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For the New Independent States
of the former Soviet Union

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By
A USAID Project Consortium Led by CH2M HILL

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UKRAINE Summary of Data on Metering, Billing, and Revenues Lviv Vodokanal

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PREFACE

Under the 1992 Freedom Support Act, the United States Congress initiated a program to provide various forms of assistance to new independent states (NIS) of the former Soviet Union. Cooperative Agreements were signed between representatives of the U.S. government and each country in which assistance was to be undertaken. The U.S. Agency for International Development (USAID) was given the responsibility to coordinate all U.S. government assistance to the NIS under the Act.

Through competitive bidding, USAID awarded a multi-year contract to a team managed by CH2M HILL International Services, Inc. (CH2M HILL) to support implementation of an environmental assistance program to republics of the former Soviet Union. Under this contract, termed the Environmental Policy & Technology (EPT) Project, CH2M HILL is to assist USAID's missions in Moscow, Kyiv, and Almaty undertake a program to promote environmental improvements in the NIS. The USAID mission in Kyiv supports environmental, and other, assistance programs to Ukraine, Belarus, and Moldova. CH2M HILL established an office in Kyiv from which to perform services in these countries under the EPT Project.

This report was prepared as a contractually required deliverable under a contract between USAID and CH2M HILL. Although work on this report was conducted in cooperation with the assisted governments and USAID, the findings and recommendations are those of the CH2M HILL team. They do not necessarily represent official positions of the governments of the assisted countries nor of the United States of America.

The CH2M HILL team includes the following organizations:

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- Consortium for International Development
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NOTIFICATIONS

NOTE ON TRANSLITERATION

Ukrainian personal, institutional, and place names used in EPT documents are transliterated into English from Ukrainian (not Russian), according to the modified U S Library of Congress standard for Ukrainian-to-English transliteration that has been adopted by many Western organizations and publications, including the *Encyclopedia of Ukraine* (University of Toronto Press, 5 vols, 1984-1993) and O Subtelny's authoritative *Ukraine A History* (University of Toronto Press, 1988, 2nd edn 1994), as well as by the Ukrainian Commission on Legal Terminology (Resolution No 9 dated 19 April 1996)

NOTE ON COST ESTIMATES

The opinions of cost shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation and implementation from the information available at the time the opinion was prepared. The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. As a result, the final project costs may vary from the opinions of cost presented herein.

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ABBREVIATIONS, ACRONYMS & GLOSSARY

CH2M HILL	CH2M HILL International Services, Inc A U S -based international environmental engineering consulting firm under contract to USAID to implement a large component of the EPT Project
DO	Delivery Order
EPT	Environmental Policy & Technology (Project) A USAID-funded program to provide environmental assistance to the New Independent States of the former Soviet Union
krb	Karbovanets - temporary currency of Ukraine (was in use from 1991 until September 16, 1996)
LVK	Lvivvodokanal Municipal Communal Enterprise The vodokanal in the Western Ukrainian oblast center of Lviv
m ³	Cubic meters
m ³ /d	Cubic meters per day
oblast	Territorial-administrative unit in the former Soviet Union that is still in use following Ukraine's independence A U S analogue would be something between a state and a county
USAID	U S Agency for International Development
USD	U S dollar
vodokanal	Municipal water utility, in charge of water supply and wastewater collection and treatment
ZhEK	Municipal building management agency responsible for operation and maintenance of houses and multi-apartment buildings owned by city administrations, as well water, sewerage, gas, electricity, and heating systems within them ZhEK is a Ukrainian abbreviation
ZhBK	Building management agency owned by a housing construction cooperative ZhBKs have the same responsibilities as ZhEKs

The following terminology has been applied in this report

Gross margin is the remainder when the sum of production cost, obligatory payments, and VAT have been subtracted from the gross revenue

Gross revenue (gross proceeds) is the income received for the sales of services and for other activities

Losses are funds that an enterprise will not be able to recover

Net profit is the remainder when profit tax is subtracted from the gross margin

Obligatory payments are taxes included into the tariff. Currently, obligatory payments include land and transportation taxes

Payment by acceptance is a non-cash bank transfer, i.e., payment for services provided with the payer's consent and authorization

Payment without acceptance is made via a bank. It means that if a supplier has applied for payment to a bank (to obtain payment for services provided), and if the enterprise has any funds in its bank account, the bank, on the basis of documents submitted by the supplier and without the enterprise's consent, transfers the money to the supplier's account

Production costs is the amount of all costs related to production, including taxes and other costs allowed by law

Tariff is the rate used to calculate charges for services

Unrecovered production costs are the costs incurred for production and sales that have not been paid for by consumers

Section 1 INTRODUCTION

1 1 BACKGROUND

As part of a United States government bilateral assistance program, the U S Agency for International Development (USAID) is supporting environmental management in Ukraine Under direction from USAID, a consortium led by CH2M HILL International Services, Inc (CH2M HILL), is implementing part of USAID's Environmental Policy & Technology (EPT) Project by undertaking various tasks that have been agreed to by representatives of the governments of both countries

Under Delivery Order 9, Task U2 (Lviv Urban Water and Wastewater Management Demonstration), Subtask 3 1 (Collect Data on Metering, Billing, and Revenues), the requirements include

to present and field verify existing data in a vodokanal on

a the total number of connections from the water system to users including information on the size and type of pipe material of the connections whether they have valves to isolate the connection from the system and the category of user served by the connection (industrial commercial public or residential)

b by category of user an inventory of water meters

c by category of user the total amount of water billed to users in 1993 and 1994 the amounts actually recorded on functioning meters and for the amounts estimated the basis for those estimates

to present data on the billings and revenues for a vodokanal's distribution system which would utilize existing information from the vodokanal with selected verification as appropriate This would include data on various aspects of water related revenues including the following

a the amounts of billed revenues in previous years by category of user and the amounts of revenue actually received in those periods

b the amount and source of all other income or funds received including such sources as 1) fees for installation of water 2) funds for capital construction projects from external governmental authorities whether loans or grants or 3) any other funds received from any other sources

c description and evaluation of existing procedures for the preparation and distribution of bills to customers for water including the types of equipment and systems utilized the length of the billing period by category of customer the time required from the end of the billing period to the issuance of bills and the average delay from issuance of bills to receipt of revenues

d determination and evaluation of the role of the ZhEKs in public housing units relative to the collection of revenues from apartment residents for water services and to the distribution of these revenues once collected including the timing and extent to which revenues are returned to the vodokanal

This report includes data from a survey period spanning 1993 to the end of the first half of 1996

1.2 OVERVIEW

Lvivvodokanal (LVK) is the water & sewerage utility ("municipal communal enterprise") in the Western Ukrainian city of Lviv. LVK is in charge of extracting, treating, and supplying drinking water to the city and outlying inhabited areas, and maintaining the water distribution system and water and wastewater facilities.

The LVK supplies water to the city of Lviv, to villages located within the Lviv well fields' radius of influence and along the transmission mains, to other towns located nearby the Western group of well fields (Horodok, Liubin Velyky, Rudky, and Komarno), and to the town of Vynnyky.

The EPT Project has an office established in the building used by Lvivvodokanal, and a cooperating country national (CCN) staff of engineers, economists, computer specialists, and translators is working on the project.

