Indonesia

Jakarta Water Supply Development Project (Immediate Project of 2nd Stage, First Phase)

Report Date: October, 2002
Field Survey: September, 2001

1. Project Profile and Japan's ODA Loan

Location Map of the Project

Buaran Treatment Plant

1.1. Background

The City of Jakarta (DKI Jakarta) was one of the biggest and most rapidly developing capital cities in South-East Asia, having a total population of 6.5 million in 1980. In contrast to the rapid population growth, the water coverage ratio in the city of Jakarta remained low, at 32.5%. Consequently, most people in Jakarta were compelled either to purchase potable water from venders or to take unsanitary water from shallow wells and rivers. Even for those people who benefited from the public water supply system, insufficiency of production capacity caused chronically low water pressure and intermittent supply.

According to the "Jakarta Water Supply Development Project" (1985 Master Plan) provided by the Japan International Cooperation Agency (JICA), water demand for the year 1990 was expected to increase to 9,600 l/sec. Day-Average Water Demand for the same year, therefore, was calculated at 15,900 l/sec, based on the condition that unaccounted-for water (UFW[1]) was reduced to 40% (refer to Table 1).

Table 1 Projected Water Demand for The City of Jakarta

		1985	1990	1995	2000	2005
Population in Service Area	(thousand)	5,372	6,538	8,002	9,092	10,496
Served Population	(thousand)	4,419	5,357	6,523	7,497	8,784
Coverage Ratio	(%)	82	82	82	82	84
Water Requirement	(l/sec)	6,500	9,600	14,000	18,700	24,800
Day Average Demand	(l/sec)	13,400	15,900	20,300	25,300	31,500
Day Max. Demand	(l/sec)	15,400	18,300	23,300	29,100	36,700
UFW	(%)	49	40	33	29	25

[1] UFW: The difference between "Net Production" (the volume of water delivered into a network) and "Consumption" (the volume of water that can be accounted for by legitimate consumption, whether metered or not)

Source: "Jakarta Water Supply Development Project Master Plan" 1985

While total production capacity, including treatment plants under construction, was only about 10,800 l/sec at the time of appraisal, absolute water shortage was expected to surpass this figure by 1990.

To rectify the above situation and to cope with the anticipated future water shortage, "Construction of Buaran Treatment Plant (Buaran I)," was planned as the Immediate Project for the Second Stage of the Master Plan, to be followed immediately by the "Construction of Buaran Treatment Plant Extension (Buaran II)" as the First Phase Project for the Second Stage of the Master Plan.

1.2. Objectives

To increase water supply capacity in the City of Jakarta by constructing Buaran I and II treatment plants.

1.3. Project Scope

Buaran I (IP-290)

1. Construction of new water treatment plant (Buaran I T.P.) having production capacity of 2,000 l/sec
2. Installation of distribution trunk mains having total length of 16.8km
3. Consulting Services

Buaran II (IP-306)

1. Construction of water treatment plant extension (Buaran II T.P.) having production capacity of 3,000 l/sec
2. Installation of transmission mains having total length of 15km
3. Construction of distribution center
4. Installation of distribution trunk mains having total length of 8.5km
5. Consulting Services

1.4. Borrower/Executing Agency

The Government of the Republic of Indonesia/ Directorate General of Human Settlement, Ministry of Public Works (CIPTA KARYA)[2]

1.5. Outline of Loan Agreement

	Buaran I (IP-290)	Buaran II (IP-306)
Loan Amount Loan Disbursed Amount	4,500 mil. Yen 4,490 mil. Yen	10,923 mil. Yen 10,827 mil. Yen
Exchange of Notes Loan Agreement	July 1984 Feb. 1985	Dec. 1985 Dec. 1985
Terms and Conditions Interest Rate Repayment Period (Grace Period) Procurement	 3.5% 30 years (10 year) General Untied (Partially Untied for Consulting Services)	 3.5% 30 Years (10 Years) General Untied (Partially Untied for Consulting Services)
Final Disbursement Date	Feb. 1993	Dec. 1994

[2] Currently, Directorate General of Urban and Rural Development, Ministry of Settlement and Regional Infrastructure

2. Results and Evaluation

2.1. Relevance

As stated earlier, the City of Jakarta suffered from an absolute water shortage as a consequence of production capacity insufficiencies attributed to chronically low water pressure and intermittent supply in the early 1980s. In order to improve water supply in Jakarta, a Feasibility Study was conducted by JICA at the request of the Indonesian Government, and, as a result, a comprehensive Master Plan, which reviewed Master Plan (1972), was prepared in 1985. The Master Plan included both a long-term plan, in which targets were set through the year 2005, and a short-term plan, which required immediate implementation. The short-term plan, consisting of the Immediate Project and the First Phase of the Second Stage Project, aimed to increase water production capacity to meet water demand by the year 1990.

Table 2 1985 Master Plan Project Scope (For Water Treatment Plant Project)

		Scheduled Completion	Production Capacity
Second Stage	**Immediate Project**		
	Buaran I T.P. (IP-290)	1988	2,000 l/sec
	First Phase Project		
	Buaran II T.P. (IP-306)	1990	3,000 l/sec
	Lebakbulus T.P.	1990	3,000 l/sec
	Second Phase Project		
	Cakung T.P.	1993	5,000 l/sec
Third Stage	**First Phase**		
	Lebakbulus T.P.	1999	5,000 l/sec
	Cakung T.P.	1999	1,000 l/sec
	Second Stage		
	Lebakbulus T.P.	2002	5,000 l/sec
	Cakung T.P.	2002	2,000 l/sec

Source: “Jakarta Water Supply Development Project Master Plan” 1985

The main objective of the Master Plan was to increase total production capacity in Jakarta to 18,600 l/sec by constructing the Buaran I, Buaran II and Lebakbulus (financed by France) treatment plants. Demand was projected to reach 15,900 l/sec in 1990. Therefore, the objective of both the Buaran I and II projects was relevant, timely and consistent with government development policy (REPELITA IV 1984-1988) at the time.

