems with efficiency relating to the implementation of the project overall.

2.3 Effectiveness

2.3.1 Responding to the demand for water

(1) Water supply performance within Dalian City

Table 2 shows the water supply performance within Dalian City. With the total volume of water supply in 2004 being 2.465 million m^3 per day, the figure increased slightly compared to the previous year. From the fact that the proportion of water for domestic use in urban areas is increasing, taking the place of agricultural use, this project can be thought to have responded to the increased demand for water for urban domestic use.

Table 2. Water Supply Performance Within Dalian City

		2001	2002	2003	2004
Volume of water for agricultural use	10,000 m3/day	122.74	114.52	-	81.37
	Percentage of total	48.64	45.04	-	33.00
Volume of water for domestic use in urban areas	10,000 m3/day	56.16	60.00	-	89.86
	Percentage of total	22.26	23.60	-	36.44
Volume of water for domestic use in rural areas	10,000 m3/day	20.82	20.27	-	23.29
	Percentage of total	8.25	7.97	-	9.44
Volume of water for industrial use	10,000 m3/day	52.60	59.45	-	52.05
	Percentage of total	20.85	23.38	-	21.11

Total volume of water supplied	10,000 m3/day	252.33	254.25	240.27	246.58

Source: 2004 Dalian City Water Source Press Release (24 March 2005)

(2) Water supply performance owing to this project

Table 3 shows the water supply performance in this project. Through the completion of the project, in addition to current demand for water being sufficiently met, facilities have been developed which have the supply capacity to respond to future demand for water[5]. Furthermore, out of the four pumps at the Wazidian No.5 pumping station developed in this project, currently three are in constant operation, and are able to respond to future increases in the demand for water.

Table 3. Water Supply Performance in this Project

	1997	1998	1999	2000	2001	2002	2003	2004
Water demand volume forecast in this project (10,000m^3/day) (A)	96.6	82.4	102.4	111.7	112.5	-	121.6	-
Capacity of water supply facilities in this project (10,000m3/day) (B)	105.4	105.4	102.0	102.0	102.0	122.0	143.7	143.7
Gap between demand and supply （C)=(B)－(A)	8.8	23	-0.4	-9.7	-10.5	-	22.1	-
Capacity of facilities in this project (10,000m3/day)	-	-	-	-	-	20.0	40.0	40.0

[5] Although Table 3 shows water supply facility capacity to have increased by 200,000m^3 per day from 2001 to 2002, this is because water treatment plants developed in Phase One of the project began operations in January 2001. In addition, although water supply facility capacity increased by a further 200,000m^3 per day from 2002 to 2003, this is because water treatment plants developed in Phase Two of the project began operations in October 2003.

(D)								
Average daily water supply volume in this project (10,000m^3/day) (E)	-	-	-	-	-	13.4	19.9	27.5
Usage rate of facilities in this project (%) (E)÷(D) X 100	-	-	-	-	-	67	50	69

Source: Dalian Water Supply Group (forecasts of the volume of demand for water are based on reappraisal documents)

(3) Water supply coverage rate, and average volume of water used per capita

Table 4 shows the water supply coverage rate[6], and average volume of water used per capita within Dalian City. As can be seen from this table, the water supply coverage rate in Dalian City is 100%. The average volume of water used per capita (2004 figures) in Dalian was 288 liters per capita per day (lpcd) in urban areas, 93 lpcd in rural areas, with the average being 190 lpcd. This represents a large increase on the 86 lpcd at the time of appraisal[7] (1997). Moreover, the population with a water supply in Dalian City has increased from 2.14 million at the time of appraisal, to 2.4 million (2004 figure). From the above, it is thought that there has been an improvement in the conditions of water supply in Dalian City.

Table 4. Water Coverage Rate, and Average Volume of Water Used Per Capita Within Dalian City

	1997	1998	1999	2000	2001	2002	2003	2004
Water supply coverage rate	100	100	100	100	100	100	100	100
Average volume of water used per capita (liters per capita per day)	86.0	88.0	-	-	-	-	-	190
Population with a	214	217	220	223	226	229	237	240

[6] Water supply coverage rate: (population with a water supply) divided by (population within the area) x 100

[7] Note that the average volumes of water used per capita in China as a whole, for 2003, were 212 liters per capita per day (lpcd) in urban areas, and 68 lpcd in rural areas. The same figures for Liaoning Province, which includes Dalian, for 2003, were 197 lpcd in urban areas, and 66 lpcd in rural areas.

water supply (x10,000)								

Source: Dalian Water Supply Group

2.3.2 Water quality

Water treatment plants developed in this project are equipped with a chlorine and chemical infusion equipment room, with water treatment disinfection and sterilization being carried out by means of a chlorine infusion machine. Moreover, water treatment plants in this project are equipped with a water quality testing room, and water quality tests are carried out regularly.