1.3 RELATIONS BETWEEN LVK AND CONSUMERS

Relations between LVK and consumers have certain peculiarities, in that the consumer is not always the one who pays LVK directly.

1.3.1 Consumers and Primary Customers

Consumers are the legal or physical entities that are provided with water and wastewater services. Primary customers of LVK services are the legal or physical entities with which the LVK concludes agreements for providing water and wastewater services (or one of these services). Without such agreements, the use of water and wastewater services is considered to be unauthorized. Primary customers are the ones that pay LVK.

Consumers who are not LVK primary customers are clients of intermediaries who are primary customers, i.e., who by agreement with LVK take over the responsibility to represent the consumers' interests. These consumers are also called secondary customers. Currently, there are 3,936 primary customers and 26,166 secondary customers in Lviv.

Primary customers include industrial enterprises, communal services, and budget organizations that have some facilities under their authority. Some primary customers, such as industrial enterprises, also have apartment buildings, dormitories, clubs, sport complexes, kindergartens, and hospitals under their authority.

Residents of private houses (these are very few) are also LVK primary customers. The majority of residents, who live in state apartment buildings, cooperative apartment buildings,

and buildings that belong to different enterprises, are LVK consumers but not primary customers. They pay for LVK services via building management agencies (including ZhEKs and ZhBKs, see Section 1.3.3)

It should be noted that primary customers pay LVK under various tariffs

1.3.2 Categories of Consumers

Until the end of the first half of 1996, all the LVK consumers were classified in three categories, which governed the tariff rates applied for water consumption and wastewater services. The three groups are

- 1 Residential sector
 - residents of state apartment buildings, that pay through ZhEKs
 - residents of cooperative buildings, that pay via ZhBKs (house construction cooperatives)
 - residents of apartment buildings belonging to enterprises or organizations, and Defense Ministry apartment buildings, that pay via their house management boards
 - residents of private houses, that are primary customers and pay LVK themselves
- 2 Industry and transport
- 3 Other consumers, consisting of communal services, budget organizations, and collective farms

1.3.3 Building Management Agencies

Until July 1996, the majority of the residential category of consumers (98%) were billed for LVK services through primary customers. These included ZhEKs (housing & utilities departments), ZhBKs (house construction cooperatives), and other building management agencies. Residential primary customers with the most consumers are the ZhEKs

There are 61 ZhEKs in Lviv

- 15 in Halytsky district
- 13 in Frankivsky district
- 10 in Zaliznychny district
- 12 in Shevchenkivsky district
- 11 in Lychakivsky district

There are also 169 ZhBK building management agencies, 4 agencies responsible for buildings belonging to industrial enterprises and other organizations, and 3 agencies in charge of Defence Ministry apartment buildings

According to the mandates of the building management agencies, they are to make agreements with LVK for water and wastewater services. As a rule, the agreements contain amendments added by the agencies, which may include the following items

- 1 The primary customer will pay into the LVK bank account only the amount of residents' payments collected by the 30th of every month — not the amount billed by LVK
- 2 Where water meters are installed, the measurement of water consumed is based on meter readings
- 3 Meters are to be installed by LVK — not at the expense of the primary customer
- 4 LVK, not the primary customer, is responsible for supplying water to the primary customer's water consumers, and maintaining water facilities, sources of water, and devices (including seals)

All the ZhEKs charge their consumers according to the established norms of water consumption and wastewater services, rather than the amount of money that LVK charges them for services. It takes less time, and the ZhEKs make fresh accounts only when the tariffs for water and wastewater are changed. In addition, it is advantageous to the ZhEKs in that they collect the maximum from the consumer based on the norms, and are not likely to have to pay out of their own pocket for excessive water consumption (for which the primary customer is responsible)

ZhEKs transfer payments collected to the LVK bank account as the payments are collected from the residents. For example, there are many ZhEKs that transfer partial payments two to three times during a month. They retain 10% of the payments they collect as a service fee

The ZhEKs in Lviv can be divided into three types

- A Have their own cash-offices, equipped with computers, and payments are made directly at these cash-offices (all the ZhEKs in Zaliznychny district)
- B Have no cash-offices, but are equipped with computers, and payments are made through savings-banks (part of the Shevchenkivsky district ZhEKs)
- C Do not have cash-offices, the documents are processed with calculators, and payments are made through savings banks (all the ZhEKs in Frankivsky, Lychakivsky, and Halytsky districts, and the remainder of Shevchenkivsky district)

In ZhEK types A and B, it is possible to define what portion of their money should be paid to LVK. However, it is impossible to define LVK's dole in group C, which includes most

ZhEKs The LVK has no access to information on payments by the residential sector to the ZhEKs for LVK services

With the LVK having a large debt to electricity suppliers (1.5 trillion karbovanets or 8.6 million USD in August 1996), the Lviv City Administration decided to audit the ZhEKs on transferring payments collected (from the residential sector) to the LVK bank account

The audit (carried out by representatives of the Control Inspection, Tax and Financial Departments) revealed that on September 01, 1996, the residential sector had paid 63.7 percent of the amount billed, whereas the ZhEKs transferred only 38.5 percent to the LVK bank account, i.e., 25.2 percent of the cash collected was not transferred to LVK

So far there are no realistic enforcing methods regarding the ZhEKs, although there are appropriate clauses in the agreements between them and LVK. For example, according to the agreement, the primary customers (i.e., ZhEKs), have to provide LVK with apartment descriptions¹ at least twice a year. In general, they meet this requirement, but LVK has no access to the ZhEK files, and thus cannot check on the reported number of residents in apartments

¹ An apartment description is a document which contains data on the number of residents and plumbing fixtures in an apartment

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Section 2 METERING

Metering in the water supply system is necessary for the system's rational and efficient operation. Only having reliable measurement results at each stage of the process of water supply — starting at the well and ending with the consumer's tap — can clear judgements be made about the technical condition of each section in the system and, if necessary, prompt action be taken to stop water losses and wastage.

Moreover, metering at each section of the system will allow the LVK to stop illegal connections to the water supply system, reduce the amount of water which is unpaid for, and improve its financial situation. In addition, water metering of consumers will provide them with reliable information about their water usage and allow them to make decisions about using less water and saving money. On the other hand, metering represents a significant capital expenditure and operation cost.

At present, metering in the LVK water systems is incomplete, due to a lack of metering devices installed in the system, both at the water production and water consumption stages.

The amount of water billed is determined based on established norms for water consumption, and on readings of meters where they exist. According to LVK data, only 10 percent of water users have meters installed (see Table 2-6).

The LVK calculates losses in the system as a difference between the amount of water delivered and amount billed. The system losses also include water used for supplying the approximately 90 villages located within the well fields' zone of influence. Therefore, total losses in the system are equal to the amount of unbilled water. Measuring of the amount of unbilled water should be a priority step to increasing the efficiency and profitability of the water supply system. Reducing water losses will allow LVK to improve its financial condition.

The amount of water delivered and amount billed for the last four years, according to LVK data, is shown in Table 2-1.