In 1997, the Master Plan was revised again, and certain targets, similar to the previous Master Plan, were outlined through 2019. These included the construction of water treatment facilities. Therefore, the objective of both the Buaran I and II projects is still relevant and consistent with current government development policy.

2.2. Efficiency

2.2.1 *Project Scope*

The project was executed as defined in the original scope, except for some modifications in the design of water treatment facilities at both Buaran I and Buaran II. In order to make use of new technology in the field of water treatment plant operation that was developed by the manufacturer, two tender proposals were offered, one based on the consultant’s design and an alternative based on the manufacturer’s own design. As a result of international tendering, the manufacturer’s design was selected. The modifications were adequate and necessary for incorporating the advantages available with the new technology, which enhanced the performance of the

water treatment facilities.

2.2.2 *Implementation Schedule*

The modifications in project scope (from consultant's design to manufacturer's design) affected both the Buaran I and II projects. The start of construction for Buaran I was delayed by 26 months, owing to modifications of the project scope. The construction work itself was also delayed for 20 months, mainly due to the contractors' poor performance. Accordingly, the Buaran I element was delayed for a total of 42 months. The Buaran II was originally scheduled for completion in 1990, but it was extended to 1994 when the detailed design was carried out in 1987. The entire undertaking was delayed for 21 months.

2.2.3 *Project Cost*

Actual expenditures for the foreign portion of both Buaran I and II were almost the same as, or within the range of, the original estimates. However, the local portion of both projects was almost double, or more than double, the originally estimated costs, mainly because of increases in the cost of the treatment facilities and schedule delays. Nevertheless, the amount of total project construction cost for Buaran I was 7,099 million Yen, approximately 19% less than the original estimate of 8,802 million Yen. There was a similar cost under-run for Buaran II; while the original estimate was 19,530 million Yen, the actual project cost amounted to 14,938million Yen, a reduction of approximately 23%. These cost under-runs can be attributed to the depreciation of the Rupiah.[3]

2.3. Effectiveness

DKI Jakarta is divided into six distribution zones at present. The Buaran I T.P. directly serves the water needs of Zone 6, and Buaran II T.P. serves Zone 3 through Distribution Center R3 (see Figure 1). As the achievements of this project the entire water supply system, from treatment plant to end water connection, must be evaluated. In addition, it is also necessary to consider the other projects in the First Phase of the Second Stage, such as construction of the Lebakbulus T.P. and the development of a distribution system. Therefore, effectiveness indicators for all of the water supply projects in DKI Jakarta will be used to evaluate the achievements of this project. The specific contributions of Buaran I and II treatment plants (Buaran Treatment Plant) to the completed water supply project will also be evaluated.

When the operation and maintenance of the water supply system in DKI Jakarta was outsourced to private organizations in 1998, the service area was divided into two areas, Jakarta East (Zones 2, 3 and 6) and Jakarta West (Zones 1, 4 and 5). Based on the decision, effectiveness indicators have been monitored separately for the two areas; in addition, the project will also be evaluated for two different periods, before and after privatization.

Figure 1 Distribution Zoning System

2.3.1 *Before Privatization*

The following table and figure compare the target performance indicators and the levels actually achieved

[3] The exchange rate shifted from 1 Yen = Rp. 7.63 in 1986 to 1 Yen = Rp. 21.28 in 1994.

at the plants. Before privatization, the indicators cover the entire DKI Jakarta area, whereas the indicators after privatization only cover Jakarta East.

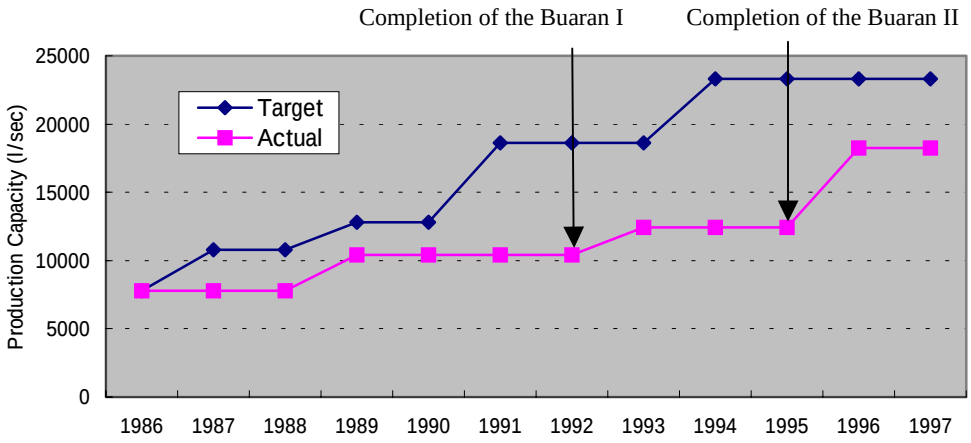

Figure 2 Comparison of Target and Actual Production Capacity

Source: "Jakarta Water Supply Development Project Master Plan" 1985 and The World Bank ICR

As shown in Figure 2, the total production capacity in DKI Jakarta increased by 10,430 l/sec between 1986 and 1997. Of the 10,430-l/sec increase, approximately 50% can be attributed to this project. There were delays, however, in constructing the treatment plants, which led to a delay in achieving the target amount. There was also a deviation from the original target in the total production capacity, which was supposed to increase to 23,300 l/sec by the year 1997. Actual production capacity in the same year was 18,230 l/sec, approximately 5,000 l/sec short. This shortage was due to the cancellation of the Cakung Treatment Plant (production capacity: 5,000 l/sec), which was planned for construction during the Second Phase of the Second Stage (refer to Table 2). Consequently, the gap between the planned and actual coverage ratio widened (refer to Table 3). Even so, the coverage ratio improved from 35% to 52% from 1990 to 1997, indicating that approximately 2.3 million people were newly served during the period. However, the coverage ratio of 52% was still far lower than the target of 82%.

