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POTABLE WATER PROJECT FOR THE WESTERN ZONE OF THE CITY OF BUENOS AIRES

(AR-0039)

PROJECT REPORT

1988

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I. INTRODUCTION

A. Background

- 1.01 Argentina has low potable water coverage rates in comparison with other Latin American countries. In 1984, coverage at the national level was 58.5% and for the metropolitan region of Buenos Aires it was 68%. In the 13 divisions that make up Greater Buenos Aires, water services reach 46.4% of the population and in the two districts in the project area, Tres de Febrero and Morón, only 36.5% of the population is supplied by public networks with the added aggravation that most of the water comes from wells which tap groundwater sources that are contaminated or in the process of becoming so.
- 1.02 The potable water project for the western zone of Buenos Aires proposed for financing is the result of a study conducted by the corporation Obras Sanitarias de la Nación (OSN) (National Sanitation Works) to determine the possibility of expanding services in those districts (municipalities) in the province of Buenos Aires that fall within its jurisdiction which presently receive partial service. The production capacity of different sources, the carrying capacity of underground watercourses (tunnels that carry water at low pressure) and of the existing distribution infrastructure were examined for the purpose of ensuring that the expansions would be cost-efficient. It was determined that the districts of Morón and Tres de Febrero, in the western zone of the city, will require a capacity of 3.9 m³/sec by 1990, while the zones in the southern and western extremes require 7.4 m³/sec. An analysis of priorities clearly showed the urgent need to assist the project zone in replacing its current water supply which comes from contaminated wells. Also, expansion is necessary to cover zones that are further out and not presently serviced by the OSN.
- 1.03 The capacity of existing water treatment plants was also studied and it was concluded that the most economical solution is to modernize the San Martín plant, which, at an additional cost considerably lower than that of a new plant, will make it possible to guarantee the quality of treated water and expand its capacity from 2 million m³/day to 3.4 million m³/day, making it possible to meet the estimated demand for the metropolitan area of Buenos Aires up to the year 1997, and maintaining the capacity of the Belgrano plant which is 1 million m³/day.
- 1.04 The project was prepared by an interdisciplinary group from the corporation Obras Sanitarias de la Nación, which is responsible for water and sewerage services for Greater Buenos Aires. Through a joint program with the Pan American Health Organization, financed under agreement ATN/SF-2629 PAHO/IDB, the Bank cooperated in preparing the project by contracting two international experts who advised the OSN on the design for the rehabilitation of the San

Martín water treatment plant and on preparation of the economic analysis for the project's major components.

B. Request and priority

- 1.05 On July 8, 1986, the Ministry of Economic Affairs asked the Bank to participate in financing the project. On July 16, 1987, the Ministry of Economic Affairs confirmed the priority attached by the government to the potable water project for Buenos Aires analyzed in this report, which is consistent with the social priorities established by the Argentinian government in its development plan for 1985-1990.

C. Missions

- 1.06 In March 1985, the Bank sent a mission to review the content of the project and to guide the executing agency in preparing the request for the loan and the respective supportive documents. During this mission, the Bank recommended that consideration be given to executing the works planned by the OSN in stages because of institutional weaknesses in the area of OSN finances, the amount required (US\$600 million), the term necessary to execute the works (10 years) and the very nature of the works. The subprojects presented on that occasion were: (a) potable water for Morón and Tres de Febrero; (b) sewerage for the northern zone; (c) sewerage for Morón and Tres de Febrero; (d) the fourth main sewer; and (e) the San Martín treatment plant. In September and December 1986, two missions were sent to review the financial and socioeconomic aspects of the project. Last, in May 1987, an analysis mission was sent that processed the basic information required for project analysis.
- 1.07 The operation presented here has a total cost equivalent to US\$245 million and will help to improve living conditions for over one million residents in the western zone of Buenos Aires by replacing the current water supply source, which is highly contaminated with nitrates, with treated water from the San Martín plant. Modernization of the plant will also make it possible to significantly boost water treatment capacity, not just for the project zone but for the whole metropolitan area, ensuring supplies of better quality water in sufficient amounts to cover demand up to 1997. The project provides for activities to train personnel in techniques for operating the main works, and also includes preparation of a sewerage project for the western zone, which is a supplementary work for sanitation in this area and is to be executed over the medium term.
- 1.08 As a result of the analysis, the proposed water project is considered feasible from the technical, socioeconomic, financial and institutional viewpoints, as indicated in the following chapters. Accordingly, it is recommended that financing be approved in the amount of US\$98 million from the Bank's ordinary capital resources.

II. FRAME OF REFERENCE 1/

A. The potable water and sewerage sector in Argentina

1. Organization of the sector

- 2.01 The Department of the Secretary of Water Resources (SRH) of the Ministry of Public Works and Services is the body responsible for planning and general supervision of the sector's activities. At the urban level, potable water and sewerage services in Argentina are the responsibility of the provincial and municipal governments. The corporation Obras Sanitarias de la Nación (OSN) is a decentralized agency coming under the SRH and is responsible for providing water and sewage collection and disposal services for the federal capital and the 13 divisions of Greater Buenos Aires. Until 1980, when the Executive Branch issued Decree 255/80 making the policy of transferring these services to the provinces effective, the OSN was responsible for almost all water and sewerage services in urban centers with populations of over 10,000. The lack of organizational structures in each province, together with a shortage of administrative and management teams, caused a drop in the commercial and operating efficiency of the new agencies that took over these duties in 1980.
- 2.02 The rural sector, which lives in communities of under 15,000 inhabitants is served by the National Water and Sewerage Service (SNAP) which plans, promotes, finances and offers technical support to the provinces for project construction. SNAP comes under the Secretary of Water Resources and works in cooperation with the provincial water services, which are responsible for promoting, formulating and constructing projects in this subsector in the provinces. They hand over the completed works to cooperatives or management boards organized by the communities to operate and maintain the works.
- 2.03 At the national level, other government institutions play a role in the sector, such as: the Secretary of Planning (SP) coming under the Office of the President of the Republic, which is responsible for planning development in both the urban and rural areas; the Ministry of Health and Social Action (MSAS) which has three branches involved in the sector--the Directorate of Environmental Quality, the Secretary for Urban Development and Housing (SEDUV) and the Directorate of Environmental Management. At present, there are 24 bodies in Argentina responsible for providing water and sewerage services, 23 of which are provincial, with the 24th being the OSN.

1/ Annex II-1 discusses the recent economic situation and future prospects.

2. Coverage of services at the national level

- 2.04 Argentina's total population at the end of 1984 was 28.1 million, 84% of which lives in urban areas, 4% in concentrated rural areas (communities from 200 to 15,000 inhabitants), while the remaining 12% is scattered in rural areas. Up-to-date information on the coverage and quality of services at the national level is not available, but estimates for the end of 1984 are as follows:

<u>Provinces</u>	Urban and concentrated rural population Millions of people	<u>Percentage with water</u>	<u>Percentage with sewerage</u>
Federal Capital	2.92	100.0	100.0
13 districts of Greater Buenos Aires	5.54	46.4	30.9
Rest of the country (23 provinces)	19.69	54.3	20.1
Total	<u>28.15</u> =====	58.5	29.8

- 2.05 These rates of coverage are not comparable with those elsewhere in Latin America, which at the regional level as of the same date were 80.3% for water and 48% for sewerage. The coverage ratios show that Argentina has a serious shortfall in both services and it should be added that since 1980 their quality has also deteriorated due to poor maintenance and the problem of the administrative and technical weakness of the provincial agencies already discussed above.

3. Health indicators

- 2.06 According to the most recent statistics, in 1984 life expectancy in Argentina was 70 years, in comparison with 62 years in 1975. Among the main causes of mortality, fifth place is held by infectious and parasitic diseases that are clearly associated with poor water quality and lack of sanitation. Annual mortality from intestinal diseases in recent years has been 2,000, 70% of which included infants of under one year, and 15%, children of under four years of age. Infant mortality ranges from 17 per 1,000 live births in the Federal Capital to 49 in the province of Salta.

4. Coverage goals at the national level

- 2.07 Argentina is one of the signatories to the Mar de Plata Act, which in 1977 declared the period from 1981 to 1990 as the Decade of Water and Sanitation, and has therefore been striving to comply with this commitment. The goals proposed by Argentina are aimed at achieving national urban potable water coverage of 89% by the end of 1990. For the concentrated rural sector, water coverage was set at 75%. Last, for urban sewer systems, the coverage goal was 75%.

2.08 A document recently prepared by the Asociación Interamericana de Ingeniería Sanitaria (AIDIS) (Inter-American Association for Sanitary Engineering) studies problems in the sector as well as the decline in service in terms of coverage and quality, and concludes that the goals set cannot be attained until the next decade, which is why the many tasks to be done must be ranked in order of priority. The following priority areas have been identified: (a) maintaining installations and rehabilitating existing systems; (b) expanding facilities so that many investments that have already been made in basic works which have idle capacity can be used more efficiently; (c) reducing the high percentages of water leakage which are due to the obsolescence of many installations and the lack of budget resources for maintenance; (d) reducing pollution of watercourses caused by lack of installations to treat waste water; and (e) planning investments in sewerage as a supplement to the expansion of the water systems. The document recommends that given the financial constraints on the sector, programs be undertaken to maximize investment efficiency. Also, to make these changes, it is imperative to have appropriate human resources available, which is why institution building is a vital aspect for the success of the future program. A recent World Bank loan includes activities for institutional strengthening of the OSN and the provincial bodies in Córdoba and Santa Fé.

5. Coverage in the Federal Capital and its suburbs

2.09 The area with the highest population density in the country is the Federal Capital and the 13 districts in the province of Buenos Aires that fall within the jurisdiction of the OSN. ^{1/} At the end of 1984, the Federal Capital had 100% water coverage, while coverage in the 13 districts was 46.4%, i.e. three million residents did not receive this service from public systems. Combining both figures, coverage for Greater Buenos Aires is 64.9%. As for sewerage, coverage in the Federal Capital was 100% and in the 13 districts only 30.9%, i.e. 3.8 million did not have access to these public services. Combining both figures, the corporation covers 45.2% of sewerage services.

2.10 The institutional, operational and financial analysis conducted pinpoints operational problems deriving from the age of the OSN's installations and the lack of timely economic resources to rehabilitate and expand services in tune with the size of the City of Buenos Aires. The lack of master metering and individual metering (only 20% of the connections are metered) together with the age of the distribution systems makes it possible to estimate that water losses through leakage may be in the order of 50% of production. There are various zones in the system that have water services, but

^{1/} Avellaneda, Lanus, Lomas de Zamora, Almirante Brown, Vicente López, San Isidro, San Martín, Tres de Febrero, Morón, Tigre, La Matanza, San Fernando and Esteban Echeverría.

due to the very run-down condition of the service lines, their water supplies are limited. An examination of the operating condition of the existing water system shows that underground watercourses and pumping stations have underused capacity, secondary supply lines provide restricted service, and existing plants can barely serve current demand. As for sewerage, the critical elements are lack of wastewater treatment, poor coverage of the systems and completion of the fourth main sewer.

- 2.11 The corporation's Ten-Year Investment Plan for the period 1987 to 1996 includes execution of the so-called "19 systems" ^{1/} that are briefly described below: No. 1 rehabilitation of the San Martín plant; No. 2 renovation of the secondary supply lines and reinforcement of the distribution mains in many sections of the system; No. 3 supply for zones with shortfalls in water services such as Lomas de Zamora, Almirante Brown, and the southwestern zone; No. 4 reconditioning of the chemical storage systems in the water treatment plant; No. 5 reinforcement of distribution mains in various parts of the capital; No. 6 potable water for Morón and Tres de Febrero; No. 7 expansion of the Belgrano treatment plant and the Avellaneda and Lanus systems; No. 8 expansion of the La Matanza water system; No. 9 master metering and customer metering; No. 10 fourth main sewer and principal collector sewers; No. 11 renovation of the sewer systems in various sectors; No. 12 northern zone sewage treatment plant; No. 13 Morón and Tres de Febrero treatment plant and collector systems; No. 14 expansion of the existing sewage treatment plant in the southeastern zone; No. 15 collector systems in the southern zone; No. 16 administration buildings; No. 17 equipment; No. 18 investments in administration; No. 19 various investments. As for investment distribution, not counting systems 16, 17, 18 or 19 which are common to all, 58% would go for potable water and 42% for sewerage out of a total equivalent to US\$891 million over a ten-year period.
- 2.12 The investment plan covers the priority works that the corporation considers to be the most critical; however, the company's strict financial constraints mean that this plan is subject to readjustment.
- 2.13 The OSN, through a loan granted by the World Bank (see 2.84), will invest US\$16 million in studies for institutional strengthening, master metering and customer metering, and equipment. Together with the support provided by the World Bank for the so-called Operational Improvement Plan, it is advisable to supplement these efforts with a review of management and internal auditing practices aimed at achieving more efficient management. Without these measures, it would not have been considered advisable to recommend the operation studied in this document.

^{1/} The number assigned to the system is for identification purposes and does not refer to priority.

