

REPUBLIC OF MONTENEGRO

**PUBLIC ENTERPRISE FOR WATER SUPPLY, WASTE
WATER TREATMENT AND DRAINAGE AND SOLID
WASTE DISPOSAL**



AND

**KREDITANSTALT FÜR WIEDERAUFBAU, FRANKFURT
AM MAIN ("KFW")**



LOAN No. 9259
DATED DECEMBER 19TH, 2000

**REHABILITATION, UPGRADING AND EXTENSION OF
THE WATER AND SEWAGE SECTOR OF THE COASTAL
REGION OF REPUBLIC OF MONTENEGRO AND OF THE
MUNICIPALITY OF CETINJE**

**BORROWER'S
FINAL PROJECT REPORT**

JULY 2007

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INTRODUCTION

The water supply sector in the coastal region of the Republic of Montenegro in 1990s had limited capital investments and inadequate maintenance which resulted in lack of potable water, particularly during the summer months, when the number of temporary residents raises. This is especially evident in coastal municipalities of Herceg Novi, Tivat, Kotor, Budva and Bar and also in the old capital of Cetinje situated in the hinterland of the Adriatic coast.

Recognizing this problem, on December 19th, 2000, the Kreditanstalt für Wiederaufbau (“KfW”) concluded the Loan Agreement with the Public Enterprise for Water Supply, Waste Water Treatment and Drainage and Solid Waste Disposal “Regionalni vodovod Crnogorsko primorje” (“PEW”) in the amount of 10 million DEM (5.112.928,91 Euro) for the purpose of rehabilitation, upgrading and extension of the water and sewage sector of the coastal region of Republic of Montenegro and of the Municipality of Cetinje (“Project”). Due to very serious sanitary conditions caused by the lack of potable water during the summer months, the decision was made to invest first in the water supply sector, while the sewage sector would be improved by subsequent investments.

The Project foresaw the number of urgent technical measures with a scope to repair and renew the existing systems for water supply, increase the available quantity of potable water and largely eliminate supply bottlenecks. The following activities have been undertaken:

- Leakage reductions;
- Hydrogeological investigations of potential raw water sources;
- Extension of the existing sources;
- Construction / Rehabilitation / Modernization of water supply facilities;
- Construction of new water supply pipelines and installation of new equipment (pumps, water meters and supplementary equipment), etc.

This report represents the technical and financial overview of measures implemented under the Project, their effectiveness, cost and achieved goals.

I. PROJECT MEASURES

The project measures have been executed in the Municipalities of Kotor, Tivat, Budva, Bar and Cetinje. Two other coastal Municipalities: Herceg Novi and Ulcinj have declined the participation to the Project.

The overall table showing the investments from the KfW loan, with contract names and references, contractors, exact contract amounts and financial commitments for each municipality is presented in Annex I.

The project measures can be divided in three parts: procurement of goods, procurement of consultancy services and physical measures – works.

Procurement of goods

During the period of implementation of the project, several contracts for the procurement of goods have been executed. The supplied goods were procured by competitive bidding procedures with participation of international and domestic companies. The following table shows the contracts signed for the procurement of goods.

Description	Contract No.	Contractor	Total Value of Contract [Euro]
Supply of goods for realization of the first phase of urgent measures and for rehabilitation of the existing water supply network	A2-1	Raku	1.854.948,19
	A2-2/1	Olimpos	45.741,33
	A2-2/2	MIN	7.705,17
	A2-2/3	Gemax	13.874,42
	A2-2/4	3M plus	11.385,40
Procurement of pumps	A2-3	KSB	105.978,23
Supply of goods for realization of the second phase of urgent measures	A2-4/1	Raku	180.937,17
	A2-4/2	Olimpos	93.483,82
TOTAL			2.314.053,73

The largest quantity of goods has been supplied through the contract no. A2-1, signed with “Raku Handels GmbH” on May 2nd, 2001. The scope of this contract was to supply the goods, produced by reputable manufacturers, required for the improvement of the water supply systems in the entire project area. Additionally, a significant quantity of spare parts, necessary for day to day operation and maintenance of the system has been supplied to local water utilities. PEW, as the Purchaser, has received and approved the entire shipment of goods for this, as well as for the other goods contracts, and has delivered them to local water utilities with appropriate certificates of delivery. The majority of goods supplied under the contract no. A2-1 has been installed in the first phase of measures implemented under the project (period July-November 2001 under the contracts C1-1 with “Gemax d.o.o.” and “Integral Inzenjering d.o.o.”). Some additional material was necessary for the completion of this first phase of works, and consequently the series of contracts of relatively smaller financial value was realized (contracts nos. A2-2 / 1 to 4).

For the purpose of realization of the second phase of measures under the project (reconfiguration measures and urgent measures on pump stations and reservoirs), PEW has signed the contract no. A2-3 with pump manufacturer “KSB”, and two contracts with suppliers of water supply materials, “Raku Handels GmbH” and “Olimpos d.o.o.” (contracts nos. A2-4/1 and A2-4/2).

In general, all the supplied goods were new, unused, of the most recent and current models, standardized by DIN or equivalent standards. Particular attention was taken during the installation of the equipment, where all the corresponding standards were applied including the recommendations from manufacturers. In some occasions, like during the installation of pumps, even the manufacturer's representatives were present, in order to ensure the quality of the performed works. The most appropriate indicator of the quality of the equipment which was installed under the Project, and also of the works which were performed, is the negligible number of remarks made by the final users (local water utilities) during the defect liability periods and after.

Procurement of consultancy services

The consultancy services were a significant part of the implementation of the Project. The Loan Agreement foresaw the financing necessary not only for the physical measures and adequate design services for the execution of the works, but also for the institutional setup of the future water supply sector of the coastal area of Montenegro. Additionally, certain amount was spent for Aquamundo's consultancy services in assistance in co-ordination of measures, preparation of legal documents and supervision. The following table shows the contracts signed for the procurement of consultancy services.