Table 5 shows tap water quality standards (national domestic drinking water hygiene standards), as well as the quality of treated water, measured at water treatment plants in this project. The figures for treated water at water treatment plants in this project all meet tap water quality standards, and there are no problems to report.

Table 5. Tap Water Quality Standards, and Quality of Treated Water at Water Treatment Plants in this Project

Item	National water quality standard	Water quality	
		Pre-treatment	Post-treatment
Color	Less than 15 deg.	20 deg.	Less than 5 deg.
Turbidity	Less than 3NTU	8.51NTU	0.32NTU
Odor/taste	None	1	0
PH value	6.5 - 8.5	7.40	7.20
Total hardness	Less than 450mg/l	83.7mg/l	72.6mg/l
Iron	Less than 0.3mg/l	0.139mg/l	Less than 0.1mg/l
Manganese	Less than 0.1mg/l	0.104mg/l	Less than 0.025mg/l
Lead	Less than 0.05mg/l	0.00008mg/l	Less than 0.00005mg/l

Source: Dalian Water Supply Group

2.3.3 Level of satisfaction with water supply among residents of the project region

In this study, in order to ascertain beneficiaries' level of satisfaction with the water supply situation, a beneficiary survey was carried out on 124 people from among those residents living in the region benefiting from the facilities developed in this project. Below are the beneficiary survey results from this study.

Beneficiary survey results

Level of satisfaction with the water supply situation

When asked about questions about their level of satisfaction with the current water supply situation, 77% (96 people) of respondents said they were satisfied, while 19% (24 people) said they were dissatisfied. In terms of reasons for their dissatisfaction, 31% cited high water tariffs, 29% low water pressure, while 17% cited poor water quality. It is thought that the problems relating to water pressure have arisen due to the fact that there are many high-rise dwellings in Dalian. In addition, it is thought that reason for complaints about water quality lies with the aging of water pipelines not covered by this project.

When it came to current water tariffs, 39% said they were high, 43% thought they were appropriate, while 18% said they were low. Although there was almost no correlation between income and the level of satisfaction with the water supply situation, the lower the monthly income of households, the higher was the proportion who felt that water tariffs were high (48%).

2.3.4 Re-calculation of Financial Internal Rate of Return (FIRR)

Taking construction costs, as well as operation and maintenance costs (water source costs, electric power costs, chemical costs, and labor costs) as the project costs, with income from water tariffs resulting from the project as the benefit, and project life as being 30 years from the start of operations, the Financial Internal Rate of Return at the time of reappraisal was calculated to be 5.39%. Note that the FIRR at the time of evaluation could not be re-calculated, due to the fact that data could not be gathered from the executing agency.

2.4 Impact

2.4.1 Improvements in the living environment of Dalian City residents

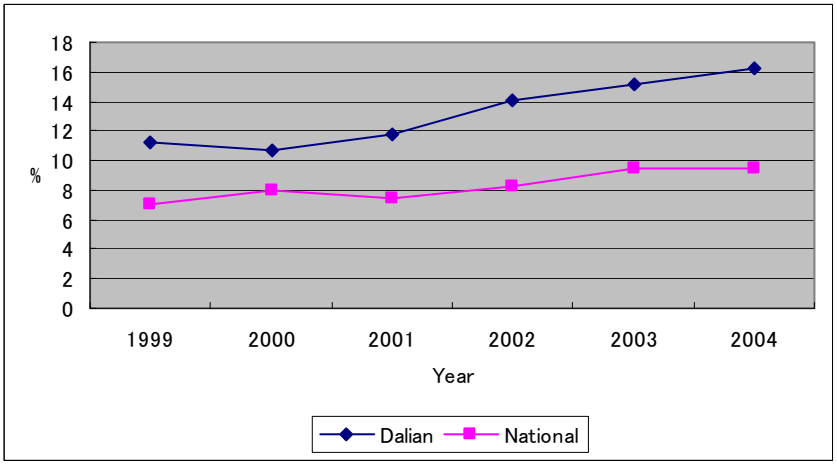
Due to the fact that there are no yearly statistics or study reports to measure improvements in waterborne infectious diseases as a result of this project, it is difficult to quantatively establish its impact on improvements in the public hygiene of Dalian City residents.

Although the beneficiary survey results did not reveal any major changes in residents' health due to project implementation, residents living in the area covered by the survey are in good health, and there are few cases of diarrhea and other illnesses caused by water. Furthermore, as a result of the project being implemented, not only has the average volume of water used per day increased, but the survey elicited responses to the effect that residents were cleaning and taking baths more often. Therefore, this project can be judged to have contributed to improvements in the hygiene environment at the resident-level.