B. Basic sanitation in the project area

1. General information

- 2.14 The western zone project area comprises the districts of Morón and Tres de Febrero. It is located to the west of the metropolitan region of Buenos Aires and covers an area of 177 km² (5% of the area of Greater Buenos Aires), 131 km² of which (74%) are in the Morón district and 46 km² (26%) in the Tres de Febrero district. The estimated population at the end of 1986 was 1,024,300, 662,000 of which live in Morón and 362,300 in Tres de Febrero. Most of the area is urban with a high population density (5,708 inhabitants/km²), which added to its close proximity to the city of Buenos Aires, makes it appear to be a continuation of the city, an impression that is strengthened by its similar level of activity and dynamism. The non-urbanized zone includes an airport, a military base, an agriculture experimental station and the area bordering Reconquista river.
- 2.15 Geographically, the project area is located on the edge of the Pampa Ondulada, which is gentle tableland bordered by the valleys of the Reconquista river to the northwest and the Matanza river to the southwest, with its highest points not more than 30 meters above sea level. Its surface hydrography is dominated by the Reconquista river, and a number of streams drain towards its basin such as Horqueta, Durazno, Las Catonas and El Morón. Abundant and uniformly-distributed rainfall has created numerous smaller streams in low areas that have been important in the urbanization process because they serve as storm sewers, and many of them have been enclosed. The explosive growth of Greater Buenos Aires, with no policy of separating residential and industrial areas, has led to a high degree of pollution of the surface water in the area. The problem is especially serious in Morón creek and therefore in the Reconquista river.

2. Potable water service

- 2.16 For all the districts in Greater Buenos Aires, supplies from public systems cover 52.1% of the total population. Coverage in the project area served by OSN systems is 36.5%, but differs in each district. Thus, in Tres de Febrero, coverage is 50.1% while in Morón it is only 29%. If coverage by neighborhood systems is added, the result is 40.9%. This means that out of a total population of approximately one million, over 600,000 lack public water services, as shown in the following table.

Water supply source (1986)

Type of service	I N H A B I T A N T S					
	Tres de Febrero		Morón		TOTAL	
	Inhabitants	%	Inhabitants	%	Inhabitants	%
OSN system	181,500	50.1	192,000	29.0	373,500	36.5
Neighborhood system	26,500	7.3	18,400	2.8	44,900	4.4
Individual wells	154,300	42.6	451,600	68.2	605,900	59.2
TOTAL	362,300	100.0	662,000	100.0	1,024,300	100.0

- 2.17 As for meters, at present there are only approximately 4,400 in the project area, and resources from a loan recently approved by the World Bank will be used to purchase and install the meters needed to achieve 100% coverage of existing connections in Tres de Febrero, which number approximately 60,000.
- 2.18 Water supply is mainly from groundwater, except for a small section in Tres de Febrero fed by OSN lines whose source is the River Plate. The neighborhood networks and individual systems are also fed from groundwater sources.
- 2.19 It is estimated that net water consumption in 1986 for the project zone was 120.1 million m³. Consumption by households connected to the networks represented 31%, individual wells 44%, commercial and official consumption 8.5%, and industrial consumption from wells belonging to the plants 16.5%. Based on these volumes, the population served receives an average of 329 liters per day.
- 2.20 Intensive exploitation of the underground source is causing two additional problems in the project area that will aggravate the problem of low coverage in the future unless this project is carried out. The first is depletion of the underground source as can be seen from the drop that has been recorded in pressure levels, and the second is deterioration in water quality due to an increase in salinization (natural contamination) and a rise in nitrate content (induced contamination). This drop in quality is very serious in some zones in the area such as Tres de Febrero and the northern and eastern parts of Morón. Section F of this chapter gives details on the environmental situation and the underground sources are described. It should be stressed that in some wells drilled by the OSN nitrate concentrations have been found much higher than internationally accepted limits, and their use has been discontinued. Also, people using private wells have been warned not to give this water to unweaned children because of the problem of metaglobinemia. ^{1/}

^{1/} The high nitrate content affects oxygen in the blood causing poisoning and death, especially in children under one year of age.

- 2.21 In short, the deficiencies in the water supply systems in Morón and Tres de Febrero include low coverage by public systems and poor quality groundwater, which poses serious health risks to users on account of the high nitrate content.

3. Sewerage system

- 2.22 The public sewer system has a coverage of 30% in the project area, with 20.9% in Morón and 46.7% in Tres de Febrero. As is the case with potable water supplies, there are neighborhood organizations in the area that provide sewer service, especially in Tres de Febrero where 9% is provided by such organizations, and it is estimated that they furnish a total of 6% of the service in the entire project area.
- 2.23 As for final sewage disposal, 30% of residents are connected to systems, 63.7% use other disposal systems, mainly septic tanks and cesspools, while the remaining 6.3% use latrines or have no system.
- 2.24 The lack of a public sewer service, together with a topography marked by low lying zones in part of the area and rainfall throughout the year, make for very poor environmental conditions in the project area. In Section F of this chapter, details are given on the environmental problem and how it will be solved. The project includes preparation of studies and sewerage projects so that the OSN can make an early start on these works which are not included in this project.

C. Existing water supply system in Greater Buenos Aires and the expansion plan 1/

- 2.25 Buenos Aires' main water resource is the River Plate. A slow filtration plant called General San Martín was built at the beginning of this century which has been much modified and expanded over the years. At present it has three virtually independent plants using different technologies within the same precinct.
- 2.26 In Buenos Aires water was piped from the treatment plant to the distribution centers 2/ using the traditional method of impulsion pipes at pressures of approximately 70 m. In 1933, when expansion of the water service was being considered, two possible solutions for piping water were considered: one was the impulsion method and the other was the gravity method using underground watercourses with conduits of large diameter and gentle slope that carry the water towards the consumption centers where pumping stations are installed, and the area served by each station is fed by gravity.

1/ See map in Annex II-2.

2/ Caballito, Córdoba and Paitoví centers.

- 2.27 The underground watercourse alternative offers the following advantages:
- (a) the excellent quality of the subsoil of Buenos Aires makes it possible to build tunnels lined with plain concrete;
 - (b) the large diameters result in smaller load losses, and less energy consumption is required;
 - (c) there are no major problems with breaks because gravity conduits requiring no pressure are used;
 - (d) only domestic materials are used in their construction;
 - (e) because of their large volume, the underground watercourses function as reserve tanks;
 - (f) from the strategic viewpoint, they provide maximum security since they are located 30 m below ground level; and
 - (g) major traffic problems do not arise during construction because tunnels are involved.
- 2.28 The first underground watercourses connected the San Martín plant to three existing deposits and were later extended to connect new deposits in the capital and Lanus.
- 2.29 The Bank helped to partially finance the treatment plant known as General Belgrano (Bernal) and the Paitovi-Lanus and Bernal-Lanus underground watercourses, through loan 70/SF-AR, approved at the end of the 1960's. The result was to direct water from both plants into an integrated system for all of Greater Buenos Aires. Later, in 1977, the Bank approved loans 526/SF-AR and 14/IC-AR to finance completion of the Paitovi-Floresta and Floresta-Matanza watercourses, with their corresponding pumping stations and elevated tanks for zonal distribution. For its part, the OSN has constructed the Saavedra-Villa Adelina and Villa Adelina-Vicente López watercourses using domestic resources.
- 2.30 In short, the OSN has prepared a technically acceptable expansion plan that it has been carrying out in stages and which currently has the following general characteristics:

1. <u>Production</u>	Capacity m3/day	Source
a) San Martín treatment plant	2,130,000	River Plate
b) Belgrano treatment plant	1,000,000	River Plate
c) Wells	410,000	Groundwater
Total	3,540,000	

2. Piping

a) Watercourses <u>1/</u> with diameters from 2 m to 4.6 m	77 km
b) Interconnecting lines <u>2/</u>	341 km
c) Distribution mains	1,071 km
d) Secondary supply lines	8,177 km
e) Domestic connections	1,062,000
f) Meters	209,000

D. Capacity of the different components in the existing Greater Buenos Aires water system

2.31 To give an idea of the installed capacity available in the system and to determine deficiencies so that work on the expansion plan can be continued, the OSN has prepared a water balance table that is attached as Annex II-3 which shows the required and maximum capacities planned for each component, which represent the production required to meet demand in 1990 and 2013. Demand has been calculated using very conservative figures, since metered coverage is very low and the rate schedule for metered service has still not been implemented. For the Federal Capital, 700 l/person/day has been adopted and for the rest of the metropolitan area 350 l/person/day. It has been assumed that the population will grow at a uniform rate, in accordance with historical trends and based on the 1980 census. Based on this analysis, it was determined that the capacity of the underground watercourses is in the order of 76 m3/sec and the demand by the year 2013, not including the southern zone or the western extreme 3/ which have still not been incorporated into the OSN's radius of service, will be in the order of 56 m3/sec.

2.32 With the OSN's immediate plans to expand the San Martín plant, total production would be 3,400,000 m3/day, which together with production from the Belgrano plant and production from wells, would give a total of 56 m3/sec, i.e. enough treated water to cover demand in the federal capital and the 13 districts. To cover demand in areas still not serviced by the OSN, which involve six additional districts, it

1/ Including nine pumping stations.

2/ Includes elevated distribution tanks in each zone.

3/ South: Berazategui, Quilmes and F. Varela. West: Merlo, Moreno and General Sarmiento.

will be necessary to double the capacity of the Belgrano plant, which is planned for the future under the corporation's ten-year investment plan.

- 2.33 In short, the system has sufficient piping capacity to serve demand in the OSN area, leaving reserve capacity for areas still not serviced. With regard to production and treatment, the San Martín plant must be expanded to serve demand up to 1997, and by expanding the Belgrano plant, it is feasible to serve the entire demand of Greater Buenos Aires up to the year 2013. ^{1/} The table in Annex II-3 shows that the current treatment capacity of 40 m3/sec will not be sufficient to cover demand in the OSN service area even for the year 1990 when demand is estimated at 47 m3/sec and therefore expansion of the San Martín plant is a critical element in the expansion plan.

E. Environmental situation in the metropolitan area

- 2.34 The environmental situation in Greater Buenos Aires shows serious signs of degradation as described in the special study entitled "Environmental Evaluation of the Water Resources in the SIMEB (Buenos Aires Integrated Metropolitan System)". This study points out that the situation is the result of imbalance between demand and supply. The former is mainly composed of residential and industrial demand, which are the two most important activities in the area. The latter refers to the quantity and quality of surface and underground sources, and the presence or absence of sanitation infrastructure.
- 2.35 The following were evaluated to measure the supply: (a) in surface watercourses, the biochemical demand for oxygen (BDO); (b) in the underground source, the values of total dissolved solids (salinization) for quality and pressure levels as indicators of capacity; and (c) for basic sanitation infrastructure, the percentage ratio between total urban area and the urban area provided with the services.
- 2.36 Demand was evaluated according to: (a) concentration of housing; (b) service deficit; and (c) concentration of industrial activity. Critical areas were defined as those where:
- (a) surface sources are contaminated above the limits established by the OSN for discharges of waste into watercourses;
 - (b) the groundwater resource has a total dissolved solids content above the maximum established by the OSN which is 2,800 mg/l and there is evidence of drops in pressure levels;
 - (c) lack of basic sanitation infrastructure in areas where the drawbacks listed under (a) and/or (b) above exist;
 - (d) demand for the resource is high due to high population and industrial density.

^{1/} Federal Capital and 19 districts.

- 2.37 Based on these criteria, four critical areas have been mapped out, three of which fall within the jurisdiction of the OSN. ^{1/} The following is a brief description of these three critical areas:

1. Northern critical area

- 2.38 Includes parts of the Escobar and Tigre districts and all of the districts of San Fernando, San Isidro and Vicente López. It includes the lower courses of the Escobar, Garín, Claro and Las Tunas streams, eventually broadening into the lower course of the Reconquista river. The seriousness of the supply problem can be seen in the pollution of the surface courses, which although they do not present high BDOs, ^{2/} show signs of the presence of oils, grease, floating solids, odors, etc. As for the groundwater resource it is progressively deteriorating because of the effects of salinization, with values from 3,000 to 4,000 mg/l of total dissolved solids being common, especially in the zone close to the shores of the River Plate. The saline front has not been stabilized, but instead continues to advance. The pressure levels dropped by 20 m from 1945 to 1975. This zone will be dealt with in Project 12 of the expansion plan (see section A.5 of this chapter), which has already been put out for public bids.

2. Western critical area

- 2.39 Includes the districts of General San Martín, Tres de Febrero and the north and northeastern sections of Morón. The middle course of the Reconquista river and its main tributaries, especially Morón creek which crosses this area from east to west and flows into the Reconquista, run through this zone. The pollution parameters indicate a BDO of 240 mg/l and the presence of toxic microcontaminants, all higher than the acceptable levels set by the OSN. These values have been monitored in the series of data for the years 1969, 1971, 1974 and 1986.
- 2.40 The case of Morón creek is a typical example of the seriousness of the problem in a very localized form. BDO values over 700 mg/l and oxygen consumption values in the order of 200 mg/l have been recorded, and this creek is one of the major sources of pollution of the Reconquista river.
- 2.41 The groundwater resource is highly polluted and the pressure levels are low due to the large number of wells in existence, since almost all of the area is supplied from groundwater sources. This zone will be dealt with in Project 13 of the expansion plan (see section A.5 of this chapter).

^{1/} See the map in Annex II-5.

^{2/} BDO is the biochemical demand for oxygen, in other words the amount of oxygen required to oxidize organic materials, which is usually expressed as BDO at five days.

3. Southern critical area

- 2.42 This area includes the districts of La Matanza, Esteban Echeverría, the northern part of Lomas de Zamora and Almirante Brown, and all of Lanus, Avellaneda and Quilmes plus the northern zone of Berazategui. The La Matanza river, and Las Perdices, San Francisco, Jiménez and Conchitas creeks are involved. All these rivers and creeks present BDO values of above 300 mg/l with very high concentrations of industrial pollutants.
- 2.43 Throughout the area the pressure levels are dropping by almost one meter a year. The values for total dissolved solids are above 4,000 mg/l. Overexploitation has led to vertical suction between aquifers that have become exhausted or are close to depletion in the districts of Quilmes, Berazategui, Lomas de Zamora, Avellaneda and Lanus. This zone will be dealt with in Projects 7, 8 and 15 in the expansion plan.
- 2.44 In short, the western critical area which includes the districts of Morón and Tres de Febrero is considered to be the most alarming of the three and priority has been given to solving its problems given the environmental condition resulting from surface contamination and the poor quality of the underground source.

