Final Report

Private Sector Development Contract

Albania — Urban Services Water Rate Analysis for Berat, Durres, and Kavage

Prepared for

United States Agency for International Development
Bureau for Europe and Newly Independent States
Office of Energy, Environment, and Urban Development
Urban Development and Housing Division
Washington, DC

Prepared by

PADCO, Inc.
1025 Thomas Jefferson Street, NW
Suite 170
Washington, DC 20007

Contract No. EUR-0034-C-00-2032-00
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Acknowledgments

The authors of this report express their appreciation to the water enterprises of Durres, Kavaja and Berat and their staff, for their in-king cooperation with and participation in this project. In particular, we wish to thank the following people: in Durres — Ardian Radovicka, Director; Maim Keçi, Chief Engineer; Roland Zhelili, Chief of Accounting; and Alma Stama, Chief of Sales Department; in Davaja — Shahin Pagria, Director; Shaqir Feimi, Engineer; Fatbardha Koçi, Engineer; and Ismail Kadiu, Chief of Accounting; in Berat — Bahir Hada, Director; Lefter Ndreu, Chief of Technical Department; Tomor Lila, Chief of Sales Department, Eglantina Baba, Economist; and Lulezim Sina, Chief of Village Sector; for their timely submittals of financial statements and technical documents, and for their untiring efforts and patience while we conducted the necessary interviews.

The authors also wish to thank the Ministry of Public Works, Territorial Adjustment and Tourism, of the Government of Albania and the Urban Institute in Tirana, Albania, for initiating studies for this project. In particular, we express our appreciation to Mr. Arben Demiri, Advisor to the Minister, who provided guidance and gave insightful comments throughout this project. We are also grateful to the urban Institute for arranging the field visits to the water enterprises, setting up the interviews and providing us with transportation and an interpreter to assist us in completing our work.

The field work for this project was sponsored by the United States Agency for International Development (USAID) and undertaken by the authors under contract to Planning and Development Collaborative International, Inc. (PADCO). We would like to express our gratitude to USAID and PADCO staff for their guidance and cooperation in this effort, especially to Ms. Rebecca Black and Ms. Lisa Evans.

The authors of this report are Rick Albani, of Vista Consulting Group, Inc., McLean, Virginia, which specializes in providing management consulting, planning and financial services to water and wastewater utilities; and Mike Cooney, of Okatie, South Carolina, an independent consultant who specializes in providing financial services to international companies, public agencies and private companies.

It is hoped that this effort will lead to water rates for each water district in Albania, that are based on the true costs of providing water service, to allow the water enterprises to grow and provide improved service to customers, while remaining a viable entity.

Executive Summary

Three cities in Albania; Durres, Kavaja, and Berat were selected to be studied to determine the present cost of a cubic metre of water. This cost data is to be used in determining new water rates for the country's water enterprises that will eliminate Government subsidies and provide sufficient funds for the water enterprises capital replacement, renovation and return on investment.

The following table summarizes the cost, revenue and cost/rate gap for each city that is presented in detail in this report.

In Lek

Water Enterprise	1995	First Six Mo. 1996	Recommend
Durres			
Revenue M^3			
3			
Kavaja			
3			
3			
Berat			
3			
3			

The cost discussions of each city goes into the risks, uncertainties, and actions considered necessary for the proposed rates to accomplish the goal of financial stability in a water enterprise.

A “pricing rule” is used though out this document that stresses total cost recovery, including preventive maintenance, debt service, capital replacement and return on investment. The influence of these cost factors and the effect unaccounted for water has in rate setting is discussed at length. The importance of regulations and their enforcement is a prerequisite in reducing unaccountable water.

As requested the Albanian “1993 Accounting Law” was reviewed as to it's adequacy to meet water enterprise reporting requirements. It was found to be inadequate and a conceptual form of amendment to the “Law” is proposed. This amendment requests statistical information in sufficient detail to provide a measure of the water enterprise operational and financial viability.

1 Purpose of Technical Assistance Assignment

It is the goal of the Ministry of Public Works, Territorial Adjustment, and Tourism (MoPW or the Ministry) of the Government of Albania (GOA) to increase the water rates in the major water enterprises in Albania. The increased rates should be based on an actual cost of service reflecting present fiscal year 1995 & 1996 costs and on the performance and water delivery currently being experienced in the representative water enterprise. The water rate cost base is to include operating and maintenance cost, present asset depreciation, and a sum sufficient to cover the annual rehabilitation of the existing system, bad debt, profit incentive, and debt service if applicable.

Further the Government of Albania desires an accounting system able to accurately track the significant costs of service from which "pricing rules" could be established to substantiate recommended water rate decisions. It is hoped that this "accounting system" would form the basis for future water enterprise regulations and financial analysis.

At a meeting at the Ministry with Mr. Arben Demiri, Advisor to the Minister, on August 19, 1996, it was stated that it is presently recognized by the GOA that water rates do not cover true costs resulting in Government subsidies. This gap, covered by the subsidies, must be presented to the Government and the consumer so it is readily understood what contributes to the rate cost gap, and what portion of this gap can be reduced through the positive effect of capital improvement, investment, and/or improved management and water utility regulations. This task was to provide data that could facilitate responses to the technical, financial, and customer interests all integrated in the outcome of rate adjustments.

Mr. Demiri requested that the GOA 1993 "Accounting Law" be reviewed as to it's suitability to meet the informational requirements of the water industry for rate setting, pricing decisions and as a measure of financial viability. The intention of this review was to propose amendments to the "1993 Law" that could better present water utility financial information to the interested Ministries. Section XI of this report contains a discussion of the proposed amendments and Appendix 1 contains the proposed supplemental reporting requirements.

Three cities, Durres, Kavaja and Berat were chosen to be analysed. Each of these cities presented a different water service challenge to their respective enterprises and as such would serve as a test of the ability to develop cost data, accounting systems and pricing rules that could have industry wide application. The critical elements of the pricing rule and its methodology are discussed in Section X of this report.

2 Task Approach

The data collected and the cost/pricing rules developed were based on the present water system and cost data incurred in 1995 and the first six months of 1996. Little time was

directed toward developing a model that reflected planned but unfunded future capital improvements.

Each city was visited for two days and meetings were held with the respective enterprise Director, the Engineering and Financial staffs.

Technical, financial, and demographic information was collected for 1995 and the first six months of 1996. We assembled this data by significant cost elements, and developed, by element, the cost per cubic metre billed. This full cost per cubic metre billed then was compared to the amount of revenue generated by the present water rate schedule. The cost/rate gap, was analysed as to the performance factors of the utility that influenced the "gap".

The experiences gained in gathering the necessary data in the study were analysed with an aim of providing a better data collection system and uniform presentation of rate, cost, and water system information to regulatory and financial entities. Though this task addresses present cost/rates, the documentation in the report does identify the need to recognize future cost and financial obligations reflected in present ongoing developments with The World Bank and other Donor Institutions.