Description	Contract No.	Contractor	Total Value of Contract [Euro]
Five years investment plan - consultancy services Annex: Measuring stations Project	B1-1	Fideco	152.270,39
	B1-1 Annex		31.278,87
Hydro-geological investigations – consultancy services Annex: Hydro-geological investigations in Buljarica	B1-2	Hidromol	207.358,90
	B1-2 Annex		42.084,20
Urgent measures on pump stations and reservoirs - consultancy services	B1-3	ITR - Design	10.634,87
		ITR - Supervision	10.086,62
		Vodoprojekt	8.691,96
		Hidromol	4.136,35
Priority measures on rehabilitation of the water supply system - consultancy services	B1-4	FIDECO	90.360,61
		Vodoprojekt	16.361,34
Consultancy Services for Montenegro Water Supply Rehabilitation Project at Regional Level and Assistance in co-ordination of projects	B1-5	Fin Invest	109.211,15
Preparation for selected reconfiguration measures	B1-6	GKW	34.500,00
Consultancy services Aquamundo			211.674,84
		TOTAL	928.650,10

The objective of the contract no. B1-1 signed with "Fideco d.o.o." was to define a list of measures sorted according to the degree of priority, which were planned to be implemented step by step over a period of 5 years, starting with the year 2003. According to these priorities, the Capital Investment Plan was prepared, sustained through the correlation between the useful life of the system components, proposed strategy requirements and the water demand forecast. The

contract was directed to municipal water utilities of Kotor, Tivat, Budva and Cetinje. An additional service was requested to the consultant: the preparation of the design documents for the measuring stations project, for the purpose of determination of the hydraulic characteristics in water distribution systems (flows and pressures in pipes, water level in reservoirs, etc.).

The contract no. B1-2 represents the geophysical and hydro-geological investigations of water sources within municipalities Herceg-Novi, Kotor, Tivat, Budva, Bar and Cetinje. The work foresaw the realization of geophysical and hydro-geological investigations in order to determine conditions and possibilities for tapping additional quantities of water for solving the problem of water supply. The contract was realized according to the investigation programs in period from July 2001 until October 2002. According to multidisciplinary investigations which were performed, the contract resulted in determination of possible additional water sources (15 l/s in Bar and 20 l/s in Budva), which could be used for water supply of the inhabitants, and to the works that should be done in order to realize that goal.

The general objective of the number of contracts referenced under no. B1-3, as well as the contract no. B1-6, was to prepare the design documents for the realization of the second phase of urgent measures, named reconfiguration measures and urgent measures on pump stations and reservoirs. One contract was signed with "ITR system d.o.o" for the purpose of supervision services for the same measures.

The scope of the contract no. B1-4 was to perform an analysis and diagnosis of the operation of particular components of the municipal water supply systems, and to select the low risk emergency measures which were supposed to be implemented in order to rapidly improve its performance and reliability.

The objective of the contract no. B1-5 was the inspection of all water supply pump stations in municipalities of Kotor, Tivat, Budva, Bar and Cetinje. The produced report comprises the list of pump stations, maps with marked locations, short description with functional schemes and proposals of measures for rehabilitation, instructions for preparation of final electro-mechanical designs and algorithms of activities for recovery.

Physical measures – works

Civil works executed in the five municipalities participating to the Project, Kotor, Tivat, Budva, Bar and Cetinje, represent a wide scope of activities which were aimed to efficient improvement of the water supply sector. The following table represents the general overview of the signed contracts, which refer to the coastal municipalities and Cetinje.

Description	Contract No.	Contractor	Total Value of Contract [Euro]
Civil works first phase – Urgent measures on rehabilitation of the system	C1-1	Gemax	232.514,86
		Integral Inženjering	321.533,57
Civil works – Nalježići	C1-2	Gemax	29.267,53
Civil works second phase – Urgent measures on pump stations and reservoirs	CD1-1	Gemax	147.476,65
		Integral Inženjering	220.452,20
		Hidromol	212.059,42

Civil works second phase – Selected reconfiguration measures	AD2-1	Gemax	152.458,00
	CD1-2	Hidromol	3.605,00
	D1-4-I	Integral Inženjering	201.031,47
	D1-4-II	Hidromol	78.016,02
	D1-4-III	Hidromol	56.881,13
	D1-4-IV	Gemax	35.127,11
TOTAL			1.690.422,96

The detailed explanations of the works performed are given as the separate paragraphs referring to particular municipality.

In the first phase, the works were performed on the base of design documents submitted by the local water utilities. These urgent measures represented mostly the construction of new pipelines, and the two contractors (“Gemax d.o.o.” and “Integral Inženjering d.o.o.”) have been selected through one tender procedure, since there were 6 separate lots, or sections, for which the bidders have submitted their bids. The sections were divided on the base of the lowest evaluated price, in such a manner that both contractors have been awarded physically and financially equal shares. Only after the evaluation of the bids, Herceg Novi withdrew from the project, and the section of the contract for the works in this municipality which was supposed to be awarded to “Gemax d.o.o.”, was cancelled.

The second phase of works implied a several number of tender procedures of a more complex nature. These are also thoroughly explained in subsequent paragraphs.

Municipality of Kotor

The following table gives the overview of physical measures implemented under the Project in the municipality of Kotor. The financial amounts of the contracts referenced under nos. C1-1/1, CD1-1/2 and AD2-1 correspond to the part of the works executed in the municipality of Kotor, while the other contracts are related entirely to this municipality.

