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VENEZUELA

WATER SUPPLY PROJECT FOR THE CENTRAL REGION

(VE-0052)

LOAN PROPOSAL

NOVEMBER 1987

**REGION CENTRAL
UBICACION RELATIVA NACIONAL**

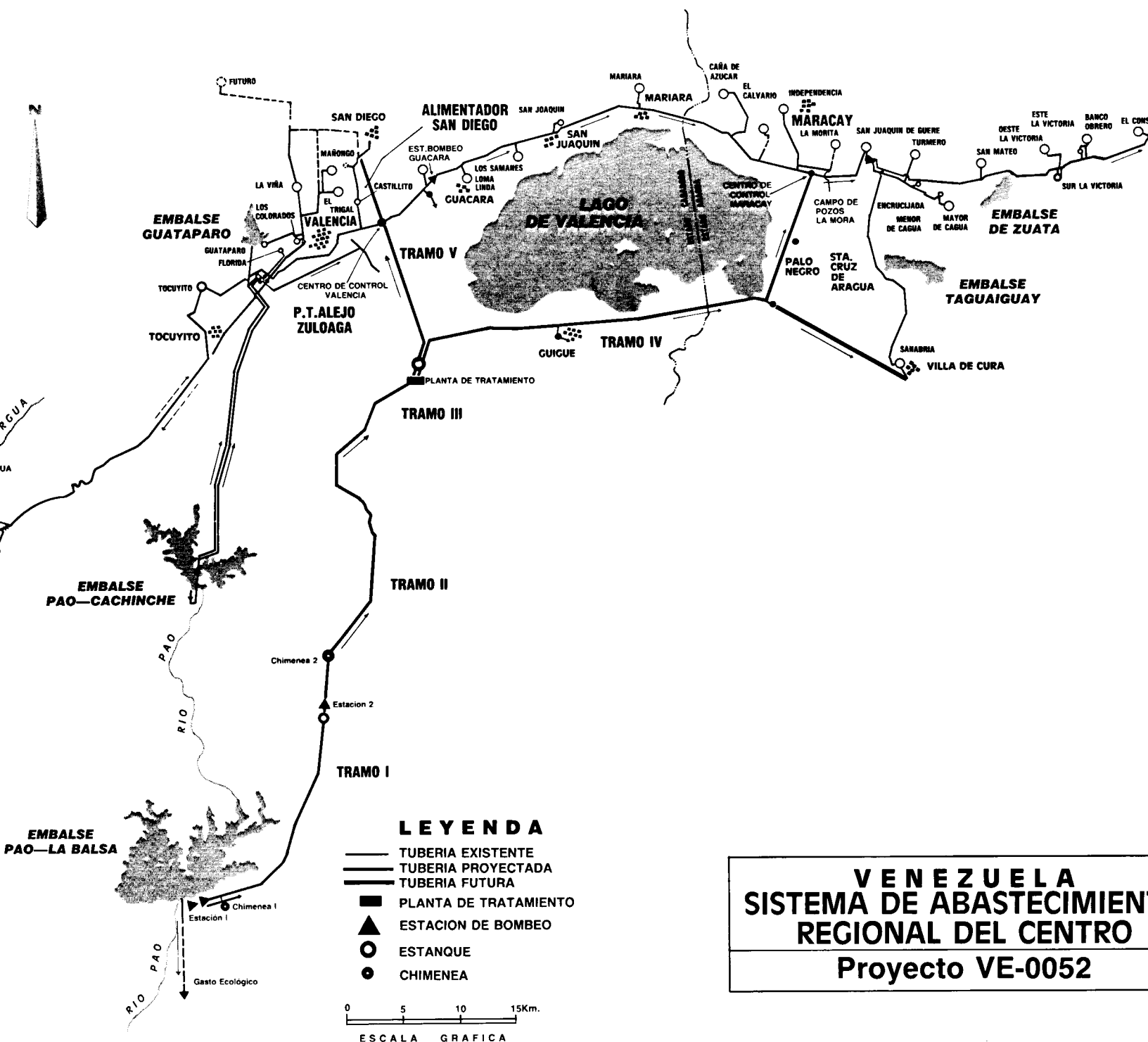
**PROYECTO DE AGUA POTABLE
PARA LA REGION CENTRAL
(VE-0052)**



LOCALIDADES DEL AREA DE INFLUENCIA DEL PROYECTO

PROYECTO DE AGUA POTABLE PARA LA REGION CENTRAL (VE-0052)





V E N E Z U E L A

Basic Socioeconomic Data

1. General

Land area (thousand of Km ²)	898,805
Total population (thousand of inhabitants, 1986)	17,914
Rural population (%)	18.7
Population growth rate (%) (1975-85)	2.9
Crude birth rate, per thousand population (1985)	29.0
Mortality rate per thousand population (1985)	4.6
Infant mortality rate per thousand live birth (1985)	26.1
Life expectancy at birth (years) (1985)	69.0
Literacy rate (%) (1984)	85.6

Wage Income Distribution (1982)

<u>Family Income</u> <u>Bracket (Bs/month)</u>	<u>Percentage of Wage</u> <u>Earning Families</u>	<u>Percentage of Wage</u> <u>Income Received</u>
up to 700	2.73	0.26
700 900	2.29	0.39
901 1,200	3.12	0.87
1,201 1,500	5.45	1.54
1,501 1,700	3.94	1.27
1,701 2,000	8.41	3.22
2,001 2,500	8.01	3.47
2,501 3,000	8.43	4.87
3,001 4,000	14.78	10.69
4,001 5,000	10.24	9.61
5,001 9,000	20.69	28.45
9,001 15,000	8.45	19.73
15,001 20,000	1.75	6.21
20,001 or more	1.53	9.36
Not Declared	0.18	-

Source: OCEI.

Per capita electric energy consumption Kwh/year (1985) 2,039

Economically Active Population by Sectors (Average, 1986)

<u>Sector</u>	<u>Thousand</u>	<u>Percentage</u>
Agriculture, forestry, fishing	874.1	14.5
Hidrocarbons and mining	66.8	1.1
Manufacturing	985.4	16.4
Electricity, gas and water	61.6	1.0
Construction	546.8	9.1
Commerce and financial services	1,481.0	24.6
Transportation and communications	373.6	6.2
Other services	1,636.5	27.2
TOTAL	6,025.6	100.0

Source: OCEI.

Urban Unemployment Rate (II Semester, 1986) 10.3

2. <u>Gross Domestic Product</u> 1/	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
<u>Sector of Origin</u>					
<u>Petroleum</u>	<u>22.0</u>	<u>20.1</u>	<u>25.4</u>	<u>22.4</u>	<u>15.3</u>
Production of crude	18.8	15.8	19.6	15.4	8.5
Refining	4.2	4.3	5.8	7.0	6.8
<u>Rest of the Economy</u>	<u>77.0</u>	<u>79.9</u>	<u>74.6</u>	<u>77.6</u>	<u>84.7</u>
Agriculture	5.9	6.7	6.9	7.8	8.9
Non-oil manufacturing	11.7	12.7	13.7	14.3	16.1
Construction	5.4	4.9	3.0	3.0	3.7
Services 2/	52.6	53.4	49.0	50.2	53.6
Others 3/	1.4	2.2	2.1	2.3	2.4
<u>End Use</u>					
Consumption	75.9	79.8	72.9	75.5	80.6
Gross domestic investment	26.4	14.2	14.8	14.6	20.3
Rest of the world 4/	-2.3	6.0	12.3	9.9	-0.9

- 1/ Percentage distribution based on GDP estimates at current prices.
 2/ Includes transportation and communication, commerce, financial services, government services and other services.
 3/ Includes non-oil mining, electricity, gas and water.
 4/ Exports of goods and services minus imports of goods and services.

Gross Domestic Product Real Growth
 (at constant 1968 prices)

	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
GDP	0.6	-5.6	-1.4	0.3	5.2
<u>Petroleum</u>	<u>-6.6</u>	<u>-4.1</u>	<u>0.3</u>	<u>-3.3</u>	<u>4.9</u>
Production of crude	-8.5	-6.7	0.6	-6.3	6.6
Refining	1.2	5.4	-0.7	7.4	-0.2
<u>Rest of the Economy</u>	<u>1.3</u>	<u>-5.7</u>	<u>-1.2</u>	<u>0.6</u>	<u>5.2</u>
Agriculture	3.6	0.4	0.8	5.7	6.0
Non-oil manufacturing	2.2	-1.6	5.1	1.7	5.6
Construction	-4.8	-13.5	-34.4	-4.1	15.8
Services	1.4	-7.3	-1.1	-0.3	4.1
Others	1.6	0.1	2.2	4.0	8.9

	Millions of US\$				
	1982	1983	1984	1985	1986
3. Foreign Trade					
Exports of goods (FOB)	16,516	14,759	15,967	14,178	8,686
Petroleum	15,627	13,667	14,794	12,862	7,218
Iron	83	80	81	107	186
Aluminum	293	439	370	375	347
Steel	52	149	134	192	223
Cacao	15	18	15	18	17
Coffee	3	5	22	27	57
Other	443	401	551	596	638
Imports of goods	12,797	6,409	7,262	7,388	7,700
Consumer goods	3,908*	1,912*	1,518	1,529	1,217
Intermediate goods	4,006*	2,368*	3,057	2,763	2,587
Capital goods	4,883*	2,129*	2,687	3,096	3,896

* Central Bank data in bolívares transformed into dollars using the (average) implicit rate of exchange.

	Millions of US\$				
	1982	1983	1984	1985	1986*
4. Balance of Payments					
Exports of goods (FOB)	16,516	14,759	15,967	14,178	8,686
Imports of goods (FOB)	-13,584	-6,409	-7,262	-7,388	-7,700
Services (net)	-6,539	-3,712	-3,150	-3,739	-2,525
(Investment income, net)	(-1,530)	(-2,133)	(-1,352)	(-2,338)	(-1,465)
Transfers	-639	-211	-137	-128	-89
Balance in current account	-4,246	4,427	5,418	2,923	-1,628
Net capital flows	3,911	-3,402	-3,848	-1,115	-2,175
Errors and omissions	-2,385	-278	308	-101	0
Change in net internal reserves (- = increase)	2,446	-468	1,878	1,757	3,803

* Preliminary estimate.

5. <u>Public Finances</u>	Percentage of GDP				
	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
<u>Central Government</u>					
Current revenues	26.9	24.7	28.5	28.6	25.4
Current expenditures	18.7	18.6	19.8	19.5	18.7
Savings in current account	8.1	6.1	8.7	9.1	6.7
Capital expenditure	13.0	8.4	6.0	6.9	7.9
Surplus (+) or deficit (-)	-4.9	-2.3	2.7	2.3	-1.2
Domestic financing	2.2	2.8	-1.4	-2.3	1.2

6. <u>Money and Credit</u>	Millions of Bs as of December 31				
	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
<u>Foreign Assets (net)</u>	41,674	51,114	77,397	85,703	91,580
<u>Domestic Credit</u>	94,904	100,811	114,211	105,405	142,030
To the government (net)	-2,212	-1,715	-5,116	-20,965	-19,435
To public enterprises	1,261	1,488	1,073	1,492	1,274
To the private sector	86,879	91,625	106,934	118,120	152,458
Money (M1)	58,015	70,049	86,693	93,708	98,479
Quasi-money	57,979	69,994	76,787	88,603	119,418
Monetary liquidity (M2)	115,994	140,043	163,480	182,311	217,897

	Percentage Change				
	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
<u>Foreign Assets (net)</u>	9.4	22.7	51.4	10.7	6.9
<u>Domestic Credit</u>	22.4	6.2	13.3	-7.7	34.7
To the government (net)	74.6	22.5	-198.3	-309.8	7.3
To public enterprises	-14.5	18.0	-27.9	39.0	-14.6
To the public sector	12.7	5.5	16.7	10.5	29.1
Money (M1)	5.6	20.7	23.8	8.1	5.1
Quasi-money	20.2	20.7	9.7	15.4	34.8
Monetary liquidity (M2)	12.4	20.7	16.7	11.5	19.5

7. <u>Prices</u>	<u>Annual Percentage Change</u>				
	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Consumer	9.9	6.7	11.9	11.4	11.6
Wholesale	8.1	7.0	17.5	18.2	15.7
Wholesale (imported)	7.3	6.0	17.8	15.3	9.2
GDP deflator	1.4	5.7	21.3	6.8	3.2

8. <u>External Public Debt</u>	<u>End of</u>		
	<u>1984</u>	<u>1985</u>	<u>1986</u>
Outstanding balance	27,322.6	26,538.6	25,291.6
1. Commercial banks	24,207.8	23,539.7	22,783.0
2. Other creditors	3,114.8	2,998.9	2,508.6
Bond holders	1,791.1	1,934.3	1,725.4
Suppliers and contractors	831.7	677.7	518.3
Multilateral agencies	333.2	290.9	200.8
Other governments	155.7	96.0	64.1
Others	3.1	-	-

9. <u>Debt Service</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
Total debt service (millions of US\$)	6,261	4,997	5,083
Debt service/exports of goods and non-factor services (%)	38.1	35.2	58.5

10. IDB Loans Approved up to December 31, 1986

	<u>Millions of US\$</u>	<u>Percentages</u>
Total approved (39 loans)	1,040.5	100.0
Ordinary capital	307.9	29.6
Interregional capital	558.3	53.7
FSO	101.4	9.7
Other funds	72.9	7.0
By sectors		
Agriculture and fisheries	198.8	19.1
Industry and mining	311.2	29.9
Tourism	-	-
Transportation and communications	-	-
Energy	374.5	36.0
Education, science and technology	34.6	3.3
Public health and environment	55.2	5.3
Urban development	31.9	3.1
Preinvestment and other	32.9	3.2
Exports financing	1.4	0.1

VENEZUELA
WATER SUPPLY PROJECT FOR THE CENTRAL REGION
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LOAN PROPOSAL

I. INTRODUCTION

A. Basic information on the operation

1. Date of request

- 1.01 The loan request, signed by the Ministry of Finance on behalf of the Republic of Venezuela, was submitted to the Bank on June 12, 1987, together with technical documentation concerning the proposed operation.