Table 3 Comparison of Target and Actual Performance Indicators (*Before* Privatization)

Indicator	Unit	1990		1997	
		Target	Actual	Target	Actual
Population in Service Area	Thousand	6,538	6,439	8,438	8,880
Served Population	Thousand	5,357	2,254	6,913	4,618
Water Coverage Ratio	%	82	35	82	52
Number of Connection	Thousand	477	228	788	462
Water Produced	Million m^3	-	263	415	467
Water Sold	Million m^3	125	123	237	198
UFW	%	40	54	31	56

Source: "Jakarta Water Supply Development Project Master Plan" 1985 and The World Bank ICR

Nevertheless, it is conceivable that the target levels were set too high at the time of Master Plan. Although in fact, the JICA Master Plan was revised in 1997, based on actual performance records between 1985 and 1995. According to the Revised Master Plan, Day-Maximum Water Demand in 1997 was estimated at 14,543 l/sec. If the UFW had been reduced to 20% from the level of UFW in 1990, the total production capacity of DKI Jakarta would have been enough to cover the entire population in the service area.

The actual UFW of 1997, however, was 56%, which was not only far higher than the target value of 31%, but also higher than the UFW of 1990 (54%). There were several factors that contributed to the high UFW, including leakage from the distribution system, illegal connections and billing deficiencies. Among these

reasons, systemic leakage was the primary factor. For instance, 77% of UFW in 1995 was attributed to systemic leakage, particularly leakage from the distribution system.

The actual amount of water produced in 1997, 31% of which was produced at the Buaran T.P., exceeded the target amount by 12%, because of the high UFW. Consequently, the actual amount of water sold in 1997 was 16% short of the target amount of 237 million m^3.

2.3.2 *After Privatization*

As stated earlier, water supply for Jakarta East, which consists of Zones 2, 3 and 6, was consigned to a private company called Thames Pam Jaya in 1998. Since then, the company has set its own targets for improving water supply services in Jakarta East (refer to Table 4).

Table 4 Comparison of Target and Actual, Performance Indicators (*After* Privatization)

Indicator	Unit	1998		1999		2000	
		Target*[2]	Actual	Target*[2]	Actual	Target*[2]	Actual
Population in Service Area	Thousand	4,250	4,312	4,321	4,366	4,394	4,393
Served Population	Thousand	2,332	2,505	2,560	2,579	2,788	2,606
Water Coverage Ratio	%	60	58	64	59	69	59
Number of Connections	Thousand	286	278	316	284	345	304
Water Produced*[1]	Million m^3	262	269	267	247	269	234
Water Sold*[1]	Million m^3	92	92	106	106	118	118
UFW	%	50	58	47	52	42	46

*[1] Excluding the amount of water purchased. *[2] Original target set in the Cooperation Agreement.

Source: Thames Pam Jaya

The UFW ratio, a crucial factor affecting water supply effectiveness, increased 2% in the very first year of privatization, even though it had been improving steadily, declining from 58% in 1998 to 46% in 2000.

Of the 4,394,000 people in Jakarta East, approximately 2,606,000, or 59% of the total served population, could access water supply services in 2000. Both the coverage ratio and UFW improved after privatization, but target levels were not reached in either case. The amount of water sold was almost the same as the target level, though other performance indicators, such as the number of connections and the amount of water produced, fell short. Further efforts at providing better water supply services are to be hoped for.

2.3.3 *Contribution of Buaran Treatment Plant*

Construction of Buaran I T.P. (production capacity: 2,000 l/sec) was completed in 1992, and construction of Buaran II T.P. (production capacity: 3,000 l/sec) was completed in 1995; the total production capacity of the Buaran T.P. reached 5,000 l/sec in 1995. Table 5 illustrates actual performance between 1992 and 2000. The Production Rate in 1995 was 40%, less than half of capacity, because Buaran II T.P., completed in August 1995, was not fully operational for much of the year. The average production rate between 1992 and 2000 was approximately 85% (excluding 1995), suggesting that water was in fact produced efficiently at the Buaran T.P.

Table 5 Performance of Buaran Treatment Plant

Indicator	*Before* Privatization						*After* Privatization		
	1992[1)]	1993	1994	1995[2)]	1996	1997	1998	1999	2000
Production Capacity (l/sec)	2,000	2,000	2,000	5,000	5,000	5,000	5,000	5,000	5,000
Water Produced at Buaran T.P. (mil. m^3)	55.1	47.5	55.1	62.8	124.1	146.4	149.3	135.4	124.5
Production Rate (%)	87	75	87	40	79	93	95	86	79
Share of Buaran T.P. in Water Production (%)	18	14	16	18	30	31	54	54	53
Population Served by Buaran T.P. (thousand)	533	464	546	676	1,287	1,446	1,363	1,384	1,381

[1)] Completion year of Buaran I [2)] Completion year of Buaran II (not in full operation)

Source: Thames Pam Jaya

The Buaran T.P.'s share of total water production in DKI Jakarta increased from 18% to 31% between 1992 and 1997 with the construction of Buaran II T.P. Accordingly, the population served by the Buaran T.P. increased from 533,000 to 1,446,000 people.

After privatization, more than half of the total amount of water in Jakarta East was produced at the Buaran T.P. Despite increases in water production between 1997 and 1998, although the population served by the Buaran T.P. decreased by approximately 6%, owing to the increase of UFW. The amount of water produced at the Buaran T.P. decreased after privatization, due to the Economic Crisis of 1998; however, the population served increased between 1998 and 1999 owing to the reduction of UFW. The Buaran T.P. served 1,381,000 people, approximately 53% of the total served population in Jakarta East, in year 2000.