Contract No.	Contractor	Description	Contract Amount (€)
C1-1/1	Gemax	Rehabilitation of the Water Distribution Network on the following project sites: - Old Town of Kotor (New DN200/90 PE & DN200 Steel pipeline) - Dobrota (3000 meters of the new PE DN160 pipeline including tapping bridges for house connections) - Skaljari (New DN150 PE pipeline including house connections) - Naljezici (New PE DN150 pipeline) - Simis (New PE DN150 pipeline)	196.190,79
C1-2	Gemax	Civil Works on installation of the new PE DN160 pipeline in Naljezici	29.267,53
CD1-1/2	Integral Inzenjering	Mechanical works on installation of the new pumps in the pump station Skaljari	23.465,62
		Civil Works on construction of the new booster station for Skaljari and Prcanj	36.283,78
		Mechanical works on installation of the new pumps in the pump station Reservoir Risan	12.687,28
AD2-1	Gemax	Installation of the electromagnetic flow meters	122.344,14
D1-4-IV	Gemax	Civil works on installation of the new DCI DN200 pressure pipeline from the PS Skaljari to the BC Trojica	35.127,11
TOTAL FOR WORKS IN KOTOR			455.366,25

By rehabilitation of the water distribution network on several locations in the first phase of works in the municipality, the water losses in the system have been considerably decreased. In October 2001, water supply of the municipality was performed for the first time without restrictions when the water on the main source was still salty. The consumers in the region of Škaljari have been supplied by potable water in the summer period for the first time since 1979.

By construction of the primary (PE DN200) and secondary pipeline (PE DN90) in length of 280 m along the Old town of Kotor, and additional 160 m of DN200 plastic coated cement lined steel pipe outside the city walls, the equal distribution of water to the inhabitants on both sides of the Kotor bay, during the summertime, has been achieved.

Installation of the new PE DN150 pipeline in Dobrota (length of 3km including 50 tapping bridges and surface boxes for future house connections to be made at a later date), replaced the 100 years old water mains. The normal water supply of 3000 habitants was provided.

In project site Skaljari 500m of DN150 PE pipe was installed including tapping bridges and 60 house connections and surface boxes.

Implementation of civil works at project site Naljezici was already prepared under the Contract C1-1/1 and included performing of the by-pass pipeline PE DN150. The construction started, but could not be finished due to unsolved problems with private properties and the planned pipeline's route had to be replaced with the route along the existing creek bed. This replacement of the route

could not be treated as a part of the original Bill of Quantities nor considered as an additional work. In order to complete the works at this project site the PEW has been forced to organize a separate tender procedure (contract reference no. C1-2). The works included specific works on placement of the PE DN150 pipe into concrete case in order to protect this pipeline from the outside influences along the creek. As an additional protection the pipe has been sleeved through by a DN200mm PVC pipe. Finally, the total of 570m of DN150 PE pipe has been constructed at this site, including all associated valves, fittings and valve chambers.

In project site Simis 375m of DN150 PE pipe was installed including all associated valves and fittings and construction of valve chambers.

In the second phase of physical measures in the municipality of Kotor, three contracts were executed. The contract no. CD1-1/2 was signed with “Integral Inzenjering d.o.o.”, and it was executed in municipalities of Kotor and Cetinje. In Kotor, three measures have been completed under this contract. Their realization was influenced by the delivery of the pumps by “KSB Fluid System” under the Contract A2-3. Due to delay in delivery of several months the construction started in August 2003. After delivery of the pumps, the construction was successfully completed on the project sites PS Skaljari and PS Reservoir Risan. The installation of the new booster station improved the water supply of the consumers in the region of Skaljari and Prcanj. Regarding the other two pump stations Skaljari and Risan, the activities that have been carried out, are giving very good results especially in PS Skaljari where the new pumps along with the newly installed pressure pipeline (contract no. D1-4-IV) provide normal water supply of that region including the Industrial Zone of Kotor.

The construction of eleven new monitoring-stations, as part of the contract no. AD2-1 in the municipality of Kotor, on the main distributive pipelines and in reservoirs, made possible the acquirement of necessary information about the water quantities supplied, especially during the summer period.

The works under the contract no. D1-4-IV were carried out in period March - May 2003. This measure represents replacement of the 30 years old steel pipeline. Due to salt water pipeline was very damaged and large leakages were present (according to some estimations 20l/s of leakages). The old pipeline is replaced with the DCI DN200 pipeline with inside cement protection. The works are carried out along the very difficult route and selected pipe material is more than appropriate for the working conditions. The pipeline was connected to the network and it is providing the normal water supply of the industrial zone and of three villages, which was not the case in the previous years.

Municipality of Tivat

The following table gives the overview of physical measures implemented under the Project in the municipality of Tivat. The financial amount of the contract referenced under no. C1-1/1 corresponds to the part of the works executed in the municipality of Tivat, while the contracts nos. D1-4-III and CD1-1/1 are related entirely to this municipality.

Contract No.	Contractor	Description	Contract Amount (€)
C1-1/1	Gemax	Rehabilitation of the Water Distribution Network on the following project sites: - Refurbishing Plavda Valve Chamber - New PE DN300 gravity pipeline Podkuk-Gas station	36.324,08
CD1-1/1	Gemax	Civil works on construction of the new reservoir chamber Pod Kuk capacity of 1000 m ³ including installation of the new electrically operated valves to the city	147.476,65
D1-4-III	Hidromol	Rehabilitation of the Water Distribution Network on the following project sites: - Markusevina (New PE DN100 pipeline including house connections) - Cesljar (New PE DN100 pipeline including house connections) - Gornji Kalimanj (New PE DN75 pipeline including house connections) - Marici (New PE DN200 and PE DN50 pipeline including house connections) - Popovina (New PE DN75 and PE DN50 pipeline including house connections) - Donji Kalimanj (New PE DN50/32 pipeline including house connections) - Gornje Seljanovo (New PE DN75/50 pipeline including house connections) - Air valve manhole close to the Gas station	56.881,13
TOTAL FOR WORKS IN TIVAT			240.681,86

With reconstruction of the water supply network in Tivat during first phase of urgent measures (year 2001) leakages were reduced from 54% to 45%. During the restriction period in year 2002, the consumers were supplied with water 13 hours daily in regard to 7 hours during the previous year.