The Consultants developed recommendations for pricing rules, and the sensitivity of utility performance/rate factors. The task has also provided the impetus that suggested necessary amendments to the present "1993 Accounting Law" to provide a water utility management report and an aid to improved regulation of this sector of Albania's infrastructure.

3 Cities Studied

It was determined that a study of a representative sample of the different modes of operating water systems, be conducted. The Cities of Durres, Kavaja and Berat were chosen because each is different in size and operating characteristics, but similar to other water enterprise operations throughout Albania.

Durres is a port city with a service population of approximately 200,000 people. It supplies water to 69 nearby villages and Shijak, and sells water to the City of Kavaja. The sources of supply for Durres are two well fields. Water is pumped from the wells to the City and Villages from as far away as 40.0 km, so that a large portion of its operational expenses is the cost of electricity.

Kavaja is an interior city, near the coast with mostly flat terrain and some hills. Water is supplied to approximately 101,700 people combined within the City and 36 nearby villages. The sources of supply for Kavaja are purchases from Durres, supplemented by wells. Approximately 70 percent of the total supply comes from Durres, located 13.0 km away, so that a large portion of its operational expenses is the cost of purchasing water.

Berat is a mountain city, located approximately 120 km south of Tirana. Water is supplied to approximately 85,OOO people combined within the City and 49 nearby villages. The primary sources of supply for Berat are mountain sources that flow by gravity to the City, located approximately 30.0 km away. These sources are supplemented by one well, and a small amount of water purchased from nearby Lushnja, that feeds three of Berat's villages. As a result, Berat's costs for producing water are relatively low compared to the other two cities.

The following sections describe each of the cities studied in detail and based on the technical, financial, and demographic information obtained from the cities' water enterprises during our visit to them.

4 Durres Water District Characteristics

1996 Population Served: 200,000; 120,000 in City of Durres and 80,000 in 69 nearby Villages and Shijak.

1996 Break Down of Customers Served: (including Shijak)

Classification	*City*	*Villages*	*Total*
Residential			
No. of Services	*30,000*	*4,846*	*34,846*
No. of Metered Serv.	*0*	*0*	*0*
Percent Metered Serv.	*0*	*0*	*0*
Private Enterprises			
No. of Services	*623*	*0*	*623*
No. of Metered Serv.	*0*	*0*	*0*
Percent Metered Serv.	*0*	*0*	*0*
Institutions and Government			
No. of Services	*232*	*0*	*232*
No. of Metered Serv.	*0*	*0*	*0*
Percent Metered Serv.	*0*	*0*	*0*
Totals			
No. of Services	*30,855*	*4,846*	*35,701*
No. of Metered Serv.	*0*	*0*	*0*
Percent Metered Serv.	*0*	*0*	*0*

The first phase of the on-going World Bank project (described later herein) includes the installation of approximately 32,000 meters on residential customers in Durres and Shijak, by July 1997.

Sources of Supply	*Available Supply*	*Dependable Yield*

Fushe Kuqe Wells	**800 1/sec**	**700 1/sec**
Fushe Kruja Wells	**150 1/sec**	**140 1/sec**
Ergen River	**20 1/sec**	**0 1/sec**

On average, 85 percent of the annual supply comes from Fushe Kuqe wells, 12 percent from Fushe Kruja wells, and 3 percent comes from Ergen River supply. The Ergen River supply is out of service 50 percent of the time because of low river flows or high turbidity. The Fushe Kruja wells are used to supply the difference when the Ergen River supply is out of service. For the first six months of 1996, the total water produced from all sources of supply, was as shown below:

Sources of Supply	*Total Produced*	*Percent Produced*
Fushe Kuqe Wells	*10,125,000 m^3*	*81.7%*
Fushe Kruja Wells	*2,033,000 m^3*	*16.4%*
Ergen River	*235,000 m^3*	*1.9%*
Totals	***12,393,000 m^3***	***100.0%***

The Ergen River system will be permanently discontinued in October 1996.

There is also a master metre to measure the bulk sales to Kavaja. These sales are intermittent at the maximum flow rate of 65 l/sec or 5,600 m^3/day, to a minimum flow rate of 12 l/sec or 1,000 m^3. Water sold to Kavaja in the first six months of 1996 was 962,200 m^3 or a daily average of 5,346 m^3.

4.1 Transmission System

Generally reasonable condition, replaced in 1950s, very little leakage, total of 65.8 km of steel pipe, broken down into three sub-sections, described below.

- ***Fushe Kuqe system — 40.5 km, water is pumped to Kurate via 700 mm (28") steel main, flows by gravity to storage reservoir at Arapaji, flows from storage reservoir by gravity via a 500 mm (20") steel main, some water is pumped to higher elevations to serve a few villages.***
- ***Fushe Kruja system — 22.6 km, water is pumped to Vora via 500 mm (20") steel main and pumped again from Vora to Shijak.***
- ***Ergen River system — 2.7 km, water is provided by gravity via 250 mm (10") steel pipe to Pjeslikez and part of Durres.***

4.2 Distribution System

165 km — generally poor condition, much leakage, consists of 27 separate distribution systems connected to the transmission system, mostly 80 mm – 400 mm (3" – 16") cast iron and steel pipes installed in the 1930s and 1950s. Many of the distribution systems provide water to the Villages. There is currently an on-going capital project to replace 120 km of the distribution network. This project is being constructed in two phases and is sponsored by the World Bank.

4.3 Distribution Storage

Consists of five concrete in-ground reservoirs (deposits); three serving Durres City, Durres Beach, and Shkozet, one serving Shijak, and one at Arapaji. The total combined capacity of all reservoirs is approximately 14,200 cubic meters (3.75 million gallons). This represents 17 percent of the average daily production capacity. These reservoirs also leak.

Water is provided to the citizens for approximately three hours per day, broken down into two periods per day. During these periods there is unlimited consumption. If water were provided 24 hours per day, unaccounted for water is estimated to be 70 percent. Under the current intermittent conditions the unaccounted for water for 1995 was 67.3 percent, and for the first six months of 1996 was 66.1 percent. Unaccounted for water includes both technical losses and losses due to illegal connections.

4.4 Treatment

Liquid chlorine is added at each reservoir site to treat the water. No other chemicals are used.

4.5 World Bank Project

This project consists of two phases. The first phase (costs US$19 million) is to replace 60 km of pipe within the distribution networks in Durres and Shijak, to construct a new transmission main from the Fushe Kuqe wells to the City of Duress with pressure reduction controls and master meters in place to control the amount of water distributed to the Villages, and to install 32,000 residential meters, to begin to bill customers based on their actual usage. The first phase started earlier this year and will end in July 1997.