2. Borrower and executing agency

- 1.02 The borrower would be the Republic of Venezuela, and the project would be executed by the Instituto Nacional de Obras Sanitarias (National Sanitation Administration) (INOS). When the project was completed, the Empresa de Aguas Regional del Centro (Central Region Water Company) (EDARCA) would assume responsibility for operating, maintaining, and administering the water supply system.

3. Objective of the project

- 1.03 The basic objective of the project is to expand the water supply system in the Central Region in order to satisfy the needs of a population that is expected to reach 3.5 million in the year 2000, in 15 urban centers and 24 rural communities.

4. Description of the project

- 1.04 The essential elements of the project are as follows:

- (i) Catchment of a volume of flow of 5 cubic meters per second from the La Balsa reservoir on the Pao river.
- (ii) Expansion and rehabilitation of various components of the subsystems which comprise the Central Region System.
- (iii) A program for the institutional strengthening of the Empresa de Aguas Regional del Centro, C.A. (EDARCA).
- (iv) A program to protect the Pao river basin.
- (v) A program to reduce levels of water unaccounted for.

5. Total cost and financing of the project

- 1.05 The total cost of the project is estimated at the equivalent of US\$383.6 million. The prevailing exchange rate of 14.5 bolivars to one U.S. dollar was used.

a. Amount of the loan

- 1.06 The Bank's share of the financing for the project would be the equivalent of US\$153.4 million from the interregional capital resources (40% of the total cost).

b. Local contribution

- 1.07 The local counterpart funding for the execution of the project would be the responsibility of the borrower.

6. Terms and conditions of the proposed IDB loan

- 1.08 The terms and conditions of the Bank's loan would be as follows:

a. Terms

Disbursement period: 4 years
Grace period: 4 years
Amortization period: 25 years

b. Financial terms and conditions

Interest rate: Variable, in accordance with the Bank's policy
Credit fee: 1.25% on undisbursed balances
Inspection and supervision: 1% of the total amount of the loan

B. Background of the proposed operation

1. The Central Region of Venezuela

- 1.09 The Lago de Valencia basin in central Venezuela is, together with Metropolitan Caracas vicinity, the country's fastest-growing region in terms of population and urban and industrial development. This area is currently home to about 2 million persons, and its population is expected to reach approximately 3.5 million by the start of the next century. The region's 1,000 industries generate 70% of all manufacturing jobs in the country, not counting the petroleum sector. This urban and industrial growth has had a powerful impact on the ecology of the basin and particularly on its water resources. Since colonial times, a very large percentage of the nation's agricultural output has come from this watershed, with its 50,000 hectares of top-quality land situated around the lake at an elevation of more

than 400 meters above sea level. It is the only concentrated urban zone of the country which has very good prospects for agriculture and supplies a large volume of produce.

2. Growth in the demand for water

- 1.10 As the Lago de Valencia area has been developed, its water needs have grown sharply, and since 1973 it has been necessary to bring water in from the Pao river basin. According to the most recent estimates, urban water consumption in the zone is about 10.5 cubic meters per second, of which 7 cubic meters come from other watersheds. Estimates for the year 2010 set the demand for water at about 22 cubic meters per second. About 20% of the 2.4 million residents of the areas surrounding the Lago de Valencia currently do not have regular potable water service; they obtain their water from rural aqueducts or purchase it from water trucks. The shortage of water also is slowing industrial activity. Until now, the region has had ready access to the domestic market, owing to the proximity of the country's large urban centers, and to foreign markets (through Puerto Cabello) for exports of finished products and imports of raw materials and supplies. With the shortage of water, however, the general economic development of the region is suffering now as well. It is for this reason that the Venezuelan Government has assigned priority to works to expand the water supply system in the Central Region.

3. Formulation of the project

- 1.11 The Bank has taken an active part in the formulation of this project, which will resolve the problem of the water supply in the Central Region of Venezuela. Some factors taken into consideration were that the project was part of the Comprehensive Environmental Sanitation Program for the Lago de Valencia (see Chapter III for a description of this program) and that the priority ascribed to it was an indication that measures were needed immediately to increase the supply of water to a population that was beginning to be seriously affected by water shortages. On the institutional front, it was noted that by means of Decree 55 of 1984 the government had made provision for decentralizing the administration of the Instituto Nacional de Obras Sanitarias (INOS), the state agency in charge of water and sewerage systems for the country's population. The Bank had concurred with the national authorities that priority should be given to the establishment and start-up of the Empresa Regional del Centro (Lago de Valencia zone), and that the most effective and timely structural, organizational, and financial support possible should be provided for the execution of the works. To assist in the pursuit of this objective, a specialist was sent to Caracas for two weeks in May 1986, under a PAHO/IDB agreement, to help in the preparation of the organizational bases of the Empresa de Aguas Regional del Centro, C.A.

4. Advisory support from the Bank

- 1.12 In November 1985, a consultant from the Centro Panamericano de Ingeniería Sanitaria y Ciencias del Ambiente (CEPIS) in Lima completed, for INOS, a national diagnosis of the situation of water unaccounted for, and recommended that a pilot project be conducted in the Central Region system. The project was to include a hydraulic study, flow and pressure studies, detection of visible leaks, a system register, replacement of lines in poor condition, and system-wide and customer metering. It was recommended that INOS include the cost of implementing this pilot project in the total cost of the project.
- 1.13 Two consultants (a sanitation engineer and an economist) were hired under the PAHO/IDB agreement in December 1985 to conduct studies of demand and expansion alternatives for the water supply system in the Central Region. These studies, which were completed in the latter part of July 1986, included an economic feasibility study showing the cost-benefit ratio for the least-cost alternative, and a determination of prospective beneficiaries. Using resources from this same agreement, a consultant specializing in water quality was sent in June 1986 and May 1987 to assist the Ministry of the Environment with the studies it was carrying out in the Lago de Valencia.

5. Request by the government

- 1.14 In June 1987, the Ministry of Finance, on behalf of the Government of Venezuela, formally requested financing from the Bank for part of the works that were planned for expanding the water supply to communities in the Central Region of the country. It was noted in the request that the water supply project was part of the Comprehensive Environmental Sanitation Program for the Lago de Valencia, and that under the terms of that program a new request for financing would be presented immediately after this project, for the construction of sewage treatment plants, and then a final request for the control of the water levels of the lake. The two aforementioned components would be combined with irrigation and aquifer-recovery programs.

6. IDB missions

- 1.15 The April 1986 orientation mission for this project indicated the supporting documents and information that should accompany the loan request. In September 1986 the Bank sent a special mission to Venezuela to hold discussions with the authorities concerning the institutional and financial action that would be taken to establish the Empresa de Aguas Regional del Centro. On September 22, 1986, the Executive Branch authorized INOS to establish water and sewerage companies in accordance with the needs of the community and the organizational structure ultimately given to the Central Region. As a first step in the process of approving the Empresa de Aguas Regional del Centro, C.A., a draft of the company's articles of

association was prepared, considered by the Board of Directors of INOS, and adopted on December 17, 1986. Subsequently, the President of the Republic, in Cabinet, approved the creation of the company. The necessary documents were forwarded on August 10, 1987, to the House of Representatives' Standing Committee on Finance for ratification of the establishment of the company. Ratification was received on September 2, 1987.

- 1.16 The Bank sent another mission from July 7 to 10, 1987, for the purpose of examining the feasibility and general concept of the project with INOS management and technical staff, and recommending any modifications that would be needed in order to ensure that the final document supporting the loan request would contain the technical, financial, economic, and legal information that the Bank requires for operations of this nature. Finally, a special mission spent from September 21 to October 3, 1987, in Venezuela to gather the technical, economic, and financial information that served as a basis for the analysis in this proposal.

II. FRAME OF REFERENCE

A. Recent economic trends

1. Fall in the price of oil

- 2.01 The abrupt fall in the international price of oil in the first half of 1986 created serious imbalances in Venezuela that threatened to frustrate the revival of economic growth, whose first positive results were already discernible in 1985. The substantial reduction of oil exports created severe external repercussions and a sharp drop in current public sector revenues which, had it not been for the country's ample international reserves and the equally sizable domestic currency reserves held by the Treasury and Petróleos de Venezuela, S.A. (PDVSA), the national petroleum company, would have been devastating for the Venezuelan economy. In spite of this adverse circumstance, gross domestic product (GDP) in 1986 showed real growth of 3.1 percent, unemployment dropped from the 13.1% recorded in 1985 to 11.1%, and the inflation rate was basically unchanged from the previous year (11.4% in 1985 and 11.6% in 1986). However, the price paid for these positive results was a US\$3.8 billion loss of international reserves.
- 2.02 The world oil-price collapse in the first half of 1986 left Venezuela with an average price for the entire year of US\$12.90 per barrel, or half the 1985 average. Consequently, oil exports fell 44 percent in value, or US\$5.644 billion, which led to a reduction in the surplus in the merchandise trade balance from US\$6.8 billion in 1985 to US\$1.103 billion in 1986. Thus, despite the appreciable reduction in interest payments abroad, deriving from the fall of interest rates on the international financial markets, the 1985 surplus of US\$3.086 billion in the current account of the balance of payments gave way to

a US\$2.177 billion deficit in 1986. The added effect of the continued negative net balance of capital movements in and out of the country (amounting this time to US\$1.697 billion) produced a net loss of international reserves in 1986 in the amount of US\$3.874 billion. This meant that the total reserves of the monetary authority fell by 27.7 percent, and that the operative reserves slipped to a level close to US\$5 billion.

2. Outlook

- 2.03 Several new factors should affect the behavior of the Venezuelan economy in 1987. One of them involves a set of economic measures, adopted in December 1986, whose aim is to bring the economy into line with the new external circumstances without affecting the momentum already acquired by economic growth. The centerpiece of this package was the lowering of the official exchange rate from 7.50 to 14.50 bolivares per dollar and a reordering of trade and financial transactions to be carried out in the three established exchange areas (7.50, 14.50 and free market). To this was added a bonus for those exports that were previously settled in the free market. In addition, a second negotiation of the external public debt was carried out at the end of February of this year, and as a result the spread on LIBOR was reduced to 7/8, the amortization obligations established in the previous agreement for the years 1987 to 1989 were lowered by 60 percent, and favorable conditions were created for the resumption of the financing of Venezuelan activity by international banks. From another point of view, although the world oil market situation remains uncertain, a consensus appears to exist that the average price for Venezuelan exports will be at least 25 percent higher than the extremely low one registered in 1986.
- 2.04 The devaluation of last December is already causing sizable adjustments in the domestic prices of products made with imported inputs. Other producers are also seeking to readjust their prices, while the government is attempting to contain upward price pressures. An increase in inflation therefore may be possible in 1987, but the authorities hope that it will be limited to the first part of the year. In the balance of payments arena, it is hoped that the trade surplus will recover part of the ground lost and that net interest payments on the external debt will register a modest reduction. Furthermore, if the use of external credit can be resumed, 1987 may run its course without losses of international reserves.

B. The basic environmental sanitation sector

1. General information

- 2.05 According to projections of the 1981 general census, Venezuela's population in 1986 was an estimated 17,791,000, of whom 14,642,000 (82.3%) lived in urban centers and 3,149,000 (17.7%) in rural areas. The spatial distribution of the population changed drastically when the oil industry was born and what had been an agricultural economy

became an oil-based one. Rapid urban development and the growing concentration of the population in urban areas are the most salient characteristics of the geographical distribution of the country's people. It is evident from the foregoing that the urban growth pattern is predominant in the process of change in geographic distribution, and this has resulted in very large cities which require substantial resources for the delivery of public services.

2. Population with access to sanitation services

- 2.06 The growth in basic environmental sanitation services has gone hand in hand with the growth in the population. It is estimated that at the end of 1986, 81.4% of the total population had water service and 57% had sewerage service. The following table shows the population served by water and sewerage systems, and coverage percentages.

Population served by Water and Sewer Systems in Venezuela
1986

<u>Population</u>	<u>Urban</u>	<u>Rural</u>	<u>Total</u>
Population in census	14,642,000	3,149,000	17,791,000
With water service	11,885,000	2,600,000	14,485,000
With sewers	9,425,000	719,000	10,144,000
% coverage: water	81	83	81
% coverage: sewers	64	23	57

Source: Ministry of the Environment and Renewable Natural Resources.
1986.

3. Agencies in charge of sanitation services

- 2.07 Under the National Constitution and the Municipalities Act, the municipalities are responsible for the construction, operation, and maintenance of water supply, sewerage, and drainage systems. However, since its establishment in 1943, the Instituto Nacional de Obras Sanitarias (INOS) has provided these services for town and city councils under agreements signed with the municipalities. The Ministry of Health and Welfare, for its part, is charged with the construction, operation, and maintenance of water and sewerage systems for "dispersed" rural communities, which are defined as those population groups whose homes do not constitute a "population center" with a distinctive organized core.