By installation of the new electro-mechanical operating valves in the new valve chamber, distribution of water from the main source Plavda was facilitated, with good base for the future automatic regulation of the water supply.

The construction of the new PE DN300 pipeline in length of 610m including all associated valves and fittings and construction of valve chambers, replaced the old distribution pipeline between the valve chambers in Podkuk and Gas-Station. In this manner the “bottle-neck” on this part of the system was removed and flow rate to the city increased.

Construction of the second chamber of the reservoir Podkuk, capacity of 1000 m³, represents final completion of the Podkuk reservoir which, now with two chambers total capacity of 2000 m³, provides much improved water supplying of Tivat. The works have been completed in May 2002. Installation of the new electrically operated valves on the inlets and outlets from both chambers secures the equal restrictions and water distribution in summer period along with the new valves installed in the manholes Plavda and Podkuk within first phase of urgent measures.

The works under the contract no. D1-4-III included the installation of the new pipelines on 8 locations within water supply system of Tivat. The installation was followed with connection of the consumers to the new water mains.

At project site Markusevina the old PVC pipeline was replaced with the new PE DN100 pipeline including one house connection. On several places old pipe was damaged and during the previous years the water utility Tivat had problems with frequent leakages on the old pipeline.

At project site Cesljar the old pipelines diameters from 75 to 100mm were replaced with the new PE80 DN100 pipe including house connections. The new pipeline is connected to the local source and water supplying of this region was improved.

At the project site Gornji Kalimanj by installation of the new PE DN65 pipeline the water pressure was increased, which was not the case in the recent years. Ten new house connections were installed with the surface boxes and telescopes.

At project site Marici the 100 years old pipe DN100 with the frequent leakages was replaced with the new PE80 DN200 pipe including connecting sections DN50 and DN32. By installation of pipeline DN200 the connection between two zones (upper and lower) has been achieved. This project site included also 20 house connection to the new pipeline.

At project site Popovina the old PVC DN50 pipeline with frequent leakages due to bad quality of the pipe material was replaced with the new PE80 DN75 and DN50 pipes including 24 house connections.

The old damaged AC pipeline with frequent leakages at project site Donji Kalimanj was replaced with the new PE DN50 pipeline with 4 house connections.

At the project site Gornje Seljanovo the new PE DN75 and DN50 pipeline was installed with the new house connections. The connections were performed directly to the house water meters and any possibility of illegal connection was eliminated.

Installation of the air valve on the gravity pipeline DN200 (close to the Gas station) secures this part of the system against the water hammer, which is present especially during the summer period. As a result of the water hammer, the leakages were always present on this part of the system.

Municipality of Budva

The following table gives the overview of physical measures implemented under the Project in the municipality of Budva. The financial amounts of the contracts referenced under nos. C1-1/2, and CD1-1/3 correspond to the part of the works executed in the municipality of Budva, while the contract CD1-2 is related entirely to this municipality.

Contract No.	Contractor	Description	Contract Amount (€)
C1-1/2	Integral Inzenjering	Rehabilitation of the Water Distribution Network on the following project sites: - Milocer (New DN450 steel pipeline in length of 50m) - Smokov Vijenac (New DN300 PE pipeline) - Smokov Vijenac Landslide (New DN250 PE pipeline) - St. Jovan (New DN280 PE pipeline) - Settlement Ivanovici (New DN250 PE pipeline)	77.561,72
CD1-1/3	Hidromol	Civil Works on installation of the new water hammer equipment on the pump stations Utrg and Sjenokos	29.636,39
		Civil Works on rehabilitation of the source Podgor	14.229,25
CD1-2	Hidromol	Civil and mechanical works on installation of the new sector valves in the water junctions within Municipality of Budva	3.605,00
TOTAL FOR WORKS IN BUDVA			125.032,36

The results of the urgent measures in the municipality of Budva are related to the increase of the water flow to the city. The existing gravity pipeline was replaced with the new in length of 1,3 km.

In Milocer, by installation of the 50m of steel pipeline DN450, the damaged gravity pipeline was rehabilitated, and after several years it is functioning again.

By replacement of the old and installation of the new pipelines in two locations at the project site Smokov Vijenac (25 and 220 m), the adequate protection of the distributive pipeline towards the town has been enabled.

By replacement of the existing DN250 AC distributive pipeline with 530m of new DN250 PE pipeline on the location of St. Jovan, the water flow towards the town of Budva has been increased and the outflow in the reservoir of Rezevici prevented.

At the project site settlement Ivanovici the new DN250 PE pipeline in length of 370m was installed including all valves and fittings and construction of manholes.

The measures under the contract no. CD1-1/3 represent rehabilitation of water hammer equipment at the pump stations Utrg and Sjenokos along with the revitalization of the source Podgor within water supply system of Budva. The civil works on rehabilitation of the source Podgor implied also the installation of the underwater pipeline DN600. Since these works could be performed only in the period of the hydrological minimum (during the summer), and since the water utility Budva was not willing to allow this activity in that period, PEW was forced to terminate the part of this contract and the final contract amount is 14,229.25 €.

The contract no. CD1-2 implied the civil and mechanical works on installation of the new sector valves in the water junctions within municipality of Budva. The total of four valve chambers was constructed with the installation of all corresponding water supply material.

Municipality of Bar

The following table gives the overview of physical measures implemented under the Project in the municipality of Bar. The financial amounts of the contract referenced under no. C1-1/2 corresponds to the part of the works executed in the municipality of Bar, while the contract D1-4-I is related entirely to this municipality.