The second phase (costs US$21 million) will replace an additional 60 km of pipe within the distribution networks in Durres and Shijak, and will replace all the pumps and pump stations at the two well fields. The pumps are currently 21 years old and were manufactured in China and Bulgaria. There are few spare parts to service them or repair them. This phase of the project will be funded by an Italian sponsored loan, which has not yet in place. Funds are also needed for the design of this phase.

Because of moist and corrosive soils, cement-lined ductile iron pipe and steel pipe are being installed for the larger mains, and poly-vinyl chloride (PVC) and poly-ethelene chloride (PVE) are being installed for the new smaller mains and service lines to each customers premise. Some new galvanized iron services are being installed where heavy loads are expected to be above them. Valves and fittings are also being replaced. Large mains are being buried two meters in depth and small mains are being buried one metre in depth. An Italian contractor, who obtained the job through competitive bidding, is performing the work.

4.6 Rates

Rates are based on prices established by the Ministry of Public Works, Territory Adjustment, and Tourism. These rates are lek 5/m^3 for families and a maximum of lek 60/m^3 for private enterprises, institutions, and government entities. There are presently 35,701 accounts billed each month; 30,855 are located within Durres and 4,846 are accounts within the Villages.

None of these accounts have working meters in the customers' premises. As a result the families are billed at the rate of 150 l/capita per day. For a typical family of four people, this equates to 18 m^3/mo. or approximately lek 90/mo.

For the first six months of 1996, the total water billed and the total price for the water billed to each classification of customers, was as shown below:

Classification	Amount Billed	Amount Charged
Residential		
City of Durres	1,814,400 m^3	9,072,000 lek
Shijak	265,000 m^3	1,325,000 lek
All Villages	738,000 m^3	3,690,000 lek
Private Enterprises		
City of Durres	38,462 m^3	2,000,000 lek
Shijak	5,115 m^3	266,000 lek
All Villages	11,596 m^3	603,000 lek
Institutions and Government		
City of Durres	265,673 m^3	13,815,000 lek
Shijak	107,019 m^3	5,565,000 lek
All Villages	0 m^3	0 lek
Water Sold to Kavaja	962,200 m^3	6,735,400 lek
Totals		
City of Durres	2,118,535 m^3	24,887,000 lek
Shijak	377,134 m^3	7,156,000 lek
All Villages	749,596 m^3	4,293,000 lek
Water sold to Kavaja	962,200 m^3	6,735,400 lek
Grand Totals	**4,207,465 m^3**	**43,071,400 lek**

4.7 Other Information

Expenses and revenues are tracked and kept in accordance with the new Accounting Law of 1993. Expenses are broken down by classifications — examples of such expenses are: depreciation (based on revaluation rules of the Ministry), business taxes, materials and supplies, salaries, social benefits, chemicals, electricity, and purchase water expense. There is no money spent on preventive maintenance and emergency repairs are very expensive. These repairs are typically funded by the Government of Albania.

Uncollectibles are not written off. Many industries and government institutions have closed in the past two years, but still there are no write-offs. Currently, the water works enterprise uses shutoffs to effect collections. In addition, interest can be charged at the rate of 5 percent per day on delinquent bills, after 30 days. Approximately 3,002 residential accounts and 73 private enterprises presently are over due on their water bills. Most families are paying their bills even though they were accustomed to having the Albanian Government pay for water and electricity.

5 Durres Cost of Water

Schedule I analyses the cost of water in Durres for 1995 and the first six months of 1996. Operating and Maintenance expenses are listed and expressed in lek/m³ produced. Other expenses for uncollectibles, system loss, debt service and profit are displayed and expressed in lek/m³ billed. The total cost consists of the cost of a cubic metre produced and the addition expenses related to the Administration of the system and the delivery and payment of a cubic metre of water.

The major expense for the city of Durres is electricity used to pump the water from deep wells and push it to the city's distribution system. In 1995, because of the poor condition of the delivery system, the cost for "excess system loss" was 86.6 percent of the electric cost or 10.33 lek/m³ billed. Improvement in this performance area is expected with the completion of phase I of the system improvement program. As yet costs reported for 1996 do not reflect any appreciable progress in reducing the excess system loss.

The provision for debt service is based on the present interest only payment of the World Bank loan to the Government of Albania. In using this cost data in setting water rates for the city of Durres keep in mind that in 1998 debt service, by agreement, will increase to approximately 190,000,000 lek, or 22.59 lek/m³ billed. Increased consumption or considerable reduction in water system losses will be required to offset this contracted cost increase.

The revenue generated by the present water rate in 1995 was 12.03 lek/m³ billed. The billed rate leaves 14.83 lek of costs used in this exercise not recovered. The cost/rate gap, using the preliminary six month 1996 results would indicate a difference of 18.31 lek.

From the cost and revenue data collected in the City of Durres, an average water rate of 30 lek/m³ is recommended. This is slightly higher than the data suggests, but the effect of the increased 1998 debt service could be softened by building a small reserve in advance. For this recommended rate to be adequate for the remainder of this century the distribution system improvements and a reduction in unaccountable water loss, must be achieved.

Schedule 1

Durres Water Enterprise
Breakdown of Cost of Water by Component
For Year 1995 and First Six Months of 1996

Operation and Maintenance Expense	*1995*	*Percent (%)*	*Cost per m³ Prod.*	*1996 Six Months*	*Percent (%)*	*Cost per m³ Prod.*
Chemicals	*11,952.1*	*6.6%*	*0.47*	*8,307.1*	*8.4%*	*0.67*
Electricity	*98,966.2*	*54.6%*	*3.90*	*51,242.7*	*51.8%*	*4.13*
Repairs and Maintenance	*5,682.4*	*3.1%*	*0.22*	*4,279.3*	*4.3%*	*0.35*
Salaries	*25,070.8*	*13.8%*	*0.99*	*14,635.8*	*14.8%*	*1.18*
Social Costs	*6,809.7*	*3.8%*	*0.27*	*4,896.4*	*4.9%*	*0.40*
Depreciation	*7,200.0*	*4.0%*	*0.28*	*3,153.7*	*3.2%*	*0.25*
Licenses and Fees	*142.6*	*0.1%*	*0.01*	*79.8*	*0.1%*	*0.01*
*Facility Rehab Fund **	*25,386.0*	*14.0%*	*1.00*	*12,393.0*	*12.5%*	*1.00*
Purchased Water	*0.0*	*0.0%*	*0.00*	*0.0*	*0.0%*	*0.00*
Total Oper. & Maint. Exp.	***181,209.8***	***100.0%***	***7.14***	***98,987.8***	***100.0%***	***7.99***
Other Expenses			***Cost per m³ Bill***			***Cost per m³ Bill***
Uncollectible Allow. 1%	*2,229.0*		*0.27*	*1201.1*		*0.29*
Norm. Sys. Loss 20%	*36,242.0*		*4.37*	*19,804.0*		*4.71*
Excess Sys. Loss	*85,712.2*		*10.33*	*45,598.1*		*10.84*
Profit 2 %	*4,458.0*		*0.54*	*2,402.2*		*0.57*
Debt Service	*35,000.0*		*4.22*	*17,500.0*		*4.16*
Total Other Expenses	***163,641.2***		***19.72***	***86,505.4***		***20.56***
Cost per M³ Billed			*26.85*			*28.55*
M³ Produced	*25,386.0*			*12,393.0*		
M³ Billed	*8,300.0*			*4,207.5*		
% Unaccount Water	*67.3*			*66.1*		
Revenue per M³ Billed			*12.03*			*10.24*