4. The Instituto Nacional de Obras Sanitarias (INOS)

a. Activities to date

- 2.08 INOS was established in 1943 for the purpose of providing the country's population with a water supply and sewerage infrastructure that was consistent with a healthy environment. At present, INOS

administers 105 urban water supply systems which serve 11 million people (75.5%), and 379 rural systems that bring water to 2.4 million inhabitants (76.4%). Its sewerage systems serve 8.9 million people (60.8%). The difference in the percentage coverage for water and sewerage services is attributable to the fact that the efforts of INOS have been aimed chiefly at providing safe water supply systems. More attention has been given recently to the area of sewage collection, treatment, and disposal.

5. Decentralization of INOS

- 2.09 The Instituto Nacional de Obras Sanitarias (INOS) is an autonomous agency attached to the Ministry of the Environment and Renewable Natural Resources, with distinct legal capacity and assets that are separate from those of the central government. INOS currently is undergoing a process of decentralizing its administration, with the primary aim of delegating and transferring more and more functions to the regional, state, municipal, and local levels. When this process is complete, the country will have a series of regional, state, and local companies which will be in charge of administering, operating, and maintaining water supply systems. These companies will have the elements and resources necessary for them to provide, either directly or through cooperative arrangements with their counterparts, an effective, efficient service; in other words, they are to operate on business principles. The water supply systems will be the primary operating nucleus of this system.

a. First steps in the decentralization process

- 2.10 In 1985, as a first major step in the INOS decentralization process, water supply systems in the Guayana Region were transferred to the Corporación Venezolana de Guayana (CVG), pursuant to Official Decree 456 of January 7, 1985, published in Official Gazette 33138. In this decree, the President of the Republic, in the exercise of the powers vested in him under the Organic Law, provided that "... the services and other tasks that fall to the Instituto Nacional de Obras Sanitarias in the Guayana development zone, in the area of studies, construction, rehabilitation, and expansion of water supply, sewerage, and drainage systems, and responsibility for operating and administering those systems, are transferred to the C.V.G., which is hereafter authorized to enter into such agreements as may be required with the respective town and city councils."

b. Establishment of the Empresa de Aguas Regional del Centro, C.A. (EDARCA)

- 2.11 On September 2, 1987, a Congressional committee approved the executive order that established the Empresa de Aguas Regional del Centro, C.A., which was to operate and administer the works that are envisaged in the project described in this proposal. The new organizational concept is the result of the national government's decision to decentralize INOS operations by creating operating units that would

be run as businesses. Pursuant to this policy, INOS is preparing the groundwork for the establishment of other regional companies in Maracaibo (Zulia) and Barquisimeto (Lara), which without doubt will give new vigor to the administration of these public utility services. In this way, INOS will become more and more a planning agency for the sector, which is the ultimate purpose of the reorganization plan. (See paragraphs 6.02 and 6.03.)

C. Rate system

1. Legal foundations

- 2.12 The rate system in effect in Venezuela at present for water and sewerage services was established in a joint resolution of the Ministry of Development and the Ministry of the Environment and Renewable Natural Resources, which was published in Official Gazette 2750 (Extraordinary Issue) of February 27, 1981. INOS, as the agency which delivers water and sewerage services to the nation, is charged with the study of the rate system. Such studies are conducted by INOS and, after approval by its Board of Directors, are forwarded to the Ministry of the Environment and Renewable Natural Resources for its consideration, as the ministry to which INOS reports and the one so empowered under the Organic Law of the Central Government.

2. Rate policy

- 2.13 It is government policy that the rates charged by water and sewerage companies must generate sufficient revenues to enable them to be financially self-sufficient. However, because of INOS's institutional deficiencies, its billings are not reaching the necessary levels, and in recent years it has had to resort to government contributions to finance the sector's construction program. (See paragraph 6.07 for a description of the remedies that are being proposed in this document.)

a. Residential rates

- 2.14 Nine rate structures were designed for residential customers and classified as "types". The basic criterion for the classification was the relative level of economic development of the communities. Type 1 rates, for instance, are the rates applied to consumers living in the least-developed areas, who are the least able to pay. Type 9 rates are charged in communities with the highest level of development. These rates apply to buildings used exclusively for family homes or living space. The minimum service to be charged, or the basic sanitation requirement, was set at 20 cubic meters per month per customer, and ranges from Bs.5 to Bs.10 depending on which of the nine rate types is applied.

b. Commercial and industrial rates

- 2.15 Commercial rates are charged in buildings used for retail establishments, those used for offices, craft shops, or industries that employ five or fewer workers, and combined commercial-industrial operations. Industrial rates are applied to any building in which raw materials are converted to consumer goods, semimanufactured products are assembled, or craft industries employ six or more workers. The rates charged to industrial and commercial customers are not subsidized. The rate to be applied is calculated by multiplying the unit price set for residential consumption by a factor that ranges from 1.25 to 1.80.

c. Rates for government customers

- 2.16 The general principle followed when determining the rates to be charged to the public sector is that the regular operating budget of each government department or agency should provide for payment of the water it consumes in the course of its day-to-day operations. However, exemptions or reduced rates are allowed, as provided for in various agreements signed in the past by the INOS and some city councils, in the case of water used on the premises of those councils, water from public hydrants used to fight fires, and water used for street cleaning. For the most part, the public sector pays for its water at commercial or industrial rates.

D. IDB cooperation in the development of the sanitation sector

- 2.17 The IDB has contributed financing for four INOS projects, in the form of loans totaling US\$33.8 million. Because these loans were approved many years ago, no evaluation of the works completed under the projects is provided here. However, it can be stated that the purpose of the financing was achieved in every case, the loans were disbursed in full, and all have been repaid. The loans and projects in question are as follows:

<u>Year</u>	<u>Project</u>	<u>Loan</u>	<u>(US\$ millions)</u>
1961	Construction of 53 water supply systems in small communities	16/TF-VE	10.0 (repaid)
1962	Improvement of the Mara-caibo water supply system	51/OC-VE	6.0 (repaid)
1966	Expansion of water supply and sewerage systems in Cumaná, Puerto Cabello, Ciudad Guayana and other locations	122/SF-VE	7.2 (repaid)
		138/OC-VE	<u>10.6</u> (repaid)
		Total	33.8 =====

E. Basic sanitation in the project area

1. General characteristics

- 2.18 The consuming centers in the service area of the project are located in the states of Aragua, Carabobo, and Cojedes, which comprise the zone that was named the "Central Region" in executive order 478 of 1980 (see maps). This region, located in north-central Venezuela, has an area of 26,462 square kilometers, or 3% of the nation's territory. The 1986 population of the three states comprising the Central Region was 2.7 million, ^{1/} giving it a density of 103 inhabitants per square kilometer. This population is expected to double by the year 2010.

2. Water supply services

- 2.19 The region has scant surface-water resources suitable for human consumption after treatment. Most of its potential lies in groundwater resources, which are overexploited for a variety of uses and are not sufficient to satisfy the demand. INOS thus has been forced to bring water in from the adjacent Pao river basin. Since 1974, all of the water brought in from outside the Lago de Valencia basin has come from the Cachinche reservoir on the Pao river, which is the principal source of the region's water supply system.
- 2.20 Water is taken from the Cachinche reservoir and the small Guataparo reservoir to the Alejo Zuloaga treatment plant. Because of its deteriorating facilities, the actual capacity of this plant is lower than its design capacity, and it is the major bottleneck in the system. INOS has prepared a project for the rehabilitation of this plant, with the aim of achieving an average volume of 7.2 cubic meters per second. Provision has been made for this rehabilitation project, using local counterpart resources, in the program of minor works included in the proposed project. This will make it possible to increase the supply of water while catchment works are being built at the La Balsa reservoir on the Pao river.

3. Sewerage works

- 2.21 Six sewage-collection systems are operating at present in the Central Region. They dump untreated sewage into the watercourses that flow into the Lago de Valencia, and have contributed to the pollution of the lake. The communities served by these systems are Valencia, Tocuyito, Guacará, Mariara, San Joaquín, Maracay, El Limón, Cagua, Villa de Cura, Turmero, La Victoria, El Consejo, San Mateo, and Tinaquillo. The Comprehensive Sanitation Program for the Lago de Valencia, which is described in Chapter III, provides for the construction of two treatment plants and associated sewerage works. In 1986, a total of 1.7 million persons, or 77.1% of the total population of the project area, had access to sewerage systems.

^{1/} The 1987 population of the service area of the project is just under 2.4 million.

4. Water unaccounted for

- 2.22 The Central Region system lacks the essential elements that would be required for reliable measuring of water unaccounted for. There is no system-wide metering system, and few customer meters are being used. A great deal of water is lost in a system as complex as this one, with numerous water intakes and pumping plants, and loose control of the water being used for public gardens and fire-fighting, water used for public services, water siphoned off, and so on. Compounding this problem are inadequate technical and customer registers. The conservative estimate by the consultants in charge of the demand study in 1985 was that 43% of all the water being produced was unaccounted for. Very few systems in Latin America have levels of unaccounted-for water lower than 30%; generally speaking, the figure lies somewhere between 40% and 50% of water produced. Even well-organized systems like those operating in Monterrey (Mexico), Medellín (Colombia), and Sao Paulo (Brazil) have high percentages of water unaccounted for (39%, 41%, and 28%, respectively). Hence, the situation identified in the Central Region system is considered to fall within Latin American ranges. Simply as a point of reference, it could be noted that the percentages of unaccounted-for water reported by U.S. systems in 1981 varied from 15% to 20%, although in areas such as Louisiana, Texas, and New York, the level was as high as 39%. The figure for Canadian systems that year was 19%. (See paragraphs 4.06, 5.11, and 5.12 for a description of the program that is being proposed to remedy this situation.)

F. Analysis of the supply and demand for potable water

1. Water supply

- 2.23 Water is supplied to communities in the Central Region from two sources: within the Lago de Valencia basin, and outside that basin. Most of the total supply is brought from outside, specifically from the Cachinche reservoir on the Pao river, which has a capacity of 224.7 million cubic meters annually, or 78.6% of the total water supply at present. The other 21.4% is obtained from inside the Lago de Valencia basin, that is to say, from wells administered by INOS, the Guataparo reservoir, and some surface-water sources, which have annual capacities of 51.6 million, 4.7 million, and 4.7 million cubic meters, respectively. The overall potential supply is the equivalent of 285.7 million cubic meters per year. However, because the Alejo Zuloaga plant can process only about 6 cubic meters per second rather than its design capacity of 8 cubic meters, the actual supply is only 250 million cubic meters per second. Furthermore, the various types of losses and leakage that occur in the system reduce the water available to final consumers by 43%, leaving a net supply in the order of 163 million cubic meters annually.

2. Demand for water

a. Current demand

- 2.24 The estimated 1987 population of the area served by the system is 2,336,970, of which 83.1%, or 1,942,000 residents, have water service. There are 266,000 household service connections, about 15% of which are estimated to be unregistered. There are meters on 73.3% of those connections (195,857), but only 52% of them (103,350) are operational. Of the 16.9% of the population without public water service, 6.8% (159,000 persons) obtain water from rural aqueducts that will be incorporated into the Central Region system in the future, and 10.1% (237,000 persons) buy water for the most part from water trucks. The estimated 1987 demand for water for residential use, which was calculated on the basis of the findings of a socio-economic survey of households in 1986, would be 163.7 million cubic meters annually. Other categories of customers (public sector, commercial, and industrial) will require a volume of 37.1 million cubic meters per year. Thus, the total estimated demand for 1987 is 200.8 million cubic meters. However, taking into account that 43% of production is lost (water unaccounted for), a total of 352 million cubic meters annually would be needed in 1987 to satisfy the demand.

b. Future demand

- 2.25 The following factors and assumptions were used to estimate the future demand for water in the service area of the project: (i) an increase in coverage of the system to 97% in the year 2000; (ii) an increase in the population density of the areas currently being served; (iii) the incorporation of rural zones into the system; (iv) growth in per capita consumption by residential consumers, owing mainly to income elasticity; and (v) an increase in consumption by non-residential customers, owing to an increase in the demand for the goods and services they produce. Based on these assumptions, total demand would grow by 4.5% annually in the period from 1987 to 1992, and by 3.7% annually from 1993 to 2010. Accordingly, the project has been designed to supply a population of about 3.5 million in the year 2000.

3. Supply and demand

- 2.26 The following table shows the situation of the supply and demand for water in the service area of the system from 1987 to 2000. The water supply is shown net of leakage and losses, but includes part of the water delivered to customers but not billed.

CRS Service Area

Water Supply and Demand

(in millions of m³/yr)

Year	S U P P L Y ^{a/}					D E M A N D ^{b/}		
	Without project	With project Production	Loss ^{d/} control	Subtotal	Total	Total demand	Absolute shortfall	%
1987	162.85	0.00	0.00	0.00	162.85	200.8	40.97	20.1
1988	162.85	0.00	1.89	1.89	164.74	206.4	41.68	20.2
1989	162.85	0.00	5.89	5.89	168.74	216.6	47.81	22.1
1990 ^{c/}	189.80	0.00	6.31	6.31	196.11	227.2	31.05	13.7
1991	191.26	0.00	8.19	8.19	199.45	237.5	38.03	19.1
1992	192.72	89.88	16.07	105.95	298.67	248.4	-	-
1995	197.19	89.88	23.19	113.07	310.26	286.3		
2000 ^{c/}	249.30	89.88	39.36	129.24	378.54	355.9		

^{a/} Production net of losses.

^{b/} Includes billed and unbilled water.

^{c/} Includes new sources in accordance with least-cost expansion plan.

^{d/} Increases in the supply of water as a result of the Program to Reduce Unaccounted-for Water.