Contract No.	Contractor	Description	Contract Amount (€)
C1-1/2	Integral Inzenjering	Rehabilitation of the Water Distribution Network on the following project sites: - Kajnak – Kurilo (New DN400 steel pipeline) - Canj (New PE DN150 pressure and PE DN280 gravity pipeline) - Bjelisi (New PE DN250 pipeline)	98.411,17
D1-4-I	Integral Inzenjering	Civil works on connection of the reservoir Susanj to the water supply system of Bar, including the rehabilitation of the reservoir walls. Reservoir is connected with two PE100 DN400 pipeline in total length of 2x389 meters.	201.031,47
TOTAL FOR WORKS IN BAR			299.442,64

At project site Kajnak Kurilo 500m of existing DN400 steel pipeline was replaced with new DN400 plastic coated cement lined steel pipe, including installation of all valves, fittings and construction of manholes. This measure improved and increased the flow of the water from the source Kajnak towards the town.

The measure at project site Canj implied the replacement of 550m of existing steel pressure main with DN150 PE pipe and 250m of existing steel gravity main with DN250 PE pipe, including installation of all valves, fittings and construction of manholes. This measure provided the normal water supply to the tourist place Canj during the summer period.

By installation of the PE DN250 in length of 300m in Bjelisi settlement further development in extension of the water supply network was enabled, in situation where the old pipeline had no capacity to provide the normal water supply of the consumers.

The rehabilitation of the reservoir Susanj, including the installation of two PE100 DN400 pipelines in length of 389 meters, reconnected this important water facility to the water supply network of the municipality of Bar. In previous years this reservoir was not in function since the pipelines by which it was connected to the network were damaged and located below a number of houses constructed illegally on that location.

Municipality of Cetinje

The following table gives the overview of physical measures implemented under the Project in the municipality of Cetinje. The financial amounts of the contracts referenced under nos. C1-1/2, CD1-1/2, CD1-1/3 and AD2-1 correspond to the part of the works executed in the municipality of Cetinje, while the contract D1-4-II is related entirely to this municipality.

Contract No.	Contractor	Description	Contract Amount (€)
C1-1/2	Integral Inzenjering	Rehabilitation of the Water Distribution Network on the following project sites: - Street Pavle Rovinski (Replacement of the House Connections) - Street IV Proleterska (New DN150 PE pipeline) - Street Vojvode Boza (Replacement of the House Connections) - Street Hercegovacka (New DN150 PE pipeline) - Street Nikola Lekic (Replacement of the House Connections) - Street Bajova (New DN200 PE pipeline) - Street Jabucka (New DN100 PE pipeline) - Route Predgradje-Mala Pijaca (New DN200 PE pipeline) - Street Gruda-Donje Polje II (Replacement of the House Connections) - Street Medovina (New DN63 PE pipeline) - Settlement Humci (New DN250 PE pipeline)	145.560,68
CD1-1/2	Integral Inzenjering	Civil Works on reconstruction of pump station Uganjska Vrela	108.218,31
		Civil Works on construction of new booster station Zagrablje including new DN110 PE pipeline in the streets Ivanovica and Gruda – Donje Polje	39.797,21
CD1-1/3	Hidromol	Civil Works on installation of the flow meters and new water hammer equipment on the pump station Podgor	85.019,94
		Civil Works on installation of the flow meters and new water hammer equipment on the pump station Visnjica	83.173,84
AD2-1	Gemax	Installation of the measuring equipment and electrically operated valves on the outlets of the Reservoirs Zagrablje I, Zagrablje II and Sandin Vrh	30.113,86
D1-4-II	Hidromol	Civil works on installation of the new PE DN300 gravity pipeline from the BC Lasor to the Reservoir Zagrablje	78.016,02
TOTAL FOR WORKS IN CETINJE			569.899,86

The first phase of urgent measures gave very good results in the municipality of Cetinje. The works were related to the installation of the new pipelines with new house connections. New PE pipes were installed in length of 2360m and including 260 pieces of new house connection with the surface boxes. With rehabilitation of the water supply network along the streets, the water losses have been considerably decreased. By replacement of the pipeline on one of the working sites the losses of 15 l/s were eliminated.

At project sites in streets of Pavla Rovinjskog, Vojvode Boza, Nikole Lekica and Gruda-Donje Polje the total 165 new house connections including surface boxes have been installed.

At project site street IV Proleterska 350m of DN150 PE pipe including tapping bridges and 25 house connections and surface boxes have been installed.

At project site street Hercegovacka 250m of DN150 PE pipe including tapping bridges and 30 house connections and surface boxes have been installed.

At project site street Bajova 400m of DN200 PE pipe including tapping bridges and 60 house connections and surface boxes have been installed.

At project site street Jabucka 250m of DN200 PE pipe including tapping bridges and 15 house connections and surface boxes have been installed.

On the route Predgradje - Mala Pijaca 800m of DN200 PE pipe including tapping bridges and 50 house connections and surface boxes have been installed.

At the project site street Medovina 250m of DN63 PE pipe including tapping bridges and 15 house connections and surface boxes have been installed. The consumers inhabiting this part of Cetinje were provided with water after 12 months.

At project site Humci new 60m length DN200 PE pipe including all associated valves and fittings have been installed including the construction of the valve chamber.

In the second phase of physical measures in the municipality of Cetinje, four contracts were executed, with several measures. The contract no. CD1-1/2, signed with “Integral Inzenjering d.o.o.”, in relation to part executed in the municipality of Cetinje, referred to the reconstruction of pump station Uganjska Vrela and construction of the new booster station Zagrablje including new DN100 PE pipeline in the streets Ivanovica and Gruda – Donje Polje.

The rehabilitation of the pump station Uganjska Vrela gave very good results regarding the saving of the electrical energy during the winter period, and with 50 l/sec provides better water supply of Cetinje. A new electrical transformer station was also constructed.