** =1 Lek per M³ Produced*

6 Kavaja Water District Characteristics

***1996 population served:** 101,700; 30,000 in City and 71,700 in 36 nearby villages. There are approximately 50 villages in total, but only 36 are currently served. The Villages were originally organized and operated by agricultural cooperatives. The water works enterprise has slowly taken them over as the cooperatives cease operating. There is approximately 2.5 percent annual growth in the overall water system (including the villages).*

1996 Break Down of Customers Served

Classification	City	Villages	Total
Residential			
No. of Services	6,054	3,220	9,274
No. of Metered Services	5,912	280	6,192
Percent Metered Services	97.7%	8.7%	66.8%
Private Enterprises			
No. of Services	157	110	267
No. of Metered Services	150	100	250
Percent Metered Services	95.5%	90.9%	93.6%
Institutions and Government			
No. of Services	38	0	38
No. of Metered Services	38	0	38
Percent Metered Services	100%	100%	100%
Totals			
No. of Services	6,249	3,330	9,579
No. of Metered Services	6,100	380	6,480
Percent Metered Services	97.6%	11.4%	67.7%

Residential meters are 12.5 mm (0.5") and 18.75 mm (0.75") and are installed at no cost. Other meters are larger and installation costs are assessed to those customers.

Sources of Supply	Available Supply	Dependable Supply
Purchased from Durres	5,600 m^3/day	4,000 m^3/day
Two Wells in Kavaja	1,164 m^3/day	1,000 m^3/day
Ten Wells in Villages	2,022 m^3/day	2,000 m^3/day

While there is some reliability in what can be withdrawn from the wells, the dependable supply is rarely achieved on a daily basis due to inefficient and deteriorated pumps. Also, 5,600 m³ of supply is supposed to be available per day for purchase from Durres, per an informal agreement. Water received by Kavaja from Durres in the first six months of 1996 was 962,200 m³ or a daily average of 5,346 m³. This amount is deceiving since there are some days where only 1000 m³ has been delivered to Kavaja. For the first six months of 1996, the total water produced from all sources of supply, was as shown below:

Sources of Supply	Total Produced	Percent Produced
Purchased from Durres	962,200 m³/day	70.4%
Kavaja Wells	344,100 m³/day	25.2%
All Villages	60,000 m³/day	4.4%
Totals	**1,366,300 m³**	**100.0%**

6.1 Transmission System

Generally reasonable condition, approximately 25 percent unaccounted for water between Durres and Kavaja, consists of 13 km of 400 mm (16") steel main. The transmission main is metered at Durres boundary, at the Kavaja Reservoir (2,000 m³ storage deposit), and three other points in between. There is an additional 1.5 km of 400 mm (16") steel transmission main from the Kavaja Deposit to the City of Kavaja.

6.2 Distribution System

The distribution system in the City of Kavaja has been 70 percent replaced under a project sponsored by Germany. It now consists of approximately 61 km of cement-lined ductile iron and PVC mains, ranging in size from 50 mm (2") to 400 mm (16") with most of it being between 100 mm (4") and 250 mm (10"). The new distribution system contains a loop within the City to reinforce the system and equalize pressures within the City.

The Villages encompass a service territory of approximately 68,459 m³. Their combined distribution systems total approximately 68.5 km. These mains are made of steel and plastic, with the steel mains being very old. The average size pipe in these systems is 50 mm (2") and leakage is severe. These mains provide water service to several public taps within each Village and not to the customers premises directly.

6.3 Distribution Storage

There are three reinforced concrete in-ground storage reservoirs (deposits) located between Durres and the Kavaja deposit, having a combined storage capacity of 2,600 m³. One tank is 400 m³ and located in Golem, another is 200 m³ and located in Agonas, and the last tank is 2,000 m³ and located in Kavaja. There is also a 40 m³ tank, located adjacent to each of the wells serving the Villages.

Water is provided to the citizens for approximately six to eight hours per day, broken down into two or three periods per day. If water were provided 24 hours per day, unaccounted for water is estimated to be 55 percent. Under the current intermittent conditions the unaccounted for water for 1995 was 61.8 percent, and for the first six months of 1996 was 58.2 percent. Unaccounted for water includes both technical losses and losses due to illegal connections.

6.4 Treatment

Chlorine is added at each tank site to treat the water. Liquid chlorine is used within the City's tanks and powdered chlorine is used in the Villages. No other chemicals are used.

6.5 Rates

Rates are based on prices established by the Ministry of Public Works, Territory Adjustment, and Tourism. These rates are lek 5/m³ for families and a maximum of lek 60/m³ for private enterprises, institutions, and government entities. There are presently 9,579 accounts billed each month; 6,100 are metered accounts within Kavaja and 380 are metered accounts within the Villages. The unmetered accounts are mostly families and are billed at the rate of 150 l/capita per day. For the typical family, which consists of four people, this equates to 18 m³/mo. or approximately lek 90/mo.

For the first six months of 1996, the total water billed and the total price for the water billed to the City and to the Villages, was as shown below:

Classification	*Amount Billed*	*Amount Charged*
City of Kavaja	*430,000 m³*	*4,920,500 lek*
All Villages	*140,900 m³*	*333,300 lek*
Totals	***570,900 m³***	***5,253,800 lek***

6.6 Other Information

Expenses and revenues are tracked and kept in accordance with the new Accounting Law of 1993. Expenses are broken down by classifications — examples of such expenses are: depreciation (based on revaluation rules of the Ministry), business taxes, materials and supplies, salaries, social benefits, chemicals, electricity, and purchase water expense. There are several liabilities, most noteworthy are lek 5.8 million owed to the City of Durres for water purchased and lek 2.3 million owed to KESH (the Albanian power company) for electricity. There is no money spent on preventive maintenance and emergency repairs are very expensive. These repairs are typically funded by the Government of Albania.

Uncollectibles used to be written off after two years; now the water works enterprise uses shutoffs to effect collections. In addition, interest can be charged at the rate of 5 percent per day on delinquent bills. Approximately 10 percent of all revenue billed is outstanding. Most families are paying their bills even though they were accustomed to having the Albanian Government pay for water and electricity.