Table 2-1				
Difference Between Water Delivered and Water Billed by LVK				
	1993	1994	1995	1996
Water Delivered (1,000 m ³)	152,432	151,379	150,539	144,650
Water Billed for (1,000 m ³)	133,612	120,169	114,718	107,226
Losses in the System (1,000 m ³)	18,820	31,210	35,821	37,424
Losses in the System (%)	12.3	20.6	23.8	25.9

The table shows that system losses almost doubled over the analyzed period of time (from 18,820,000 m³ in 1993 to 37,424,000 m³ in 1996)

LVK metering results, taken at the main stages of water production and delivery, were checked, and some additional measuring was done, by the EPT/Lviv staff

2 1 METERING AT WELL FIELDS

The city of Lviv abstracts water from 173 wells, located in 20 well fields, outside the city limits. Since most of the well fields are not equipped with operating and calibrated meters, the amount of water produced at the well fields is not actually metered, neither at each individual well nor in total. Instead, LVK calculates the amount of water produced by the amount of energy used.

EPT/Lviv staff conducted one-time measuring at some of the well fields. Table 2-2 shows average daily water production, according to LVK monthly data and based on the actual measurements taken by EPT/Lviv staff.

Table 2-2			
Average Daily Water Production at Selected Well Fields			
Well Field	Average Daily Production (m³)		
		EPT/Lviv Measurements	LVK Data
Stryi	(02Jul96)	123,700	139,798
Hlynnia - Navaria	(04Sep96)	14,400	14,073
Velykopole	(10Nov96)	11,700	7,748
Volia Dobrostanska	(10Nov96)	14,100	6,777
Vilshanytsia	(18Mar97)	14,400	12,310
Stare Selo	(05Sep96)	19,400	22,453
Pluhiv	(03Apr97)	49,400	51,130
Total		247,100	254,289

The LVK and EPT/Lviv data on the total amount of water produced at these well fields differs by only 3 percent. This is not a significant deviation, and the LVK water production data can be considered acceptable.

2 2 METERING IN TRANSMISSION MAINS

About 600 km of steel, cast iron, and reinforced concrete pipes are used for transmitting water from the four groups of well fields outside Lviv to the pump stations at the city limits. Ninety villages located within the well fields' zone of influence (with a total population of about

67,300) are connected directly to the system — to the well field headers, directly to individual wells, or to the transmission mains. These villages get water free of charge. The LVK operates and maintains the water supply networks in these villages. In the town of Vynnyky, the water supply network is operated by the Kolibri communal enterprise, by agreement with LVK.

Apart from the villages within the well fields' zone of influence, the Lviv water supply system also provides water to villages along the transmission mains. LVK calculates the amount of water supplied to these villages as the difference between the amount produced from wells (including purchased water) and the amount received at the pump stations at the city limits.

All the villages are connected without pressure reducers or water meters. Water is therefore supplied to some villages at considerable pressure, which causes great water losses resulting from leakages. Regardless, LVK calculates village water consumption according to established norms.

Table 2-3 shows LVK data for the last four years on the amount of water delivered and amount billed to customers outside the city, i.e., to villages, "other" customers (including the Horodok vodokanal and communal enterprises), and to Vynnyky town.

	1993	1994	1995	1996
Water delivered (1,000 m³)	10,671	9,753	9,486	27,650
villages	4,865	4,575	3,256	19,463
other	4,455	3,943	4,571	6,427
Vynnyky	1,351	1,235	1,659	1,760
Water billed (1,000 m³)	4,636	4,178	7,163	6,380
villages	302	179	2,397	4,491
other	3,901	3,738	3,737	1,483
Vynnyky	433	261	1,029	406
Losses (1,000 m³)	6,035	5,575	2,323	21,270
Losses (%)	56.6	57.2	24.5	76.9
villages	93.8	96.1	26.4	76.9
other	12.4	5.2	18.2	76.9
Vynnyky	67.9	78.9	38.0	76.9

Analyzing the LVK reported data in Table 2-3, it becomes clear that losses in that part of the system are substantial. Two questions then arise:

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- 1 Why should LVK deliver an amount of water considerably exceeding the amount of water billed?
- 2 Where does the unbilled water go?

In answer to these questions the following assumptions can be made

- there are illegal connections
- excessive water consumption occurs
- there are significant losses in the village networks

Based on inspections and measurements taken by the EPT/Lviv along the transmission mains, and on the approximate evaluation of leakage, the average amount of losses in the transmission mains can be assumed to be 5 percent of the total amount of water pumped into the system (see Table 2-1) For example, the losses for 1996 can be estimated at $(0.05 \times 144,650,000 \text{ m}^3) = 7,233,000 \text{ m}^3$

The amount of unbilled water and resulting financial losses inflicted on LVK are shown in Table 2-4, based on LVK reported data

Table 2-4		
Unbilled Water Delivered Outside the City in 1996		
Total water delivered outside Lviv	27,650,000	m ³
Water billed	- 6,380,000	m ³
Water billed at zero tariff	- 7,309,000	m ³
Losses (5% of all water delivered)	- 7,233,000	m ³
Remainder Unbilled water	= 6,728,000	m³
	2,018,000	hryvnias
	1,060,000	USD

The cost of unbilled water was calculated using the minimum tariff for residents (0.30 hryvnias/m³) Even at this tariff, LVK financial losses constitute 2,018,000 hryvnias, or 1,060,000 USD per year

2.3 METERING IN THE CITY

The city distribution system is supplied from the seven pump stations located around the city outskirts. These pump stations pump water either directly into the distribution system or to the four booster pump stations or tanks located within the distribution system, which then deliver water into the distribution network.

Ultrasonic stationary flow meters are installed at most of the pump stations, for metering the amount of water pumped into the city distribution network.

Table 2-5 shows LVK data on the amount of water delivered to consumers in Lviv and the amount billed for

Table 2-5				
Difference Between Water Delivered and Water Billed in Lviv				
	1993	1994	1995	1996
Water delivered (1000 m ³)	141,761	141,626	141,053	117,000
Water billed (1000 m ³)	124,244	111,491	107,554	100,846
Network losses (1000 m ³)	17,517	30,135	33,499	16,154
Network losses (%)	12.4	21.3	23.7	13.8

The LVK data shown in Table 2-5 indicates that reported water losses in the city distribution network constituted about 14 percent in 1996. This means that 86 percent of the total amount of water delivered to consumers was billed, no matter whether or not it actually got to the consumers' taps.

An analysis of the breakdown rate in the Lviv distribution system carried out by the EPT/Lviv staff showed that the number of breakdowns in the last 10 years has almost doubled, there are, on average, 14 breakdowns in the system every day. Thus it can be surmised that the lack of meters installed at consumer connections in Lviv allows LVK to bill for more water than the consumer actually receives.

2.4 METERING OF CUSTOMERS

The amount of water for billing is calculated by LVK based mostly on the established norms for water consumption, and also from readings of installed meters. Table 2-6 presents the number of water users by consumer group and the number of meters installed.

Table 2-6			
Customer Meters in 1996			
Consumer Group	Number of Customers	Meters in Operation	% with Operating Meters
Residential	19,632	509	3
Industry/Transport	3,489	1,175	34
Communal and budget organizations	3,045	935	36
Total	26,166	2,619	10

Since only 10 percent of customers have operating meters installed, water consumption is calculated mostly from norms. The actual water consumption can be higher or lower than the norms. If the actual water consumption is higher than the norm, then the LVK loses part of its profit, and if it is lower, then the consumer is billed more.