- 2.27 A comparison between the average annual capacity and the demand for water by the various categories of users shows that there is at present an annual shortfall of 40.9 million cubic meters, equivalent to 20% of the demand. This shortfall will continue to grow until it reaches the equivalent of 22.1% of demand in 1989, even with a program in place to reduce unaccounted-for water. When a new supply source (Tirgua) is added, the shortfall would drop to 13.7% of demand in 1990. In 1991, the year preceding the entry of the project under consideration here, the absolute shortfall would be 38 million cubic meters a year, or 19.1% of demand. Of the total increase in capacity in 1992 (about 136 million cubic meters annually), 66% would come from the production project (5 cubic meters per second from Pao-La Balsa), 12% from the program to control unaccounted-for water, and the remaining 22% from new sources other than the project.

III. COMPREHENSIVE ENVIRONMENTAL SANITATION PROGRAM
FOR THE LAGO DE VALENCIA

A. The Lago de Valencia basin

1. General description

- 3.01 The Lago de Valencia basin, in central Venezuela, is with the Caracas Metropolitan Area and vicinity the fastest-growing area of the country, both in terms of population and urban and industrial development. The growth in cities and industry has had a drastic effect on the ecology of this basin, which as a closed system receives surface water that is readily polluted and can have a high mineral content. The actions of man have served only to aggravate this tendency. Some of the serious consequences of development in this area are: (i) the ever-increasing use of the basin's surface and ground water, which has led to an even more rapid shrinkage of the volume of water in the lake, which is slowly being drained; and (ii) pollution resulting from the dumping of untreated waste produced in the basin.

2. Priority environmental concern

- 3.02 The problems of the Lago de Valencia basin can be identified as one of the country's foremost environmental concerns, and the management of its water will be the key to success or failure.

a. Drying up of the lake before 1978

- 3.03 The Lago de Valencia, which is one of Venezuela's outstanding natural resources, has been drying up since the late eighteenth century, owing to changes in the watershed caused by farming, population increases, and industrial development. By 1978, the water level had dropped from its one-time level of 427 meters above sea level to a low of 401.5 meters, as the growth in population and industry in the region surrounding the lake reduced the surface flow of its affluents.

b. Partial restoration of water levels

- 3.04 In the early 1970s, as the region faced a shortage of surface water and a growing demand for water to satisfy the needs of new urban communities and industries, water had to be diverted from the neighboring Pao river basin. With this new water supply, coupled with the particularly heavy rainfall in recent years, the level of the lake began to rise again. In 1983, when the water reached 405.1 meters, productive land was flooded and homes were destroyed.

B. Government environmental study

- 3.05 In 1972, at the initiative of national and regional authorities, a research project was started on the environmental problems of the Lago de Valencia basin. The aim of the research was to identify the precise nature of these problems and obtain the information needed to formulate a policy to eliminate or reduce pollution in that important body of water and its drainage area, which was exceptionally congested from a biological point of view and in terms of urban and industrial growth and the consumption of natural resources.

1. Findings of the studies and formulation of the program

- 3.06 The studies that the Ministry of the Environment and Renewable Natural Resources has been conducting almost continuously have shown that the contamination of this lake basin is part of a larger problem: the region's water supply. Because the basin is a closed system, the region is particularly susceptible to both soil and water pollution. Furthermore, it is more expensive to control pollution in this area than elsewhere in the country because sewage would have to be treated to a greater degree to avert a build-up of contaminants in the soil and water. On the basis of the findings of these studies, the government designed the Comprehensive Environmental Sanitation Program for the Lago de Valencia, with the aim of improving the quality of the lake's water and rescuing it as a natural resource. Technical proposals for the work that will be required to achieve these environmental sanitation objectives have been formulated in a very clear, comprehensive, and precise framework. The various specific projects that constitute the Comprehensive Environmental Sanitation Program for the Lago de Valencia pursue a common purpose, that of resolving the serious problems of water supply, pollution of the lake, and control of its water level.

2. Goals of the program

- 3.07 This program is of paramount importance for the states of Aragua and Carabobo, and will serve as a model for the country. Its physical goals entail the construction of a series of works to: (i) supply water to the population of the basin (project VE-0052); (ii) collect and treat household sewage (project VE-0060); and (iii) control the level of the lake and provide storm drainage in cities in the basin.

C. Stages in the implementation of the program

- 3.08 The general objective of the program is to halt the deterioration of the environment in the Lago de Valencia basin without interrupting development, and consequently to improve the well-being of its population. The following paragraphs provide a brief summary of the basic rationale for each phase of the Comprehensive Environmental Sanitation Program for the Lago de Valencia.

1. Water supply

- 3.09 Plans call for an additional 1.5 cubic meters per second to be added to the water supply through the Las Mercedes diversion of the Tirgua river. Construction has begun on this project. As well, water is to be obtained immediately from the La Balsa reservoir on the Pao river through an intake structure and treatment plant planned by INOS. This latter venture is part of the project submitted to the IDB which is described in this proposal.

2. Pollution control

a. Sewage treatment

- 3.10 Because the Lago de Valencia sits in a closed basin, it collects degradable and nondegradable contaminants, which become more and more concentrated with the passage of time. The lake serves as a biological reactor in which organic wastes are consumed by organisms and by oxidation. In analyses conducted by Venezuelan and foreign experts it was concluded that pollution could only be managed through effluent controls, which in turn would require the construction and operation of sewage treatment plants. According to studies carried out in 1984, industry accounted for 49% of the pollution in the lake, urban activity for 34%, and agriculture for 17%. This mass of organic waste was equivalent to what a population of 5.8 million would produce, i.e., a population almost three times the approximately 2 million persons who actually lived in the basin that year.

b. Situation in 1987

- 3.11 The state took steps to control industrial pollution by issuing a decree which requires industries in the zone which are classified as high-pollution and medium-level-pollution operations to install systems to treat their chemical residues. This has brought about a substantial drop in industrial contamination, which now accounts for only 15% of the total. The "equivalent population" (in terms of contamination produced) which had been 5.8 million in 1984 is now only 3.7 million. In order to resolve the problem of urban pollution, sewage treatment plants have been designed, and IDB financing will be sought for these facilities in 1988; the project is now in the Bank's pipeline. It was considered that a commitment should be obtained from the borrower that the works would be executed without fail (see Recommendation 8). A plant with a capacity of 2 cubic meters per second is now being built at Los Guayos (Valencia), with state funding. Taken together, all of these measures will bring the sanitation situation in the area to tolerable levels, as shown in the following table.

Impact of the Program on the Clean-up of Pollution in the Lake

<u>Sector</u>	<u>1984</u> (%)	<u>1987</u> (%)	<u>1988</u> (%)	<u>1990</u> (%)	<u>Observations</u>
Industrial	49	15	13	6	Treatment of industrial waste (by law)
Urban	34	60	58	46	Effect of the sewage treatment project
Agricultural	<u>17</u> 100	<u>25</u> 100	<u>29</u> 100	<u>48</u> 100	Strict controls to be implemented in 1988.
<u>Population</u> (in millions)					
Real	2.0	2.4	2.5	2.6	
Equivalent	5.8	3.7	3.2	1.5	

c. Combined benefits of the proposed solution

- 3.12 The construction of the three sewage treatment plants called for in the sanitation works project (second phase of the program) would achieve two fundamental objectives. First, pollution levels in the Lago de Valencia would be cut substantially when organic waste was no longer dumped into its waters. When all three treatment plants were completed, organic pollution, in terms of equivalent population, would drop by 75%. Second, the treated sewage that would be used to increase the farming area under irrigation and recharge aquifers in the lake basin would keep the lake at an optimum level at least until the end of the century. The intervening years would be used to set in place sewage disposal and drainage works that ultimately would see the lake used as a supply source--the most logical use to which it could be put, as the region's largest natural reservoir.

3. Control of the lake's water level

- 3.13 Centuries ago, the waters of the Lago de Valencia spilled over into the Orinoco river watershed, along the Pao river. In the early part of the nineteenth century this was no longer the case; on the contrary, the level of the lake dropped steadily until 1978, when it stood at 401 meters above sea level. In the following years, with the growing volumes of water brought from adjacent basins and the water restored to the lake through wastewater systems, the level of the lake began to rise again. In 1983 it reached 405 meters above sea level, causing damage to built-up areas along its shores. At present, under normal rainfall conditions, the level is rising about 0.5 meters per year. This corresponds to a volume of about 190 million cubic meters. Accordingly, in order to maintain the current

level (the critical level having been found to be 408 meters), a means must be found of preventing an estimated volume of flow of 6 cubic meters per second from entering the lake. This must be increased as the water supply to the area from neighboring basins grows. A project is currently being developed for this purpose. The Ministry is conducting a study of the problem of the rising levels of the lake, to ascertain the potential impact, feasibility, and costs of the various drainage options combined with the feasibility of increasing irrigation areas in the basin and recharging aquifers. Three options have been selected from these preliminary studies. Drainage studies for the large and medium-sized communities in the basin are under way as well, with a view to avoiding flood damage in urban areas. Proposals for construction projects will be devised on the basis of the findings of these studies.

D. Financing of the works proposed in the program

1. IDB participation

- 3.14 The financing needed for the Comprehensive Environmental Sanitation Program for the Lago de Valencia would fall into three phases. The first phase, for water supply works, would cost approximately US\$383.6 million. The IDB has been asked to finance the equivalent of US\$154.4 million of that total (40%).
- 3.15 At the second phase, which would be executed almost in tandem with the water supply project, a financing agreement would be reached with the IDB for the sanitation works for the program, which are: (i) the La Mariposa treatment plant in the city of Valencia, which would treat 2.4 cubic meters of sewage per second; and (ii) the Maracay-Taiguaigay treatment system, which will concentrate sewage from Maracay and Palo Negro at the pumping plant called for at Camburito. This system will be able to treat 4 cubic meters per second. The loan request for partial financing for the second stage is being prepared, and would be submitted to the Bank in the very near future. An orientation mission examined this project, which has been assigned the number VE-0060, in February 1987. Advisory support from three consultants--one specializing in water quality, one in the re-use of sewage for irrigation and aquifer recharging, and one in hydrogeology--has been provided by the Bank through financing made available under the PAHO/IDB agreement.
- 3.16 At the third stage, a decision will be made, in accordance with national government guidelines at the time, as to flood-control works and works to drain off surplus water from outside the basin, which would represent about 7 meters per second in the year 2000. Some of the works which would be negotiated in the future are: (i) drainage works for the largest cities in the basin; and (ii) works to drain off excess water from outside the basin. Prefeasibility studies are being conducted at present for three options, and feasibility studies of the best option are expected to be started by the end of the year.

2. Legislation adopted

a. Presidential decree

- 3.17 The chief legal instrument pertaining to operations for the program is the presidential decree which declared the Lago de Valencia basin to be a critical area warranting priority treatment and placed it under the authority of the Ministry of the Environment and Renewable Natural Resources. Other special instruments of support are the decrees and resolutions which provide for economic incentives to encourage the clean-up of pollution in the Lago de Valencia. In the area of industrial pollution, the aforementioned Ministry published Resolution 124 on December 21, 1984, to regulate the classification of the waters of the lake and set water-quality standards for industrial waste discharged both into the lake and into the public sewer system.

b. Public Credit Act for the Lago de Valencia Program

- 3.18 Under the terms of a bill now before Congress (the proposed Public Credit Act), Congress would authorize the Executive Branch to enter into local and foreign borrowing arrangements to finance the second stage of the Comprehensive Environmental Sanitation Program for the Lago de Valencia. The bill is expected to be approved by Congress in the course of its 1987 session.

IV. THE PROJECT

A. Objectives

- 4.01 The primary objective of the project is to expand the capacity of the water supply system of the Central Region, in order to provide service to the entire population at this time and satisfy the demand for water until the year 2000. The region is expected to have about 3.5 million inhabitants by that year, distributed among 15 urban centers and 24 rural communities.

B. Targets

- 4.02 The following targets are to be achieved at the end of the project execution period:
- (i) Addition of a volume of flow of 5 cubic meters per second of water from the La Balsa reservoir on the Pao river.
 - (ii) Installation of 110,000 meters in Valencia and Maracay in order that 70% of the population will have metered service connections.

- (iii) Implementation of a program to reduce water unaccounted for from its present rate of 43% of total production to 39% by the end of 1991 and 37% in 1995.

C. Description

- 4.03 The works to be constructed and supplementary activities to be carried out under the project are summarized in the following paragraphs.

1. Major works

- 4.04 A volume of water of 5 cubic meters per second will be taken continuously from the La Balsa reservoir through a pumping plant. Six segments of a supply line and two control centers will be installed, one in Valencia and the other in Maracay, with valves and accessories to receive water from the treatment plant and distribute it to Valencia, Maracay, and the other communities served by the regional water supply system according to their respective needs. A conventional treatment plant with a capacity of 7.5 cubic meters per second will be built. The project under consideration here would supply components for 5 cubic meters of that capacity.