2.3.4 *Financial Internal Rate of Return*

The Financial Internal Rate of Return (FIRR) of both Buaran I and II was recalculated, using the same conditions used for the original calculation at the time of appraisal separately, and actual performance indicators[4]. The recalculations were based on two assumptions: (1) that UFW would be constant after year 2000 and (2) that UFW would improve by 1.21% per year after year 2000. As for Buaran I, the FIRR was recalculated based on the Buaran I Project alone since the project was designed to connect with the existing distribution trunk mains. The recalculations show the FIRR to be (1) 13.14% and (2) 14.48%, figures that are respectively 2.65% and 3.99% higher than the original calculation of 10.49% in Buaran I (IP-290). This improvement was attributed to a drastic increase in water tariffs, which brought about a significant increase in revenue. To illustrate the rate of increase using 1992 constant prices, the average water tariff between 1992 and 2000 was 2.7 times higher than in 1984 (at the time of appraisal). Although high UFW[5] ratio (on average 53% between 1992 and 2000, whereas UFW was expected to improve to 40% at the time of appraisal) cancelled out the increase of tariff, to some extent, the increase of the population served can be attributed to FIRR increase.

The recalculation of the FIRR for Buaran II, on the other hand, included a financial assessment of the entire First Phase of the Second Projects, reflecting the fact that Buaran II became effective upon completion of the entire water supply system. At the time of appraisal, the FIRR was estimated to be 5.8%, indicating that the project was financially feasible. (1) The recalculation shows the FIRR to be negative, which indicates that the project was not financially feasible. This negative FIRR was attributed to delays in project completion, which significantly increased the investment cost. Other factors contributing to the negative FIRR were the low amount of water production, owing to the delays in project completion, and the high UFW ratio[6]. (2) Assuming that UFW would improve by 1.21% per year after year 2000, the recalculation shows the FIRR to be 4.8%, which shows how much the reduction of UFW influences the financial feasibility of the project.

2.4. Impact

2.4.1 *Impact on Water Quality*

An interview survey[7] of beneficiaries in Jakarta East (Zones 2, 3 and 6) conducted in 2001 found that approximately 40% of respondents were not satisfied with water supply services because of low water quality. More than 50% of the total water supply in Jakarta East was produced at Buaran T.P., so the water quality at

[4] The FIRR was recalculated based on the assumption that the Pam Jaya continued to operate the existing water supply system after privatization.

[5] UFW is a crucial indicator showing both economical and resource loss. Generally, the higher the UFW ratio is, the greater profit loss is.

[6] At the time of appraisal, it was assumed that UFW was reduced by 20% in the first 10 years, where in fact, UFW was reduced by 7% after project completion.

[7] The interview survey was cited from the "Ex-Post Evaluation For ODA Loan Projects, 2001."

Buaran T.P. was evaluated to judge the environmental impact of the project for this report.

The water supply agency (currently Thames Pam Jaya) applied the water quality standards issued by the Ministry of Health (MOH) in 1990. The standard has two levels, one for Potable Water and the other for Clean Water.

Potable Water means the water is directly drinkable, and Clean Water means the water is drinkable after boiling. According to the regulation, the standard of Potable Water is applied to treated water at all treatment plants in urban cities and the standard of Clean Water is applied to treated water at treatment plants in rural areas. Tap water at each household has to meet the standard of Clean Water both in urban and rural areas. The quality of treated water from the Buaran Treatment Plant is shown in the table below.

Table 6 Water Quality at Buaran Treatment Plant

Quality Index	Unit	Standard[1)]	1993	1994	1995	1996
Turbidity	NTU	5	0.52	0.55	1.89	0.59
Color	TCU	15	10.2	4.1	3.2	2.11
PH	-	6.5-8.5	7.3	7.3	7.4	7.1
Mn	mg/l	0.1	0.036	0.059	0.050	0.015
Detergent	mg/l	0.05	0.031	0.016	-	-
KMnO4	mg/l	10	4.88	-	3.72	2.987
Fe	mg/l	0.3	-	-	0.040	0.014
Total Coliform	-	0	-	-	0	0
Quality Index	Unit	1997	1998	1999	2000	2001
Turbidity	NTU	1.96	1.11	0.47	0.59	0.38
Color	TCU	2.72	<2.0	<2.0	1.75	<2.0
PH	-	7.14	6.97	7.09	6.94	7.02
Mn	mg/l	0.030	0.017	<0.005	0.017	<0.005
Detergent	mg/l	0.097	0.120	0.170	0.098	0.013
KMnO4	mg/l	5.545	-	-	-	-
Fe	mg/l	0.063	0.043	0.058	0.060	0.028
Total Coliform	-	0	0	0	0	0

[1)] Standard means “Potable Water Standard” by MOH

Source: “The Study on the Revise of Jakarta Water Supply Development Project Master Plan” 1997 and Thames Pam Jaya

Detergent sometimes exceeds the standard (1997-2000), but everything else is below the limit. The quality index that directly measures potableness is coliform group content. The coliform group consists of several genera of bacteria belonging to the family enterobactera. MOH requires negative coliform in drinking water. The Buaran Treatment Plant always produces potable treated water with a negative coliform group (total coliform).

In addition, the quality of raw water and treated water at the Buaran T.P. is periodically monitored by Thames Pam Jaya at present (refer to Appendix 5), and the monitoring results are reported to MOH and the Ministry of Home Affairs (MOHA).

Problems remain in the existing distribution pipelines, some of which are very old or damaged. This explains the high UWF ratio, low water quality and low pressure.

Currently, Thames Pam Jaya is taking measures to improve water quality, although it will take some time before the desired results can be obtained.

2.4.2 *Impact on Sanitation and Living Conditions of Beneficiaries*

As a consequence of Buaran I and II, approximately 1.3 million people in Jakarta East were served by the Buaran T.P. in 2000. Approximately 2.6 million people, or 59% of the total population in Jakarta East, had access to the water supply system. Before project implementation (1980), only 2.1 million people, or 32.5% of

the total population in DKI Jakarta, had access to the water supply system, and most people were compelled either to purchase potable water from venders or to take unsanitary water from shallow wells and rivers. Therefore, it is thought that the project contributed to the improvement of sanitation and living conditions of at least 1.3 million people, preventing water-borne disease by providing potable water to each household and reducing the time needed to fetch water.