The new booster station at Zagrablje, supplied by KSB, significantly improved the water supply of nearby residents.

In the streets of Ivanovica and Gruda – Donje Polje, the total of 900 m of DN100 PE pipelines has been installed, including house connections and surface boxes.

The contract no. CD1-1/3, signed with “Hidromol d.o.o.”, represented the installation of the new water hammer protection equipment for the pump stations Podgor and Visnjica within water

supply system of Cetinje. Pump stations Podgor and Visnjica are principal pump stations of the water supply system of Cetinje, with the working pressure of 40 bar. The reconstruction on these two pump station included also the installation of the AquaMaster flow meters. For the first time water utility of Cetinje had the information about the produced amount of water.

The construction of three new monitoring-stations, as part of the contract no. AD2-1 in the municipality of Cetinje, in reservoirs, made possible the acquirement of necessary information about the water quantities supplied. Along with the installation of the measuring equipment, the electrically operated valves DN350 with supplementary equipment were installed at the reservoirs Sandin Vrh and Zagrablje I. For the first time within water supply system of Cetinje, the quantity of the water distributed to the city was regulated according to the output data from the measuring equipment. In each moment of time the total flow to the city is defined and can be controlled according to the demand. These data along with the ones from the pump station Podgor and Visnjica give the right representation of the produced and supplied quantities of water.

The contract no. D1-4-II, signed with “Hidromol d.o.o.”, referred to the installation of the new PE100 DN300 gravity pipeline from the break pressure chamber Lasor to the reservoir Zagrablje, in total length of 1105 m. This measure was important due to significant leakages of the existing AC DN200 pipeline, which was not in function for several years. The realization of this Contract has been temporarily stopped due to unsolved private property issues along the route of the pipeline. Only in November 2004, the municipality of Cetinje solved these issues and the works recommenced in March 2005 (the delay was caused by weather conditions – snow). The works have been completed in June 2005.

II. IMPLEMENTATION OF THE PROJECT

Public Enterprise for Water Supply, Waste Water Treatment and Drainage and Solid Waste Disposal “Regionalni vodovod Crnogorsko primorje” was the Project implementation unit in the name of the Government of the Republic of Montenegro.

In order to implement the Project in a manner satisfactory to KfW, in accordance with sound financial and engineering practices, and in accordance with the conception agreed upon between the Government of the Federal Republic of Germany and Government of the Republic of Montenegro, KfW has granted to PEW a financial contribution in the amount of 2,0 million DEM (Financial Agreement dated December 19th, 2000). This amount, along with the 211.674,84 € disbursed from the Project, was paid to the German limited liability company “Aquamundo GmbH” created by the German companies from the water supply and sewage disposal sector (ABB AG, Bilfinger+Berger BOT GmbH and MVV Energie AG), for the purpose of:

- Preparation of legal, financial and technical documents necessary for the foundation of “Monteaqua” llc., and
- Technical assistance to the Borrower in implementation of the Project.

“Aquamundo GmbH” has signed, along with Montenegrin private company “Merkur group”, and PEW a Consortium Agreement dated November 8th, 2000, whose purpose was to jointly inspect, investigate, repair, renew and extend the existing systems for water supply and waste water drainage in the coastal area of Montenegro and Cetinje. This Consortium was to be terminated as soon as the intended Public-Private Limited Liability Company “Monteaqua” has been founded.

Additionally, PEW, represented by KfW, has signed a Consulting Contract with “Aquamundo GmbH” dated December 19th, 2000, for consulting services for the preparation of the private sector participation in the rehabilitation, operation, extension of the water supply and sewerage of the coastal region of Montenegro and Cetinje.

“Aquamundo GmbH” has been thoroughly involved in the first phase of the implementation of the Project, and has gave a significant positive impact.

The complex institutional setup was aimed to efficiently improve the situation in water and sewage sector, where a significant number of activities had to be done in parallel with the implementation of the project. Due to several different factors, the planned institutional concept has failed and it has been abandoned, but in no time this has endangered the good quality of the project’s implementation (the Consortium Agreement with “Aquamundo GmbH” ended in June 2002).

From the very beginning of the implementation of the Project, PEW had a close cooperation with the representatives of the local (municipal) water utilities. For the purpose of implementation of the best engineering practices in the execution of the works, during the entire period of implementation of the project, a water utility, which was the final beneficiary of the works, had a member of the supervision team organized by PEW. Additionally, in the first phase of works, PEW signed a contract with a foreign consultant experienced in supervision and implementation of similar contracts. Apart from the good work that this consultant has performed, PEW’s and local water utilities’ personnel benefited from his experience, too. This concept proved to be very efficient, since no difficulties aroused in this respect, although PEW was responsible for the implementation of the Project, while five municipal water utilities were the final users.

Several factors have influenced the delays which occurred during the project's implementation period. Since the separate contracts have been signed for the supply of goods and procurement of works, late delivery of the goods to the project sites was one of the major issues. Regarding the first phase of the works, the goods were provided under the contract A2-1 signed with "Raku Handels GmbH". Although the specification of the goods was prepared according to the design documents submitted by municipal water utilities, due to their imperfection, several additional contracts of relatively smaller value were signed. This was the case only after the works on the sites have already commenced, and the tender procedures for the provision of these additional goods took some time. Regarding the second phase of works, the late provision of pumps by "KSB Fluid System" under the Contract A2-3, caused the delay in execution of works of several months. The liquidated damages clause from the contract was enforced in this case.

One of the reasons for the delay was the late provision of the site to the contractors caused by the difficulties in obtaining statutory approvals from the various authorities. Additionally, the local law requires the stop of all construction activities during the months of June, July and August, especially on the main roads.

In some occasions, the works on installation of the pipelines were delayed because the route led through private properties. As an example, the contract no. D1-4-II can be mentioned, where the municipality of Cetinje, after several months solved these issues.