2. Supplementary activities

a. Program to rehabilitate minor works

- 4.05 This component of the project provides for the rehabilitation and expansion of existing subsystems. Rehabilitation work will take the form of replacing small-diameter systems in poor condition and their respective valves; upgrading of various small pumping plants and reservoirs; replacement of hydraulic equipment and components in those stations; installation of needed chlorination equipment; and rehabilitation of the A. Zuloaga treatment plant. The expansion work will involve extending small-diameter systems, building reservoirs, laying supply lines, and expanding the pumping capacity of small plants.

b. Program to reduce unaccounted-for water

- 4.06 Under this program, a specialized unit will be set up and provided with the technical means and physical resources needed to carry out a program aimed at detecting and reducing water losses. A specialized consulting firm would provide support for the program, which would be implemented over a period of four years.

c. Pao river basin protection program

- 4.07 The Ministry of the Environment and Renewable Natural Resources (MARNR) has devised a national watershed protection program. One segment of this program, pertaining to the Pao river basin, would be

included in the project under consideration here. This component, to be executed by the MARNR, provides for the purchase of equipment and hiring of personnel for conservation work, including the establishment of committees, educational and information campaigns, measures to reduce flooding and prevent forest fires, monitoring of land use, including an indication of the most appropriate crops, and monitoring of pesticide and herbicide use.

d. Program of technical cooperation for the institutional strengthening of the Empresa de Aguas Regional del Centro, C.A. (EDARCA)

- 4.08 The works built under this project would be administered, operated, and maintained by EDARCA. The institution-strengthening component calls for initiatives in the technical, financial, and commercial area. Its objectives would be achieved through the training of EDARCA staff, who gradually would assume their duties in the new company. Provision has been made for the hiring of a specialized Venezuelan firm to provide advisory support for this component, and some resources of the proposed loan would be used to hire international consultants in various highly specialized areas.

D. Cost and financing

- 4.09 The total cost of the project, at June 1987 prices, is the equivalent of US\$383.6 million, of which US\$153.4 million (40%) would be financed by the Bank. The following table provides a breakdown of the budget by investment category and source of funds.

TOTAL COST AND PROPOSED FINANCING

	<u>IDB</u>	<u>LOCAL</u>	<u>TOTAL</u>	<u>%</u>
I. <u>ENGINEERING AND ADMINISTRATION</u>	<u>200</u>	<u>19,177</u>	<u>19,377</u>	<u>5.0</u>
1.1 Engineering	-	1,655	1,655	
1.2 Supervision	200	14,481	14,681	
1.3 Administration	-	3,041	3,041	
II. <u>DIRECT COSTS</u>	<u>98,953</u>	<u>141,833</u>	<u>240,786</u>	<u>63.0</u>
2.1 Pipes	10,143	116,392	126,535	
2.2 Pumping stations	47,279	445	47,724	
2.3 Electric line	7,448	2,483	9,931	
2.4 Treatment plant	16,720	-	16,720	
2.5 Water unaccounted for	8,363	1,513	9,876	
2.6 Minor works	9,000	21,000	30,000	
III. <u>ASSOCIATED COSTS</u>	<u>8,297</u>	<u>11,764</u>	<u>20,061</u>	<u>5.0</u>
3.1 Land	-	4,210	4,210	
3.2 Technical cooperation	200	1,379	1,579	
3.3 Watershed protection	400	934	1,334	
3.4 Initial inventory	-	5,241	5,241	
3.5 Maintenance equipment	7,697	-	7,697	
IV. <u>UNALLOCATED</u>	<u>26,626</u>	<u>53,104</u>	<u>79,730</u>	<u>21.0</u>
4.1 Contingencies	10,700	17,311	28,011	
4.2 Escalation	15,926	35,793	51,719	
V. <u>FINANCIAL EXPENSES</u>	<u>19,324</u>	<u>4,322</u>	<u>23,646</u>	<u>6.0</u>
5.1 Interest	17,790	-	17,790	
5.2 Credit fee	-	4,322	4,322	
5.3 Insp. and supervision	<u>1,534</u>	<u>-</u>	<u>1,534</u>	
TOTAL	<u>153,400</u>	<u>230,200</u>	<u>383,600</u>	<u>100.0</u>
	=====	=====	=====	=====
Percentage	40.0	60.0	100.0	

1. Basis for cost estimates

- 4.10 INOS has an up-to-date catalogue of unit prices for Venezuelan labor and materials for civil works, and the current prices of Venezuelan materials were ascertained as well. Equipment costs were calculated using reference prices for recent construction projects and price quotations from authorized representatives of various suppliers in Caracas. Steel pipe prices were estimated on the basis of the price of plate manufactured by the Empresa Siderúrgica del Orinoco (SIDOR) and the price paid by the public for the fabrication of pipe, obtained from the country's four largest manufacturers, which produce large volumes of pipe particularly for the oil industry. In a comparison of the economics of using imported ductile cast iron pipe and Venezuelan welded steel pipe, the latter option was found to be 15% better. The costs used to prepare the budget, with the changes made during the analysis mission, are a realistic reflection of market prices for this type of works.

2. Use of the proceeds of the proposed loan

- 4.11 The proceeds of the Bank's loan would be used to finance the following shares of the various investment categories: (i) up to US\$200,000 of the costs of engineering and administration, to hire three experts who would provide advisory support for construction supervision; (ii) up to US\$98.2 million for direct costs, for the purchase of all of the equipment and materials for the pumping plants, electric line, treatment plant, minor works, and the program to reduce unaccounted-for water, and part of the civil works, plus the sum of US\$700,000 to hire an international consulting firm to conduct the study of unaccounted-for water and implement the program to reduce water losses; (iii) US\$200,000 of the associated costs category, to hire three experts for the technical cooperation component for institution-strengthening and to purchase equipment for the watershed protection activities; and about US\$7.7 million for all imported maintenance, computer, and telephone equipment; (iv) in the category of unallocated costs, the equivalent of US\$10.7 million for contingencies and US\$15,926,000 for escalation; and (v) in the category of financial expenses, US\$17,790,000 for interest during the execution period and US\$1,534,000 for inspection and supervision.

3. Financing requested

a. Amount of the proposed loan

- 4.12 In accordance with the request received, it is being proposed that a loan for the equivalent of US\$153.4 million be granted to cover 40% of the total estimated cost of the project. This is the percentage provided for in the matrix for financing for social infrastructure projects in countries in Group A, to which Venezuela belongs.

b. Financial terms and conditions

4.13 The proposed terms and conditions of the Bank's loan are as follows:

<u>Terms</u>	<u>Financial Conditions</u>
Disbursement period: 4 years	Interest rate: variable, in accordance with the Bank's policy.
Grace period: 4 years	Credit fee: 1.25% of undisbursed balances.
Amortization: 25 years	Inspection and supervision: 1% of the total amount of the loan.

4. Local contribution

4.14 The local counterpart resources for the proposed IDB loan would be provided by the Venezuelan State through annual budgetary appropriations, in accordance with the schedule of investments for the project.

V. EXECUTION OF THE PROJECT

A. The executing agency

1. Planning for the execution of the project

5.01 Because the Empresa de Aguas Regional del Centro, C.A. (EDARCA) is still being organized, the Instituto Nacional de Obras Sanitarias (INOS) would assume responsibility for executing the project. INOS has a great deal of experience in implementing projects of the same or greater magnitude, in technical and financial terms, than the project the Bank is being asked to consider at present. It is being proposed that, as a condition precedent to the first disbursement of the loan, the borrower and INOS sign an agreement setting out the obligations of the parties responsible for the execution of the project. This same agreement will indicate the responsibilities that are being assigned to the Ministry of the Environment and Renewable Natural Resources and INOS for the component aimed at the conservation of the Pao river basin, from which a volume of flow of 5 cubic meters per second is to be taken at the La Balsa reservoir to expand the region's water supply system. (See subsection 8(c)(ii) of the proposed resolution.)

2. Executing unit

- 5.02 As a first step, INOS must establish an executing unit headed by a coordinator. This office will be properly organized and provided with the staff and funding required to supervise the entire project. The executing unit will report to the Sector Planning and Development Office, which will coordinate the general implementation of the project. INOS has already selected a technical coordinator, who has begun preparatory work. He is a civil engineer with more than 10 years' experience who formerly was Chief of INOS's Valencia Regional Office, and has been familiar with the region's water supply system since the construction of the first stage supplied by the Pao river in Cachinche. The other staff for the unit would be hired after the proposed loan from the Bank had been approved. (See subsection 8(c)(i) of the proposed resolution.) INOS's General Inspection and Construction Directorate would be in charge of the direct supervision of the works.

3. Capacity of INOS to execute the project

- 5.03 It can be concluded, after an examination of the construction program carried out by INOS from 1981 to 1986, at a cost of the equivalent of US\$649,226,000 in constant terms, its current technical structure, and the human resources of the General Inspection and Construction Directorate, that the agency has the capacity to execute the proposed project, which is very similar in nature to the first stage, which has already been constructed, which is supplying the regional water supply system with 170 million cubic meters of water. At present, the aforementioned Directorate is supervising the execution of the fourth stage of the Caracas water system supplied from the Tuy river. The total capacity of the four stages of that waterworks project is about 22 cubic meters per second, and the works, involving large-diameter steel pipes, are very similar to the ones proposed in this project. The Pao river basin protection component will be carried out by the Ministry of the Environment and Renewable Natural Resources, which also has the technical resources it needs for that purpose. This component will cost the equivalent of US\$1.3 million.

B. Mode of execution of the project

1. Construction contracts and supervision of works

- 5.04 Specialized firms will be hired for all of the construction work for the project. Various site offices would be established for construction supervision, on dates and for periods that matched the execution schedule for the project. These offices will report to INOS's General Inspection and Construction Directorate.

C. Status of designs

- 5.05 INOS has the final designs for the project, at the construction drawing level. Bidding documents still must be prepared and minor adjustments made to the design for the treatment plant (to be completed by December 1987), and the design of the program of minor expansion works is not yet complete. This project, which has several components, has been prepared by Venezuelan consulting, firms duly supervised by INOS's Project Division.

D. Calls for bids and waiver of bidding requirement

1. Number of calls for bids

- 5.06 Provision has been made in the construction components of the program for 10 international calls for bids and six calls for offers restricted to Venezuela, including one direct purchase contract. The calls for bids will be issued by INOS in accordance with its own regulations, and bidding regulations previously discussed and agreed upon with the Bank. International tenders will be called for the purchase of any goods or services in amounts exceeding the equivalent of US\$200,000 which are to be financed with IDB resources. When the acquisitions are to be financed using local resources, calls for offers may be restricted to Venezuela. The local calls for bids will be for steel pipe (3), the implementation of the program to reduce unaccounted-for water, and civil engineering work for the minor works component. (The schedule of calls for bids is shown in paragraph 5.16 of the project report.)

2. Direct purchase using local resources

- 5.07 Siderúrgica del Orinoco (SIDOR) is the only Venezuelan producer of steel plate for the fabrication of pipes. Steel pipes cost 15% less than ductile cast iron pipes, and the quality is identical. Inasmuch as the use of steel pipes is the least-cost option for the project, it is recommended that the bidding requirement be waived so that the borrower may contract directly with Siderúrgica del Orinoco (SIDOR) for steel plate for the fabrication of pipes for the project, in an amount of up to the equivalent of US\$30.7 million, chargeable to the local counterpart resources. (See subsection 8(g) of the proposed resolution.) As has been indicated, by buying steel plate directly from SIDOR and then soliciting bids from the country's four private-sector companies for the fabrication of the pipes, INOS would save some of the money it would have to pay to the manufacturers if they also included the cost of the raw materials (the steel plate) in the amount of their contract. The estimated cost of manufacturing the pipes, which also would be financed using local resources, is the equivalent of US\$68 million.

E. Advance of funds

- 5.08 It is recommended that an advance be made against the proceeds of the eventual loan, in an amount up to the equivalent of the actual payments planned for a maximum of 120 days and not exceeding 10% of the loan amount. Advances would have to be justified within 180 days after the receipt of the funds.

F. Capacity of contractors and suppliers

- 5.09 The capacity of Venezuela's construction firms is ample, owing to the country's vast civil works infrastructure. The project has been designed to be executed in packages of a size that will be attractive to both foreign and local companies. With respect to the supply of local materials, particularly pipes, it has been ascertained that the Empresa Siderúrgica del Orinoco (SIDOR) is able to supply large amounts of steel plate, and that the country has four pipe-manufacturing plants, each of which supplies the oil industry with more than the 69,000 tons the project would require. It also has been confirmed that all of the pipes could be manufactured in the space of one year.

G. Water quality

- 5.10 According to the results of physical, chemical, and bacteriological analyses and a study of toxin and pesticide levels, the raw water from the Pao river and water from the sources that supply the regional system meet the water quality standards now in force in Venezuela, as published in Official Gazette No. 2323 of October 20, 1978. Because much of the distribution system of the old regional water supply network consists of asbestos-cement pipes, measures will have to be taken to ensure that the water delivered to customers has the proper pH balance. It is being recommended that the annual maintenance report, which must be submitted beginning the first year of execution of the project, include statistical information showing the chemical quality of the water, so that the appropriate acidity index may be applied to ascertain the pH balance of the water being delivered to users. (See Recommendation 8.)

H. Water unaccounted for

- 5.11 One of the first steps in INOS's program to improve its operations and commercial procedures is the reduction of the levels of water unaccounted for, with the aim of increasing its revenues. Given the uncertainty regarding the 43% figure identified in 1985, and since no subsequent studies have been done, it would not be technically sound to set goals for the reduction of unaccounted-for water percentages for the end of the period of execution of the proposed project, at least until a sound diagnosis of the present situation had been conducted. This only could be accomplished during the first year of execution of this program. When that initial figure was available, INOS would be in a position to set firm targets.

- 5.12 To seek a solution to this problem, which must be resolved if the system is to function efficiently, provision has been made in the proposed project for funding for a consulting firm to work with the specialized unit to devise a program and, subsequently, a strategy, for action to be taken to reduce the above-mentioned 43% figure to 39% in 1991. This percentage would be reduced gradually in the following years to achieve the ultimate target of 30% in the year 2010, as called for in the demand study. The Bank will closely supervise the studies to be carried out by the consulting firm that would be hired within the first 12 months of the period of execution of the project (see Recommendation 5). It is expected that, with the use of technical elements such as a model to simulate the operation of the regional water supply system and the installation of system-wide and customer meters, it will be possible to reduce the present level of water unaccounted for substantially. A 30% figure thus is considered to be the optimum future target, and INOS would reduce the current level of unaccounted-for water gradually but steadily.