In the period between March and October 1996, the EPT/Lviv staff, as part of the *Problems of System Measurements* program, did metering on the connections to the ten biggest consumers for each group, and compared the results with the norms.

The obtained data showed:

- 1 In residential buildings with 6 hours of water supply, the measured water consumption was close to the norms. In residential buildings with 24 hours of water supply, the measured water consumption was twice as high as the norms. Where measuring was done, most consumers did not have meters and were being billed by the norms.
- 2 At industrial enterprises the total measured water consumption was 1.2 times higher than the norms. These enterprises all had meters installed, so even though they use more water than the norms set for them, they pay for all of it.
- 3 For communal enterprises, the total measured water consumption and the norms coincided. For budget organizations, the total measured water consumption was 1.5 times higher than the norms. Where measuring was done, the customers had meters installed and were being billed according to their readings. But it may be supposed that unmetered budget organizations are paying nothing for up to 30 percent of the water they are using.

2.5 CONCLUSIONS

As a result of analyzing the LVK reported data on measuring at each stage of the water supply and water consumption cycles, the conclusion can be made that at present LVK suffers the largest financial losses along the section between the well fields and the Lviv city limits. In order to cut these losses the following steps must be taken:

- find and eliminate illegal connections
- find and stop excessive water consumption outside the city limits
- find and stop losses in the village water supply networks

Metering of connections to the system can play a significant role in water system management, billings, and revenue. However, a fully 100-percent metered system would represent a major capital investment, and should not be undertaken without careful analysis. This issue is discussed further in the EPT Project report on *Problems of System Measurements*.

Section 3 BILLING AND COLLECTION

3.1 ORGANIZATION

The LVK Sales Department is in charge of billing and administering the collection of payments for water and wastewater services. At the beginning of 1996, the department had a staff of 53 controllers, of which 35 were inspectors (in charge of taking meter readings on site and writing out bills). The staff also included 4 accountants, 4 data entry computer operators, and 7 engineers. Processing of incoming and outgoing data was carried out using 8 computers: 4 386-type PCs, 2 486-type PCs, and 2 286-type PCs. Four computers were used by accountants, and the other four by operators.

There was an accountant in charge of each category of consumers (residential, industry/transport, and other, see Section 1.3.2), who administers payments by the primary customers. Every month the accountant makes income statements for the primary customers which show payments transferred to the bank and debts to the LVK.

3.2 PROCEDURE

Primary customers with meters installed have their meter readings taken by inspectors/controllers, and are billed in accordance with the readings for water consumed, and also are charged for wastewater services in accordance with established norms. If there are no meters installed, the primary customers are billed in accordance with the established norms on water and wastewater services. If the water meters are not functioning, the inspectors calculate the average daily water consumption for the last two months that the meter functioned and multiply it by the number of days in the current month.

Every primary customer, and some secondary customers, has a registration/account number, entered into one of the 200 route register books. The account number has a correspondence to the page number in the register book. LVK sends a monthly bill to each of the accounts. The inspectors deliver the bill to the primary customer representative, so as to officially register its delivery. Figure C-1 presents a bill form filled in by an inspector that is delivered to a primary customer.

There is an inspector in charge of each of the register books, which has to be filled in by a certain date every month. This means that an inspector enters data on every account about the total amount of the water consumed, and the sum to be paid by primary customers for water and wastewater services (see Figure C-2).

Every register book has 100-350 accounts. An inspector has 1-3 days to fill in the register, depending on the number of accounts. After entering all the necessary information, the inspector passes the register to an operator to enter the data in a computer, and starts on the

next register Filling in the registers and issuing bills to the primary customers takes from the 16th of the current month to the 1st of the next one

Every month all the LVK primary customers receive their bills on a set day LVK bills the residential sector for water and wastewater services through ZhEKs by the 5th of a current month (see Section 1 3 3) Communal and budget organizations are delivered bills dated the day of entering the data about the quantity of the water consumed in the route register books Budget/communal organizations and the various types of building management agencies (see Section 1 3 3) pay LVK directly via bank transfers in unitemized lump-sum payments

After the 28th of every month, LVK informs industrial/transport enterprises of the amount of the bill and applies for payment to the bank This category of primary customer pays under non-acceptance terms, which means that if they have money in their bank account, the bank transfers the money to the LVK account without the need for their consent

3.3 COLLECTION DATA

3.3.1 Residential Sector

The residential sector is the largest water consumer group it consumes 56 percent of the total amount of water billed The residential sector was billed in the amount of 3 percent of the total amount billed in each of 1993 and 1994, 15 percent in 1995, and 28 percent in the 1st half of 1996

This considerable difference between the amount of water consumed and the amount billed is the result of a low tariff rate applied to this consumer group during the past five years (see Table B-1) The residential tariff was only 4 percent of the average tariff for water (7 percent for wastewater services) in 1993, 10 percent in 1994 (10 percent for wastewater), 29 percent in 1995 (23 percent for wastewater), and 76 percent in the 1st half of 1996 (81 percent for wastewater)

Of total payments collected from all consumer groups, the residential sector paid 1 percent in 1993, 3 percent in 1994, and 8 percent in the 1st half of 1996

A comparison of the amount billed to the money actually received from the residential sector is presented in Table D-1, showing that LVK did not recover 1 6 million USD from this consumer group in the 1st half of 1996

The payment collection rate for the residential sector was 26 percent in 1993, 63 percent in 1994, 42 percent in 1995, and 23 percent in the 1st half of 1996 The overall low collection rate from the residential sector is thought to be caused by the following

- Payments are collected via intermediary bodies (building management agencies) that do not always pass them on to LVK (see Section 1 3 3) Moreover, these groups do not provide LVK with any information on the amount and time of the payments

collected, even though it delivers bills with an explanatory statement in which each secondary customer is itemized separately

- Part of the population is entitled to discounts for the water and wastewater services. In the beginning of 1995, the state granted a targeted subsidy to persons with low incomes. However, it only paid back a small portion of the subsidies and discounts to LVK (see Table B-2)
- Due to poor economic conditions in the country, a considerable part of residential consumers did not receive regular salary payments, which resulted in delayed payments for communal services, including LVK services
- There is a lack of enforcing measures for those residents that do not pay for LVK services. Current legislation does not sanction applying enforcement measures for collecting debts. Furthermore, there are no clauses that specify penalties for non-payment for LVK services

In the beginning of August 1996, LVK suspended delivery of water to part of the residential sector with the largest debts. About 90 percent of the debtors paid their bills within two weeks. This action was of an experimental nature, but in the opinion of the LVK Sales Department it cannot become a policy, for the following reasons

- 1 Apartment buildings have no valves allowing water supply to be cut off to individual apartments. Water supply cut off to an entire residential building may cause unfair hardship to those residents who have already paid for LVK services
- 2 The legality of this action is questionable, since there are no clear-cut clauses in current legislation permitting cutting off supply in return for non-payment

3.3 2 Industrial Enterprises

Industries consume the smallest amount of water — only 7 percent of the total amount of water billed. However, this consumer group pays the most for LVK services. In 1993 and 1994, industrial enterprises were billed 88 percent of the total amount billed, 72 percent in 1995, and 54 percent in the 1st half of 1996²

The discrepancy between the amount of water consumed and the amount billed is a result of the higher tariffs applied to industrial enterprises (see Table B-1). Industry tariffs offset the shortfall between the other consumer groups' tariffs and the average tariff.