2.4.2 Contribution to regional economic development

Although the volume of water for industrial use in Dalian City was 246,000m^3 per day at the time of this project's reappraisal (1998), by 2004 it had increased to approximately double that figure, reaching 520,000m^3 per day[8]. In addition, the GRDP of Dalian City is showing stable growth, with a GRDP growth rate of 16.2% for FY2004, which is high when one compares it to the national average of 9.5% for the same year (see Fig. 2). From these various results, improvements in the water supply capacity, which forms part of the basic infrastructure, can be considered to be contributing to the support of Dalian City's economic development.

Fig. 2 GRDP Growth Rate (%)



Source: Dalian City Statistical Yearbook; China Statistical Yearbook

Fig. 3 Facilities to Deal with Sludge

2.4.3 Environmental impact

In terms of environmental measures at the water treatment plants developed through this project, the following are implemented: measures to deal with chlorine leakage (installation of chlorine automatic absorption apparatus), measures to deal with sludge (which is recycled once it has been separated from the water. 17.6 tons are disposed of per day), and measures to deal with noise at pumping stations (installation of low-noise pumps).

[8] Source: Dalian City Water Source Press Release (24 March 2005)

Through these environmental measures, no problems relating to sludge or noise have arisen in this project.

According to information obtained via inquiries made to the executing agency, the construction of sewage and sludge treatment facilities at water treatment plants has eased the financial burden on Dalian City, and is thought to be contributing to the improvement in river and sea water quality. Furthermore, the re-use of sludge helps to conserve water resources.

2.5 Sustainability

2.5.1 Executing agency

2.5.1.1 Structure

At the time of appraisal, the executing agency for this project was the Ministry of Construction, specific implementation was overseen by the Dalian City Public Bureau, with the Dalian Water Supply Company, under the control of the Dalian City Public Bureau, carrying out operation and maintenance of waterworks in the center of the city. In 2001, following implementation of this project, the Dalian City Water Resources Bureau and the Public Bureau were merged, and the Dalian Water Affairs Bureau was established. Currently, waterworks operation and maintenance is carried out by the Dalian Water Supply Group, under the control of the Dalian Water Affairs Bureau. The Dalian Water Supply Group has a staff of 4,146, of whom 339 are technical staff (2004). With an average length of service of 22 years among employees, the Group has a high retention rate and is stable.

2.5.1.2 Technical capacity

The Dalian Water Supply Group, acting as the executing agency, deploys highly-educated staff with specialist knowledge. Regular on-the-job training lasting from one to two weeks is given to staff once a year. Furthermore, operation and maintenance of equipment developed through this project are carried out in accordance with the maintenance manual and urban water supply plant operations, as well as technical regulations regarding maintenance and safety. Since operation of the facilities began, there has not been one accident at either a pumping station or water treatment plant, and neither are there any problems with chemicals or the maintenance of equipment.

2.5.1.3 Financial status

As it was not possible to gather data on the Dalian Water Supply Group's financial statements, the financial status of the executing agency was analysed with the aforementioned ADB Project Performance Audit Report[9] used as reference. Table 6 shows the Dalian Water Supply Group's major financial statements, while Table 7 shows actual and forecast operation and maintenance costs and income. In ensuring a liquidity ratio, which indicates management

[9] ADB, Project Performance Audit Report on the Dalian Water Supply Project (Loan 1313-PRC) in the People's Republic of China, November 2003.

security, of over 100% each year, and a capital adequacy ratio of over 50% each year, there are no problems in the area of security. In terms of profitability, although the profit ratio of total capital is extremely low, this is due to the fact that 1) total assets increased as a result of ADB project expansion; 2) with an income from subsidies to which adjustments are made according to the deficit margin so that profit remains at a constant low level; and 3) substantial depreciation costs are reported in the accounts.

Table 6. Dalian Water Supply Group Financial Statements (x10,000 yuan)

Item	2000	2001	2002
Financial performance			
Liquid assets (1)	292.6	420.0	427.5
Total amount of assets (2)	1456.9	2421.4	2474.5
Current liabilities (3)	276.2	345.7	376.1
Equity capital (4)	1172.7	2074.1	2090.0
Sales (5)	470.5	412.9	451.3
Net profit prior to government subsidies	-47.5	-46.9	-4.2
Income from subsidies	47.5	46.9	4.2
Depreciation costs	93.6	58.0	25.8
Net profit (6)	0.0	0.0	0.0
Financial indicators			
Profit ratio of total capital (%) (6)/(2)	0.0	0.0	0.0
Total capital turnover ratio（times）(5)/(2)	32.3	17.1	18.2
Net profit to sales ratio (%) (6)/(5)	0.0	0.0	0.0
Liquidity ratio (%) (1)/(3)	105.9	121.5	113.7
Capital adequacy ratio (%) (4)/(2)	80.5	85.7	84.5