F. The environmental situation in the project area

1. Morón creek

- 2.45 The basin of Morón creek covers 92 km² and is mainly located in the districts of Morón and Tres de Febrero, but also extends into the districts of General San Martín, La Matanza and Merlo. This creek, which is over 20 m wide, still floods when the rainfall is heavy. In periods of low water, its flow can range from 60,000 to 86,400 m³/day for an average of 79,000 m³/day. It can increase to values in the order of 1,700,000 m³/day after raining. ^{1/} In periods of low water, the flow is composed exclusively of discharges from different origins, with the main source being the different industrial activities in the area.
- 2.46 There are 1,248 industries in the district of Morón, which together contribute over 45,000 m³/day. The 112 that discharge into the creek generate 42,000 m³/day, i.e., 10% of the industries are responsible for 90% of the flow of residual water. The organic material discharged by industries, which represents a figure in the order of 10,000 kg of BDO/day, has a high coliform count with a MPN above 10⁷ per 100/ml. Eighteen industries contribute 89% and six industries alone contribute 67%. A clean-up of Morón creek would reduce organic pollution in the Reconquista river by 85%.

^{1/} This flow is about 20 m³/second; the average volume of flow of the River Plate is about 20,000 m³/second at the junction of the Paraná and Uruguay rivers.

- 2.47 As can be seen in Annex II-6, Morón creek, the main tributary of the Reconquista river, crosses the district of the same name diagonally and is located in the critical western region described above. The quality of its water determines the quality of the water in the Reconquista river which, in its final discharge into the River Plate, is also responsible for the water quality in the Plate in a zone located upstream from the inlet works in both the San Martín and the Belgrano plants. Given the proximity of the discharge to the San Martín plant, it can be deduced that part of the pollution will be present in the raw water taken into the plant for processing.
- 2.48 In a series of analyses of the raw water entering the San Martín treatment plant conducted by the OSN in 1985, 1986 and 1987, it was shown that its chemical composition falls within the values stipulated in national standards, but that it presents a high load of organic contaminant in the order of 10^5 MPN 1/ of coliform bacteria per 100/ml, which is why a pre-chlorination process has been included in the plan to expand the plant, which according to the laboratory tests mentioned in Annex II-4, oxidizes organic material and does not cause the creation of trihalomethanes. 2/ The final water treatment process proposed in the plan is post-chlorination, which could possibly cause formation of trihalomethanes, both in the plant and in the system to which disinfectant is also added. The possible adverse effects of disinfection will be studied in greater detail as part of the technical cooperation activities called for as part of the project. 3/
- 2.49 Morón creek, therefore, has two potential adverse effects on the environment: (a) it is an open sewer that crosses urbanized zones in Morón and Tres de Febrero, and because of its constant flooding, it constitutes a threat to people living on its banks, especially children; and (b) it is the major pollutant of the Reconquista river which in turn discharges its pollution into the River Plate affecting its quality for drinking purposes.
- 2.50 The basin of Morón creek has low sewer system coverage and to date, only approximately 130,000 people receive this service. Estimates indicate that by the year 2005, the population to be served will rise to 650,000, with domestic discharge in the order of 234,000 m³/day, and a ratio of domestic to industrial wastewater of 3 to 1.
- 2.51 As part of the initial sewerage studies, laboratory tests were conducted in 1985 and 1986 to demonstrate the feasibility of treating this wastewater using one of three alternative biological processes: (a) activated sludge; (b) extended aeration; and (c) mechanically aerated ponds. These tests show that the chemical pollutants from industrial waste do not affect biological treatment.

1/ MPN = most probable number.

2/ It has been proven that THM is a carcinogen.

3/ See terms of reference, Annex III-3.

- 2.52 As for treatment capacity, the studies conducted recommend construction of a plant with a capacity of 60,000 m³/day to be expanded later to 100,000 m³/day. When this flow is exceeded, the remainder would go to the Reconquista river untreated. Since the industrial sector is the main pollutant, financial penalties should be levied on the companies, and they should be required to meet quality standards for their effluents, which are regulated by the OSN under the so-called "environmental-pollution penalties". The penalties have been ineffective in view of the minimal fines imposed on companies that fail to treat their waste. ^{1/} This matter will be dealt with when the sewerage studies called for in the project are prepared.
- 2.53 The OSN informed the analysis mission that a bill was being drafted to create a "River Plate Basin Committee" to conserve surface and underground water resources and control their pollution. This committee would have the following functions:
- (a) to take the steps required to control pollution of surface and underground water resources, based on five-year plans;
 - (b) to coordinate all state bodies with jurisdiction in this area to ensure compliance with the law;
 - (c) to act in line with the principle of comprehensive control;
 - (d) to provide for instruments offering financial incentives for basic sanitation works; and
 - (e) to execute sanitation works, formulating sanitation policies and plans.
- 2.54 According to the draft bill, the Committee would be an independent agency administered by a board composed of three members, one representing the OSN, one the province of Buenos Aires and one the Chamber of Industrialists, and would come under the Ministry of Public Works through the Undersecretary for Water Resources.
- 2.55 For the above reasons, a clean-up of the Morón basin constitutes a very high priority for the OSN. The Bank considers that, given the intimate relation between the pollution of Morón creek and the sewerage project for the western zone, it is indispensable to include resources in the project cost, to be charged to the counterpart contribution, to complete the sanitation studies within 30 months so as to have available the study of alternatives and the final design for the selected alternative. It is recommended that within the 30 months after the proposed loan contract is signed, the OSN submit to the Bank the technical and financial plan for executing the works so that prior to completion of the water project, the sewerage project

^{1/} To date, only 5.6% of the industries have submitted their sworn declaration on the "environmental-pollution penalty".

will have taken a large physical step forward. Among the technical cooperation activities included in this operation, provision has also been made for short-term consulting for the OSN to conduct the studies mentioned above.

2. The groundwater source

- 2.56 The water resource in this zone is a series of productive aquifers in sedimentary formations (sand, limestone, sandy lime, etc.) which can be interpreted as vertical sections of a multiunit aquifer, in which the interrelationship of the subunits depends to a greater or lesser extent on the sediments separating them. The three productive levels are called: (a) the Epipuelche subaquifer; (b) the Puelche subaquifer; and (c) the Hipopuelche subaquifer.
- 2.57 In the Epipuelche, production starts at from 2 to 3 m deep and extends to 30 m below ground level. Natural productivity is low, and closeness to and contact with surface waters and sewage discharges (septic tanks) leads to high organic contamination which has meant that this resource has been rejected for water supply purposes.
- 2.58 In the Hipopuelche, production generally starts below 80 to 90 m, and although flows can reach 80 m³/hour, the content of dissolved salts is above 4,000 mg/l. This characteristic also means that this resource must be rejected for water supply purposes. The Puelche subaquifer, which appears at from 40 to 70 m below ground level, has the best characteristics with regard to production and water quality for the two districts and generally for all of Greater Buenos Aires and today is the main source of supply for zones lacking public systems provided by the OSN.
- 2.59 In the project area, groundwater forms the main supply for both domestic and industrial uses. In general terms, there is a marked deficit as can be seen by the drop in pressure levels, with the collateral effects of salinization and the presence of nitrates. The average flow per well in the area supplied by the OSN is in the order of 50 m³/hour, and there are 86 wells in Morón with average yields of 56 m³/hour. Approximately 25% of these wells are not in production at present.
- 2.60 Due to overexploitation, the Puelche subaquifer is changing over time, passing from a semi-confined to a free stratum, which allows polluted water to seep in. It can be predicted that over the short term, yields above 40 m³/hour cannot be expected, and over the medium term (approximately 10 years) 30 m³/hour.
- 2.61 Contamination in the Puelche aquifer is of two kinds: natural and induced. Natural (salinization), which occurs in Zone 1, is due to the presence of marine deposits below the 5 m curve, and values for dissolved solids have been obtained above 3000 mg/l and for chlorides and sulphates from 700 to 900 mg/l, which means that this resource must be rejected for potable purposes. As for induced contamination,

which is present in Zone II, there has been a considerable increase in the nitrate content due to a number of factors, such as: (a) seepage of surface pollution through flooding of watercourses such as the Morón and the Reconquista; (b) seepage from septic tanks caused by rainfall; (c) drops in pressure levels which cause suction of polluted surface waters. The following table gives the status of the Puelche resource in both districts, showing the drop in the static levels in all wells and the high nitrate content.

<u>District</u>	<u>Well No.</u>	<u>Period Years</u>	<u>Change in static level (m)</u>	<u>Current nitrates mg/l</u>
MORON	10	1941-1985	- 42.00	90
	12	1942-1985	- 37.00	83
	40	1971-1985	- 12.18	100
	47	1972-1985	- 12.7	80
	36	1966-1985	- 16.8	96
TRES DE FEBRERO	1	1963-1985	- 15.50	140
	8	1971-1985	- 10.50	112
	14	1972-1985	- 12.00	120
	15	1972-1985	- 8.80	110

2.62 OSN standards set the maximum permissible nitrate content at 45 mg/l which, as can be seen, is greatly exceeded. The situation is even worse if we compare it with the guidelines of the World Health Organization, which set out 10 mg/l of nitrates as the limit for considering water apt for human consumption.

2.63 In view of the quantity and quality of the underground aquifer available the project area was divided into three zones for the purpose of conducting water-use studies. The project analysis has used them to measure the economic benefits deriving from replacement of sources such as the highly contaminated existing source that would be abandoned, and the new source that would be brought into service with the project. Annex II-7 shows the approximate layout of these three zones.

3. Impact of the project on the underground aquifer

2.64 Water for industrial consumption will continue to come from underground sources. The project will not provide surface water to industrial establishments for use in their processes. It will, however, serve businesses, public establishments and industries but only for drinking and sanitary purposes.

2.65 Industrial consumption has been calculated at 15% of the total, and it is estimated that 8.5% of this volume is used for sanitary purposes in Tres de Febrero and 7.9% in Morón. Therefore, provision of water under the project will not imply any increase in industrial

waste, and consequently in chemical and organic pollution, which could cause the present quality of the underground aquifer to deteriorate even further.

- 2.66 With regard to the organic load from human activity, it is clear that quantities of organic materials will not increase with the project and that higher water consumption will lead to greater dilution of organic pollutants. The population that does not have public sewer systems, which is estimated at 70% of the total population, monitors and regulates its own consumption because of the need to avoid overloading their individual waste disposal systems, which are generally cesspools or septic tanks, because it is costly to have them cleaned frequently.
- 2.67 In conclusion, the potable water project will not increase current pollution of the underground aquifer; also private wells will be eliminated by the end of the project under the corporation's regulation known as "compulsory radius", which obliges the users to shut down their own installations if public systems exist in their neighborhoods. As for the impact that a rise in the phreatic levels would have on the general water table as a result of closing a large number of individual wells, it is expected that given the great depth of the aquifers and the fact that industry will continue to make intensive use of the underground resource, its recovery will be very slow and therefore there will be no problems with imbalances over the short and medium terms.

G. Alternatives for supplying the western zone

- 2.68 To find the least-cost solution, the OSN studied a series of technical alternatives for the main project works, including the following:
1. Source of supply
- 2.69 Two alternatives were studied: one was to use surface supply for the expansion plan and the other was to use groundwater from outside the project area. The technical and economic comparison is discussed in Annex II-4, and the least-cost alternative is surface water supply using underground conduits.
2. Principal distribution system
- 2.70 Two alternatives were studied, one with two elevated tanks in Tres de Febrero and five in Morón, and the other with one elevated tank in Tres de Febrero and three in Morón. Annex II-4 describes the technical and economic comparison, which gives almost identical results, with a slight economic advantage for the first alternative which was the one selected. It also offers operational advantages for managing the distribution system and controlling leakage.

3. Expansion of the San Martín treatment plant

- 2.71 Three alternatives were studied for expansion of the plant (see general plan in Annex III-2). The first involves constructing a new supplementary plant with a capacity of 2,950,000 m³/day, and leaving sectors A and C out of service; the second involves maintaining part of sectors A and C and constructing an additional plant with a capacity of 1,100,000 m³/day; and the third involves using the existing installations in sectors A, B and C after rehabilitating and optimizing the existing units. The last is the least-cost alternative although it will take longer to execute, because all of sector A cannot be taken out of service. Annex II-4 discusses the study program carried out and the results of the technical and economic comparison of alternatives.

H. Priority of the western zone project

- 2.72 The following considerations were used in determining the priority of executing this project:
- (a) At present, in the OSN service area there are 2.3 million people without public water service, and this project would reduce the shortfall in coverage by almost 50%. The other 50% are scattered among other separate zones in Greater Buenos Aires and will be provided with service under the ten-year plan, so that the corporation's coverage goals will be achieved by 1996.
 - (b) With regard to water quality, as was explained previously, these districts are located in the so-called western critical area which, due to low yield of the aquifer and high saline and nitrate contamination, is the most critical of the three areas.^{1/}
 - (c) The current population in the western zone is approximately one million. Urban structure in both districts is consolidated and there are approximately 4,900 industries, but water coverage is only 40.9% and is unequally distributed in both.
 - (d) From the expansion plan it can be seen that the existing infrastructure facilitates expansion of the system towards the western zone. Any development of the system towards other areas with shortfalls in supply would require large infrastructural works. It can be said that water whose quality is up to standard is at the very doorstep of the western zone, and it is only necessary to extend the underground watercourse.
 - (e) From the viewpoint of the series of works that the corporation must undertake to cover service deficits, waterworks have been given priority because of their impact on social aspects,

^{1/} Except for a small zone in the southwest of Morón where quality and output are good.

especially health, as a result of the high risk involved in using water polluted with nitrates, especially for children.