2.5. Sustainability

As stated earlier, Operation and Maintenance (O&M) of the water supply business in Jakarta was privatized according to the concession agreement ("Cooperation Agreement") between Pam Jaya and two private enterprises for a period of 25 years starting from February 1998. Pam Jaya transferred this responsibility to PT. Pam Lyonnaise Jaya (Jakarta West) and PT. Thames Pam Jaya (Jakarta East). Therefore, Thames Pam Jaya at present operates and maintains the Buaran Treatment Plant.

2.5.1 *Organizational Structure of Thames Pam Jaya*

Thames Pam Jaya (TPJ) is a joint company of Thames Water International (of the United Kingdom); PT Kekarpola Arindo (KPA), a limited liability company under the laws of the Republic of Indonesia; and a regional government enterprise (Pam Jaya). TPJ has the exclusive right to operate all existing assets for 25 years, including the right to bill for and collect water tariffs. Pam Jaya remains the owner of existing facilities and is responsible for monitoring the performance of TPJ.

TPJ currently employs 1,800 people, including 101 engineers and 177 technicians, to operate and maintain the existing water supply facilities in Jakarta East. Based on the Cooperation Agreement, 80% of the staff was recruited from the public sector and 20% from the private sector. As a consequence, approximately 80% of the TPJ's staff was transferred from Pam Jaya. Most of the staff have knowledge and experience in operating and maintaining the existing water supply facilities.

2.5.2 *Performance of Thames Pam Jaya*

During the 25-year term of cooperation, the TPJ is committed to bringing in funds to invest in extending the distribution network, increasing the service ratio, improving water quality and improving customer service. The performance of TPJ is evaluated by Pam Jaya, based on its achievement of technical targets and service standards, as follows:

* Development of water quality to the standard of drinkable water within a period of 10 years.
* Development and expansion of distribution lines to 1 million new consumers in the first 5 years.
* Connection of 130,000 new pipelines in the first 5 years.
* Achievement water pressure up to 7.5 meters.
* Decrease of leakage level from 53% to 35% in the first 5 years.

It has been three years since privatization, and TPJ is currently struggling to achieve these targets. For instance, 101,000 new consumers were served, 26,000 new pipelines were connected and the UFW was reduced to 46% in the first three years (refer to Table 4). These numbers are below the target levels, and it is quite unrealistic to expect that TPJ will achieve the targets in the next two years. The targets were set before 1998, based on the JICA Revised Master Plan. At the time, they were reasonable because TPJ was planning to invest its capital in expanding and constructing new water treatment plants and replacing distribution lines. After the Economic Crisis of 1998, however, commercial consumption failed to increased and real value of water tariffs decreased, and TPJ was not able to invest its capital as planned. In the current economic situation, it is not realistic to expect that the targets will be achieved. In fact, TPJ is currently negotiating modifications of

the target levels.

The expansion of water supply service to more than 100,000 new consumers can be considered quite an achievement in terms of public interest, since most of the new services were provided to households, particularly those in poor communities.[8] Financial deficit notwithstanding, TPJ significantly reduced connection charges or provided free connection to poor communities.

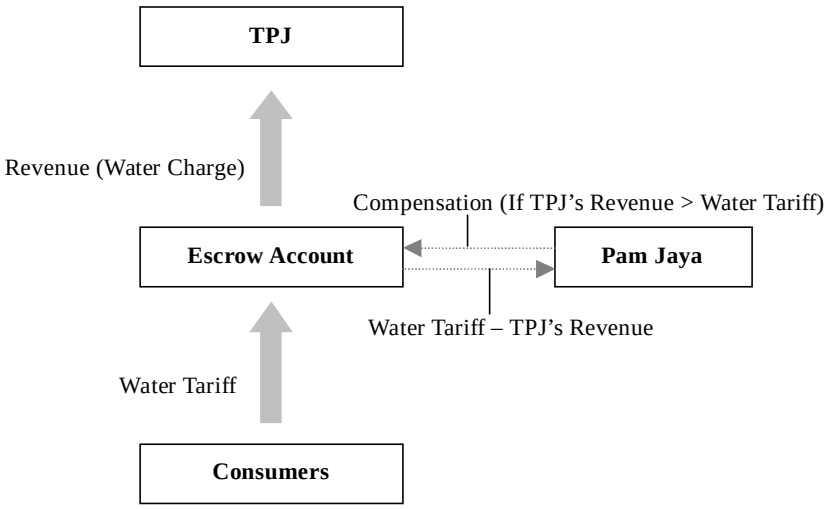

Figure 3 Financial Arrangements

Source: "Cooperation Agreement"

2.5.3 *Financial Status of Thames Pam Jaya*

According to the Cooperation Agreement, TPJ's revenue share is determined by multiplying the water charge[9] by the amount of water sold (volume of water billed and collected). Payment collected from the consumers (water tariff×volume sold) goes into an Escrow Account[10] and the TPJ receives its revenue share (water charge×volume sold) from the Escrow Account. In the event that TPJ has not received the full amount of revenue share in a particular year (water charge > water tariff), Pam Jaya shall pay the difference (water charge – water tariff) as compensation, within 60 days of the end of that year.

In the very first year of privatization, the water charge was set almost equal to the water tariff. However, due to the Economic Crisis, TPJ recorded a deficit in operating income. In order to secure the minimum operation profit, the water charge was set higher than the water tariff in 1999 and 2000 (refer to Figure 4). Accordingly, the TPJ recovered from the deficit, mostly by increasing the amount of water sold and reducing UFW (refer to Table 7).