The Villages are 20 km or more away from the City and the well pumps are in poor condition and operate inefficiently, requiring more electricity. There are few spare parts available to repair and service the pumps. The German project is still on-going. When it is completed, the majority, if not all, of the customers in the City and Villages will be metered, all chlorinators will be automated to feed the proportionate volume of chemical required to treat the water, and several pump stations and associated pumps will be improved and replaced.

7 Kavaja Cost of Water

Schedule II analyses the cost of water in Kavaja for 1995 and the first six months of 1996. Operating and Maintenance expenses are listed and expressed in lek/m³ produced. Other expenses for uncollectibles, system loss, debt service and profit are displayed and expressed in lek/m³ billed. The total cost consists of the cost of a cubic metre produced and the addition expenses related to the Administration of the system and the delivery and payment of a cubic metre of water.

Kavaja purchases approximately 70 percent of it's water from the neighbouring city of Durres. With the exception of the cost of salaries , purchased water is the water districts major cost. A pricing increase of Durres water to Kavaja has not been reflected in this study. However any consideration of Kavaja's future water rate should be set only after negotiations with Durres as to rate and supply.

In Schedule II there is no provision for debt service in the cost computation because the present work on the inner city distribution system is financed by a Government of Germany grant. It is recommended that the staff complete and estimate the cost of a capital replacement and improvement program for the next five years with the thought of building a fund for this activity through a "capital debt service" charge.

Results of the system rehabilitation are beginning to reflect in the rate of system water loss. This performance measurement improved 3.6 percent in the first six months of 1996. The completion of the city wide metre program has yet to be reflected in usage data, but with the use of metre reading data in billing in the last half of 1996 some adjustment in cubic meters billed can be expected.

Revenue per cubic metre billed with the present rate structure resulted in 8.76 lek/m³ in 1995 and preliminary data for 1996 indicates 9.20 lek. Using these numbers the cost/rate gap for 1995 is 16.72 Lek and in the first six months of 1996 18.31 Lek.

With the uncertainty of the future cost of water from Durres it is difficult to recommend a new rate based on today's cost for Kavaja. A rate that produces 30 lek/m³ billed is supported by the financial numbers presented. The increase over the present cost data provides some small reserve for purchase water increases, consumption adjustments because of metered billing data, and a future capital program. A program to continue the reduction of "technical system" loss and the establishment and enforcement of water regulations is needed to offset the expected increase in the costs of electricity, salaries, social benefits and purchased water.

Schedule 2

Kavaja Water Enterprise
Breakdown of Cost of Water by Component
For the Year 1995 and the First Six Months 1996

Operation and Maintenance Expense	*1995*	*Percent (%)*	*Cost per m³ Prod.*	*1996 Six Months*	*Percent (%)*	*Cost per m³ Prod.*
Chemicals	*2,464.5*	*9.5%*	*0.89*	*1,130.3*	*7.4%*	*0.83*
Electricity	*2,480.6*	*9.5%*	*0.90*	*1,240.3*	*8.1%*	*0.91*
Repairs & Maintenance	*0.0*	*0.0%*	*0.00*	*0.0*	*0.0%*	*0.00*
Salaries	*8,888.6*	*34.1%*	*3.22*	*5,477.4*	*35.9%*	*4.01*
Social Costs	*3,451.1*	*13.3%*	*1.25*	*1,936.2*	*12.7%*	*1.42*
Depreciation	*627.5*	*2.4%*	*0.23*	*313.7*	*2.1%*	*0.23*
Licenses & Fees	*0.0*	*0.0%*	*0.00*	*0.0*	*0.0%*	*0.00*
*Facility Rehab Fund**	*2,760.5*	*10.6%*	*1.00*	*1,366.3*	*9.0%*	*1.00*
Purchased Water	*5,360.9*	*20.6%*	*1.94*	*3,776.5*	*24.8%*	*2.76*
Total Oper. & Maint. Exp.	***26,033.7***	***100.0%***	***9.43***	***15,240.7***	***100.0%***	***11.15***
Other Expense			*Cost per m³ Bill*			*Cost per m³ Bill*
Uncollected Allow. 1%	*268.4*		*0.25*	*157.1*		*0.28*
Norm. Sys. Loss 20%	*5,206.3*		*4.94*	*3,047.3*		*5.34*
Excess Sys. Loss	*10,892.6*		*10.34*	*5,821.4*		*10.20*
Profit 2%	*536.4*		*0.51*	*314.2*		*0.55*
Debt Service	*0.0*		*0.00*	*0.0*		*0.00*
Total Other Expense	***16,903.7***		***16.05***	***9,340.0***		***16.36***
Cost per M3 Billed			*25.48*			*27.51*
M3 Produced	*2,760.5*			*1,366.3*		
M3 Billed	*1,053.3*			*570.9*		
% Unaccount Water	*61.8*			*58.2*		
Revenue per M3 Billed			*8.76*			*9.20*
**= 1 Lek per M3 Produced*						

8 Berat Water District Characteristics

***1996 Population Served:** 85,000; 60,000 in City of Berat and 25,000 in 49 nearby Villages. There are approximately 125 Villages in total within the Water District, but only 49 are currently served. Twenty three of the 49 are served from the main transmission system by gravity feed. The Villages were originally organized and operated by agricultural cooperatives. The water works enterprise has slowly taken them over as the cooperatives cease operating. There is little annual growth in the overall water system (including the villages).*

1996 Break Down of Customers Served

Classification	City	Villages	Total
Residential			
No. of Services	10,295	2,436	12,731
No. of Metered Serv.	0	0	0
Percent Metered Serv.	0	0	0
Private Enterprises			
No. of Services	431	0	431
No. of Metered Serv.	345	0	345
Percent Metered Serv.	80.1%	0	80.1%
Institutions and Government			
No. of Services	31	0	31
No. of Metered Serv.	0	0	0
Percent Metered Serv.	0	0	0
Totals			
No. of Services	**10,757**	**2,436**	**13,193**
No. of Metered Serv.	**345**	**0**	**345**
Percent Metered Serv.	**3.2%**	**0**	**2.6%**

Sources	Available Supply	Dependable Yield
Bugova (gravity)	600 1/sec	380 1/sec
Uznova Well	100 1/sec	80 1/sec
Villages Wells	150 1/sec	100 1/sec
Lushnja (purchase)	58 1/sec	50 1/sec

On average, 88 percent of the annual supply comes from Bugova, 7 percent from Uznova well, 3 percent comes from all the Village wells combined, and 2 percent is purchased from Lushnja. The Uznova well is used to supply the difference when the Bugova supply is low in flow, typically in the summer months, each year. For the first six months of 1996, the total water produced from all sources of supply and purchased from Lushnja, was as shown below:

Sources of Supply	Total Produced	Percent Produced
Bugova (gravity)	9,120,384 m^3	97.8%
Uznova Well	0 m^3	0.0%
Villages Wells	175,840 m^3	1.9%
Lushnja (purchase)	34,000 m^3	0.3%
Total	**9,330,224 m^3**	**100.0%**

8.1 Transmission System

Generally poor condition, significant leakage, total of 30.0 km of 700 mm (28") steel pipe.