- (f) The plan to expand the water system of Greater Buenos Aires is the most adequate technical solution and is being carried out in stages with the help of the Bank. This will be the third stage of the plan.
- (g) Parallel to this project, the OSN will take steps to improve its institutional and operational structure so that over the short term physical elements will be available such as master metering and customer metering to control water losses, which will make it possible to prepare plans to rehabilitate the systems, which is another priority activity. Also, the OSN will establish a rate structure that will make it possible to improve the corporation's income on the one hand, and to penalize high consumption on the other. In other words, this project forms part of a rational and coherent program to rehabilitate and extend the potable water system of Greater Buenos Aires.

I. IDB participation in the sector

- 2.73 The Bank has helped to finance potable water programs through nine loans in an amount equivalent to US\$177.2 million, US\$53.7 million of which were used for the urban sector and US\$124.5 million for rural waterworks. Chapter IV of document PR-832-A, which is the project report on the Rural and Urban Potable Water Program (loans 14/IC-AR and 526/SF-AR) of October 1977, presents an evaluation of the first five loans granted to develop the Argentinian potable water sector, two of which were used for the rural sector and the other three for the urban sector. The following is a review of operations which are not the object of this report:

1. Rural sector program

(a) Loans 83/IC-AR and 661/SF-AR

- 2.74 Currently in effect are loans 83/IC-AR and 661/SF-AR approved in October 1981 to finance the Fourth Stage of the Rural Potable Water program executed by the National Water Service (SNAP), whose main objectives are: (a) to provide water for 160 rural or semiurban communities to serve an initial population of 255,000 people; (b) to improve the capacity of the staff responsible for supervising the works and operating and maintaining them. Program execution has been slow, with 80 works completed and 77 construction projects in progress. The weighted physical advance was 62.5% as of June 30, 1987, 4.5 years after the contract came into effect. The deadlines for commencing the works and the final disbursement were postponed for two years. It is expected that the works will be completed within the term that ends in September 1988, and that program objectives will be attained.

(b) Loans 14/IC-AR and 526/SF-AR (rural subprogram)

- 2.75 In November 1977 the Bank approved loans 14/IC-AR and 526/SF-AR for US\$31 million and US\$52 million, respectively, for a rural and urban water program to be executed by SNAP and by the OSN. The original cost for the rural subprogram was equivalent to US\$67 million, of which the Bank was to finance US\$37 million. The total cost of the subprogram was equivalent to US\$73,950,000, of which the Bank financed US\$35,750,000. Execution of the rural program was delayed by 1.5 years, and the revised goals were attained at the end of 1984, which were to provide 176 communities, with populations ranging from 100 to 10,000, with potable water service for 348,000 people, which meant a reduction of 13% in the original goal. Compliance with the rates clause for the rural components of these loans has been satisfactory because the waterworks are managed by cooperatives that are appropriately organized and able to collect for the service.

2. Loans for the urban sector

(a) Loans 14/IC-AR and 526/SF-AR (OSN urban subprogram)

- 2.76 The original subprogram planned to provide potable water services for 700,000 people in the suburban district of La Matanza, and to install 440,000 meters in that area and in various other cities in Argentina. In 1984, the Bank improved supplementary works to extend the service to an additional low-income population in the order of 400,000 people. This urban subprogram, executed by the OSN, had a total assigned cost equivalent to US\$130.5 million, of which the Bank was to finance US\$46 million. Execution was quite slow (7.5 years) due to: (a) problems in constructing certain works, where the unexpected condition of the subsoil impeded the use of planned equipment for excavation and lining one tunnel; (b) delays in completing another tunnel and putting a pumping station financed from a previous loan (70/SF-AR) into service, which was a prior condition to the first disbursement for this operation; (c) delays in approving international bid calls and in arranging the exemption from the Act known as "Buy at Home"; and (d) financial and institutional constraints due to the restructuring of the OSN in 1980.
- 2.77 The original objectives and goals of the program were attained, and water apt for human consumption was provided for a large percentage of the suburban population of Buenos Aires. When the term for the last disbursement expired, the supplemental works were only partially completed, because a delay in submitting the pertinent documentation to the Bank extended the time required for execution beyond what had been planned. The works were completely finished and executed with resources from the local contribution. When the term for the last disbursement expired, amounts equivalent to US\$8.5 million from loan 14/IC-AR and US\$11.3 million from loan 526/SF-AR for the urban subprogram were cancelled, reducing the total cost of the project to

the equivalent of US\$85,610,000 which meant that the Bank's share dropped from the 35.2% originally planned to 30.6% of the total cost of the subprogram.

(b) Compliance with contractual clauses

- 2.78 With regard to installation of the 440,000 meters planned for in the project, the 40,000 that the OSN had purchased using its own resources were installed in the first stage, and subsequently the 160,000 for the La Matanza project and different areas in metropolitan Buenos Aires. Because of the 1980 institutional restructuring, the OSN ceased to have jurisdiction over the cities in the interior of the country, which made it impossible to purchase and install the remaining 240,000 meters planned for outside the city of Buenos Aires. However, with financing from the IBRD, the OSN is carrying out a program that provides among other things for purchasing and installing 200,000 customer meters (still not put out for bid) in the metropolitan area of Buenos Aires. In addition, 60,000 meters will be installed in Córdoba and 4,000 in Rosario. Provision is also made for metering at the central plant and main distribution system levels.
- 2.79 In short, in spite of the OSN's efforts to install meters in the provinces, this was not done, and Bank resources for provision of the 240,000 meters were cancelled. Under the new operation, contractual clauses will be included to increase the level of customer metering in the OSN's area of service. Also, metering will be accompanied by creation of a rate structure based on metered service, which is the corporation's current policy and which the Bank will monitor through the contractual clauses proposed for this operation.
- 2.80 As for the rate clause, it was established in loans 14/IC-AR and 526/SF-AR that, for the urban component of which the OSN was in charge, rate revenues were to cover operating costs of the La Matanza system (the project financed by the Bank) and the servicing of both loans. It was further stipulated in the loan contracts that the rate in effect in the La Matanza system in December 1977 was to be increased annually by 25%, in real terms, in order to achieve the above-mentioned coverage, as soon as the project being financed was placed in operation.
- 2.81 In the OSN's accounting system, revenues and expenditures are not classified by water systems, and its accounting records thus do not provide the information that would be needed to properly establish rates by system. It also is impossible, with the organization's current system of accounts, to determine the coverage of rates by system, if rates were to be set without changing the accounting system. The OSN's rate structure does not provide for rates by system. For these same reasons, the OSN could not produce the rates for the Matanza system to which the 25% annual increase stipulated in the contracts for loans 14/IC-AR and 526/SF-AR was to be applied. In short, the aforementioned rate provisions that appear in the loan

contracts clearly were established without bearing in mind that, given the nature of the OSN's accounting system, there would be difficulties in complying with those provisions and in ascertaining whether the coverage target in La Matanza had been achieved through the effect of general OSN rates.

- 2.82 The deadline for complying with the prior conditions to the first disbursement for the urban subprogram was extended twice, each time for a period of three months, to comply with the commitment of completing and putting the Bernal-Lanus underground watercourse into operation. The delay in complying with this deadline and other factors made it necessary to extend the deadline for commencing the works by one year. The deadline for the final disbursement was postponed four times, for a total period of 42 months, to make it possible to fully complete the original program for the works, and the additional works were completed one year after the deadline in question, using the local contribution.
- 2.83 The minimum semiannual progress stipulated for constructing the Paitoví-Floresta tunnel was complied with. In each project, the technical conditions were complied with, except for the term of execution which was generally longer than what had been planned.

3. Loans for urban development

(a) Loans 206/IC-AR and 514/SF-AR

- 2.84 In addition to the loans mentioned, in September 1986 the Bank approved financing for a Global Urban Development Program for US\$120 million in foreign exchange and US\$2 million in local currency under loans 206/IC-AR and 514/SF-AR, respectively. The objective of the program is to improve living conditions for the Argentinian urban population that lives in small and medium-sized cities in the interior. It consists of a line of credit to finance urban development works at the provincial and municipal levels, and a subprogram for technical assistance in preparing projects, conducting studies and strengthening the agencies responsible for delivering urban services. It is estimated that the demand for financing for potable water services will represent approximately one half of program resources. The loans were signed on January 20, 1987, and the prior conditions for the first disbursement are in the process of being complied with.

J. Actions of other institutions

- 2.85 The World Bank approved a loan (November 18, 1985) ^{1/} for US\$60 million for the following purposes: (a) to rehabilitate water and

^{1/} The loan contract was signed in November 1986 and became effective in May 1987.

sewage systems; (b) to extend service to new areas; and (c) to strengthen the planning and management of companies in the sanitation sector. The program, whose execution has recently begun, includes:

- (a) Preparation of a national potable water and sewerage plan, including an investment plan, criteria for financial and technical analyses, the design of systems for services, rate levels and structures, and an analysis of the institutional and financial structure required for proper development of the sector;
- (b) operational improvements to the systems in Buenos Aires and Rosario, including metering, rehabilitation of distribution systems and better management by the companies in the sector;
- (c) rehabilitation and extension of the potable water system in Córdoba, including a new treatment plant, rehabilitation of the existing plant, completion of a canal, installation of pumping stations and construction of trunk and distribution mains; and
- (d) a program for institutional strengthening of the OSN, the Santa Fé Provincial Directorate of Sanitation Works and the Córdoba Provincial Sanitation Works Authority.

2.86 The Bank believes that the operational improvements provided for under the World Bank loan are very important. It is also important to implement the recommendations arising from the management improvement program simultaneously with execution of the project proposed in this document. Without the commitments in question, sufficient grounds would not exist to justify the IDB's financial participation. 1/

1/ See Recommendations.

III. THE PROJECT

A. Objectives and goals

- 3.01 The objective of the project is to complete water service for households in the districts of Morón and Tres de Febrero by replacing the current source of supply, which is groundwater that is highly contaminated with nitrates, by surface water treated at the San Martín treatment plant. This plant would be modernized and expanded to supply the western zone and other sections of Greater Buenos Aires. These districts house a current population of approximately one million, which will grow to 1.3 million by the year 1997, which is the design period considered for the project. The project also includes expanding the domestic metering program and contributing to building up the executing agency.
- 3.02 The specific goals of the project are: (a) to install distribution systems for approximately 144,000 new metered household connections which by the end of the construction period will serve an additional population of approximately 700,000; (b) to install 60,000 meters at existing connections in different parts of Greater Buenos Aires; (c) to expand the San Martín treatment plant from 2,000,000 m³/day which is its current capacity, to 3,400,000 m³/day, which will make it possible to treat the water required by the population in Greater Buenos Aires in the year 1997 (the Federal Capital and 13 districts); (d) to conduct the necessary sewerage studies for sanitation in the project area; and (e) a program of supplementary activities involving technical aspects and community promotion related to the project.

B. Project description 1/

- 3.03 The project includes execution of the following works and supplementary activities.

1. Works for the project to supply water to the western zone

(a) Underground watercourse

- 3.04 The course will be 3.30 m in diameter and approximately 16.5 km long with an initial capacity of 8.70 m³/sec and a final capacity of 7.26 m³/sec, and will connect the existing Saavedra pumping station to the pumping stations in Tres de Febrero and Morón.

(b) Two pumping stations

- 3.05 One in Tres de Febrero with three 1,000 HP electric pumps and another at Morón with six 1,000 HP electric pumps. An elevated tank with a capacity of 2,900 m³ will be installed at the Tres de Febrero station and one with a capacity of 5,800 m³ (two levels each of 2,900m³) at the Morón station. Each pumping station will have a chlorination chamber, office space, dressing rooms, toilets, storage space and cranes to assemble and disassemble equipment.

1/ See Annex III-1 which contains a plan of the area.

(c) Two interconnecting lines

- 3.06 One in Tres de Febrero for an approximate length of 10.3 km with pipes whose diameters range from 0.6 m to 1.10 m, and another in Morón, with an approximate length of 31.2 km and diameters ranging from 0.4 m to 1.10 m. These works also include two elevated tanks each with a capacity of 1,300 m³ at Tres de Febrero, and five tanks each with a capacity of 1,300 m³ at Morón.

(d) Principal distribution mains

- 3.07 Installation of approximately 40 km of principal distribution mains in Tres de Febrero, with diameters from 0.1 m to 0.6 m, and approximately 380 km in Morón, with diameters from 0.1 m to 0.8 m.

(e) Service lines

- 3.08 Approximately 92.3 km of secondary service lines 0.075 m in diameter for household supply in Tres de Febrero, and 615.1 km of lines with the same diameter in Morón. This also includes installation of 144,000 metered household connections. 1/

2. Works to rehabilitate and expand the San Martín plant 2/

- 3.09 Extension and improvement to the existing General San Martín treatment plant, which by the end of the works will have a capacity of 3,400,000 m³/day provided by three independent, interconnected modules: (a) a module for 2,200,000 m³/day which corresponds to sectors A1 and A2; (b) a module for 350,000 m³/day which corresponds to sector B; and (c) a module for 865,000 m³/day corresponding to sector C.
- 3.10 The module corresponding to sectors A1 and A2 uses the existing sedimentation tanks (settling tanks 1 to 6 in sector A1 and 16 to 21 in sector A2), and mechanical flocculation equipment and rapid plate sedimentation equipment will be installed in them. Mixing will be done using two Parshall measuring flumes, one for each sector. The existing rapid filters will be remodeled (batteries IX to XII) leaving batteries I to VI as reserves and batteries VII and VIII out of service.
- 3.11 Module B will be maintained as is, i.e. a compact Pulsator Degremont plant with a Venturi flowmeter and Aquazur filters. Module C which is a compact Pulsator Degremont settling tank will be augmented by adding the filters from battery C, with filters with a double layer of sand and anthracite, and rapid mixing will be done with a new Parshall measuring flume to be built under this project.