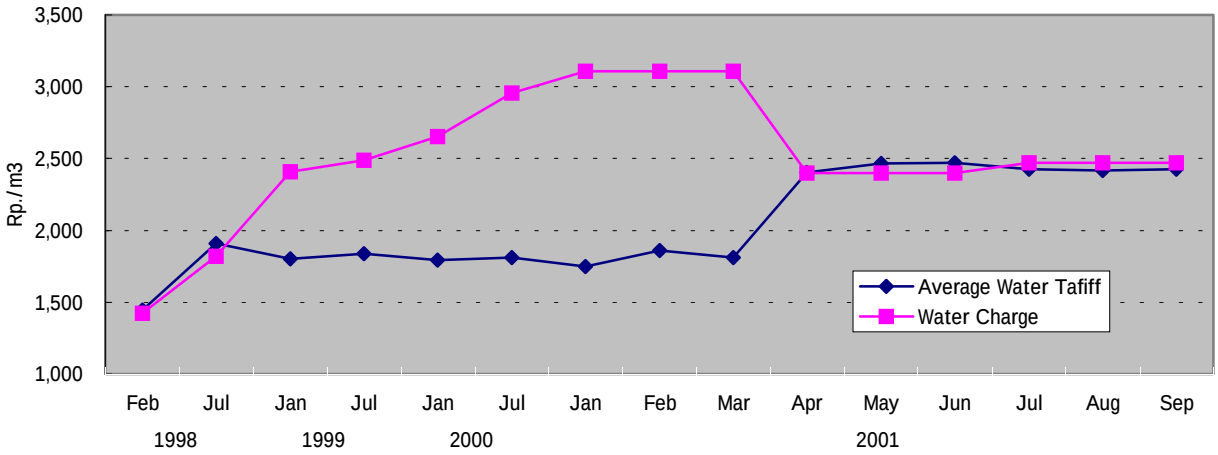

Figure 4 Comparison of Average Water Tariff and Water Charge

Source: Pam Jaya

[8] 60% of the served population in Jakarta East is considered low-income.

[9] Water charge is a predetermined fixed amount per m^3 to calculate TPJ's revenue share. It is calculated using an agreed escalation formula taking into account the investment program conducted by the TPJ. The water charge is adjusted at the beginning of each semester (every 6 months before 2001 and every 3 months after 2001) in order to ensure a minimum profit for TPJ.

[10] The Escrow Account is a mutual account of TPJ and Pam Jaya, in which all water tariffs collected from the customers shall be deposited for the purpose of distribution or revenue share to the beneficiaries (TPJ and Pam Jaya).

Unit: thousand Rupiah

Table 7 Income Statement of the Thames Pam Jaya

	*FY 1998	*FY 1999	*FY 2000
Operating Revenue	192,615,279	230,116,151	330,004,850
Operating Expenses	-217,112,634	-215,321,800	-231,978,192
Operating Income	**-24,497,355**	**14,794351**	**98,026,658**

*Income statement was calculated in fiscal year. For instance, FY 1998 starts on 1 April 1998 and ends on 31 March 1999.

Source: Thames Pam Jaya

In April 2001, the water tariff was increased by 35% in order to adjust the tariff level to inflation.[11] Accordingly, the water charge was set to an amount almost equal to the water tariff (refer to Figure 4).

According to Pam Jaya, it is not financially feasible for TPJ to operate the water supply system in Jakarta East because the area consists largely of poor communities. In view of the public interest, TPJ's minimum operating profit is secured by setting water charges higher than water tariffs or by adjusting water tariffs to an appropriate level. In this way, TPJ can continue to provide high quality services to consumers.

2.5.4 *Establishment of Regulatory Body*

As stated earlier, TPJ has the exclusive right to operate all existing assets for 25 years. In other words, given TPJ's virtual monopoly, consumers have no alternative suppliers available for the next 25 years. In order to protect consumers, the Cooperation Agreement specifies minimum technical targets and service standards, and also a pre-determined maximum water charge. Pam Jaya carried out the functions of a regulatory body, monitoring and enforcing these obligations. However, when Pam Jaya became a TPJ stockholder[12], this arrangement was deemed inappropriate. A separate regulatory body was finally established at the end of 2001 (refer to Figure 5).

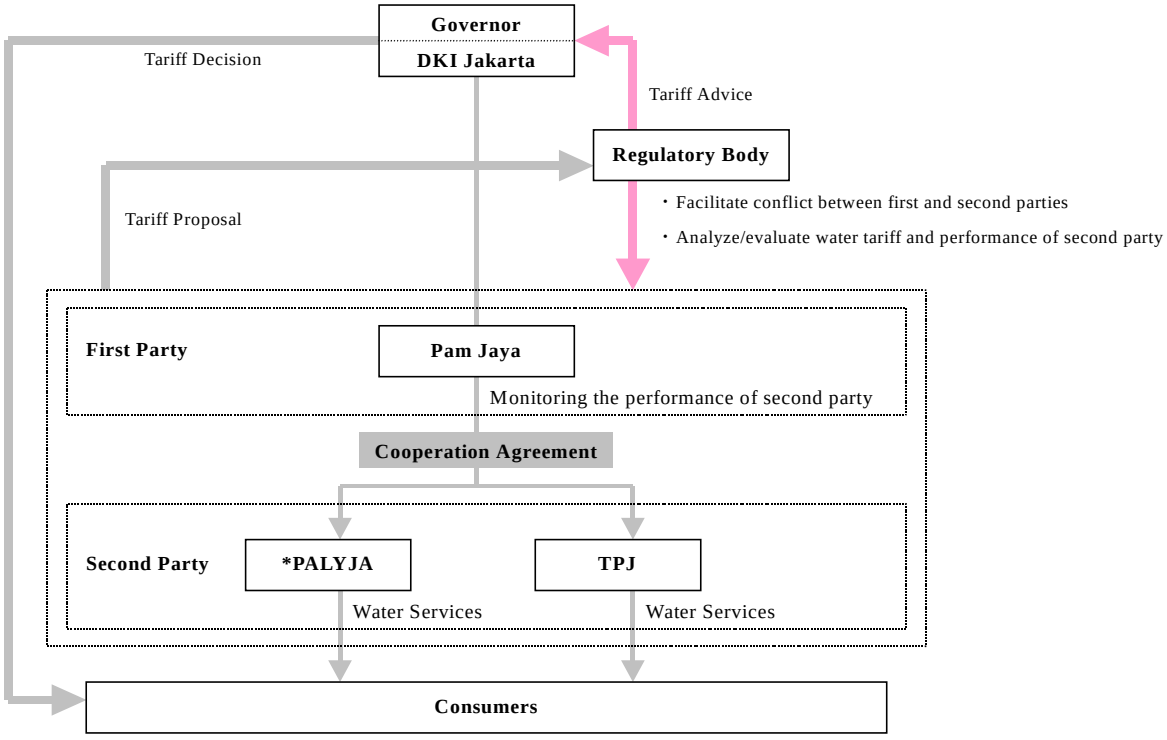

Figure 5 Regulatory Body and Current Arrangements of Jakarta Water Supply System

[11] Based on regulations set by the Ministry of Home Affairs in 1990, water tariffs shall be adjusted every three years.
[12] Pam Jaya has a 10% share in TPJ.