I. Operation and maintenance

- 5.13 Only corrective maintenance is performed at present at the system's five pumping plants and the Alejo Zuloaga treatment plant. To ensure that the entire regional system will be properly maintained, it is being recommended that the contract stipulate that INOS must, within 12 months after the date of signature of the loan contract, submit the maintenance program to be implemented beginning the second year, including an indication of the human and material resources required. It is being recommended as well that the contract include the standard maintenance clause which requires that the project works be maintained in accordance with generally accepted standards and that, within the first quarter of each calendar year for 10 years after the works are completed, a report on their state of repair be submitted to the Bank for consideration, including information on the quality of the water treated. (See Recommendations 9 and 10.)

J. Land and easements

- 5.14 Arrangements for the land and rights-of-way needed for the project works are at various stages. A specialist has been hired to prepare a list of properties and their owners and to arrange for an appraisal. According to the schedule that has been drawn up, all land and rights-of-way will have been obtained by July 1988. On the basis of INOS's experience, it is expected that all of this land will be available as it is required. In any event, before any call for bids were approved, the Bank would verify that INOS was in possession of the land. (See Recommendation 1.)

K. Ex post evaluation

- 5.15 It is being recommended that the borrower submit to the Bank all of the information needed for the ex post evaluation of the project and

for assessing the extent to which its targets have been achieved. This information will be furnished as follows: (a) 18 months after the effective date of the contract: (i) the baseline data for the project; and (ii) a description of the system to be used to compile and process data for the annual comparisons with the baseline data, to allow for an evaluation of the results of the project's implementation; and (b) 36 months after the effective date of the contract, and each year thereafter until three years after the date of the last disbursement of the financing, annual comparative data in the same categories as the baseline data. (See Recommendation 11.)

VI. THE BORROWER AND THE EXECUTING AGENCY

A. The borrower

- 6.01 The beneficiary of the loan to be provided by the Inter-American Development Bank for the financing of part of the Central Region System Project would be the Venezuelan State, which would contribute the local counterpart funding required for the works to be carried out. The Instituto Nacional de Obras Sanitarias (INOS) would serve as executing agency for the project, through an executing unit. The works completed under the project would be operated by the company EDARCA, which has been established specifically for the administration, operation, and expansion of water supply and sewerage systems in the Central Region system.

B. Operating agency (EDARCA)

1. Background

- 6.02 The Instituto Nacional de Obras Sanitarias (INOS) was established on April 15, 1943, as the national agency charged with the study, construction, repair, operation, and administration of water and sewer systems. The Venezuelan authorities arrived at the conclusion that it was necessary to reorganize INOS and decentralize its operations, in order to achieve the desired levels of efficiency and performance, notably in the area of the operation and administration of water supply and sewerage systems, in which some weaknesses were evident.

2. Establishment of EDARCA

- 6.03 One step in the decentralization process was the creation of the Empresa de Aguas Regional del Centro, C.A. (EDARCA), which was approved by the Finance Committee of the House of Representatives of Congress on September 2, 1987. Before the company can be entered in the Mercantile Register (the next step needed for it to begin operations), 20% of its authorized capital must have been paid in. To this end, INOS has appraised fixed assets worth Bs.200 million for this initial capital contribution. According to its articles of

association, EDARCA is a corporation with authorized capital of Bs.1 billion. INOS has subscribed for Bs.990 million of that amount, and the Compañía Nacional de Reforestación (CONARE) for the remaining Bs.10 million. The company's highest authority is its General Meeting of Stockholders. It is to be managed by a Board of Directors which will consist of four directors elected by the stockholders and one chosen by the company's workers.

C. Current organization of the Central Region System

1. Regional Superintendent

- 6.04 At present, INOS is in charge of operating, maintaining, and administering the water supply system of the Central Region. This work is the responsibility of a regional superintendent who has a coordinator in each state in the region. The Central Region has three coordination offices, in the states of Aragua, Carabobo, and Cojedes. The coordination offices have similar administrative structures. Each office has administrative, financial, and technical departments headed by their respective manager.

2. Billing and collection

- 6.05 There are deficiencies in the commercial area in the Central Region system. The chief problem, and one which has a substantial impact on the system's operating results, is the lack of a complete, effective metering system. While practically all service connections in the region have meters, only 25% of residential connections and 36% of nonresidential connections actually have their water use metered, because broken meters are not repaired (owing to a lack of spare parts) and those that are beyond repair are not replaced. More meter readers are needed as well. Because of these deficiencies in the metering system, water bills are based on estimated consumption, which is lower, on average, than metered consumption.

a. Overdue accounts

- 6.06 The collection area is another which has been neglected. No measures are adopted to ensure that users will pay overdue accounts, and service is not cut off when bills are not paid. On December 31, 1986, the region's total accounts receivable were equivalent to 19 months of billings, and the actual collection rate that year was only 31%. However, because no analysis of the age of accounts receivable is available, there is no way of determining to what extent accounts that have been overdue for several years but are still on the company's books are responsible for that low collection ratio. In the period from 1983 to 1986, total collections were 74% of total billings.

b. Proposed remedies

- 6.07 Neither the accounting system nor the commercial procedures currently being used in the Central Region are considered to be suitable for the new company EDARCA if its objectives are to be achieved. It is being proposed in this document that, under a technical cooperation component, assistance be given for the organization and operation of EDARCA. This would include the implementation of accounting and commercial systems, including proper collection procedures. However, in order to ensure that the new company will begin operations on a more solid financial footing, it is being recommended that INOS, within 12 months after the effective date of the loan contract, adjust and write off as necessary the amounts owed for services in the Central Region and, after calculating the correct balance of accounts receivable, that it raise its collection rate to 70% in 1988 and 75% in 1989. (See Recommendation 6.) As well, it is being recommended that the loan contract require EDARCA to demonstrate, within 120 days after the end of every year beginning with the 1991 fiscal year, that it has collected at least 85% of the amounts owed to it during the year. (See Recommendation 7.)

D. Operating results of the Central Region System

1. Operating statements from 1984 to 1986

- 6.08 Operating statements for INOS for the last three years were prepared from its own accounting records and additional information obtained during the analysis mission. This financial information is summarized below.

Central Region System

Operating Statement
(US\$000s)

	<u>1984</u>	<u>1985</u>	<u>1986</u>
<u>Operating revenues</u>			
Residential service	12,213	13,204	13,036
Nonresidential service	4,160	4,816	5,153
Other revenues	93	200	185
	<u>16,466</u>	<u>18,220</u>	<u>18,374</u>
<u>Operating expenses</u>			
Payroll	2,533	2,188	1,956
Electricity	5,733	4,953	4,428
Chemicals and materials	3,465	3,465	3,465
Commercial and admin. exp.	4,500	4,500	4,550
Depreciation	3,623	3,623	3,623
Central administration	2,100	2,100	2,100
	<u>21,954</u>	<u>20,829</u>	<u>20,122</u>
Net operating income (loss)	(5,488)	(2,609)	(1,748)
	=====	=====	=====

2. Adherence to the Bank's rate policy

- 6.09 The above figures show that revenues in 1984 did not cover operating and maintenance costs. However, in 1985 and 1986 the system's water revenues did cover those costs, so the minimum requirement of the Bank's public utility rate policy was satisfied. Operating income exceeded operating and maintenance costs (excluding depreciation) by US\$1,014,000 in 1985 and US\$1,875,000 in 1986. In the period from 1988 to 1990, when more users will have their water consumption metered, it is expected that revenues may be high enough to cover depreciation as well. (See paragraph 6.14.)

E. Start-up of EDARCA operations

1. Legal requirements for the company to operate

- 6.10 From a legal standpoint, EDARCA will begin to operate when it is entered in the Mercantile Register. INOS will make a capital contribution to the new company in the form of the operating fixed assets that are needed for water supply and sewerage services. Any liabilities incurred by INOS to finance these assets will not be transferred to EDARCA. The transfer process, including the hiring of staff, is expected to be completed before January 1, 1991. It therefore is being recommended that the eventual loan contract require EDARCA to begin operating the Central Region system before January 1, 1991, and to have completed, by that date, the process of transferring fixed assets and hiring the staff necessary for its operations. (See Recommendation 4(d).)
- 6.11 The fixed assets entailed in the project, which the Bank would help finance, would be transferred to EDARCA when they were fully constructed, and in this case the liability deriving from the IDB loan would be transferred as well. The contract for the proposed loan would require the borrower to deliver the project works to EDARCA for operation and maintenance, and would stipulate that the Bank's resources must be transferred on terms and conditions similar to those established by the Bank. (See Recommendation 4(c).)

2. Technical cooperation

- 6.12 Because of the weaknesses that are evident in the administration, operation, and maintenance of the Central Region system, there is a need for a new organizational structure and commercial, accounting, and internal control procedures for the system. The technical cooperation component that is being proposed as part of the project has been designed for that purpose. The consulting firm that would carry out the technical cooperation component will be responsible for designing and implementing systems. The preliminary terms of reference for these technical assistance services are shown in Annex VI-1 to the project report. It is being recommended that the contract for the proposed loan require a consulting firm to be hired

to provide advisory support for the organization of EDARCA. (See Recommendation 4(a).) As well, it would be a condition precedent to the first disbursement of the loan that a coordinator be appointed for the process of transferring fixed assets and placing EDARCA in operation. (See subsection 8(c)(iii)(2) of the proposed resolution.)

F. Financial analysis

1. Rates

- 6.13 The Central Region's revenues from the rates it charges to users have been high enough to satisfy the Bank's policy requirement that certain minimum expenses be covered, although they have not been sufficient to cover all depreciation expenses. In order to ensure that EDARCA's income will remain at acceptable levels, it is being recommended that the eventual loan contract stipulate that the borrower must ensure that the rates applied in all EDARCA subsystems will generate revenues at least sufficient to cover all operating expenses, including those relating to administration, operation, maintenance, and depreciation. If the application of the foregoing should fail to generate sufficient revenues for the timely performance of all of EDARCA's obligations and finance a percentage of its investment program, the necessary measures, including rate increases, would have to be taken to achieve that purpose. It is considered that the percentage of the expansion program to be financed with revenues derived from the application of the rate structure should be at least 20%. (See subsection 8(e) of the proposed resolution and paragraph 6.01 of Appendix III.)

2. Operating results for the period from 1987 to 1990

- 6.14 Plans call for EDARCA to operate, maintain, and administer the Central Region system beginning in 1991. In order to ensure that, in the years in which INOS will still be operating the system, operating revenues will increase substantially as the customer metering program is implemented (meaning an increase in the percentage of users who will be paying for water and sewer services on the basis of metered consumption), it is being recommended that the loan contract for the proposed project require the borrower to demonstrate, within 120 days after the end of each calendar year, for the 1988, 1989, and 1990 fiscal years, that the operating revenues of the Central Region water supply system are covering the system's operating and maintenance expenses plus an increasing percentage of depreciation, which is to reach 100% in 1989 and thereafter. (See subsection 8(d) of the proposed resolution.)

3. Financial projections of EDARCA

- 6.15 According to the projections, operating revenues would increase each year. Operating income in 1991 would be the equivalent of US\$18.7 million, and in 1997 the equivalent of US\$33.3 million. This 77%

increase will come about because of the increase in the number of service connections with metered service. In 1991, 62% of all connections will have metered service, and that percentage will grow to 92% in 1997. The net operating income that would be obtained if the current rates were applied would not be sufficient to cover the financial expenses associated with the transfer of the IDB loan. However, according to the financial projections, this situation would improve as operating revenues rose and financial expenses dropped. It should also be noted that there would be a net loss in 1993 of the equivalent of US\$11 million, which would have been reduced to the equivalent of US\$3 million by 1997. If these projections are borne out, the borrower will have to take acceptable measures, including rate increases, to ensure that the rates charged generate sufficient revenues to cover all of EDARCA's obligations. (See subsection 8(e) of the proposed resolution.)

VII. SUMMARY OF THE CONDITIONS SET FORTH IN THE NORMATIVE DOCUMENTS FOR THE OPERATION

A. Controls for the execution of the project

- 7.01 When the Venezuelan Government requested financing from the Bank for this project, mention was made as well of the need for assistance from the Bank in devising a new form of organization for the Instituto Nacional de Obras Sanitarias (INOS), in order to improve its administrative efficiency by setting up regional water and sewer companies that would be run like commercial concerns. In the case of EDARCA, the company that was to provide water and sewer services in the Central Region, it was foreseen that there would be a transition period, from the date of the company's legal establishment on September 2, 1987, until it assumed full responsibility for providing the region's water and sewerage services in about 1992, once the water supply system expansion project analyzed in this proposal were completed.

B. Project timetable

- 7.02 Taking into account the factors described above and the need to prevent any break in continuity of the management of the water supply system that might impair the billing and collection process while the project is being carried out and before EDARCA takes over full operation and administration of the waterworks, a system has been devised, in conjunction with the prospective borrower and INOS officials, to ensure that certain prior requirements, which are considered essential for the success of the project, are met by dates set out in a carefully-structured timetable. These requirements fall into the following groups:

1. Conditions to be met before the execution of the works

- 7.03 The following conditions would have to be met before the execution of the project works, and would be included in the contract as conditions precedent to the first disbursement (subsection 8(c) of the proposed resolution): (i) the essential staff needed for the proper execution of the project would have to have been hired for the executing unit of the project and have joined that unit; (ii) an agreement would have to have been signed between the borrower and the Instituto Nacional de Obras Sanitarias (INOS) for the execution of the project; and (iii) the Empresa de Aguas Regional del Centro, C.A. (EDARCA) would have to have: (1) been entered in the Mercantile Register, and (2) appointed a general coordinator to take charge of the process of organizing the company.