As a percent of the total payments collected, industrial and transport enterprises paid 90 percent in 1993, 89 percent in 1994, 81 percent in 1995, and 84 percent in the 1st half of 1996

² Industrial billing structure for LVK services is presented in Section 3-1 and Figures 3-1 to 3-4 of the report *Financial Impacts*

A comparison of the amount billed by LVK and payments collected from this group is presented in Table D-2. The result of the calculated profit shows that LVK did not recover its production costs from this group during the period from 1993 until 1996. In the 1st half of 1996, LVK's profit amounted to 1.6 million USD.

LVK's collection rate for industry/transport enterprises was 84 percent in 1993, 78 percent in 1994, 79 percent in 1995, and 121 percent in the 1st half of 1996. These enterprises pay for LVK services under non-acceptance terms (see Section 2.2). Despite this condition, the industries paid 70 percent in barter or mutual clearing of debts, and only 30 percent in cash.

In 1996, the LVK Sales Department closely monitored 170 industries that were major water consumers. If any of them developed a large debt for water and wastewater services, LVK cut off their water supply at three days' notice. In most cases, these enterprises found a way to pay at least part of their debt within a short period.

3.3.3 Other Consumers

Other consumers consist of communal services and budget organizations, accounting for 37 percent of the total amount of water consumed. They were billed in the amount of 9 percent of the total in each of 1993 and 1994, 13 percent in 1995, and 18 percent in the 1st half of 1996³.

Until August 1996, the "other" category of consumers was divided into budget organizations and communal enterprises, and were subject to different tariffs for water and wastewater services (see Table B-1).

Of the total payments collected, the proportion of payments received from this group was 9 percent in 1993, 8 percent in 1994, 10 percent in 1995, and 9 percent in the 1st half of 1996.

Comparison of the amount billed and the revenue actually received by LVK from communal services and budget organizations is presented in Table D-3. Profit calculations show that LVK did not recover its production costs from these consumers during the survey period. At the end of the 1st half of 1996, the profit was a negative 0.8 million USD.

The payment collection rate of the group was 86 percent in 1993, 76 percent in 1994, 57 percent in 1995, and 39 percent in the 1st half of 1996. As with the building management agencies (ZhEKs), the budget and communal organizations authorized their banks by written request to transfer payments to LVK.

³ Billing Structure for LVK services to this consumer group is presented in Section 3.1 and Figures 3-1 to 3-4 of the report *Financial Impacts*.

3.4 CONCLUSIONS

During the survey period, budget institutions were LVK's principal debtor. There has been almost no cutoff of water supply to budget organizations, because among the LVK's largest debtors within this consumer group are hospitals, educational establishments, and kindergartens, and it is doubtful whether the State Sanitary-Epidemiology Service and the City Administration would give permission for suspending their water supply.

Section 4 REVENUE

4 1 WATER SUPPLY AND WASTEWATER SERVICES REVENUE

LVK's main source of revenue is the gross proceeds received in compliance with set tariffs for water and wastewater services provided. The difference between the sales revenue and the total production cost is the gross margin, which consists of the sum of the net profit of the enterprise, the state's net profit levied as the VAT, profit tax, and obligatory payments. Thus, LVK's financial status can be analyzed according to the following formula:

$$\begin{aligned} \text{Net profit (of the enterprise)} &= \text{Revenue minus gross margin} \\ &= R - (\text{TPC} + \text{VAT} + \text{PT} + \text{OP}), \text{ where} \end{aligned}$$

R - sales revenue received for services

TPC - total production costs incurred

VAT - value added tax

PT - profit tax

OP - obligatory payments (currently include land tax and transportation tax)

From 1993 until the 1st half of 1996, profits were calculated on the basis of the amount billed and payments actually collected. The results of these calculations are presented in Table D-4. These calculations show that during the survey period (from 1993 until the 1st half of 1996), LVK did not recover all its production costs and did not pay supplier's bills in full, as it did not generate sufficient revenue.

The LVK consumer collection rate was 82 percent in 1993, 78 percent in 1994, 71 percent in 1995, and 78 percent in the 1st half of 1996⁴.

LVK was not able to recover its production costs and make a reasonable profit due to the following major reasons:

- delayed and incomplete payments for water and wastewater services by consumers
- existing taxation and accounting practice
- delay in the application of new tariffs
- increased costs

If consumers had paid 100 percent of their bills during the survey period, LVK could have recovered all its production costs (with the exception of 1994).

⁴ The payment collection rate for the services provided in the period from 1993 till the 1st half of 1996 is presented in the Section 3 1, Table 3-1 of the report *Financial Impacts*.

The losses in 1994 would be accounted for by the following reasons

- 1 Current legislation did not allow LVK to take into account the forecasted inflation rate
- 2 There were delays in establishing new tariffs, because many various state institutions had to take part in verifying the calculation and approval

4.2 OTHER SOURCES OF REVENUE

During the survey period of the report (from 1993 to the 1st half of 1996), LVK also had the following additional sources of revenue

- sale of materials
- repair of water meters
- transportation services
- rents
- higher tariffs for exceeding concentration norms for discharged wastewater
- capital investments from the budget for LVK system development

The total income received from the above mentioned sources is presented in Table 4-2 This income was a small portion of LVK's total revenue, varying from 0.7% in 1993 to 0.1% in the 1st half of 1996

Item	Unit	1993	1994	1995	1st half 1996
Sale of Materials	millions krb	0	200	3000	0
	USD	0	2,000	17,000	0
High Concentration Wastewater	millions krb	0	0	300	0
	USD	0	0	2,000	0
Rent Payments	millions krb	223	0	300	0
	USD	18,000	0	2,000	0
Water Meter Repair	millions krb	8	43	100	100
	USD	1 000	0	1,000	1 000
Transportation Services	millions krb	76	260	500	1,100
	USD	6,000	2,000	3,000	6,000
Total Income	millions krb	306	503	4240	1,200
	USD	24,000	4,000	24,000	7,000

LVK sold whatever materials it received as barter payment for services provided that were not used in sustaining its production process

Water meters were repaired at the request of consumers For the repair of water meters LVK charged set prices The price charged for calibration was 20% of the meter repair price Table 4-2 presents repair and calibration costs of flow meters of various diameters

Water Meter Diameter (mm)	Cost in krb	Cost in USD
50	870,000	4 60
100	1,435,000	7 70
150	1,595,000	8 50
200	1,745,000	9 30

Consumers were not charged for the water supply installation But they were charged for flushing water supply pipelines In this case the price was based on the calculated amount of water used

During the survey period only a small amount of capital investments⁵ for the LVK system development was made These funds were mainly from the local municipal budget There were no other sources of capital investments or bank loans

⁵ Capital investments in the water and wastewater systems are presented in Section 3 4, Table 3-4 of the report *Financial Impacts*

Section 5
NEW STANDARD AGREEMENT
BETWEEN LVK AND PRIMARY USERS

In 1996 a new standard agreement between the LVK and its primary users was drawn up which in the LVK's opinion, the agreement has a legal force. So far the LVK has not been keeping to the clauses of the agreement presented below. This is accounted for by the fact that the document has no clear-cut legal clauses on the relations between the LVK and the primary users.