Several problems in the implementation of the Project have arisen after the withdrawal of the municipality of Herceg Novi from the Project. This happened after the contract no. A2-1 has been signed and the deliveries have already commenced, and after the tender procedure and evaluation of bids for the first phase of urgent measures have been completed. The contracts for the part of the works in Herceg Novi have not been signed, while it was agreed that the goods foreseen for Herceg Novi are stored in PEW's warehouse. Afterwards, these goods were delivered to other water utilities participating to the Project.

In respect to the handing over procedures, in each contract financed under the Project, PEW was the signing party, and therefore, it had the responsibilities defined according to the terms of contracts.

In the goods contracts, PEW as the Purchaser, has received and, with the participation of water utility representative, has approved the quality, quantity and concordance with the technical specifications of the materials to the Supplier. Upon receipt, PEW has delivered the materials to the water utility with an appropriate Certificate of Delivery. These materials later on have been used for the execution of works under the Project, or as spare parts in daily maintenance performed by water utility.

Regarding the consultancy contracts, PEW has delivered the prepared studies, investment plans and programs to the referring municipalities. The design documents prepared under the consultancy contracts were used for preparation of tender documents for works.

In the works contracts, the municipal water utilities have been closely involved in the implementation of the project measures with permanent participation of its representative in the supervision team. Upon completion of works, the Final Taking-Over Notices have been issued to the water utility. It notified that the works at the Project site have been completed according to technical specifications detailed in the contract documents, and that the Defect Liability period of 12 months begins on the issuing date. All available operation and maintenance manuals have also been delivered to the water utility. Any defect which occurred during this period was reported by

water utility and PEW has promptly informed the contractor to make the necessary repairs. After the Defect Liability period for a particular water facility has expired, any obligation of PEW in respect to the contractor or water utility ceased to exist.

In order to determine the quality of work performed in the implementation of the project, KfW has engaged PwC Deutsche Revision for the special audit of the financial execution of the Project. The obligation of the auditor was the following:

- Review of order procedures and order placements financed out of the disposition fund and by direct disbursements
- Evidence of the proper use of funds disbursed by KfW
- Plausibility of the project measures from the technical point of view.

The results of the audit have shown that the auditor has “found no indications for irregularities in the order procedures and the award of contracts and for any misuse of funds” (PwC Deutsche Revision Special Audit Report dated October 7th, 2002).

III. COST AND FINANCING

The KfW loan in the amount of DEM 10.000.000 and accompanying agreements for grant fund use (2 million DEM for interest subsidy and 2 million DEM for consultancy services for preparation and implementation of new institutional concept) became effective on February 23rd, 2001, which was also the date of the practical beginning of the project's realization.

Considering the relatively low level of reliability of data on the existing condition of the local water supply systems, which were not prepared for investments, in the beginning of 2001, the newly founded consortium "Monteaqua" had a rather difficult task. The investment activities were to be carried out on the basis of the existing data, as well as to immediately ensure water supply improvement. Since at that moment all the knowledge was boiled down to the information gathered during work on the systems over many years, the water utilities' managements decided that through their daily cooperation with "Monteaqua", the objectively best possible conditions would be made for water utilities to carry out the selection of investment activities, i.e. to prepare the physical measures' plan.

After that phase had been successfully completed, the Consortium employees had, with great effort, managed to prepare the tender documentation and carry out transparent tender procedures, and, by means of fast-track model, provided the implementation of measures, as well as the investment supervision during their execution.

Thanks to that, in the first year of the project implementation 80% of the KfW loan was realized, which allowed for the invested funds to be used in the best possible way. This quick and successful realization of the loan enabled avoiding inflationary blow in January 1st, 2002 due to introduction of Euro. The Government of Montenegro also contributed to the successful project realization by exempting the project from tax and custom duties.

It should be noted that the official audit of the loan spending, carried out by "Price Waterhouse & Coopers", confirmed that the project had been managed successfully and in accordance with the existing international standards and procedures, as well as the special procedures of KfW, and that the investment measures had been fairly selected and implemented. It also confirmed that this public enterprise is fully capable of implementing such a complex project.

Considering that this is the final report of the Borrower on usage of loan funds, loan no. 9259, dated December 19th, 2000, the use of grant funds provided to "Aquamundo GmbH" for consultancy services was not dealt with in this report.

IV. PROJECT RESULTS AND ACHIEVEMENT OF PROJECT GOALS

More than 50 physical measures have been executed under the Project worth about 1,7 million Euro; 2,3 million Euro was spent for the procurement of the water supply material necessary for the works including spare parts; and 0,9 million Euro for the consultancy services.

The KfW loan no. 9259 was only the first step in wider investment cycle which was planned to be implemented in coastal area of Montenegro and Cetinje, with a scope of rapid improvement of water and waste water sector. The investments in local water supply networks were essential, since the differences in quantities of produced and invoiced water in each municipality were such that the normal operation of the water utilities was endangered. At the beginning of the Project implementation there was no or limited monitoring of produced quantity of water, while a significant number of consumers was paying a lump sum amount for the consumed water, without proper measurement; consequently the technical losses could not be measured adequately. That is the principal reason why the exact data demonstrating improvements reached in each municipality, shown by indicators, like water losses before and after the Project etc., were not available. The only exception is the municipality of Tivat, where it was calculated that the water losses were reduced from 54 to 45 %.

Although there is no precise information about the results of Project's activities, the impact of the Project was significant. It financed the rehabilitation of the local water supply networks after several years, increased the institutional and public awareness regarding the problems in water supply and restarted the investment cycle in this sector. After this Project, several new projects have been financed by KfW, but also from other international financing institutions. They were all aimed to upgrade and rehabilitate the coastal municipal water supply systems. That is the indispensable precondition for the final solution of the problems in this sector, which is the regional water supply from the Skadar Lake.