2. Conditions to be met in the course of execution of the project

- 7.04 The most critical phase of the project, particularly insofar as the organization of EDARCA and application of rates are concerned, would be the years 1988 to 1992. Accordingly, it has been determined that some of the actions planned for this period should run parallel and others in sequence.
- 7.05 The activities envisaged for the organization of EDARCA would take the following order:

a. Supervision of the organization phase

- (1) From the first year of execution of the project until EDARCA is operational, the general coordinator will submit progress reports on the EDARCA organization process, which will include an indication of the progress made on the transfer of the fixed assets of the Central Region water supply system and the hiring of the staff needed for the new organizational structure.
- (ii) The Board of Directors and senior officials of EDARCA must have been appointed before January 1, 1990, and the borrower must have signed an agreement with EDARCA under the terms of which EDARCA agrees to repay the IDB loan, assumes responsibility for maintaining the project works, and undertakes to satisfy the rate requirement set out in the contract between the Republic of Venezuela and the IDB.
- (iii) All of the assets of the Central Region water supply system must have been transferred by January 1, 1991, and the project works must have been transferred within six months after the date of the last disbursement of the loan.
- (iv) EDARCA must have commenced operations before January 1, 1991.

b. Monitoring of compliance with rate requirements

7.06 The following provisions have been made to ensure that the collection process will not be impaired while EDARCA is becoming organized:

- (i) The borrower, through INOS, must demonstrate, within 120 days after the end of each calendar year, for the fiscal years 1988, 1989, and 1990, that the operating revenues of the Central Region water supply system are covering the system's operating and maintenance costs plus a percentage of its depreciation expenses. The latter percentage is to increase steadily until 1989, by which time 100% of depreciation costs are to be covered. INOS must also agree to increase its collection rate in the Central Region to 70% of amounts receivable in 1988 and 75% in 1989.
- (ii) Within 120 days after the end of each fiscal year beginning in the 1991 fiscal year, the borrower must demonstrate to the Bank that EDARCA has collected at least 85% of the amounts owed to it the previous year, and that it is able to generate enough revenues to perform all of its obligations.

c. Summary of control measures

7.07 The following chronological table has been prepared to show clearly the proposed measures and time limits.

TIMETABLE OF ACTIVITIES

	<u>DEADLINE</u>	<u>NORMATIVE DOCUMENT</u>
I. <u>Project execution - INOS</u>		
1.1 Agreement on project execution Borrower/INOS	Before first disbursement	Prop.Res.8(c)(ii)
1.2 Staff - executing unit	Before first disbursement	Prop.Res.8(c)(i)
II. <u>Organization of EDARCA</u>		
2.1 Entering of EDARCA in Mercantile Register	Before first disbursement	Prop.Res.8(c)(iii)(1)
2.2 Hiring of consultants	9 months after effective date of contract	Recommendation 4(a)
2.3 Appointment of EDARCA coordinator	Before first disbursement	Prop.Res.8(c)(iii)(2)
2.4 Reports by general coordinator	Annually, until EDARCA is operating	Recommendation 3
2.5 Appointment of Board of Directors and senior officials	January 1, 1990	Recommendation 4(b)
2.6 Agreement borrower/EDARCA (transfer of obligations)	January 1, 1990	Recommendation 4(c)
2.7 Finalization of asset transfer	January 1, 1991	Recommendation 2
2.8 Start-up of EDARCA operations	January 1, 1991	Recommendation 4(d)
2.9 Transfer of project works to EDARCA	6 months after last disbursement	Recommendation 4(c)
III. <u>Rate requirements</u>		
3.1 Cover oper. and maint. cost and part of depreciation	1988	Prop. Res. 8(d)
3.2 Achieve collection rates of 70% and 75%	1988 and 1989	Recommendation 6
3.3 Cover oper., maint., and 100% depreciation	1989 and 1990	Prop. Res. 8(d)
3.4 Collect at least 85% of amounts owed during the year	1991	Recommendation 7
3.5 Generate enough revenues to perform all obligations	1991	Prop.Res.8(e) and Annex A 6.01

VIII. JUSTIFICATION OF THE PROJECT

A. Technical feasibility

- 8.01 The water supply project for the Central Region calls for the expansion of the numerous subsystems that comprise the Central Region system and a component to rehabilitate minor works. The project has been prepared in accordance with generally accepted technical standards, and is the least-cost technical alternative. Final designs are available, at the construction drawing stage, so construction work could begin as soon as the financing is approved. The four-year completion timetable is feasible. INOS has a great deal of experience from having served as executing agency for a number of similar projects. The first stage of this water supply system, which takes water from Cachinche on the Pao river, was built by INOS directly, using national funding. Those works are acceptable from a technical standpoint.

B. Financial and institutional feasibility

- 8.02 According to the analysis conducted, there should be no difficulty in receiving the local counterpart funding for the project in good time. Even though the Empresa de Aguas Regional del Centro, C.A. (EDARCA) was created very recently, the measures envisaged in the proposed institution-strengthening program should be sufficient to ensure that it will operate properly. It should be pointed out that the administrative and technical foundations for EDARCA are already in place, inasmuch as they were those of the Central Region Directorate of the Instituto Nacional de Obras Sanitarias (INOS). Accordingly, the staff joining EDARCA would already be trained and could adapt quickly to the principles of the new organizational structure.

C. Socioeconomic feasibility

1. Internal economic rate of return

- 8.03 In the economic analysis of the project, taken as a whole, a comparison was made of benefits at economic prices (measured by the various consumer groups' willingness to pay and savings), which totaled US\$250.5 million, and investment, operating, and maintenance costs, also in economic prices, which came to US\$150.4 million. Thus, the project was found to have a net present value of US\$100.1 million and an IERR of 23.2%, which surpasses the 12% minimum required by the Bank.

2. Sensitivity analysis

- 8.04 According to the sensitivity analysis conducted, the rate of return of the project is especially sensitive to the growth rates in demand that were projected for the evaluation. However, even if the growth rates were 30% lower than projected, the IERR of the project would still be 16.3%.

3. Ability to pay

- 8.05 According to data obtained in the socioeconomic survey of the Central Region, about 72% of the new users that would have water delivered through the public water-supply system are below the low-income limit as defined for Venezuela. However, calculations using the minimum monthly rate charged by INOS in the region (8 bolivars) reveal that only 1% of potential users would have to spend more than 3% of their income for water service.

4. Distributional impact on low-income groups

- 8.06 The distributional impact coefficient for low-income groups was calculated by dividing the net transfers of income to low-income consumers and unskilled workers by the total benefits accruing to the private sector. The calculations show that 54.7% of the net benefits generated by the project would go to low-income groups.

IX. RECOMMENDATION

- 9.01 For the reasons outlined above, the proposed project is considered to be feasible from a technical, economic, financial, institutional, and legal standpoint, and approval of the loan is recommended. To this end, the following normative documents are submitted herewith to the Board of Executive Directors for its consideration:

- Proposed Resolution
- Recommendations
- Description of the Project (Annex A to the Loan Contract)

PROPOSED RESOLUTION 1/

VENEZUELA. LOAN /IC-VE TO THE REPUBLICA DE VENEZUELA
(Water Supply Project for the
Central Region)

The Board of Executive Directors

RESOLVES:

That the President of the Bank, or such representative as he shall designate, is authorized, in the name and on behalf of the Bank, to enter into such contract or contracts as may be necessary with the República de Venezuela, as borrower, for the purpose of granting it a loan to cooperate in the execution of the Water Supply Project for the Central Region. This financing shall be subject substantially to the following conditions:

1. Amount and currencies: Up to US\$153,400,000, or its equivalent in other currencies which are part of the inter-regional capital resources of the Bank, to pay for goods and services acquired through international competition in the member countries of the Bank and for such other purposes as may be specified in the loan contract. Payments of amortization and interest shall be made in the currency or currencies specified by the Bank, in a quantity equivalent to the corresponding amount owed, calculated in units of account in terms of dollars of the United States of America, in accordance with provisions to be included in the loan contract.
2. Source of funds: The inter-regional capital resources of the Bank.
3. Guarantee: The general responsibility of the borrower.
4. Credit fee: 1-1/4% per annum on the undisbursed portion of the financing, commencing to accrue 60 days after the date of the loan contract and payable in dollars of the United States of America on the same dates as the interest.

1/ The provisions contained in this Appendix I will become final only when the Board of Executive Directors has approved the loan proposal.

5. Amortization: The borrower shall amortize the loan in a period of 25 years from the date of the loan contract, by means of semiannual, consecutive and, insofar as possible, equal installments. The first installment shall be paid six months after the date of the loan contract. The first installment shall be paid six months after the date scheduled for the last disbursement of the financing. The Bank may credit the amortization installments proportionally to the outstanding balance of each of the portions of the loan which accrue different rates of interest.
6. Interest: The borrower shall pay interest semiannually on the outstanding balances of the loan. The first payment shall be made six months after the date of the loan contract. During the disbursement period, the Bank: (a) shall determine the rate of interest to be applied as of the first day of each January and for the life of the loan to any amount disbursed during the ensuing year; and (b) may modify the interest rate, in accordance with the policy of the Bank, to be applied to disbursements of the loan made during the second half of the year. At the request of the Borrower, resources of the financing may be used to pay interest during the period of disbursement thereof.
7. Disbursement: The term for disbursement of the financing shall expire 4 years after the effective date of the loan contract.
8. Special Conditions:
 - (a) The resources of the loan shall be utilized in their entirety by the Instituto Nacional de Obras Sanitarias (hereinafter referred to as "executing agency" or "INOS"), with the exception of the portion of the loan earmarked for the Program for the Conservation of the River Pao Basin, which shall be utilized by the Ministerio del Ambiente y de los Recursos Naturales Renovables (hereinafter referred to as "MARNR"). If modifications in the legal provisions or the basic regulations concerning the INOS or the MARNR are approved which, in the opinion of the Bank, may substantially affect the project, the Bank shall have the right to require the borrower and/or the INOS or the MARNR to provide explanatory and detailed information in order to determine whether such modification or modifications may have an adverse impact on the execution of the project. Only after hearing the borrower and/or the INOS or the MARNR and assessing their information and clarifications, may the Bank take such measures as it deems appropriate, in accordance with provisions to be set forth in the loan contract.
 - (b) The resources of the loan, shall be used to participate in the execution of a project estimated at the equivalent of US\$383,600,000. Consequently, the loan contract shall contain such provisions as the Bank deems appropriate to ensure that such additional resources as may be necessary, for the complete

execution of the project shall be duly provided, in an amount estimated at the equivalent of US\$230,200,000, in accordance with a schedule of investments satisfactory to the Bank.

- (c) Prior to the first disbursement of the financing, the borrower shall submit to the satisfaction of the Bank:
 - (i) evidence that INOS has hired and brought on board the minimum staff necessary for the project executing unit.
 - (ii) evidence that an agreement has been signed between the borrower, the Instituto Nacional de Obras Sanitarias (INOS) and the MARNR for the execution of the project.
 - (iii) evidence that the Empresa de Aguas Regional del Centro, C.A. (EDARCA): (1) is listed in the Commercial Register; and (2) has appointed a general coordinator to take charge of the program of activities relating to the organization of the enterprise.
- (d) The borrower, through INOS, shall demonstrate, within 120 days from the end of each calendar year, for the fiscal years from 1988 to 1990 inclusive, that the operating revenues from the Water Supply System of the Central Region are covering the system operation and maintenance costs and an increasing proportion of the depreciation which, starting in 1989, must reach 100%.
- (e) The borrower shall take appropriate measures acceptable to the Bank to ensure that the tariff rates for the Water Supply System of the Central Region shall produce, beginning in 1991, revenues sufficient, at least, to cover all of the operating costs, including those relating to administration, operation, maintenance and depreciation. If the foregoing does not generate sufficient revenue to cover the timely service of all of EDARCA's obligations and to finance a proportion of the enterprise's investment program, in accordance with the stipulations of paragraph 6.01 of Chapter VI of Appendix III, the borrower and EDARCA shall adopt the necessary measures, which may include increases in the tariff rates, for the enterprise to obtain the additional resources needed to meet said goal.
- (f) In the acquisition of machinery, equipment and other materials for the project, and in the awarding of construction contracts, the system of public bids shall be followed in each case in which the value of such acquisitions or contracts exceeds the equivalent of US\$200,000. The bidding shall be subject to the procedures to be appended as an annex to the loan contract.
- (g) Notwithstanding paragraph (e) above, the borrower, with resources of the local counterpart, may contract directly with the Siderúrgica del Orinoco, C.A. (SIDOR) the acquisition of

steel plates for the manufacturing of pipes for the project, for up to the equivalent of US\$30,700,000.

- (h) The Bank shall establish such inspection procedures as it deems necessary to assure the satisfactory execution of the project and the borrower shall extend all cooperation which is required for the most effective accomplishment of this purpose. From the amount of the financing the sum of US\$1,534,000 shall be allocated for credit to the general income accounts of the Bank to meet expenses of general inspection and supervision.