To enter into an agreement with the LVK, the primary user is to submit the following documents to the LVK production-technical department. All these documents are to be approved by the LVK.

- 1 An application for connection to the LVK water distribution system to receive the required quantity of water, including quantity calculations
- 2 A statement stipulating the responsibility related to maintenance of distribution pipelines between the LVK and the primary user
- 3 A plan of the area distribution system approved by the Chief Architecture Department of the City of Lviv
- 4 A certificate with the plan of the area water distribution system which is under the primary user's authority containing the data on the quantity of water consumed, a plan of a sewerage system and the quantity of discharges, and specifications of any flow meter which may be installed
- 5 A schematic layout of the primary user's facilities containing the layout of the water distribution system and wastewater service connections

The LVK is responsible for providing the water consumer with drinking water that meets the requirements of the current state standards (ГОСТ 2874-82) and for receiving wastewater discharges within the set limits.

The primary user's general responsibilities are the following:

- 1 To pay on time for the LVK services
- 2 To maintain the water distribution system and wastewater network, devices and equipment under the primary user authority
- 3 To pay a penalty for exceeding the amount of the water consumption as based on the norms. It is 5 times the tariff for the water consumed.
- 4 To maintain flow meters and the premises where the water meters are installed.

- 5 To pay for the water consumed and wastewater services in accordance with the approved tariffs
- 6 To pay for the services in accordance with the new tariffs that are changed during the current agreement without changes in the terms of the agreement,¹
- 7 To purchase and install meters, billing is done according to meter readings
- 8 Meter readings must be taken at least once a month by an LVK representative together with a primary user representative, if the water meter has been temporarily removed by an LVK representative or broken (if the primary user is not to blame for it), the quantity of the water consumed is calculated as an average metered daily water flow for the last two months that the meter functioned and the calculation is made according to this procedure until a new meter is installed, if there has not been any metering, the calculation is based on the theoretical delivery capacity of each service connection
- 9 The amount of wastewater that gets into the sewerage system is the amount of water consumed from the communal water distribution system plus other sources of water supply in accordance with meter readings and if there is no meter installed, the calculation is based on the delivery capacity of every service connection
- 10 To appoint an employee responsible for the water supply within the primary user's facilities, maintenance of the water supply sources, other water facilities, water meters and seals on them

The primary user category including industrial enterprises, communal services and budget organizations have the following responsibilities

- 1 To pay 0.5 percent penalty of the amount billed for every day of delay in case of delayed payment, taking into account the inflation rate
- 2 In case of a groundless refusal to pay, whole or in part, the amount of money that the LVK billed, the primary user is to pay a penalty of 5 percent of the amount billed, if the primary user delays payment more than 15 days, the LVK can stop providing water and receiving sewerage discharges without further notice
- 3 To pay for the LVK services directly via a bank which means that on a set day at a primary user's written request (communal services and budget organizations) the payments (the amount of which is stipulated in the agreement) are to be transferred from the primary user's bank account to the LVK bank account. The payment of the amount stipulated in the agreement is to be made in the period from the 1st to the 5th of the current month. The final bill is made on the basis of meter readings. The

¹ If the primary user does not keep to the terms of the agreement, sanctions are applied to him in accordance with 'The Regulations on Maintenance of Water Supply System in the Cities and Villages of Ukraine'

charges billed include the current month charges for the quantity of water stipulated in the agreement and the charges for the extra quantity of water consumed and wastewater discharges, penalties and other possible billings

- 4 Industrial enterprises are to pay for actual water consumption and wastewater services under non-acceptance terms by the 28th of the current month after the LVK informs the primary user the cost and applies for payment to the bank
- 5 To pay according to higher tariffs for discharges containing contaminant concentrations exceeding the norms
- 6 The agreement is made for two years

For the primary user group that includes ZhEKs, have the following responsibilities

- 1 To pay the LVK's bill by the 30th of the current month
- 2 To check over billing at least once in three months and to deliver the list of apartment descriptions once in six months²
- 3 The agreement is made for one year

For the primary user category including ZhEKs, the LVK responsibilities are the following

- 1 To deliver to the primary user a group bill for water and wastewater services (for the previous month) by the 5th of the current month
- 2 To repay the primary user (ZhEKs) 10 percent of the total amount of money paid by the population for water and wastewater services (a service fee)
- 3 To repay the primary user the cost of pumping water to the upper floors if the LVK has been submitted the calculated cost and the address of booster pumps' location

After making the agreement, each primary user is given a six -figure registration code in which the first figures indicate the consumer category of a primary user. The identification codes of the primary users are the following

- 100 -- ZHBKs (house construction cooperatives) and house managements in charge of the apartment buildings belonging to the Ministry of Defense and some enterprises
- 101 -- ZhEKs
- 102 -- Budget organizations
- 105 -- Baths, laundries and hotels
- 2 -- Communal services

² Apartment descriptions are important because the LVK's billing is based on the number of residents shown in the apartment descriptions

- 3 -- Industrial enterprises
- 4 -- Collective farms
- PRI-- Private houses

The last figures of the registration code, with the exception of ZhEKs, correspond to the number of the agreement. The last three figures of the ZhEKs' registration codes correspond to the ZhEKs' identification numbers.

The LVK primary users are grouped on a territorial basis regardless of the consumer category. Some consumers that are not the LVK's primary users, are also registered in the route register books, and have their own registration number (konto). In fact, all consumers have their kontos with the exception of the apartment buildings supplied with water through district heating facilities (which have their kontos). The LVK sales department is furnished by the ZhEKs with the data on the number of houses, apartments and residents that are served by these facilities.

Appendix A
NATIONAL BANK OF UKRAINE EXCHANGE RATES

The calculations in the tables have been made in accordance with the official rates of the National Bank of Ukraine The official exchange rate was the following

- on 25 December 1993 - 12,610 krb for 1 USD
- on 25 December 1994 - 117,200 krb for 1 USD
- on 25 December 1995 - 179,400 krb for 1 USD
- on 25 June 1996 - 181,200 krb for 1 USD

Appendix B
WATER AND WASTEWATER TARIFFS AND DISCOUNTS

**Table B-1
Water and Wastewater Tariffs**

Consumers	Measurement Unit	1993	1994	1995	1 st half of 1996
Water					
Average Tariff	krb/m³	1914	6072	21414	27669
including	\$/m³	0 15	0 05	0 12	0 15
Residential Sector	krb/m ³	85	610	6160	21000
	\$/m ³	0 01	0 01	0 03	0 12
Percentage Ratio of Average Tariff	%	4%	10%	29%	76%
Budget Institutions	krb/m ³	500	780	24740	34000
	\$/m ³	0 04	0 01	0 14	0 19
Percentage Ratio of Average Tariff	%	26%	13%	116%	123%
Communal Services	krb/m ³	1650	8680	24740	34000
	\$/m ³	0 13	0 07	0 14	0 19
Percentage Ratio of Average Tariff	%	86%	143%	116%	123%
Industry	krb/m ³	14200	87160	247700	192000
	\$/m ³	1 13	0 74	1 38	1 06
Percentage Ratio of Average Tariff	%	742%	1435%	1157%	694%
Wastewater					
Average Tariff	krb/m³	619	3216	14190	11172
including	\$/m³	0 05	0 03	0 08	0 06
Residential Sector	krb/m ³	43	310	3240	9000
	\$/m ³	0 00	0 00	0 02	0 05
Percentage Ratio of Average Tariff	%	7%	10%	23%	81%
Budget Institutions	krb/m ³	170	400	10870	15000
	\$/m ³	0 01	0 00	0 06	0 08
Percentage Ratio of Average Tariff	%	27%	12%	77%	134%
Communal Services	krb/m ³	1230	4700	12020	15000
	\$/m ³	0 10	0 04	0 07	0 08
Percentage Ratio of Average Tariff	%	199%	146%	85%	134%
Industry	krb/m ³	7100	26800	49940	54000
	\$/m ³	0 56	0 23	0 28	0 30
Percentage Ratio of Average Tariff	%	1147%	833%	352%	483%