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Trg Sunca bb
85310 Budva
Republic of Montenegro
Phone: + 382 (0) 86 451 921
Fax: +382 (0) 86 451 937
E-mail: monteaqua@cg.yu
Website: www.pewmc.com

ANNEX I

**APPLIED INVESTMENTS FROM
KFW LOAN NO. 9259**

APPLIED INVESTMENTS FROM THE KfW LOAN 9259 (5,112,928.91 Euro) IN MUNICIPALITIES

Purpose of the Contract	No. of Contract	Contractor	Total Value of Contract	Kotor	Tivat	Budva	Cetinje	Bar	H. Novi	PEW
Supply of goods for realization of the urgent measures and for rehabilitation of the existing water supplying network	A2-1	RAKU	1,854,948.19	528,550.50	165,940.63	313,500.30	310,613.38	363,706.53	172,636.85	
	A2-2/1	Olimpos	45,741.33			13,445.27	17,090.46	15,205.60		
	A2-2/2	MIN	7,705.17					1,840.65		
	A2-2/3	Gemax	13,874.42		13,874.42	5,864.52				
	A2-2/4	3M PLUS	11,385.40				11,385.40			
	A2-3	KSB	105,978.23	62,693.95			43,284.28			
	A2-4/1	RAKU	180,937.17	42,807.04	20,689.57		60,770.36	56,670.20		
A2-4/2	Olimpos	93,483.82				36,259.58	57,224.24			
Five years investment plan - consultancy services Annex: Measuring stations Project	B1-1		152,270.39	33,076.10	33,076.10	33,076.10	33,076.10	9,983.00	9,983.00	
	B1-1 Annex	FIDECO	31,278.87	7,819.72	7,819.72	7,819.72	7,819.72			
Hydro-geological investigations – consult. services Annex 2: Buljarica	B1-2		207,358.90	50,116.83	38,030.91	33,085.95	17,383.80	35,852.43	32,888.98	
	B1-2 Annex	Hidromol	42,084.20			42,084.20				
Urgent measures on pump stations and reservoirs - consultancy services	B1-3	ITR - Design	10,634.87	5,423.78			5,211.09			
		ITR - Supervision	10,086.62	1,045.83	2,820.90	716.37	5,503.52			
		Vodoprojekt	8,691.96			1,789.52	6,902.44			
		Hidromol	4,136.35	1,232.21	1,733.28	1,170.86				
Priority measures on rehabilitation of the w. sup. s. - consultancy services	B1-4	FIDECO	90,360.61	22,590.15	22,590.15	22,590.15	22,590.15			
		Vodoprojekt	16,361.34					16,361.34		
Regional water supply – consult. services	B1-5	Fin Invest	109,211.15	18,201.86	18,201.86	18,201.86	18,201.86	18,201.86	18,201.86	
Preparation for selected reconfiguration measures	B1-6	GKW	34,500.00	4,800.00	3,900.00		7,050.00	18,750.00		
Civil works – Urgent measures on sanation of the system	C1-1	Gemax	211,857.65	182,513.73	29,343.92					0.00
		Gemax add. works	20,657.21	13,677.06	6,980.16					
		Integral Inž.	300,029.02			71,162.42	132,798.43	96,068.17		0.00
		Integral Inž. add.works	21,504.55			6,399.30	12,762.25	2,343.00		
Civil works – Najlezici	C1-2	Gemax	29,267.53	29,267.53						
Civil works – PS Opacica	D1-1	Integral Inž.	0.00							0.00
Civil works – Urgent measures on pump stations and reservoirs	CD1-1	Gemax	141,044.29		141,044.29					
		Gemax add. works	6,432.36		6,432.36					
		Integral Inž.	206,518.92	70,711.38			135,807.54			
		Integral Inž. add.works	13,933.28	1,725.30			12,207.98			
		Hidromol	201,213.05			43,865.64	157,347.41			
		Hidromol add works	10,846.37				10,846.37			
Selected reconfiguration measures	AD2-1	Gemax	152,458.00	122,344.14			30,113.86			
	CD1-2	Hidromol	3,605.00			3,605.00				
	D1-4-I	Integral Inž.	185,969.35					185,969.35		
		Integral Inz add works	15,062.12					15,062.12		
	D1-4-II	Hidromol	78,016.02				78,016.02			
	D1-4-III	Hidromol	51,821.47		51,821.47					
		Hidromol add works	5,059.66		5,059.66					
	D1-4-IV	Gemax	32,057.63	32,057.63						
Gemax add. works		3,069.48	3,069.48							
Consultancy services Aquamundo	AquaMundo		211,674.84	34,209.87	34,209.87	34,209.87	34,209.87	34,209.87	23,054.02	17,571.47
Other obligations			143,844.43	17,445.51	12,528.98	13,861.92	15,173.98	14,968.60	24,563.75	45,301.70
TOTAL SIGNED CONTRACTS :EURO			5,076,971.21	1,285,379.60	616,098.24	666,448.97	1,222,425.84	942,416.94	281,328.46	62,873.17
Remaining Funds			35,957.60							
Loan 9259			5,112,928.81							

ANNEX II

SPECIAL ACCOUNT FOR DISPOSITION FUND

N°	Name/Description	Total
1	Total funds (€)	1.347.147,69
2	Funds transferred so far to the special account (€)	1.347.147,69
3	Remaining funds (€)	2.765,39
4	Remaining funds %	0%
2	Funds transferred so far to the special account (€)	1.347.147,69
5	Disbursements made so far (€)	1.344.382,30
6	Account balance at the end of reporting period (€)	2.765,39
7	Forecasted payments for following reporting period (€)	0,00
6	Account balance at the end of reporting period (€)	2.765,39
8	Fund requirements during following reporting period (€)	-2.765,39