*PALYJA (PT. Pam Lyonnaise Jaya) serves Jakarta West. Source: Made based on hearing from the TPJ and Pam Jaya

The regulatory body is an independent organization, consisting of members appointed by the Governor of DKI Jakarta. The members are selected from the general public and include consumers, professors and retired government officers. The body's main functions are to facilitate conflict between the first (Pam Jaya) and second (TPJ) parties, and to analyze and evaluate the performance of the second party and water tariffs proposed by the first and second parties.

Establishment of such organization is new for the Indonesian people, and its organizational capability is still unknown. However, the regulatory body is expected to protect the consumer's rights by reflecting the consumer's voice.

2.5.5 *Prospects for Project's Sustainability*

In 1998, TPJ increased the amount of water production at Buaran T.P. and other treatment plants in order to meet consumer demand. Because of high UFW, however, TPJ had operating losses in the same year. This high UFW created additional operating costs, which squeezed TPJ's operating revenue. TPJ has reduced production volume of its treatment plants, including the Buaran T.P., since economic conditions have not been suitable for expanding service area. Under the circumstances, leakage from the distribution system and illegal connections have become serious problems, contributing to the high UFW. Jakarta's high groundwater levels pose additional problems. Leakage sometimes causes suction, meaning that groundwater is sucked into pipes containing treated water, causing low water quality. TPJ has placed its highest priority on reducing UFW. The TPJ is currently undertaking a plan to install water pressure gauges on every distribution pipe in order to identify leakage. It is also planning to conduct a campaign against systematic illegal connections in cooperation with the local authorities. Reduction of UFW is the key to increasing operating revenue and to expanding and improving water supply services. The performance of TPJ should be monitored further in order to verify the project's sustainability in the future.

3. Lessons Learned

Even the water quality of water treatment plants come up to the local standard for drinking water, many users are not satisfied with water supply services due to low water quality and low pressure. In order to achieve the project objectives more effectively, more attention should be paid to improve whole water supply system as well as the project implementation itself.

Comparison of Original and Actual Scope

Items/Activities	Original Scope (At time of Appraisal)	Revision/Modification
Buaran I		
I. Project Scope		
1. Intake Facilities	Daily Production: 2.0m^3/sec Flow Rate: 2.14 m^3/sec	As planned 2.2 m^3/sec
2. Treatment Facilities	a. Receiving Well b. Mixing Well c. Flocculation Basin d. Sedimentation Basin e. Rapid Sand Filter - conventional type - A=93.2m^2, 18 units f. Clear Water Reservoirs g. Clear Water Pump Well h. Operation and Chemical Building i. Wastewater Disposal Facility J. Chemical Feeding System k. Power Substaion	a. Mixing Well b. Preparation Basin c.d. Flocculation and Sedimentation Basin e. Rapid Sand Filter - constant water level type - A=84m^2, 16 units f. As planned g. As planned h. As planned i. As planned j. As planned k. As planned
3. Distribution Facilities	a. Pumping Station b. Distribution Pump c. Distribution Main -φ1,100mm x 7.6km -φ1,000mm x 5.8km -φ 900mm x 3.4km	a. Pumping Station b. Distribution Pump c. Distribution Main -φ1,200mm x 3.2km -φ1,100mm x 2.4km -φ1,000mm x 5.4km -φ 900mm x 3.0km
4. Consulting Services	D/D: 98 M/M Construction Supervision: 135 M/M	N.A. N.A.
II. Implementation Period		
1. Selection of Consultant	Nov. 1984 – Oct. 1985	Mar. 1985 – Feb. 1986
2. Detailed Design	Nov. 1985 – June 1986	Mar. 1986 – June 1987
3. Construction Supervision	Oct. 1986 – Mar. 1989	Oct. 1987 – Sep. 1992
4. Tendering	July 1986 – May 1987	Feb. 1988 – Nov. 1989
5. Procurement	May 1987 – Mar. 1988	Nov. 1989 – Apr. 1992
6. Construction of Treatment Plant	July 1986 – Dec. 1986	May 1988 – Mar. 1989
7. Installation of Equipment	Jan. 1987 – Mar. 1988	Mar. 1989 – June 1992
8. Pipe laying works	Jan. 1988 – Mar. 1989	June 1989 – Sep. 1992
III. Project Cost		
Foreign currency	4,500 mil. Yen	4,490 mil. Yen
Local currency	18,152 mil. Rp	36,741 mil. Rp
Total	8,802 mil. Yen	7,099 mil. Yen
JBIC Yen loan portion	4,500 mil. Yen	4,490 mil. Yen
Exchange Rate	1 Rp. = ¥ 0.237 (As of May 1984)	1 Rp. = ¥0.071 (The Weighted Average)
Items/Activities	Original Scope (At time of Appraisal)	Revision/Modification
Buaran II		
I. Project Scope		
A. Buaran Treatment Plant	Daily Production: 3.0m^3/sec	As planned
1. Intake Facilities	Flow Rate: 3.3 m^3/sec	As planned
2. Treatment Facilities	a. Receiving Well b. Mixing Well c. Flocculation and Sedimentation Basin d. Rapid Sand Filter - surface wash type - A=5m^2/h, 18 units	a,b and c - Pulsating-type clarifiers including mixing chamber and V-type Aquazur filters d. Rapid Sand Filter - wash system of air souring and backwash