Note The tariffs were in effect at the end of the accountable periods

Table B-2
State Mandated Discounts and Subsidies for LVK Services

	Measurement Unit	1993	1994	1995	1st half of 1996	Total
Discounts	millions krb	8	260	23,140	63,580	86,988
Amount Billed to State	USD	6,000	2,200	129,000	351,000	482,800
Amount Paid by State	millions krb	0	0	0	30,000	30,000
	USD	0	0	0	166,000	166 000
Amount Liable by State	millions krb	8	260	23,140	33,580	56,988
	USD	6,000	2,200	129,000	185,000	316 800
Subsidies	millions krb	0	0	190	630	820
Amount Billed to State	USD	0	0	1,000	3,000	4,000
Amount Liable by State	millions krb	0	0	190	590	780
	USD	0	0	1,000	3,000	4,000
Unpaid Debt to LVK	millions krb	8	260	23,330	34,170	57,768
	USD	6,000	2,200	130,000	189,000	320,800

Appendix C
ILLUSTRATIONS OF LVK STANDARD BILLS AND REGISTER

Figure C-1: STANDARD BILL

Form № 1

"LVIVVODOKANAL"
CITY OF LVIV COMMUNAL ENTERPRISE

Lviv, Zelena str, 64, tel 75-32-34
Bank account № 000508705
Lviv Lychakivsky Ukrainian Social bank
Ministry of Finances
П-119

BILL № 1-55

Primary user "Atlas"
Primary user s bank account No _____

Address Zelena str 20

Period billed May 6 to June 6, 1996

Last meter reading 01314m³

Previous meter reading 01254m³

Difference 60m³

Amount charged for water 14,715,600

Amount charged for wastewater 2,996,400

Total 17,712,000

Including VAT(value added tax)- 2,952,590

Energy fund - 88,294

(Inspector)

Total amount billed - 17,800,294

Форма №

ЛЬВІВСЬКЕ МІСЬКЕ КОМУНАЛЬНЕ
ПІДПРИЄМСТВО «ЛЬВІВВОДОКАНАЛ»

м. Львів вул Зелена 64 телефон 75 32 34
Розрахунковий рахунок № 000508705
Львівський Укр соц банк м Львів
МФО 325097 П-119

РАХУНОК № 1-55

Абонент "Атлас"

Розр рах абонента _____

Адреса Зелена 20

За час від 6/5 по 3/6 1996 р

Останній показ 01314 м³

Поперед показ 01254 м³

Різниця 60 м³

Сума на воду 14 715 600

За канал 2 996 400

Разом киб 17 712 000

ВТЗ МДВ - 2 952 590

ен. фонд - 88 294

До оплати (копія)

Рахунок одержи № 17.800 294

Дата 17.800 294 1996

Вина, крб 2952590/96р.

Разом крб 2952590

Одержано « » 1996 р

Держбанк крб _____

Контролер _____

Касир _____

Термін оплати 3 дні. За несвоєчасну оплату МКП Львівводоканал відключає воду без попередження. Претензії по рахунку не звільняють від оплати і приймаються на розгляд 5 днів з дня одержання рахунку. Боритесь з антиком водам бо це витік ваших грошей!

Лісія «Атлас» ЗТМ 315 4 500 000

The bill is to be paid within three days. In case of delayed payment the Lvivvodokanal cuts off the water supply without notifying. Claims related to billing do not exempt from payment and shall be accepted within 5 days of the date of their receipt. Eliminate water leakages because that is the leakage of your money.

Appendix D
SUMMARY OF BILLINGS AND PAYMENTS

Table D-1
Dynamics of Amount Billed and Payments Actually Collected from Residential Sector

No	Measurement Unit	1993		1994		1995		1st half of 1996	
		Billed	Collected	Billed	Collected	Billed	Collected	Billed	Collected
1	Gross Revenue 1,000,000 krb \$1,000	1,558	399	13,847	8,702	382,417	162,267	585,026	137,388
		124	32	118	74	2,132	904	3,229	758
2	Total Services Production Costs 1 000 000 krb \$1,000	1 052	1 052	11 535	11 535	292 447	292 447	403 266	403 266
		83	83	98	98	1 630	1 630	2 226	2 226
3	Result from Main Activity 1 000 000 krb \$1,000	506	-653	2 312	-2 833	89 970	-130 180	181 760	-265 878
		40	-52	20	-24	502	-726	1 003	-1 467
4	Land Tax ¹ 1 000 000 krb \$1,000	15	15	103	103	5 609	5 609	3 142	3 142
		1	1	1	1	31	31	17	17
5	Transportation Tax 1 000 000 krb \$1,000	0	0	0	0	45	45	50	50
		0	0	0	0	0	0	0	0
6	Profit Tax 1 000 000 krb \$1,000	32	8	207	130	746	317	25 085	5 891
		3	1	2	1	4	2	138	33
7	Value Added Tax 1 000 000 krb \$1,000	336	86	3 029	1 904	64 598	27 410	97 500	22 897
		27	7	26	16	360	153	538	126
8	Other Expenditures not Included into Production Costs 1 000 000 krb \$1,000	-	-	23	23	-	-	-	-
		-	-	0	0	-	-	-	-
9	Other Services Sale Revenue 1 000 000 krb \$1,000	3	3	15	15	386	386	102	102
		0	0	0	0	2	2	1	1
10	Calculated Profits or Unrecovered Production Costs 1,000,000 krb \$1,000	141	-744	-932	-4,875	24,967	-157,565	59,227	-294,614
		11	-59	-8	-42	139	-878	327	-1,626

Note

¹ Until 1995 the land tax was included in production cost

² Profits and unrecovered production costs have been calculated according to the following formula

line 10 = line 1 - line 2 - line 4 - line 5 - line 6 - line 7 - line 8 + line 9

Table D-2
Dynamics of Amount Billed and Payments Actually Collected from Industry