8.2 Distribution System

There are approximately 210 km of distribution mains in the City of Berat. These mains are generally in poor condition with much leakage. They are mostly 60 mm – 400 mm (2.5"–16") steel pipes installed in the 1930s.

The Villages have combined distribution systems totalling approximately 125 km. These mains are made of galvanized iron, steel, asbestos cement and plastic. Most of these mains are very old. The mains in these systems range in size from 12.5 mm (0.5") to 100 mm (4") and leakage is severe. These mains provide water service to several public taps within each Village and also to some families directly.

8.3 Distribution Storage

There are seven concrete in-ground reservoirs (deposits); six serve the City, and one serves the textile factory in the City. The total combined capacity of all reservoirs is approximately 11,700 m^3 (3.10 million gallons). There is an additional 2000 m^3 reservoir adjacent to the one serving the textile factory. This reservoir is currently being used as a warehouse but could be put back into service if needed.

Two 2000 m^3 reservoirs collect the water as it enters the City from the transmission mains. From here the water is treated and re-distributed to all other reservoirs to balance the pressures throughout the City.

There are also 38 deposits located within the Villages, ranging in size from 20 m^3 to 50 m^3. The combined storage capacity of these deposits exceeds 1000 m^3.

Water, by gravity, is provided to the citizens of Berat 24 hours per day. Pumped water from the Village wells is provided approximately eight hours per day, broken down into two periods per day. Unaccounted for water for 1995 was 75.8 percent, and for the first six months of 1996

was 77.9 percent. Unaccounted for water includes both technical losses and losses due to illegal connections.

8.4 Treatment

Powdered chlorine is added to the two receiving reservoirs (only) within the City to treat the water. Powdered chlorine is also added to the 38 deposits located in the villages. No other chemicals are used.

8.5 Rates

Rates are based on prices established by the Ministry of Public Works, Territory Adjustment, and Tourism. These rates are lek 5/m³ for families with meters and a maximum of lek 60/m³ for private enterprises, institutions, and government entities. There are presently 13,193 accounts billed each month; 10,757 are located within Berat and 2,436 are accounts within the Villages. Only the private enterprise accounts have working meters in the customers' premises. As a result the families are billed at a usage rate of 150 l/capita per day. For a typical family of four people, this equates to 18 m³/mo. or approximately lek 90/mo.

For the first six months of 1996, the total water billed and the total price for the water billed to the City and Village customers, was as shown below:

Classification	Amount Billed	Amount Charged
City of Berat	1,927,614 m³	27,084,984 lek
All Villages	89,338 m³	446,688 lek
Totals	**2,016,952 m³**	**27,531,672 lek**

8.6 Other Information

Expenses and revenues are tracked and kept in accordance with the new Accounting Law of 1993. Expenses are broken down by classifications — examples of such expenses are: depreciation (based on revaluation rules of the Ministry), business taxes, materials and supplies, salaries, social benefits, chemicals, electricity, and purchase water expense. There is no money spent on preventive maintenance and emergency repairs are very expensive. These repairs are typically funded by the Government of Albania.

Uncollectibles are not written off. Most customers pay their bills within three months of receiving them. Currently, the water works enterprise does not shutoff delinquent payers because of social and political pressures. Interest can be charged at the rate of 5 percent per day on bills unpaid after 30 days under existing law, but use of this power is infrequent.

9 Berat Cost of Water

Schedule III analyses the cost of water in Berat for 1995 and the first six months of 1996. Operating and Maintenance expenses are listed and expressed in lek/m³ meters produced. Other expenses for uncollectibles, system loss, debt service and profit are displayed and expressed in lek/m³ billed. The total cost consists of the cost of a cubic metre produced and the

addition expenses related to the Administration of the system and the delivery and payment of a cubic metre of water.

Berat's source of water, mainly mountain streams that flow by gravity to water storage deposits, is a definite cost advantage. Electrical pumping costs and purchased water expenses are at a minimum. Salaries are it's main cost. As additional village water systems came under the city's management in 1996, salaries grew to 48 percent of operating costs. Because of lack of local funds, and presently no Donor agencies funding their system rehabilitation programs, the city's distribution system is in poor shape. This is demonstrated in the significant system water loss. In 1995 this loss was 75.8 percent of water produced, and in the first six months of 1996 it has increased to 77.9 percent. Excess system water loss accounts for over 55 percent of the cost of a cubic metre billed in Berat. Keep in mind that even with this system loss Berat is able to provide 24-hour water service to 81 percent of it's customers, mostly city residents. The water lost could provide water for other customers and lessen the systems use of expensive wells.

In Schedule III there is no provision for debt service in the cost compilation. It is recommended that the staff complete and estimate the cost of a capital improvement and replacement plan for the next five years with the thought of building a fund for this activity through a "capital debt service" charge.

Revenue from water billings in 1995 averaged 13.73 lek/m^3 billed. In the first six months of 1996 the average was 13.65 lek/m^3. The cost/rate gap for these two periods were 2.20 Lek and 5.69 Lek respectfully. This gap, significantly lower then the cities of Durres and Kavaja reflect the advantage of a surface water gravity fed system.

Because of the added cost of managing additional small village systems, as well as the need for funds to rehabilitate the distribution system, it is recommended that an average water rate billed be established at 23 lek/m^3 for Berat. The additional funds above the present cost gap should be available to rehabilitate the system, reduce technical losses, establish and enforce water connection regulations, and reduce the overall system water loss.

Schedule 3

Berat Water Enterprise
Breakdown of Cost of Water by Component
for the Year 1995 and First Six Months 1996