1/ For the areas in Tres de Febrero and Morón that already have household connections, the meters will be provided out of resources from the World Bank loan.

2/ See general plan of the plant in Annex III-2.

- 3.12 The project also includes a new building for chemical dosing where chlorine, aluminum sulfate for coagulation, polyelectrolytes to assist in coagulation, fluorine to control cavities, and lime for the pH balance of the treated water will be added. Funds belonging to the corporation but not forming part of this project are being used to construct a plant to manufacture lime for the chemical treatment of the water. Annex II-4 describes the treatment alternatives studied and gives a technical and economic comparison of them.

3. Installation of meters in different parts of the system

- 3.13 Installation of 60,000 meters on existing connections in different parts of the distribution system.

4. Supplementary activities

(a) Community promotion

- 3.14 Consists of a program to motivate, inform and organize groups of future users of the project to be executed by the OSN for the purpose of ensuring prompt participation by third parties, through the Morón and Tres de Febrero municipalities, in financing the secondary supply lines.

(b) Technical cooperation

- 3.15 Technical cooperation is required to conduct a program for research and training of OSN staff in the following technologies: operation of treatment plants, underground hydraulic structures, laboratory and water sampling in the different stages of treatment; studies to define the optimum methods for disinfection, disposal and sludge recovery from the treatment plant; and environmental aspects related to water pollution. The terms of reference for technical cooperation are given in Annex III-3.

(c) Sewerage studies and project

- 3.16 The necessary studies will be conducted in the western zone, which includes the districts of Morón and Tres de Febrero, to formulate an investment project that will include collection, treatment of domestic and industrial waste and final disposal in Morón creek. The detailed terms of reference are given in Annex III-4.

C. Project cost and financing

- 3.17 The total cost of the project in prices as of March 1987 is estimated at equivalent to US\$245 million, of which the Bank would finance US\$98 million (40%) which is the maximum permitted under the matrix in effect for urban development and social infrastructure projects in group A countries. The budget, broken down by investment category, is given in the following table:

POTABLE WATER - BUENOS AIRES
COST AND FINANCING

(in thousands of U.S. dollars)

<u>Investment category</u>	<u>IDB</u>	<u>LOCAL</u>	<u>TOTAL</u>	<u>%</u>
1. <u>Engineering and administration</u>	-	13,000	13,000	5.3
1.1 Engineering	-	4,000	4,000	
1.2 Supervision	-	5,700	5,700	
1.3 Administration	-	3,300	3,300	
2. <u>Direct costs</u>	62,300	96,700	159,000	64.9
2.1 Underground watercourse	14,800	12,500	27,300	
2.2 Pumping stations	5,700	5,500	11,200	
2.3 Interconnecting lines	7,400	5,000	12,400	
2.4 Distribution mains	16,600	11,000	27,600	
2.5 Elevated tanks	1,700	1,100	2,800	
2.6 San Martín treatment plant	12,700	13,500	26,200	
2.7 Service mains	-	28,500	28,500	
2.8 Meters and connections	3,400	19,600	23,000	
3. <u>Associated costs</u>	500	5,200	5,700	2.3
3.1 Land	-	1,400	1,400	
3.2 Technical cooperation	500	300	800	
3.3 Western B.Aires sewerage studies	-	2,000	2,000	
3.4 Community information	-	1,500	1,500	
4. <u>Unallocated</u>	16,561	29,187	45,748	18.7
4.1 Contingencies	6,285	11,465	17,750	
4.2 Escalation	10,276	17,722	27,998	
5. <u>Financial expenses</u>	18,639	2,913	21,552	8.8
5.1 Interest	17,659	-	17,659	
5.2 Commitment fee	-	2,913	2,913	
5.3 IDB inspection	980	-	980	
T O T A L	98,000	147,000	245,000	100.0
Percentage	40.0	60.0	100.0	

- 3.18 The project costs have been estimated on the basis of unit prices as of March 1987 for labor and materials, and the budget was calculated at an exchange rate of US\$1=1.54 australes. Subsequently, the costs were updated to values as of September 30, 1987. It was also verified that almost all the materials and equipment will be purchased domestically. The OSN has experience in executing works of a similar kind and realistic estimates have been used.
- 3.19 The engineering and administration costs of US\$13 million include: (i) the equivalent of US\$4 million for detailed engineering with the assistance of personnel contracted during project execution, representing 2.6% of direct costs; (ii) the equivalent of US\$5.7 million for technical and administrative supervision of project execution which the OSN will carry out by contracting specialized technical staff, ^{1/} representing 3.7% of the direct costs; and (iii) the equivalent of US\$3.3 million for the cost of managing and operating the unit of the OSN that will be responsible for coordinating the different areas in the project, including support staff drawn full-time from other parts of the corporation or staff under contract. This amount represents 2.1% of the direct cost. Total engineering and administration costs amount to only 8.4% of the direct cost, which is considered very reasonable for projects of this size whose engineering designs are almost completed.
- 3.20 Direct costs, in the equivalent of US\$159 million, represent 64.9% of the total cost of the project and cover the acquisition and installation of pipes, accessories, valves, pumping equipment, water treatment equipment, meters, civil works, electric connections, transport, labor, technical services and contractors' profits. The cost of the value added tax has not been included because under current legislation, the OSN can be exempted from this tax for investment projects of this kind. The quantities of works as well as the list of materials and equipment have been taken from the engineering design prepared by the corporation's technical staff. A consultant financed by the Bank calculated the cost of the water treatment component.
- 3.21 Associated costs equivalent to US\$5.8 million include resources for: (i) acquisition of land; (ii) technical cooperation for research and training of technical staff, to be executed by consulting companies or specialized agencies; (iii) studies and the final plans for the sanitary sewers in the western zone to be executed by the OSN with support from individual consultants; and (iv) community promotion, including purchasing vehicles and hiring additional staff with experience in this kind of activity.
- 3.22 Unallocated funds in the equivalent of US\$45,748,000 include: (i) the equivalent of US\$17,750,000 for contingencies, calculated as 10%

^{1/} See details in Annex III-4.

of all investment categories except for financial costs; and (ii) the equivalent of US\$27,998,000 for cost escalation during the five years of project execution. This amount has been calculated by applying the rates in effect in the Bank for domestic project components 1/ and a small escalation allowance has been made for minor components in the treatment plant and the pumping stations that may be purchased abroad.

- 3.23 The financial costs in the equivalent of US\$21,552,000 include: (i) interest on the IDB loan during the construction period; (ii) the commitment fee for the IDB loan; and (iii) the IDB inspection and supervision fund. The financial conditions are described in paragraph 3.26 of this report.

D. IDB financing

- 3.24 The IDB's participation in the project's financing will be US\$98 million in foreign exchange, which represents 40% of the total cost. This financing would be granted in accordance with policy FP-33-1 for urban development and social infrastructure projects in group A countries.
- 3.25 The IDB financing will be used in the following categories: (i) in the direct costs category, to finance US\$63,249,000 for civil engineering, materials and equipment for the underground watercourse, pumping stations, interconnecting lines, principal distribution mains, elevated tanks, the San Martín treatment plant 2/ and purchase of meters; (ii) in the associated costs category, to finance US\$500,000 for consulting services for technical cooperation; (iii) in the unallocated category, to finance US\$16,512,000 for contingencies and escalation; and last (iv) in the financial costs category, US\$18,639,000 to cover interest during construction and the supervision and inspection fund.
- 3.26 The conditions for the prospective loan to the Government of Argentina are:

<u>1/</u>	<u>Escalation factors</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>1991</u>
	Escalation-domestic	82.5	60.8	75.0	85.5	79.0
	Exchange rate	1.69	3.14	6.0	11.04	11.09
	Escalation-imported	6.5	8.5	6.1	4.9	3.2

- 2/ An infrared spectrophotometer and a gas chromatograph for the plant's laboratory are included.

(a) Amortization period:	25 years
(b) Disbursement period:	5 years
(c) Grace period:	5 years
(d) Interest:	Variable depending on prevailing rates
(e) Credit fee:	1.25% per annum on the undisbursed balance
(f) Inspection and supervision:	1% of the total amount of the financing

E. Local contribution

- 3.27 The local contribution to financing the project, which is estimated at the equivalent of US\$157 million, would come from resources generated by the OSN and will be used to finance: (i) in the engineering and administration category, the equivalent of US\$13 million for the cost of project engineering, supervision and administration; (ii) in the direct cost category, the equivalent of US\$96.7 million to partially finance engineering, materials and equipment for the underground watercourse, pumping stations, interconnecting lines, principal distribution mains, elevated tanks, the San Martín treatment plant, 100% of the secondary supply lines and connections, and community promotion; (iii) in the associated costs category, the equivalent of US\$5.2 million for purchasing land, support services for technical cooperation, consulting services for the sewerage studies for the western zone, and costs related to community promotion including the purchase of 10 vehicles; (iv) in the unallocated category, the equivalent of US\$29,187,000 for contingencies and escalation; and (v) in the financial costs category, US\$2,913,000 for the credit fee for the IDB loan.

IV. PROJECT EXECUTION

A. The executing agency

- 4.01 The project would be carried out by Obras Sanitarias de la Nación (OSN--the National Sanitation Works). The Office of the Manager of Implementation of External Loans would perform the necessary coordination with the other offices and departments and would have basic responsibility in the OSN and toward the Bank for all matters relevant to processing of the loan and throughout the project construction period.

B. Project execution

1. Methodology for works execution

- 4.02 The works of this project would be executed in accordance with the methodology established by the OSN for similar projects. It is summarized below:
- (a) Planning of execution calls for preparation of a plan through the joint efforts of the OSN divisions of: Planning, Operation and Maintenance; Studies, Projects and Works; and Finance and Accounting.
 - (b) Studies and technical documentation are the responsibility of the Studies and Projects Departments (civil and electromechanical) with assistance from the corresponding operational and maintenance areas. In the event that special studies are needed, help is available from the Laboratory, Water Pollution and Technological Development Departments.
 - (c) Documentation for the call to bid is prepared by the Office of the General Manager of Studies, Projects and Works, assisted by the Office of the Manager of Contract Administration. The General Administrator is responsible for issuing the call to bid, pursuant to the corresponding resolution.
 - (d) A Special Committee appointed by the General Administrator is responsible for examining bids from suppliers and contractors. The Committee is different for each tender.
 - (e) Signature of the contracts is the responsibility of the Office of the Manager of Contract Administration, assisted by the Office of the Manager of Legal Affairs.
 - (f) Technical supervision of works is conducted by specially appointed groups to inspect the works; they report to the Works Departments (civil and electromechanical).

- (g) The detailed plans, as well as any changes in the projects, are approved by the Departments of Studies and Projects (civil and electromechanical).
 - (h) Provisional and final acceptance of works is the responsibility of Works Inspection, assisted by Administration and Contracts and Operation and Maintenance, after approval by the General Administrator following examination by the Offices of the Managers of Studies, Projects and Works and Legal Affairs.
- 4.03 It is obvious that specific rules and permanent coordination are required if a work system such as the one described above is to function properly. Consequently, it is recommended that, prior to the first disbursement of the prospective financing, the functions of the unit responsible for project coordination be defined and that it be properly staffed and given the means of carrying out its duties, pursuant to a work plan presented by the OSN to govern project execution. Annexes IV-1 and IV-2, respectively, contain the organizational chart for the company, showing the location of the Office of the Manager of Implementation of External Loans, and a breakdown of a sector of the agency at the departmental level. Annex IV-3 describes in detail the organization adopted for the Office of the Manager of Implementation of External Loans, which reports directly to the General Administrator and would be responsible for internal coordination of project execution, also serving as the direct link between the OSN and the Bank.
- 4.04 The duties of the coordinating unit in connection with the project would be: (a) to advise the General Administrator in decisions relevant to project execution; keep him apprised of technical and financial progress of the activities; analyze any problems that may arise; and propose remedial measures; (b) to coordinate the execution plans that would be prepared by the units responsible for each project component and to harmonize the goals and budgets in order to maintain a satisfactory execution rate for each component; (c) to monitor execution of each component, thus ensuring accomplishment of target goals; and prepare follow-up reports; (d) to take part in bidding and procurement, and to see that the procedures indicated in the prospective loan contract are followed; (e) to prepare disbursement requests and see that the Office of the Manager of Finance and Accounting keeps accounting records of project expenditures in accordance with the code of accounts that would be approved; (f) to develop the necessary mechanisms for ex post evaluation of the project, including compilation of the basic data and preparation of the final report; and (g) to serve as a liaison between the OSN and the Bank in connection with all areas of the project.

2. Contracting and supervision of works

- 4.05 Contracts would be let for all works to be constructed by specialized companies; for works supervision, inspectorships would be set up

under the direct responsibility of the Civil Works and Electro-mechanical Works Departments, and the necessary staff would be engaged. Supervision of works construction for the project is divided into six inspectorships: (a) the San Martín treatment plant; (b) underground watercourses; (c) Morón and Tres de Febrero pumping stations; (d) Tres de Febrero pressure pipelines and tanks; (e) Morón pressure pipelines and tanks; and (f) distribution and service mains. Each of these inspection divisions would have staff responsible for the civil works portion and the electromechanical portion, consisting of personnel from those departments. 1/ It is recommended that before signing any of the scheduled construction contracts, the OSN submit evidence to the Bank that it has assigned the necessary staff for inspection of contract works and that it has the requisite facilities and equipment to carry out such inspection (see Recommendations).