No	Measurement Unit	1993		1994		1995		1st half of 1996		
		Billed	Collected	Billed	Collected	Billed	Collected	Billed	Collected	
1	Gross Revenue	1,000,000 krb	45,843	38,401	350,279	274,948	1,870,180	1,479,417	1,110,174	1,343,236
	\$1,000	3,635	3,045	2,989	2,346	10,425	8,246	6,127	7,413	
2	Total Services	1 000 000 krb	30 950	30 950	291 798	291 798	1 430 187	1 430 187	765 258	765 258
	Production Costs	\$1 000	2 454	2 454	2 490	2 490	7 972	7,972	4 223	4 223
3	Result from Main Activity	1 000 000 krb	14 893	7 451	58 481	-16 850	439 993	49 230	344 916	577 978
	\$1 000	1 181	591	499	-144	2 453	274	1 904	3 190	
4	Land Tax ¹	1 000 000 krb	1 404	1 404	3 269	3 269	51 140	51 140	30 720	30 720
	\$1 000	111	111	28	28	285	285	170	170	
5	Transportation Tax	1 000 000 krb	1	1	13	13	406	406	487	487
	\$1 000	0	0	0	0	2	2	3	3	
6	Profit	1 000 000 krb	936	784	5 224	4 101	3 649	2 887	47 603	57 596
	Tax	\$1 000	74	62	45	35	20	16	263	318
7	Value Added	1 000 000 krb	9 892	8 286	76 624	60 145	315 911	249 903	185 021	223 863
	Tax	\$1 000	784	657	654	513	1 761	1 393	1 021	1 235
8	Other Expenditures not Included into Production Costs	1 000 000 krb	-	-	735	735	-	-	-	-
	\$1 000	-	-	6	6	-	-	-	-	
9	Other Services Sale	1 000 000 krb	278	278	471	471	3 517	3 517	998	998
	Income	\$1 000	22	22	4	4	20	20	6	6
10	Calculated Profits or Unrecovered Production Costs	1,000,000 krb	4,342	-1,342	-23,644	-81,373	123,544	-200,449	112,803	297,030
	\$1,000	344	-106	-202	-694	689	-1,117	623	1,639	

Note

¹ Until 1995 the land tax was included in production cost

² Profits and non-recovered production costs have been calculated according to the following formula

line 10 = line 1 - line 2 - line 4 - line 5 - line 6 - line 7 - line 8 + line 9

Table D-3
Dynamics of Amount Billed and Payments Actually Collected from Other Consumers

No	Measurement Unit	1993		1994		1995		1st half of 1996		
		Billed	Collected	Billed	Collected	Billed	Collected	Billed	Collected	
1	Gross Revenue	1,000,000 krb	4,197	3,522	17,961	9,835	287,791	141,716	369,497	134,065
	\$1,000		333	279	153	84	1,604	790	2,039	740
2	Total Services	1 000 000 krb	2,833	2 833	14 962	14 962	220 083	220 083	254 699	254 699
	Production Costs	\$1 000	225	225	128	128	1 227	1 227	1 406	1 406
3	Result from Main Activity	1 000 000 krb	1 364	689	2 999	-5 127	67 708	-78 366	114 798	-120 634
	\$1 000		108	55	26	-44	377	-437	634	-666
4	Land Tax ¹	1 000 000 krb	129	129	117	117	4 899	4 899	3 066	3 066
	\$1 000		10	10	1	1	27	27	17	17
5	Transportation Tax	1 000 000 krb	0	0	0	0	39	39	49	49
	\$1 000		0	0	0	0	0	0	0	0
6	Profit	1 000 000 krb	86	72	268	147	562	277	15 844	5 749
	Tax	\$1 000	7	6	2	1	3	2	87	32
7	Value Added	1 000 000 krb	906	760	3 929	2 151	48 614	23 939	61 580	22 343
	Tax	\$1 000	72	60	34	18	271	133	340	123
8	Other Expenditures not Included into Production Costs	1 000 000 krb	-	-	26	26	-	-	-	-
	\$1 000		-	-	0	0	-	-	-	-
9	Other Services Sale Revenue	1 000 000 krb	25	25	17	17	337	337	100	100
	\$1 000		2	2	0	0	2	2	1	1
10	Calculated Profits or Unrecovered Production Costs	1,000,000 krb	398	-118	-1,208	-7,435	18,831	-102,284	37,425	-148,675
	\$1,000		32	-9	-10	-63	105	-570	207	-821

Note

¹ Until 1995 the land tax was included in production cost

² Profits and unrecovered production costs have been calculated according to the following formula
line 10 = line 1 - line 2 - line 4 - line 5 - line 6 - line 7 - line 8 + line 9

Table D-4
Dynamics of Amount Billed and Payments Actually Collected by LVK

No	Measurement Unit	1993		1994		1995		1st half of 1996	
		Billed	Collected	Billed	Collected	Billed	Collected	Billed	Collected
1	Gross Revenue 1,000,000 krb \$1,000	51,598 4,092	42,322 3,356	382,086 3,260	293,485 2,504	2,540,388 14,160	1,783,401 9,941	2,064,696 11,395	1,614,689 8,911
2	Total Services Production Costs 1 000 000 krb \$1 000	34 835 2 762	34 835 2 762	318 295 2 716	318 295 2 716	1 942 717 10 829	1 942 717 10 829	1 423 223 7 854	1 423 223 7 854
3	Result from Main Activity 1 000 000 krb \$1 000	16 763 1 329	7 487 594	63 791 544	-24 810 -212	597 671 3 331	-159 316 -888	641 473 3 540	191 466 1 057
4	Land Tax ¹ 1 000 000 krb \$1 000	1 547 123	1 547 123	3 489 30	3 489 30	61 648 344	61 648 344	36 928 204	36 928 204
5	Transportation Tax 1 000 000 krb \$1 000	1 0	1 0	14 0	14 0	490 3	490 3	586 3	586 3
6	Profit Tax 1 000 000 krb \$1 000	1 053 84	864 69	5 698 49	4 377 37	4 957 28	3 480 19	88 532 489	69 236 382
7	Value Added Tax 1 000 000 krb \$1 000	11 134 883	9 132 724	83 582 713	64 200 548	429 122 2 392	301 252 1 679	344 101 1 899	269 103 1 485
8	Other Expenditures not Included into Production Costs 1 000 000 krb \$1 000	- -	- -	785 7	785 7	- -	- -	- -	- -
9	Other Services Sale Income 1 000 000 krb \$1 000	306 24	306 24	503 4	503 4	4 240 24	4 240 24	1 200 7	1 200 7
10	Calculated Profits or Unrecovered Production Costs 1,000,000 krb \$1,000	4,881 387	-2 204 175	-25,785 -220	-93,683 -799	167,342 933	-460,298 -2,566	209,454 1,156	-146,259 -807

Note

¹ Until 1995 the land tax was included in production cost

² Profits and unrecovered production costs have been calculated according to the following formula
line 10 = line 1 - line 2 - line 4 - line 5 - line 6 - line 7 - line 8 + line 9

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The Environmental Policy and Technology (EPT) Project Environmental degradation and natural resource mismanagement threaten public health, biodiversity, and economic vitality in the New Independent States (NIS). To assist the NIS in alleviating these problems, the U.S. Agency for International Development (USAID) began the EPT Project in 1993. EPT provides technical assistance and policy advice in the environmental sector and promotes environmentally sound economic development through public and private U.S. and NIS partnerships. The EPT Project is managed by USAID with support from the U.S. Environmental Protection Agency (USEPA). For assistance in project design, management, and implementation, USAID has agreements with CH2M HILL International, Harvard Institute for International Development, and ISAR. As the primary EPT contractor, CH2M HILL International has the lead role in delivering technical assistance, logistical support, and policy support for selected projects. EPT Regional Offices are located in Washington, D.C., Moscow, Russia, Kyiv, Ukraine, and Almaty, Kazakhstan.

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