		- A=7.3m^2/h, 16 units
	e. Clear Water Reservoirs	e. As planned
	f. Chemical Building	f. As planned
	g. Wastewater Pond	g. Wastewater Pond
	- 2units with drain pumps: 6 sets	- 2units with sludge pumps: 10 sets
		- wastewater pumps: 6 sets
	h. Chemical Feeders	h. As planned
	i. Workshop	i. As planned
3. Transmission Facilities		
	Transmission Pump:	
	- 5units at 60 m^3/min. w head of 25m	- 5units at 60 m^3/min. w head of 25m with supplementary impeller
		- 60 m^3/min. w head of 40m with normal impeller
	Transmission Main	
	-φ1,500mm x 9.0km	-φ1,500mm x 1.6km
	-φ1,650mm x 12.9km	-φ1,650mm x 11.4km
	Surge Tower: 1unit	Surge Tower: 3units
B. Distribution Center		
1. Receiving Chamber	1unit, capacity: 1,350 m^3	As planned
2. Balancing Reservoir	2units, total capacity: 32,400 m^3	As planned
3. Power Sub-station	2units, capacity: 6,000KVA (Main)	As planned
	2units, capacity: 100KVA (Secondary)	As planned
4. Distribution Facilities		
	Distribution Pump	
	- 45 m^3/min, 56m×2	As planned
	- 90 m^3/min, 56m×3	As planned
	Distribution Main	
	-φ1,800mm x 3.0km	-φ1,800mm x 2.1km
	-φ1,650mm x 2.7km	-φ1,650mm x 2.9km
	-φ900mm x 1.3km	-φ1,350mm x 0.5km
		-φ900mm x 1.1km
		-φ600mm x 3.8km
5. Chlorination Facilities		Chlorination and neutralization system: maximum and average dosage of 1.0mg/1 and 0.5 mg/1 respectively Chlorine gas neutralization facility.
C. Remote Supervisory System		
1. Central Terminal Unit	Buraran Treatment Plant	As planned
2. Remote Terminal Unit	Distri. Center/Surge Tower (2&3)	As planned
3. Number of Data	200	218
4. Data Transmission Media	Radio system & telephone line	As planned
D. Consulting Services	D/D: 165 M/M	N.A.
	Construction Supervision: 210 M/M	N.A.
II. Implementation Period		
1. Detailed Design	July 1987 – July 1988	July 1987 – Dec. 1988
2. Construction Supervision	July 1990 – Sep. 1993	July 1990 – June 1995
3. International Contract Packages		
- Water Treatment Facilities	Apr. 1992 – Apr. 1994	Apr. 1992 – Jan. 1995
- Pumping Center	Jan. 1992 – Jan. 1994	Jan. 1992 – Nov. 1995
- Transmission Main	Feb. 1991 – Apr. 1992	Feb. 1991 – Mar. 1993
- Distribution Trunk Main	Feb. 1991 – Aug. 1992	Feb. 1991 – May. 1993
4. Local Contract Packages	July 1991 – Feb. 1995	July 1991 – Aug. 1995
III. Project Cost		
Foreign currency	10,923 mil. Yen	10,261 mil. Yen
Local currency	37,097 mil. Rp	89,944 mil. Rp
Total	19,530 mil. Yen	14,938 mil. Yen
ODA loan portion	10,923 mil. Yen	10,827 mil. Yen
Exchange Rate	1 Rp. = ¥ 0.232	1 Rp. = ¥0.052
	(As of Apr. 1985)	(The Weighted Average)

Independent Evaluator's Opinion on Jakarta Water Supply Development Project (Immediate Project of 2nd Stage)

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The objectives of the project are relevant to the regional development strategies of City of Jakarta, as stated in the Jakarta Water-Supply Development Master Plan 1985. The project was intended to anticipate Jakarta population's need on sanitary water supply, as the population and demand for a better living grows by years. As the need becomes indispensable for a metropolitan city like Jakarta, the project should meet the priority of the Jakarta's regional development policy.

The Master Plan 1985, prepared by JICA, was revised in 1997, taking into account actual performance records 1985-1995. Water production seemed to be over-capacity about 20%, due to revised, lower targets and assumptions. However, the high UFW figure due to external causes still required high production capacity, therefore the Buaran TP, which contributed 30% of total demand, still confirmed its relevancy.

The relevance of the plan was maintained although there were significant delays for both Buaran I and II TP. Even better, the delay fulfilled the needs of more comfortable business viability as more affordable population required sanitary water supply and a significant raising of water-tariff covered operational losses and inefficiency. The delay also allowed the project to adopt new technology and better modification from the planned.

The Buaran TP provides positive impacts on increasing water supply production capacity for Jakarta East area, improving water quality, providing better service-provisioning, and improving sanitation and living condition of at least its 1.3 million customers in Jakarta East area. However, the systemic leakage problem in some distribution pipelines made those improvements fails to acquire customer's satisfactory. This loss, together with other inefficiencies in operation, in turn, contributed financial burden on customers in form of tariff raising up to 270% in 8 years.

The Buaran TP has gained a significant role in the water supply operation in Jakarta East by contributing up to 53% of total water supply production in Jakarta East, operating efficiently with avg. 85% production rate, and serving 1,381,000 population or equivalent to 53% of total served population in Jakarta East.

The PDAM DKI Jakarta, as the sole water supply company in Jakarta, was granted to have many privileges and monopoly rights to operate water supply business in Jakarta City, and the TPJ, as the operator of Buaran TP, is most likely able to maintain Buaran TP's sustainability, for both technical and economic aspects. However, some improvement programs should be addressed to obtain an optimum efficiency, gain more revenue and acquire more customer's satisfactory.

Overall, Evaluator agrees that the project has accomplished its intended goals, although it cannot fully deliver positive impacts as planned due to bad performance of other components. Still, the project provides positive impacts to contribute significantly to the objectives and allow the sustainability kept longer.