Operation and Maintenance Expense	*1995*	*Percent (%)*	*Cost per m³ Prod.*	*1996 Six Mo.*	*Percent (%)*	*Cost per m³ Prod.*
Chemicals	*4,241.7*	*6.2%*	*0.25*	*310.0*	*0.8%*	*0.03*
Electricity	*17,475.0*	*25.7%*	*1.05*	*2,000.0*	*5.2%*	*0.22*
Repairs and Maintenance	*626.3*	*0.9%*	*0.04*	*1,562.0*	*4.1%*	*0.17*
Salaries	*21,337.5*	*31.4%*	*1.28*	*18,505.0*	*48.4%*	*2.03*
Social Costs	*5,801.1*	*8.5%*	*0.35*	*4,038.0*	*10.6%*	*0.44*
Depreciation	*1,357.0*	*2.0%*	*0.08*	*2,321.0*	*6.1%*	*0.25*
Licenses and Fees	*244.4*	*0.4%*	*0.01*	*216.5*	*0.6%*	*0.02*
*Facility Rehab. Fund **	*16,670.3*	*24.5%*	*1.00*	*9,120.4*	*23.9%*	*1.00*
Purchased Water	*306.0*	*0.5%*	*0.02*	*153.0*	*0.4%*	*0.02*
Total Oper. & Maint. Exp.	***68,059.3***	***100.0%***	***4.08***	***38,225.9***	***100.0%***	***4.19***
Other Expenses			***Cost per m³ Bill***			***Cost per m³ Bill***
Uncollected Allow. 1%	*2,128.7*		*0.53*	*394.0*		*0.20*
Norm. Sys. Loss 20%	*3,334.1*		*0.83*	*7,643.0*		*3.79*
Excess Sys. Loss	*37,982.4*		*9.43*	*22,121.1*		*10.97*
Profit 2%	*4,257.3*		*1.06*	*788.1*		*0.39*
Debt Service	*0.0*		*0.00*	*0.0*		*0.00*
Total Other Expense	***47,702.5***		***11.85***	***30,552.2***		***15.15***
Cost per M3 Billed			*15.93*			*19.34*
M3 Produced	*16,670.3*			*9,120.4*		
M3 Billed	*4,026.8*			*2,016.9*		
% Unaccount Water	*75.8*			*77.9*		
Revenue per M3 Billed			*13.73*			*13.65*
**= 1 Lekper M3 Produced*						

10 Pricing Rules

The basic pricing rule is to consider, and include, in any price or rate sufficient revenue to meet all current costs, replacement allowances, debt service, uncollectible accounts and a provision for a profit or return on your investment.

In completing the cost per cubic metre/rate per cubic metre billed analyses the city cost tables in this report include costs reported in the cities financial statements as well as some provision for certain costs not presently being considered in the rate making policy. In one case it was to highlight the effect non-payment of bills can have, in another case it was to provide for a profit or return on investment. The need to continually maintain the water facility system is stressed in "facility rehabilitation fund". The effect of a poorly maintained system is demonstrated in "excess system loss". The logic of the presentation points to the cost/benefit trade off that is available through strong management of collectables and system unaccountable water.

The use of a 1 percent uncollectible allowance is not meant to set an acceptable standard, but to provide the opportunity for each enterprise to present it's experience. The three cities surveyed all indicated slow payment but only small uncollectible losses from residents, and eventual payment by institutions and government accounts.

Because of the importance of system rehabilitation and the management of unaccountable water these subjects are discussed in more detail.

10.1 Facility Rehabilitation Fund for Preventive Maintenance and Replacement

The present economic condition of the Albanian water enterprises do not allow for the expenditure for preventive maintenance or replacement. The repairs actually done are those needed on an emergency basis. Preventive maintenance and replacement are legitimate costs of any enterprise and should be recovered in the utility rate. A well run utility would normally have an annual replacement budget and a preventive maintenance activity in it's spending budget each year.

These costs are not presently part of the enterprises studied, even though Donor nations and international assistance agencies are in the process of, or planning, major rehabilitation of some water systems. These major rehabilitation projects when complete will not eliminate the need for preventive maintenance programs. The viability of the rehabilitated system will depend on such on going programs.

A typical program would provide for removing pumps and other machinery from service periodically for repair and adjustment. These programs would also have a goal of repairing a certain portion of the transmission and distribution system each year in order that valves, joints and leaking pipes can be replaced. Ideally such a program would address 5 percent to 10 percent of the system so that all are renovated in a 10 to 20 year period.

Without a detailed engineering study, 1 lek/m³ of water produced has been added to the costs to fund preventive maintenance and replacement programs.

10.2 Unaccounted for Water — System Loss

Every water system has a certain percentage of produced water that does not reach a customer, and does not contribute to the revenue of the enterprise. This water loss is considered "unaccounted for" water. The percentage of unaccounted for water compared to the produced or purchased water is a major operating measure of a water facility. The causes of this loss are attributed to technical reasons that can be traced to maintenance programs or the lack of them, theft of water through illegal connections or spotty regulation enforcement, major water main breaks, and some time unmeasured water used in water treatment and production process.

The production cost of this lost water has to be added to the cost of billed water in order for the enterprise to recover all costs.

A water system will experience a level of unaccounted for water, no matter how diligent they are in maintenance and enforcement programs. In most countries an acceptable percentage of unaccounted for water is about 20 percent. Any sum above that percent is considered an area where management with the necessary support can address this cost and reduce the loss.

In the calculation of pricing rules and in the display of present costs for the three cities studied the unaccounted for water cost has been identified as "normal system loss" and "excess system loss". Both of these cost distinctions must be recovered in the rate provision, but by highlighting excess loss, the area of management and regulatory action is identified.

11 The 1993 Accounting Law — Does it Meet Water Enterprise's Information Needs And Regulator's Requirements.

The Albanian Government has not completed it's codification of Laws, Rules, and Regulations in which the new water enterprises will operate. The activity undertaken in this task reviewed the information required by the 1993 Accounting Law to determine if it provided the normal information needed to understand the financial results of a water enterprise and guide Administrators and Regulators in their management of these resources.

The 1993 Accounting Law provides each Commercial entity, or any one carrying out Commercial activity, reporting requirements to be filed annually. The "Laws" article's define General Accounting procedures, asset, liability, and equity definitions. Independent verification of records and accounts of certain commercial organizations is defined and it proscribes reporting form, substance and frequency. As such it is a valuable document to the National Statistic Organizations that have jurisdiction in the area's where the Commercial entity exists.

Other then reference to books of original entry, and the frequency of documentation, the basic form of the system used to collect financial and management information is not addressed in the "Law".

In meeting with and requesting supporting documentation of data presented in "Accounting Law 1993" format, the quality and detail of information available was substantial. In fact the field work in this trip was concluded in late August 1996 and the cities visited were able to present financial results for the six months ending June 1996. This information is currently maintained in manual records, organized to accomplish the present information demands of the enterprise.

What is apparent is the lack of a demand for uniform presentation of available information in the water enterprises in a statistical format, designed for the water industry, and those who monitor it's performance.

This statistical presentation should highlight operational, financial, commercial, and facility management data in sufficient detail to provide a measure of the water enterprise operational and financial viability.

The requirement to provide needed information from water enterprises could be accomplished by amending the existing "Law", and requiring additional schedules be submitted that meets the informational needs of the water industry and it's regulators. In fact, presently, special schedules are requested for expanded information on personnel, capital investment, and depreciation.

The information in the listed charts and schedules, for the most part, represents data collected during this review. It is presently available and important to the water enterprises visited. The fact that the Ministry requested this study indicates it's importance in their regulatory overview. Requiring this data of a water enterprise will have a directional effect in pointing the managers toward area's of particular importance to a utilities viability.

It is recommended that the Accounting Law of 1993 be amended to require additional data from the water enterprise in a format similar to those in Appendix I. If this recommendation is acceptable to the Ministry a glossary of terms and definitions as well as a "Form of Amendment" can be prepared.