3. Community promotion

4.06 To expedite users' participation in financing of their connections to the system and, insofar as possible, that of the distribution mains, a Program for Community Promotion (PPC) has been set up. Its general objectives are to publicize:

- (a) the characteristics and scope of the western system project;
- (b) the social and economic benefits of the project;
- (c) the modes of community participation; and
- (d) the environmental and sanitation impact of the company's projects.

4.07 The PPC would be directed and coordinated by the OSN through a specific unit attached to the Office for Implementation of External Loans, and would be carried out by staff hired for that purpose. The PPC goal is to secure full utilization of the project so that the benefits envisaged would become available within the deadlines scheduled for execution of the entire project and the users would be gradually incorporated into the system as soon as each of the basic works executed by the OSN is completed.

4.08 The activities to be carried out by the PPC are: (a) To explain the characteristics and scope of the program at the provincial and municipal level; (b) to draw up an agreement for collaboration between the company and the municipalities; (c) to identify and select official and nonofficial agencies for participation in the project; (d) to prepare staff to carry out the program; (e) to diagram the work and identify the groups that should be set up, taking into consideration: technical possibilities, existing associations and time schedules; (f) to carry out the publicity work

1/ Annex III-4 contains a detailed list of the staff who would be assigned to each.

through trained staff, using simultaneous campaigns for education about sanitation and environmental protection; (g) to promote mechanisms and facilities accessible to low-income users; and (h) to educate users as to the company's commercial practices (rate schedule, customer metering, ways of payment, etc.).

- 4.09 The community promotion campaign would start in the first year, when the duties listed from (a) through (e) would be carried out; thereafter, the rest of those activities would be performed continuously until the end of the program.

4. Technical cooperation

- 4.10 The technical cooperation activities scheduled under this project would be carried out with the help of a consulting firm or a specialized agency in order to conduct the program for research and training of OSN staff in certain technological fields that are considered imperative for improvement of planning, preparation, operation and maintenance of water supply and sewerage projects. Also included is the support of experts for certain specific studies, and to advise and train staff on environmental matters, particularly the treatment of industrial wastewater.

- 4.11 For the execution thereof, the OSN would engage a consulting firm or specialized agency which will propose the experts and the training program for the activities covered by technical cooperation.

5. Western zone sewerage studies

- 4.12 This component includes a study of alternatives and the final designs for the western zone sewer system, including treatment. It would be carried out by the OSN, including the hiring of individual consultants, pursuant to the terms of reference appearing in Annex III-4. The technical cooperation cited in point 4 above calls for an international expert to review the final report on alternatives before proceeding to draw the final designs for the alternative selected. The expert would be assisted by an economist who will provide guidelines in the field of socioeconomic evaluation methodology. It is recommended that the prospective contract include a condition whereby the SRH and the OSN undertake: (a) to present, within 12 months after the effective date of the contract, the studies, the analysis of alternatives, and the basic designs for the sewage works, for sanitary and industrial waste, in accordance with terms of reference agreed upon previously with the Bank, including a diagnosis of the contamination caused by the industries contributing most to the pollution of Arroyo creek. This study is to indicate the provisions that would be made to ensure that the water quality of the industrial effluents would be compatible with the treatment level adopted at the treatment plants; and (b) to complete the sewerage studies, works, and treatment referred to in the preceding paragraph, up to the final design stage, including construction completion timetables and a viable financing plan, within 30 months after the effective date of the contract (see Recommendations).

C. Status of designs

- 4.13 The company's own staff has drawn up the final construction designs for the basic works of the western zone water supply system, which include: the underground watercourses, the pumping stations, the interconnection lines and elevated tanks, and the master and service mains. Quantity estimates, the detailed budget, an analysis of unit prices, computation notes, construction plans and technical specifications are ready. The only item remaining for preparation is the general and particular conditions for the call to bid, which would be prepared by the OSN to the Bank's satisfaction prior to each call to bid, in accordance with the execution schedule. (See Recommendations.)
- 4.14 In addition, with the help of an expert on treatment plants, financed by agreement ATN/SF-2629 PAHO/IDB, the OSN has prepared a project for rehabilitation and expansion of the San Martín treatment plant. The plan is almost finished, except for certain construction details for the A2 sector which would be bid on in 1989. It was nevertheless agreed during the analysis mission that all construction designs for this subproject be completed in December 1987. Accordingly, no specific recommendation regarding completion of designs is needed.

D. Design parameters and technical criteria

- 4.15 The OSN has the technical criteria for project preparation and execution, which have been reviewed and found satisfactory. The documents prepared by the OSN for the use of water pipelines are adequate for contractor bidding on the following items: international standard ductile cast iron; class 5 and 7 asbestos cement pursuant to OSN standards; PVC pursuant to ASTM standards; and reinforced fiberglass (PRFB) pursuant to ASTM standards. The design parameters are described in detail in Annex IV-4.

E. Execution schedule and preliminary PEP

- 4.16 Table IV-1 contains a bar graph showing execution of the principal project components that would be completed within the established five-year execution period. A detailed description of all activities and the critical path are shown in the PEP attached as Annex IV-5.

F. Bidding schedule

- 4.17 To execute the components comprising the works program, the schedule calls for 17 major tenders and a total of 23 contracts as listed in Table IV-2 on the following page. Bidding would be conducted by the OSN pursuant to Public Works Law 13064, in accordance with its internal regulations and those previously agreed upon with the Bank, which appear as Annex IV-6. Public bidding would be used for the procurement of goods and services costing more than US\$200,000 equivalent and would be of an international nature whenever funds from the prospective IDB financing are used. When bidding is financed by national resources, it may be confined to the national sphere, always conforming to the above-mentioned Public Works Law (see Proposed Resolution).
- 4.18 As may be seen in Table IV-2, only two tenders will allow acceptance of alternative bids: the item 2.10 "Dosage of chemicals" equivalent to US\$1,073,000; and item 2.16, filters for plant "C" amounting to US\$4,638,000. In the first case, it is hoped that, given their wide experience, participating companies will present much more detailed and operational alternative bids than those called for. In the second instance, since plant "C" has Degremont settling tanks, this company, if submitting a bid, would be allowed to submit an alternative proposal that would allow plant technology to be standardized. 1/
- 4.19 In both instances, all bidders would be obliged to bid on the basic project prepared by the OSN as a part of the tender and on the proposed alternative. The bidding documents for both contracts will define the criteria for selection of alternative proposals and the study committee will conduct the evaluation, awarding the contract in accordance with bidding regulations agreed upon with the Bank.
- 4.20 Bidding on construction requires the contractor to supply and install the materials. In the case of the master mains and interconnection lines to the elevated tanks, the contractors could offer any of the materials approved by the OSN, such as: ductile cast iron, asbestos cement, PVC and reinforced fiberglass.

1/ Plant "B" also uses Degremont technology.

Table IV-2

BIDDING SCHEDULE

<u>Description</u>	<u>Number of Contracts</u>	<u>Type of Bidding</u>	<u>Start of Works</u>	<u>Possibility of Presenting Alternatives</u>	<u>Tentative Amount</u> (in thousands-US\$)
2.1 Underground watercourses	2	International	10/88	no	26,888
2.2 Pumping stations	1	International	1/89	no	10,950
2.3 Interconnection lines	2	International	7/89	no	12,122
2.4 Master mains I	3	International	1/89	no	13,964
2.5 Master mains II	3	International	7/89	no	14,000
2.6 Elevated tanks	1	International	1/89	no	2,746
2.7 Service networks	*	National	**	no	-
2.8 Meters	2	International	7/90	no	3,052
2.9 Meter boxes	1	National	1/89	no	3,300
2.10 Coagulant dosage	1	International	7/88	yes	1,073
2.11 Parshall flumes	1	National	7/88	no	928
2.12 Flocculation settling tanks 1-6	1	International	7/88	no	6,015
2.13 Flocculation settling tanks 16-20	1	International	3/90	no	6,015
2.14 Filters IX and XI	1	International	10/80	no	2,561
2.15 Filters X and XII	1	International	3/90	no	2,003
2.16 Filter C	1	International	7/89	yes	4,638
2.17 Drainage A	1	National	7/89	no	2,374

* Bidding would be limited to the national sphere in accordance with provisions to be established.

** Works will start on July 1, 1989.

G. Disbursement schedule

- 4.21 Annex IV-9 contains the detailed schedule of project disbursements throughout the execution period. Table IV-3 below contains the estimated disbursement schedule for this operation, which was prepared on the basis of the preliminary PEP.

TABLE IV-3

In US\$ million equivalent

Sources	Years					TOTAL	%
	1	2	3	4	5		
IDB	5.2	24.8	37.1	22.6	8.3	98.0	40
Local	8.2	40.0	46.5	34.4	17.9	147.0	60
TOTAL	13.4	64.8	83.6	57.0	26.2	245.0	100
	====	====	====	====	====	=====	
	5.5	26.4	34.1	23.3	10.7	100.0	

H. Procurement and contracting of goods and services

- 4.22 International public bidding would be held for the procurement of equipment, works and material for project execution involving amounts of more than US\$200,000 equivalent. The regulations attached as Annex IV-6 were discussed and agreed upon in principle with the OSN and reviewed by its legal department, so that they are ready for immediate use if the company wishes to start the bidding process in the course of this year. There are three tenders on the San Martín plant subproject, for which it is planned to issue the call to bid in the near future. Annex IV-7 contains the regulations for contracting of consulting firms.

I. Recognition of expenditures

- 4.23 No recognition of expenditures made prior to approval of the prospective loan is anticipated.

J. Advance of funds

- 4.24 It is recommended that arrangements be made for an advance of funds chargeable to the loan resources, with a ceiling amount equivalent to real payments anticipated for a period of no more than 120 days, but not exceeding 10% of the loan amount. Advances will be justified by the OSN within 180 days of the receipt thereof.

K. Capacity of contractors and suppliers

- 4.25 The Argentinian supplier and contractor market is very large, and no difficulties are anticipated in this respect. Almost all of the materials and equipment will be of local origin. A call for international public bidding would nevertheless be issued in order to allow free competition of bidders from Bank member countries. The

project was divided into packages of substantially similar works to make them attractive to overseas construction firms. In some cases, a single bidding package may include more than one contract if OSN interests are better served by this procedure.

L. Water quality

- 4.26 The water currently distributed by the OSN in Greater Buenos Aires meets the company's quality standards. In reviewing the standards presented as Annex IV-8, however, certain values were found to exceed the levels published by the World Health Organization in 1986. The company, alert to this problem, set up discussion groups in its Technological Development and Laboratory and Engineering Departments to adjust national standards to the new figures prescribed internationally.
- 4.27 In the past, asbestos cement was used for a large part of the mains in the distribution system. It is recommended that, pursuant to current IDB environmental policy, a clause be included 1/ whereby the OSN agrees to submit to the Bank, in the first quarter of each year, the results of the representative analyses of treated water quality to ensure permanent ionic balance, and undertakes not to supply water with an acid content that could eventually expose the asbestos fibers in the mains. This information will also be incorporated in the baseline data for the ex post evaluation, and would serve to measure the impact on water quality at the close of the project, when the evaluation and the annual maintenance report are produced (see Appendix II).

M. Ecological and environmental aspects

- 4.28 The River Plate is the natural source of water supply for Buenos Aires and ongoing use of that source for public supply has not affected ecological conditions, nor will it in the future. The project includes technical cooperation to continue the quality studies on treated water and to determine the best method to purify the supply, given the potential problem of trihalomethane as a consequence of the reaction of untreated water with a high organic content with chlorine. Laboratory tests and the results obtained by the OSN indicate that no danger exists at present. The aforementioned studies will nevertheless be continued as a precaution against possible changes in the natural water quality of the river.
- 4.29 The project will unquestionably improve environmental conditions substantially by replacing a source of supply in the western zone which now consists of wells that are already polluted and/or in the process of contamination. The project area, however, is threatened from the environmental standpoint by the lack of public sewer facilities and the presence of a large number of pollutant industries that

1/ See Recommendations.

have turned the Morón creek--the principal affluent of the Reconquista river which flows toward the River Plate at the edge of both districts--into an open sewer. With a view to cleaning up the project area, this operation includes the necessary sewerage studies for the OSN to provide service to residents of both districts. It also calls for treatment of wastes in such a way as to reduce the polluted content of Morón creek considerably (see Recommendations).

N. Unaccounted-for water (UW)

- 4.30 The water system for Greater Buenos Aires lacks consumer and system metering, which is essential for reliable determination of UW levels. The lack of customer metering encourages waste and, given the age of the pipelines and the lack of an ongoing program for OSN pipeline rehabilitation due to financial constraints, the level of UW at this time amounts to nearly 50% of production. The percentage includes not only water losses in the mains, tanks and treatment plants, but the supplies used unofficially to fight fires, carry out public services and water park areas. Resources of the IBRD loan are financing a study of operational improvements, which will concentrate particularly on the subject of unaccounted-for water. It is recommended that the prospective loan contract establish the necessary conditions for following up that study (see Recommendations and Proposed Resolution).
- 4.31 The company's policy is designed to achieve greater operating efficiency. It is therefore hoped that the acquisition of system and customer meters--also included in the World Bank loan--will result in a substantial reduction of UW over the five-year period to achieve the future target goal of 20 to 25%. An important factor for achievement of that result is the investment that must be made in replacing the service mains, the age of which is one of the principal causes of UW.

O. Water metering in the system and OSN policy

- 4.32 At present, 200,000 water meters have been installed for a total of one million connections. Of that number, 100,000 are being read and the other half will be covered by a contract which is about to be awarded as a result of public bidding. The World Bank loan includes the purchase and installation of another 200,000 meters for existing connections in different parts of Greater Buenos Aires, pursuant to recommendations that will be made by the consulting firm engaged for the Operational Improvement Plan (see Proposed Resolution). Among other institutional development assignments, this firm will conduct a study of the entire operating system for installation, billing, reading and maintenance of the meters and propose a new rate system to be used with metered service. The findings of this study on metering and rates are expected to be ready within a period of 24 months, starting in January 1988.