Source: Project Performance Audit Report on the Dalian Water Supply Project, ADB, 2003

Table 7. Actual and Projected Operation and Maintenance Costs and Income of the Dalian Water Supply Group

	2000	2001	2002	2005
	Actual			Forecast
Total income	470.5	412.9	451.3	587.4
O&M costs	373.3	352.1	394.1	429.5

Source: Project Performance Audit Report on the Dalian Water Supply Project, ADB, 2003

Due to the fact that water tariffs were raised in 2001 (see Table 8), financial structure is gradually improving, and in 2005 a management structure was set up on a financially independent basis, without any subsidies.

Table 8. Shifts in Dalian Municipality's Water Tariff System (yuan/m^3)

	1995	1998	1999	2000	2001	2002	2003	2004
Water for domestic use	1.2	1.6	1.6	1.6	2.3	2.3	2.3	2.3
Water for industrial use	1.5	2.2	2.2	2.2	3.2	3.2	3.2	3.2
Water for commercial use	2.0	3.0	3.0	3.0	5.0	5.0	5.0	5.0

Source: Dalian Water Supply Group

However, no information has been obtained to the effect that BOT[10] is to be introduced to the operation of water treatment plants in Dalian City.

2.5.2 Maintenance

Having made checks for this evaluation, the situation regarding maintenance of facilities and machinery improved in this project is a favorable one, and no problems have arisen.

3. Feedback

3.1 Lessons learned

In March 1998, following F/S approval, the executing agency requested that the scale of this project be expanded. This led to a reappraisal being carried out in July 1999, and as a result of verifying the relevance of demand forecasts, it was decided to apply ODA loans to components with a particularly high level of urgency. Demand forecasts, the remaining length of serviceable life of existing facilities, and the length of serviceable life of the project in question need to be comprehensively assessed and established in an appropriate manner from a long-term perspective, regarding the matter of project scale. Therefore, it is important that in future appraisals, these aspects are examined as precisely as possible, with an equal degree of care being taken in considering the most appropriate scale for the project.

3.2 Recommendations

(for the Dalian Water Affairs Bureau, and the Dalian Water Supply Group)

The results of the beneficiary survey showed that approximately 20% of households were dissatisfied in some way with their current water supply, and that there were many complaints in particular regarding water pressure and water quality. With regard to the current situation,

[10] BOT: A type of arrangement in which a private contractor builds and operates facilities for a certain time, but eventually transfers ownership of those facilities to the government.

Dalian City stated in the 2005 Dalian Municipal Government Project Report that it will "upgrade 50km of the city's water supply pipeline network, build a second pressure pumping station, and improve the quality of domestic water for the residents of approximately 80,000 homes," and it is hoped that these plans will be steadily implemented in the months and years to come.

Comparison of Original and Actual Scope

Item	Plan (at time of reappraisal)	Actual
(1) Output		
1) Expansion of pumping station facilities	• Expansion of facilities at the Wazidian No. 5 pumping station, conveying water from Wazidian to Shahekou Water Treatment Plant	As planned
2) Distribution facilities	• Laying and rehabilitation of water conveyance pipeline from Wazidian Pumping Station to Shahekou (DN500-900 cancelled)	As planned
3) Treatment facilities	• Construction of Shahekou Water Treatment Plant, treatment capacity of 400,000m^3 per day (Phase One, 200,000m^3 per day component eligible for ODA loan), rapid filtration method, canted pipe sedimentation basin	As planned
4) Supply facilities	• Laying of main water supply pipeline from Shahekou Water Treatment Plant to the city water supply pipeline network, DN600-1400mm, 15.5km	As planned
5) Others	• Central automatic control system, water quality inspection facilities,	As planned

	procurement of vehicles for construction and maintenance	
(2) Period		
1) Expansion of pumping station facilities	March 1999–Dec. 1999	June 1999–April 2004
2) Distribution facilities	March 1999–June 2001	March 1999–Dec. 2000
3) Treatment facilities (I)	March 1999–Dec. 2001	Sept. 1999–August 2001
4) Treatment facilities (II)	Sept. 2001–Dec. 2003	April 2002–Oct. 2003
5) Supply facilities	March 1999–Dec. 2001	March 1999–June 2001
(3) Project cost (Phase One only)		
Foreign currency	5,500 million yen	3,345 million yen
Local currency	9,738 million yen (649.92 million yuan)	4,712 million yen (337.08 million yuan)
Total	15,238 million yen	8,056 million yen
ODA Loan Portion	5,500 million yen	3,345 million yen
Conversion rate	1 yuan = 15 yen (as of 1999)	1 yuan = 13.8 yen (1999–2003 average)