RECOMMENDATIONS

- A. It is also recommended that, in addition to the conditions set forth in the proposed resolution, the following conditions, to be met to the satisfaction of the Bank, be included in the loan contract:
1. Unless the Bank shall otherwise agree, prior to issuing each call for bids or, if a call for bids should not be applicable, prior to initiation of the construction, the borrower, through the executing agency, shall submit to the Bank: (i) the general plans, specifications, budgets and other documents required for the construction in question and, if applicable, the specific requirements and other documents necessary for the call for bids; and (ii) in the case of construction, proof of legal possession of or the pertinent rights to the lands on which the works of the project are to be built.
 2. Within 12 months from the date of the loan contract, the borrower shall agree to submit a report to the Bank on the conditions under which INOS shall transfer to EDARCA the assets of the Water Supply System of the Central Region. Said transfer shall be concluded, at the latest, by January 1, 1991.
 3. The borrower shall agree to submit to the Bank, within 90 days from the end of each calendar year beginning with the first year of execution of the project and up to the time EDARCA has entered into operation, a report prepared by the general coordinator, to whom reference is made in clause 8(c)(iii)(2) of Appendix I, concerning the advance made in the process of organizing EDARCA, including the process of transfer of the fixed assets of the Water Supply System of the Central Region.
 4. The borrower shall demonstrate to the Bank:
 - (a) within 9 months from the effective date of the loan contract, that the necessary consulting services have been contracted for the preparation of EDARCA's organizational and operational plan;
 - (b) prior to January 1, 1990, that the Board of Directors and the upper echelon staff of EDARCA have been appointed;
 - (c) prior to January 1, 1990, that it has signed an agreement with EDARCA establishing the following: (a) that the works of the project will be transferred to EDARCA within six months from the

last disbursement of the financing; and (b) that EDARCA undertakes to fulfill the obligations relating to maintenance and level of tariff rates under the loan contract between the borrower and the Bank, as well as the payment obligations agreed upon between the borrower and EDARCA, which shall not be less favorable than the conditions granted by the IDB to the borrower; and

(d) prior to January 1, 1991, that EDARCA has entered into operation.

5. The borrower, through INOS, shall agree to carry out, during the project execution period, a Program for the Reduction of the Level of Non-accounted Water, the details of which shall be submitted to the Bank within six months from the effective date of the loan contract. Likewise, within 12 months from the effective date of the loan contract, the borrower shall submit evidence to the Bank that it has contracted a consulting firm, acceptable to the Bank, to carry out that program. Within the first quarter of the second, third, and fourth years of the execution of the project, the borrower shall present to the Bank the results of the implementation of the Program for the Reduction of the Level of Non-accounted Water, with a breakdown of the actions taken in the commercial, operational and support areas of that Program.
6. Within 12 months from the effective date of the loan contract, and in accordance with the diagnosis formulated by the consultants contracted in conformity to paragraph A.4(a) of this Appendix, INOS shall proceed to collect the receivable balances for sales of water in the Central Region. During 1989 and 1990, INOS shall collect at least 70% and 75%, respectively, of the amounts due during each of those years to the Water Supply System of the Central Region.
7. Within 120 days from the end of each fiscal year, beginning with fiscal 1991, the borrower shall demonstrate to the Bank that EDARCA has collected a minimum of 85% of the balances receivable for the preceding year. For this purpose, accounts owed for which the current term has not expired shall not be considered as balances due.
8. The borrower undertakes to execute the works for the sanitation of the Valencia Lake, consisting of the sewage treatment plants for the cities of Valencia and Maracay. In this respect, the borrower, through the MARNR shall submit to the Bank, within six months from the effective date of the loan contract, the final plans and designs for the construction of the sewage treatment systems in the La Mariposa site (Valencia) and in Maracay-Taiguaiguay (Maracay) with their financing plan and execution schedule. Additionally, the borrower shall present to the Bank, within the first 60 days of each calendar year starting in 1989, a report on the progress of the execution schedule of said works.

9. The borrower shall: (a) undertake that the works included in the project shall be maintained properly pursuant to generally accepted technical standards; and (b) submit for consideration by the Bank, through EDARCA, for ten years following the end of the project and within the first quarter of each calendar year, a report on the status of conservation of those works, in accordance with the stipulations of paragraph 7.01 of Chapter VII of Appendix III.
 10. During the execution of the project, the borrower, through INOS, shall submit the following to the Bank, within the first 90 days of each year: (a) the results of the representative analyses of the quality of the water treated in the Water Supply System of the Central Region, with particular mention of the results of the acidity analyses demonstrating that the ionic balance is being achieved on a permanent basis; and (b) a report on maintenance of all of the subsystems of the Water Supply System of the Central Region, in accordance with the stipulations of paragraph 7.01 of Chapter VII of Appendix III.
 11. For purposes of the ex post evaluation of the project, the borrower, through INOS and/or EDARCA, shall submit the following to the Bank:
 - (a) within 18 months from the date of the loan contract, the basic initial data, according to the categories indicated in paragraph 8.01(a) of Chapter VIII of Appendix III, and a description of the system to be used for compiling and processing the updating of the basic initial data to evaluate the results achieved with the execution of the project;
 - (b) within 36 months from the date of the loan contract, and yearly for up to three years after the date of the last disbursement of the financing, the basic data compared each year with the basic initial data; and
 - (c) within three years from the date of the last disbursement of the financing, an ex post evaluation report on the economic and social results of the project, pursuant to the methodology indicated in paragraph 8.01(b) of Chapter VIII of Appendix III.
 12. The financial statements of the project, during its execution, and those of EDARCA, starting with the year that operations begin and for the life of the loan contract, shall be presented yearly to the Bank, audited by an independent public accounting firm acceptable to the Bank, and in accordance with requirements satisfactory to the Bank.
- B. A document of content similar to that of Appendix III (The Project) shall be appended to the loan contract.

THE PROJECT

(Annex A of the Loan Contract)

I. Project Objective

- 1.01 The basic objective of the project is to expand the supply of potable water for the Central Region, in order to meet the demand of a population estimated to reach 3.5 million inhabitants in the year 2000, distributed among 15 urban and 24 rural localities.

II. Description

- 2.01 The project includes the execution of the following works and supplementary activities:

1. Works

- (a) A catchment work will be built at the Pao-La Balsa reservoir, consisting of pumping station No. 1, with the corresponding equipment.
- (b) Station No. 2 for repumping will be installed with the corresponding equipment.
- (c) An electric line, approximately 72 km long, will be installed for the pumping stations and treatment plant.
- (d) A distribution line of about 152 km of steel pipes with diameters of 2.10 m and 1.40 m, 1.30 m and 0.9 m will be built to bring the service to the localities of the area of influence of the project.
- (e) A conventional treatment plant, including a reserve tank of 30,000 m³ capacity, will be built with a capacity of 5.0 m³/sec. for mixing, flocculation, sedimentation and quick filtration.

2. Supplementary Activities

- (a) A program of rehabilitation of minor works will be executed for all of the subsystems of the Water Supply System of the Central Region.

- (b) A program will be carried out to reduce the amount of water not accounted for, to include the purchase and installation of approximately 40,000 house meters and the repair of about 70,000 existing meters, as well as close to 15,000 house connections.
- (c) A program to protect the Pao river basin will be carried out.
- (d) A program for the institutional and operational strengthening of EDARCA will be carried out.

III. Cost and Financing

- 3.01 The total cost of the project is estimated at the equivalent of US\$383,600,000, pursuant to the following breakdown:

TOTAL COST AND FINANCING SCHEME
(In thousands of US\$)

	<u>IDB</u>	<u>LOCAL</u>	<u>TOTAL</u>	<u>%</u>
I. <u>ENGINEERING AND ADMINISTRATION</u>	<u>200</u>	<u>19,177</u>	<u>19,377</u>	<u>5.0</u>
1.1 Engineering	-	1,655	1,655	
1.2 Supervision	200	14,481	14,681	
1.3 Administration	-	3,041	3,041	
II. <u>DIRECT COSTS</u>	<u>98,953</u>	<u>141,833</u>	<u>240,786</u>	<u>63.0</u>
2.1 Pipes	10,143	116,392	126,535	
2.2 Pumping stations	47,279	445	47,724	
2.3 Electric line	7,448	2,483	9,931	
2.4 Treatment plant	16,720	-	16,720	
2.5 Non-accounted water	8,363	1,513	9,876	
2.6 Minor works	9,000	21,000	30,000	
III. <u>ASSOCIATED COSTS</u>	<u>8,297</u>	<u>11,764</u>	<u>20,061</u>	<u>5.0</u>
3.1 Land	-	4,210	4,210	
3.2 Technical cooperation	200	1,379	1,579	
3.3 Protection of the basin	400	934	1,334	
3.4 Initial inventory	-	5,241	5,241	
3.5 Maintenance equipment	7,697	-	7,697	
IV. <u>NOT SPECIFICACLLY ASSIGNED</u>	<u>26,626</u>	<u>53,104</u>	<u>79,730</u>	<u>21.0</u>
4.1 Contingencies	10,700	17,311	28,011	
4.2 Escalation	15,926	35,793	51,719	
V. <u>FINANCIAL COSTS</u>	<u>19,324</u>	<u>4,322</u>	<u>23,646</u>	<u>6.0</u>
5.1 Interest	17,790	-	17,790	
5.2 Credit fee	-	4,322	4,322	
5.3 Inspection and Supervision Fund	<u>1,534</u>	<u>-</u>	<u>1,534</u>	
TOTAL	<u>153,400</u> =====	<u>230,200</u> =====	<u>383,600</u> =====	<u>100.0</u> =====
PERCENTAGES	40.0	60.0	100.0	

IV. Procurement

- 4.01 When the goods to be procured or services to be contracted are to be financed in whole or in part with foreign exchange from the financing, the procedures and specific requirements for the bidding or other form of purchase or contracting shall permit the unrestricted participation of goods and services, including those related to any mode of transport,

from the member countries of the Bank. Consequently, no conditions that would limit or restrict the offer of goods or the participation of contractors from such countries may be imposed through such procedures or specific requirements.

V. Consulting Services

- 5.01 In the selecting and contracting of consulting services to be financed in whole or in part with the resources of the financing, no conditions or requirements may be imposed that would restrict or preclude the participation of consultants from the member countries of the Bank.
- 5.02 In the selecting and contracting of consulting services to be financed in whole or in part with resources of the local contribution, the names of the consultants selected, the specifications of the services to be rendered and the price agreed upon shall be submitted to the Bank for its approval prior to the contracting of such services.

VI. Tariff Rates

- 6.01 The proportion of the investment program which must be covered by the revenue from EDARCA tariffs, which is referred to in paragraph 8(e) of Appendix I, shall not be less than 20%, and shall be determined by comparing the net internal generation of funds with the total construction program, including its financing costs. Internal generation of funds shall be understood to mean all of the revenues minus operating costs, before considering costs of depreciation and amortization, financing charges and non-operating results.

VII. Maintenance

- 7.01 The annual maintenance reports referred to in paragraphs A.9(b) and A.10(b) of Appendix II shall be submitted to the Bank within the first quarter of each calendar year and must include at least the following:
- (i) the organization to be used;
 - (ii) the human, financial, and physical resources needed to accomplish the maintenance activities scheduled for each year;
 - (iii) the follow up mechanism to be used, defining the purpose of the scheduled visits, their frequency and scope;
 - (iv) beginning with the second annual report, an evaluation of the maintenance plan for the preceding year; and
 - (v) the presentation, for each of the months of the preceding year, of a table with the results of the LANGEIER INDEX for the most critical day, for the purpose of making a follow up of the acidity control of the treated water produced in the Water Supply System of the Central Region.

VIII. Ex post Evaluation

8.01 For the presentation of the reports to which reference is made in paragraph A.11 of Appendix II, the following initial basic data and methodology shall be used:

(a) Initial Basic Data

- (i) the population of the project area, the number of connections and the percentage of the population served;
- (ii) the production of water;
- (iii) the cost of operating and maintaining the system;
- (iv) water consumption by major categories (residential, industrial, commercial, public sector);
- (v) in the residential group, the consumption of water by family, including the public system and other sources of supply available and the cost to the user of the water from each type of source. These data shall be broken-down according to the income levels of the users;
- (vi) tariff rates, breakdown according to major consumption categories, within the residential sector broken down in accordance with the typical levels of consumption and for different income levels;
- (vii) measurement of the production and consumption and estimates of the water not accounted for, which may include, as appropriate, the following components: losses in the transmission lines, networks, reservoirs and connections before the house meters; fraudulent uses of water; errors in macro and micrometering, including in the latter case the connections without any meter, with defective meters or with meters which are not regularly read; water delivered without being metered for various public uses, such as watering of public gardens, cleaning of streets and sewer networks, for fire fighting or for public or community buildings;
- (viii) the quality of the water from the system and from other available sources. The data shall be submitted so that the fulfillment of the guideline values recommended by the World Health Organization can be examined, and shall be recorded at the level of the water entering the distribution network as well as the water distributed;
- (ix) data on waste disposal and other indicators of supplementary social and cultural factors complementary to the water supply; and

- (x) projections on population, connections, and future demand for water.

(b) Methodology

- (i) Annual data will be presented, beginning with the entry into operation of the project, for the same categories indicated for the initial basic data. In those categories in which it might not be relevant to require data every year (for example, subsections (v) and (x)), information will be presented whenever any significant changes occur and for the final year of the evaluation period.
- (ii) The data to be used shall refer to the specific project area. Information must be gathered for the consumption of water by source of supply, through statistically representative samples of the population in the project area.
- (iii) The methodology to be used in preparing the ex-post evaluation report shall be similar to the one used for the ex-ante evaluation. The evaluation report shall contain an analysis of: (1) the cost-benefit of the project; (2) its distribution effect; (3) other relevant social and cultural effects; and (4) recommendations and conclusions. In the first two cases, the Guidelines for Evaluation of Water Supply Projects (IDB), (Project analysis papers Nos. 4 and 5) shall be used.