In Appendix I are examples of the following:

Schedule A	*Statistical Summary*
Schedule B	*Supplemental Fin. Inform.*
Chart 1	*Equipment Log*
Chart 2	*Pipe Log*
Chart 3	*Source of Supply Log*
Chart 4	*Storage Capacity Log*
Chart 5	*Electricity Usage Log*
Chart 6	*Customer Information Log*
Chart 7	*Unaccounted for Water Log*

The information in the listed charts and schedules, for the most part, represents data collected during this review. It is presently available and important to the water enterprises visited. The fact that the Ministry requested this study indicates its importance in their regulatory overview. Requiring this data of a water enterprise will have a directional effect in pointing the managers toward areas of particular importance to an enterprise viability.

It is recommended that the accounting law of 1993 be amended to require additional data from the water enterprise in a format similar to those in Appendix I. If this recommendation is acceptable to the Ministry, a glossary of terms and definitions as well as a "Form of Amendment" should be prepared.

Appendices

Schedule A

Statistical Summary for Year Ending
City of _____

Customer Class	*Number of Customers*	*Cubic Meter Billed*	*000 Lek Billed*
Residential			
Private Enterprises			
Institutions and			
Total			
Source of Supply		*Cubic Meter Taken*	*Per Cubic Meter Billed*
Rivers and Streams			
Well Fields			
Purchased Water			
Total Supply			
Cost by Function	*Total 000 Lek**	*Per Cubic Meter Taken*	*Per Cubic Meter Billed*
Supply			
Power and Pumping			
Treatment			
Transmission			
Distribution			
Cust. Accounting			
Admin. and General			
Total			
Miscellaneous Information			*Amount*
Unaccounted Water			
% Unacct. Water to Prod.			
KwHr Purchased			
Km in Trans. System			
Km in Distr. System			
Km in Cust. Services			
m^3 Supply — Aver. Day			
m^3 Supply — Max. Day			
Date — Max. Day			
Population Served			
**Per Schedule B*			

Schedule B
Water Enterprise — Supplemental Financial Information
Calendar Year Ended: _____

Water Enterprise Name:

		Cost Per Function in 000 Lek							
		Source of Supply	***Power and Pumping***	***Treatment***	***Transmission***	***Distribution***	***Customer Accounting***	***Administrative and General***	***Total***
	Purchase Water								
	Chemicals								
	Electricity								
	Other Fuels								
	Materials — Maintenance								
	Wages								
	Social Costs								
	Licenses and Fees								
	Misc. Other								
	Taxes								
	Depreciation								
	Sub Total — A								
	Uncollect. Allow.								
	Debt Service								
	Facility Repair Fund								
	% Invest. Return								
	Sub Total — B								
	Total								

Chart No. 1 — Statistical Information
Equipment Log

(A)	(B)	(C)	(D)
Category	Total at Beginning of Year	Total Added or (Removed) During Year	Total at End of Year (Col. B+C)
No. of Pump Stations			
No. of Pumps			
No. of Chlorinators			
No. of Storage Reservoirs or Deposits			
No. of Vehicles			
No. of Customer Meters by Size: 12.50 mm (0.50") 18.75 mm (0.75") 25.00 mm (1.00") 50.00 mm (2.00") Other Sizes _____ _____ Total Customer Meters (all sizes)			
No. of Master Meters by Size: 50.00 mm (2.0") 80.00 mm (3.0") 100.00 mm (4.0") 150.00 mm (6.0") 200.00 mm (8.0") Other Sizes _____ _____ Total Master Meters (all sizes)			

Chart No. 2 — Statistical Information
Pipe Log

(A)	*(B)*	*(C)*	*(D)*
Category	*Total Pipe at Beginning of Year*	*Total Pipe Added or (Removed)*	*Total Pipe at End of Year (Col. B+C)*
Km of Customer Services by Size: *12.50 mm (0.50")* *18.75 mm (0.75")* *25.00 mm (1.00")* *50.00 mm (2.00")* *Other Sizes* *Total Km (all)*			
Km of Distribution Mains by Size: *50.00 mm (2.0")* *80.00 mm (3.0")* *100.00 mm (4.0")* *150.00 mm (6.0")* *200.00 mm (8.0")* *250.00 mm (10.0")* *400.00 mm (16.0")* *Other Sizes* *Total Km (all)*			
Km of Transmission Mains by Size: *100.0 mm (4.0")* *150.0 mm (6.0")* *200.0 mm (8.0")* *250.0 mm (10.0")* *400.0 mm (16.0")* *500.0 mm (20.0")* *600.0 mm (24.0")* *700.0 mm (30.0")* *Other Sizes* *Total Km (all)*			

Chart No. 3 — Statistical Information
Sources of Supply Log

(A)	*(B)*	*(C)*	*(D)*	*(E)*	*(F)*
Sources of Supply	*No. of Each Source*	*Total Avail. Yield (l/sec)*	*Total Depend. Yield (l/sec)*	*Total m³ Produced or Purchased During Year*	*Total m³ Produced or Purchased Previous Year*
Wells					
Rivers					
Springs					
Lakes					
Purchased					
Totals					

Chart No. 4 — Statistical Information
Storage Capacity Log

(A)	*(B)*	*(C)*
Locations of Storage Reservoirs (Deposits)	*No. of Storage Reservoirs at Each Location*	*Total Capacity (m³) of Storage Reservoirs*
_____ _____ _____ _____ _____		

Chart No. 5 — Statistical Information
Electricity Usage Log

(A)	*(B)*	*(C)*	*(D)*	*(E)*
Power Used to Produce Water	*Total No. of Kwhrs. Used During Year*	*Total Cost of Kwhrs. Used During Year*	*Total No. of Kwhrs. Used During Previous Year*	*Total Cost of Kwhrs. Used During Previous Year*
Electricity				

Chart No. 6 — Statistical Information
Customer Information Log

(A)	*(B)*	*(C)*	*(D)*	*(E)*	*(F)*
Class of Customer	*No. of Accounts*	*No. of Metered Accounts*	*Percent of Metered Accounts (Column C/B)*	*No. of m³ Billed During Year*	*Sales Revenue from m³ Billed During Year*
In City: *Families* *Enterprises* *Government and Instit.* *Sub-Total*					
In Villages: *Families* *Enterprises* *Government and Instit.* *Sub-Total*					
Totals					

Chart No. 7 — Statistical Information
Unaccounted For Water Log

(A)	*(B)*	*(C)*	*(D)*	*(E)*
Period of Time	*Total m³ Produced or Purchased (Chart No. 3)*	*Total m³ Billed (Chart No.6)*	*Total m³ Unaccounted For Water (Col. B/C)*	*Percent Unaccounted For Water (Col. D/B)*
a) Current Year				
b) Previous Year				
Difference (Row a – b)				