- 4.33 In the project under review, IDB financing would be used to acquire and install 144,000 meters in the western zone, plus another 60,000 to be distributed throughout Greater Buenos Aires, pursuant to recommendations of the operational study cited above. In other words, by the end of the construction period for this project, there will be a 400,000 unit increase in the number of meters. When added to present coverage, this would result in metering of 60% of the connections.
- 4.34 Funds for system-wide metering are also included in the World Bank loan. The company's policy is to close the system circuits that have complete macro- and micrometering in order to facilitate the identification of UW.
- 4.35 Given the importance of meter installation, it is recommended that the OSN submit to the Bank, within a period of 12 months after the effective date of the contract, the detailed plan it proposes to follow for implementation of the meter program so that no fewer than 400,000 new meters will be installed in a period of five years from the effective date of the contract. (See Recommendations.) It is also recommended that the borrower, through the OSN, submit evidence within a period of 36 months from the contract effective date, that the OSN has put into effect a new tariff structure based on metered service as an essential and inseparable complement to the universal metering policy proposed as a company goal. (See Recommendations.)

P. Operation and maintenance

- 4.36 There are two departments under the General Operation and Maintenance Manager: (a) Facilities and Conduits; and (b) Services. The first is responsible for operating and maintaining treatment plants, pumping stations, underground watercourses and sewers, while the second handles all matters related to other services and the water and sewer systems.
- 4.37 The OSN organizational system is adequate for its different activities. The Operation and Maintenance Department has the necessary staff to carry out its functions. Recent work in this field has suffered from the lack of sufficient budgetary resources. Minor repairs to the mains often take a long time because of the lack of spare parts, failure to replace pipelines, and the age of the mains in which small sections cannot be spliced: large sections must be changed instead. This department also lacks sufficient equipment. These components are vital for satisfactory operation of a water supply system adequate for an area such as Buenos Aires. This problem was discussed with the OSN and it was agreed that everything relevant to construction, operating, and maintenance equipment has been included in the procurement to be financed by the World Bank. As a result, no provision has been made for this item in the present project. It is nevertheless recommended that, during the project execution period, the Bank conduct annual follow-up of maintenance for the entire OSN system. (See Recommendations.)

- 4.38 The department in charge of the San Martín purifying plant, fully supported by the Laboratory Department, conducts the surveillance and adequate control of the water quality, ensuring that the supply meets the quality standards established by the OSN.
- 4.39 It may be concluded that the OSN has sufficient human resources and organization for efficient operation and maintenance, and that the equipment it needs will be acquired soon. Nevertheless, to ensure that those functions are performed satisfactorily, it is recommended that the loan contract include a clause whereby the OSN undertakes to ensure that the works executed under the project will be maintained in accordance with generally accepted technical standards, and that, during the first 10 years following completion of the project, within the first quarter of each calendar year, it will present for the Bank's consideration a report on the state of repair of those works, including the quality of treated water (see Recommendations).

Q. Construction agreements and acquisition of land

- 4.40 Most of the scheduled water works will be built underground using public roads so that no easements are required. The 10 land parcels necessary for construction of the pumping stations and elevated tanks have been clearly identified. They are small in area and most of them are owned by the government. No difficulty is anticipated in acquisition of the three privately-owned lots needed, for which expropriation formalities are well under way. It is nevertheless recommended that the OSN sign agreements with the municipalities for coordination of public works construction prior to the first disbursement of the prospective loan (see Proposed Resolution), and that, prior to the call for public bidding, it submit evidence to the Bank that it has legal possession of the land required for construction (see Recommendations).

R. Ex post evaluation

- 4.41 To provide adequate information for the ex post evaluation of the project and compliance with the proposed goals, the borrower must provide the Bank with the baseline information needed for that purpose. This will be done in the following manner:
- (a) Within 24 months after the effective date of the contract: (i) the initial baseline data the categories of which are listed below; (ii) a description of the system that would be used to compile and process the data that will be used in the annual comparisons with the initial baseline data for evaluation of the results achieved through project execution;
 - (b) At the end of the third year following the last disbursement of the financing, an ex post evaluation report on the results of the project, based on methodology and guidelines agreed upon with the Bank.

4.42 The above-mentioned data would be the following:

- (a) Population of the project area; number of connections (OSN and neighborhood mains); and the number of individual wells;
- (b) projected population of the project area; connections; and future demand for water;
- (c) water consumption by major category (residential, industrial, commercial and public sector), including the public system and other possible sources of supply (hand and electric pumps);
- (d) capacity of available underground resources in each of the project zones for consumption by users who have individual wells;
- (e) rates, broken down by major consumption categories and, within the residential sector, broken down according to typical consumption levels for the various income brackets;
- (f) cost of production, operation and maintenance of the water supply system in the project area (fixed and variable costs); and for other sources of supply, the cost of the water from each type of source to the user;
- (g) measurement of production and estimates of unbilled water used, which may include the following components, as applicable:
 - losses in the transmission lines, master main, tanks and distribution main;
 - fraudulent uses of water;
 - water supplied for various public uses, such as watering of public gardens, street cleaning, sewer mains, and fire-fighting or for the use of public or community buildings;
- (h) quality of water from the system and other available sources. The data must be presented in such a way that compliance with the guideline figures recommended by the WHO may be examined, and records would be made of the water coming into the distribution network as well as the amount distributed; and
- (i) information on disposal of excreta and other indicators of complementary sociocultural factors involving water supply.

4.43 Annual data will be compiled for the same categories as those included in the initial baseline data. For categories where data might not be required every year, information will be submitted: (a) whenever there are important changes; and (b) for the final year of the evaluation period.

- 4.44 The evaluation methodology will be similar to the system used for the ex ante evaluation of the specific project area (three zones in the Morón and Tres de Febrero districts). Statistically representative samples of the three zones will be used to show water consumption by source of supply and the production cost thereof. For the San Martín plant, production data, annual production costs broken down into operation and maintenance, unit production costs and data on treated water will be supplied. The evaluation report will include an analysis of: (i) costs and benefits of the project; (ii) its distributive impact; (iii) other relevant sociocultural effects; and (iv) recommendations and conclusions. The Guidelines for Evaluation of Water Supply Projects (IDB Monographs on Project Analysis 4 and 5) will be used for the first two items.

S. IDB supervision

- 4.45 The Bank's supervision of the project will be handled primarily by its Field Office in Argentina.

V. THE BORROWER AND THE EXECUTING AGENCY

A. Background

- 5.01 The borrower for the Buenos Aires Potable Water Project would be the Republic of Argentina and the executing agency would be the National Sanitation Works (OSN), which has previously carried out projects with partial financing from the Bank.

B. Legal regimen, object and organizational structure

- 5.02 The OSN is a public utility agency under the Department of the Secretary of Water Resources, a part of the Ministry of Public Works and Services which establishes policy for the sector. The legal framework for the company is established by Laws 13577, 14160, 18593/70, 20324/73, 20686 and 21566. They stipulate its status as a self-governed public agency with legal standing, domiciled in the city of Buenos Aires, which carries out its duties in accordance with directives issued by the Office of the Undersecretary of Water Resources. It is responsible for the study, design, construction, expansion, and operation of urban water supply and sanitation works in the Federal Capital and the cities and towns of the Republic. In 1979, however, when some services were transferred to the provinces, its jurisdiction was changed, thus reducing it to the Federal Capital and the 13 districts of Greater Buenos Aires.
- 5.03 To carry out the duties assigned in its organic law, the company is empowered to negotiate loans; enter into agreements with private sources of financing for the execution of works; propose the establishment of rates for its services; set up industries for the extraction or production of raw materials or inputs needed for exploitation; and enter into all types of contracts. Responsibility for the exercise of these attributions, as shown in the organizational chart attached as Annex IV-1, lies with the General Administrator, assisted by the Deputy General Administrator and three General Managers: Operation and Maintenance; Studies, Projects, and Works; and Finance, Personnel and Services.
- 5.04 These units in turn are supported by 13 divisions, 1/ one of which (Implementation of External Loans) was created this year through a Resolution of the Ministry of Public Works and Services to handle "... the administration, implementation and monitoring of external loans granted by international banks and agencies." As shown in the

1/ These Managerial Divisions are: Facilities and Structures; Services; Civil Engineering; Electromechanical Engineering; Assistance and Development; Contract Administration; Commercial; Implementation of External Loans; Finance and Accounting; Human Resources; Electronic Data Processing; Legal Affairs; and Planning and Control.

organizational chart appearing in Annex IV-3, this division consists of three departments, two of which bear major responsibility. The first coordinates and administers operations covered by credits from the IBRD; the second carries out similar duties for the IDB loans. Since this division would serve as the executing agency for the project under review here, it was recommended that it become an advisory unit at the level of the General Administrator, and the corresponding resolution has already been issued. To supplement the organizational structure, there are a number of departments, divisions, and sections whose duties are spelled out in the OSN Manual of Purposes and Functions.

- 5.05 Although the services were transferred to the provinces in 1979, the organization described was not put into effect until 1984 since the company found it difficult to adapt its organizational structure to the new circumstances immediately. In the meantime, only small adjustments of a spot nature were made, leaving the agency's overall structure virtually unchanged. Despite the changes introduced in 1984 and the progress made in implementing certain improvements through an interactive management system, the shortcomings affecting the general control system and extending to the administrative, accounting, financial, commercial, operating, and maintenance areas could not be overcome. In turn, the lack of reliability in the processing and recording of transactions and in the OSN report system led the Sindicatura General de Empresas Públicas (SIGEP--Auditor General for State Corporations) to refrain consistently from issuing an opinion on the OSN financial statements until the present. To solve these problems and, finally, to make the OSN more effective and efficient in accomplishing its basic objectives, it is recommended that the prospective loan contract include a clause whereby the borrower undertakes to submit, within 12 months of the effective date of the contract, a report on the improvement of the company's organizational structure and managerial capacity, currently being conducted by the Dirección de Empresas Públicas (DEP), in areas previously agreed upon with the Bank.
- 5.06 All of these activities must be duly coordinated with the institutional strengthening component, the modalities and scope of which are described in Section H, Operational improvement, in this chapter, and which is partially financed by IBRD loan 2641/AR. In addition, reports are to be presented within the first 90 days of each calendar year specifying the progress achieved in carrying out the recommendations of the report for managerial improvement.
- 5.07 The areas to be covered by the report are the following, as a minimum:
1. Analysis of the company's present structure and the objectives and motivation of its major officers, and the compatibility thereof with the company's objectives and strategy.

2. Analysis of the management information systems and their compatibility with objectives and strategies.
 3. Analysis of the part played by middle and lower management in tactical decision-making, and definition of the responsibilities for adoption of such decisions.
 4. Identification of the barriers to managerial and interdepartmental communication and the possibilities of lowering them.
 5. Evaluation of the personnel administration policy.
- 5.08 This report must place special emphasis on the plan to strengthen internal auditing, which includes the objectives listed in paragraph 5.31 (see Recommendations).

C. Personnel

- 5.09 As indicated in the OSN Organizational Charter, all matters concerning establishment of personnel policies, the hiring, promotion, and removal of staff, collective agreements, appointment of temporary staff, study grants; and advanced study courses are the responsibility of the General Administrator. To provide support in carrying out these duties a Division of Human Resources was set up within the organization to handle matters relevant to staff development and management. As of December 31, 1986, its organization included the following:

OSN
Staff Complement Broken down by Organizational Unit
as of December 31, 1986

<u>Organizational Unit</u>	<u>Staff</u>	
	<u>No.</u>	<u>%</u>
<u>General Administration Unit</u>		
General Administrator	132	1.4
Assistance and Development	609	6.4
Contract Administration	43	0.5
Electronic Data Processing	198	2.0
Legal Affairs	191	2.0
Planning and Control	79	0.8
Implementation of External Loans	6	0.1
<u>Office of the General Manager, Project and Works Studies</u>		
Office of General Manager, Project and Works Studies	141	1.5
Civil Engineering	793	8.3
Electromechanical Engineering	190	2.0
<u>Office of the General Manager, Operations and Maintenance</u>		
Office of General Manager, Operations and Maintenance	1,002	10.5
Facilities and Conduits	1,296	13.6
Services	2,900	30.4
<u>Office of the General Manager, Finance, Personnel and Services</u>		
Office of General Manager, Finance, Personnel and Services	486	5.1
Commercial	729	7.6
Finance and Accounting	453	4.8
Human Resources	276	2.9
Unassigned	7	0.1
TOTAL	<u>9,531</u>	<u>100.0</u>
	=====	=====

5.10 To convey a general idea of the change in productivity of this staff, the following table was prepared:

OSN
Personnel Productivity
1983-1986

<u>Year</u>	<u>Av. No. Employees</u>	<u>Av. No. of Water Accounts</u>	<u>1/</u>	<u>Accounts/Employees</u>	
				<u>Number</u>	<u>Index</u>
1983	9,406	1,856,103		197.3	100
1984	9,242	1,929,499		208.8	106
1985	9,060	1,989,694		219.6	111
1986	9,263	2,042,949		220.5	112

- 5.11 Before interpreting these results, it should be stated that, relatively speaking, the company's productivity is adversely affected by two factors: the high average age of its staff, and the average seniority thereof. Together, these factors result in a relatively high index of absenteeism which naturally affects global output. Nevertheless, and as may be seen in the foregoing table, the trend of productivity on the part of OSN staff, measured on the basis of its ratio to the number of water utility accounts, evolved favorably, resulting from the higher relative increase in the number of accounts included in the register of users, which also offset the increase in staff that took place in 1986. As part of the Operational Improvement Program to be started shortly with support from the World Bank, even greater improvement of this indicator is anticipated as a result of enhanced operating efficiency and a more balanced functional distribution of the company's staff. In this respect, the OSN and the World Bank have reached an agreement on various monitoring indicators, including goals to be accomplished with respect to the number of staff and the number of water connections. 2/

D. Accounting, financial and budgetary administration

- 5.12 Pursuant to the delegation of functions and responsibilities in the OSN, financial and budgetary management is the responsibility of the Office of the General Manager of Finance, Personnel and Services and, specifically, the Department of Finance (the unit that works under the Office of the Manager of Finance and Accounting), which handles all matters related to the securing, administration and application of resources and formulation of the annual budget, together with control of its execution. Under the current legal regimen, the OSN must submit an annual action plan, accompanied by a descriptive and analytical memorandum on each basic activity to be carried out in the corresponding fiscal year. This in turn must be accompanied by a financial budget for the execution of that plan. These documents

1/ Each user is represented by an "account". The term "user" is applied to a property located within the area served by the OSN.
2/ See Annex V-1.

must be approved by the Executive Branch, with participation of the competent Secretariats and Ministries, and then consolidated and finally sent to the legislature for final approval.

- 5.13 Insofar as the OSN's accounting system is concerned, the structure of its balance sheet and income statement generally corresponds to those established by law 19550 on Commercial Firms and the guidelines of professional bodies. The accounting system now being used, however, does not fully reflect applicable legal requirements; is not integrated into the budgetary system; nor does it include a plan of accounts suitable for recording and controlling transactions that would provide a basis for the preparation of reports and guide management's decision-making process. In addition, there is no manual of accounting procedures that systematizes accounting operations, establishes uniform bases for the treatment to be given different transactions, and spells out the criteria to be applied in preparing accounting reports, as well as the controls to which the information should be subject. The information issued by the Data Processing Department was found to lack sufficient quality control, thus exercising a negative impact on the reliability of the company's financial statements. This circumstance is aggravated by problems of various sizes and natures, primarily in connection with the control systems for inventories, property, plant and equipment, accounts payable, billing and collection.
- 5.14 As a result of the problems indicated in the previous paragraph and deficiencies in the systems for compiling, recording and control, SIGEP was compelled to withhold its opinion on OSN financial statements in recent fiscal years. This situation prevailed up to the fiscal year ending on December 31, 1985. ^{1/} Thereafter a start was made on the correction of various shortcomings that affected the presentation of OSN financial statements and this could give rise, eventually, to the issuance of an opinion--although with reservations--by SIGEP. The issuance of opinions without reservations from that agency is contingent on implementation of substantial improvements in the OSN administrative and accounting procedures that will allow the preparation of accurate accounting reports pursuant to generally accepted technical standards. This would be possible through the aforementioned Operational Improvement Program (see section H of this chapter).
- 5.15 It should be noted here that although the OSN's major function is to provide water supply and sanitary and storm water sewerage facilities, the company is also responsible for manufacturing intermediate goods such as chemicals (primarily sulfuric acid and coagulants), in addition to providing transportation services and workshops for its own needs. To determine and control the cost of the various activities, a cost accounting system by process and by work order was put into effect and the corresponding cost centers were defined. Since

^{1/} SIGEP is the Office of the Auditor General for State Corporations (see 5.32 to 5.38) that is conducting the audit for fiscal year 1986.

the system is based on the recording and processing of information by computers, however, the shortcomings that were described previously in connection with data processing have gradually slowed the application of cost accumulation procedures even more. Elimination of these shortcomings, as well as others described earlier, would also be corrected through the Operational Improvement Program discussed in section H of this chapter.

E. Commercial system

- 5.16 Responsibility for OSN commercial activities lies with the Office of the Commercial Manager, the head of which reports to the General Manager of Finance, Personnel and Services. One of his main functions is to take part in the study of the OSN rates schedule and to make recommendations on the rate levels to be applied; to supervise user registration work; and to ensure timely issue of bimonthly invoices as well as prompt collection thereof through the banking system. The human resources assigned to perform these duties consist of approximately 730 persons, representing 7.6% of the total OSN staff.
- 5.17 As in other functional areas, there are numerous problems which impair the efficiency of OSN commercial management. In the first place, as noted by SIGEP, there is no updated database (register of users) which frequently causes billing oversights or overcharges. There are also problems in collection, which is handled mainly by the banking system, causing delays in the classification of income and in the crediting of payments to clients' accounts. As a result, the current account records of users are neither accurate nor reliable and reconciling them with general accounting control accounts is virtually impossible.
- 5.18 The general problems of customer metering are discussed in another section of this document (see Chapter IV, Section O), but it should be noted here that only 20% of approximately one million connections have a meter installed. For purposes of maintenance, which does not include all of the meters, as well as for the installation thereof, the OSN engages a specialized firm. Approximately 20% of the meters thus installed are read by third parties hired by the OSN. The problems in this area include the slow pace of meter installation; the existence of a user registry in the customer metering system which is not adequate for its purposes; the results of the fact that the priority billing system--with its inherent operating modalities--features a fixed fee; the lack of trained staff; and, finally, the paucity of commercial service centers, some of which are inadequate for their purposes. 1/

1/ The Federal Capital includes an area of 20,000 ha, totally served by the OSN, with 1,200,000 accounts handled by a single commercial center. The rest of Greater Buenos Aires has an area of 260,000 ha, of which only 28,000 ha receive service and for which there are 800,000 accounts. Service is provided by 14 commercial centers that suffer various shortcomings as to the availability of equipment and basic facilities, which have an adverse affect on commercial relations with users.

- 5.19 The Operational Improvement Program also calls for comprehensive restructuring of the OSN commercial area, including billing, collection, customer metering and the rate system for that purpose, customer service, and, finally, staff training.

F. Data processing

- 5.20 The activities involved in electronic data processing are the responsibility of the Office of the Manager of Electronic Data Processing. The manager reports directly to the General Administrator and the office consists of the Systems Development Department, which has basic responsibility for the development and implementation of administrative, commercial and technical systems, and the Operations Department, whose main mission is the production of information through the processing equipment. The equipment consists of a central unit complemented by the corresponding peripherals. The company's commercial centers are interconnected by teleprocessing terminals that make it possible to better serve the users. The agency's informatics area is completed by the Organization and Systems Department under the office of the Manager of Planning and Control. Its basic function is "... the permanent study of the company's organic and functional structure, its information systems and administrative procedures...".
- 5.21 Prominent among the problems affecting this area are the application of measures to solve immediate problems, without adequate study; the lack of appropriate controls on data input and output; and, finally, shortcomings in the quality and dimensioning of the human and material resources used. As an initial step towards the solution of those problems, the subsystems that will comprise the OSN management information system have been defined: (a) commercial, administrative-accounting; (b) supply and control of stocks; (c) personnel administration; and (d) support for administrative planning, budgeting and control. The design of these systems will be a part of the Operational Improvement Program to be partially financed by IBRD loan 2641/AR, which calls for the development of new applications in the following areas: billing and collection; customer metering; users' register; supply; finance and accounting; and system register. The improvements scheduled will also foster accomplishment of the objectives included in the program-agreement that would be signed by the Executive Branch, through the Interministerial Committee, 1/ and the OSN.

1/ This Committee as well as the State Corporations Board were established recently by Decree 2194 of November 1986 (see Section J, External Control) and the Committee is responsible for approving the "program agreements". These agreements cover a number of years and their purpose is to improve management and economic-financial performance; determine financing needs; and optimize the use of resources of the companies involved.

G. Purchase and contracting systems

- 5.22 The Office of the General Manager of Finance, Personnel and Services is responsible for management of purchases and contracting, as well as the requirements for the supply of materials, equipment and services. As established by its organic law, the OSN must perform its contracting pursuant to the principles of publicity and price competition. To manage these activities, the company has drawn up a set of contracting regulations within the framework of its organic law and other applicable legal provisions, such as Law 13064 (Public Works Act), issued in 1947, which is basically designed to regulate the procedures to be followed in public bidding. Since that time a number of other laws and decrees have been issued that amend or expand the original instrument. The most important of them is Law 18875, known as the "Buy at Home" Act, issued in 1970. It provides that when there are technically feasible alternatives, those which call for the use of materials and products that can be obtained from domestic industry shall be chosen.
- 5.23 The following amounts have been set for the modalities governing the company's contracts:
- | | |
|---------------------|--------------------|
| Public bidding: | more than A 20,000 |
| Private bidding: | up to A 20,000 |
| Direct contracting: | up to A 500 |
- 5.24 The August 2, 1985 Resolution of the OSN General Administrator established the monetary scales that determine who is to authorize the company's purchases and contracts. Finally, in connection with the project that would be partially financed by resources of the operation under review here, the procedures for bidding and contracting of consultants agreed upon with the Bank would be applied (see Proposed Resolution and Annexes IV-6 and IV-7 of this report).
- 5.25 The inventory policy--which is closely related to the procurement management--has been unsatisfactory in recent years as a result of several factors. The first is the absence of modern systems for management of materials. In addition, there has been a permanent overdimensioning of the stock of materials for construction and maintenance. This is due, first of all, to the transfer of services to the provinces starting in 1980, and also to the overall reduction of national economic activity which affected the OSN as well and led to inventories which it has not been able to use thus far. This problem has been compounded by inadequate systems for inventory management and the lack of basic control procedures, such as periodic inventories of the stocks in warehouses. To remedy this situation the Operational Improvement Program includes: a reduction of stocks on hand; permanent updating of supplies through a computerized system; and the proposal of policies for management of materials.

H. Operational improvement

- 5.26 The need for remedial action to correct the numerous organizational shortcomings of the OSN, the gravity and scope of which have been touched upon in previous sections of this chapter, resulted in negotiation with the World Bank for partial financing of an Operational Improvement Program. It was consolidated under loan 2641/AR, in the amount of US\$60 million divided among the following agencies:

<u>Beneficiary</u>	<u>Purpose</u>	<u>US\$000</u>
Obras Sanitarias de la Nación	Purchase of goods, meters and institutional strengthening	16,000 ^{1/}
Empresa Provincial Obras Sanitarias, Córdoba	Los Molinos Treatment Plant institutional strengthening, system and customer metering	29,000
Dirección Provincial Obras Sanitarias, Santa Fé	Institutional improvement and rehabilitation	6,000
Secretaría Recursos Hídricos	Equipment	1,000
		52,000
	Financing of interest	8,000
	TOTAL:	60,000
		=====

- 5.27 The contract was signed in November 1986 and the program execution period is estimated as five years. Bidding envelopes 1 and 2 were recently opened and the process for selecting the consulting firm was completed after discussion with the World Bank. The foreign firm selected and the national consultants with which it has formed a consortium would start their work prior to the end of 1987. The project was divided into 10 subprograms, to wit: (1) system register; (2) pitometry; (3) work on the mains; (4) rehabilitation and maintenance of operational units; (5) billing and collection; (6) register of users; (7) customer metering; (8) system metering; (9) supply; (10) financial-accounting administration system. As may be seen, the program includes activities in the areas of: service--subprograms 1 through 4; commercial--subprograms 5 through 7; facilities--subprogram 8; and financial-accounting--subprograms 9 and 10.

^{1/} The institution-strengthening component has an estimated cost of US\$1,040,000 equivalent, to be financed in equal shares (US\$520,000 each) by the World Bank and the OSN.

- 5.28 To complement this program satisfactorily, it is found necessary to complete the study now in progress on improvement of the OSN general organization and managerial capacity 1/ and, in addition, on strengthening its Internal Auditing Unit as explained in Section I, "Internal control".
- 5.29 Finally, in order to coordinate satisfactory execution of the project under review with the progress attained in carrying out the action scheduled under the Operational Improvement Program, it is recommended that the prospective loan contract include clauses the compliance with which coincides with milestones in that program, as indicated below. (See Schedule for Execution of the Operational Improvement Program in Annex V-2.)

OSN Operational Strengthening

Contractual clauses proposed for
inclusion in the prospective contract 2/

<u>Status of Program Progress</u>	<u>Deadline</u>
Contracting for consultants' work corresponding to the 10 subprograms	Prior to the first disbursement
Agreement on action to be taken for implementation of recommendations of the diagnostic report and the timetable for that purpose	Within 12 months of contract signature
Presentation of progress reports, implementation of recommendations	Within the first 90 days of each calendar year.

I. Internal control

- 5.30 Responsibility for overall evaluation of the OSN control system lies with the General Auditing Department established in 1984, which reports to the General Administrator. The unit has a staff of 30, about half of whom are professionals with special training in the areas of accounting, administration, systems and technical expertise. This multidisciplinary group will be used to guide the auditing function to serve the overall organization and provide better service to OSN management. To perform its duties the staff has auditing programs, the result of its own surveys of the various systems or obtained from sources outside the company, whose usefulness is therefore more limited.

1/ See paragraph 5.05 and Recommendations.

2/ See Proposed Resolution and Recommendations.

- 5.31 Although the composition and number of auditors would allow adequate coverage of the responsibilities assigned, various factors limit the ability of this unit to carry out its work plans. To overcome those limitations, the OSN operating system would have to be restructured, necessitating: (1) analysis of the hierarchical level of the General Auditing Office, its possible location at the managerial level, organizing it in functional sections in accordance with the various multidisciplinary objectives proposed for its work; (2) drafting of internal auditing procedure manuals based on surveys of the OSN systems; (3) design of satisfactory monitoring procedures ensuring implementation of the General Auditing Division's recommendations; and (4) provision of broad possibilities for training of professional and nonprofessional staff through attendance at courses and specialized seminars. These changes will be accomplished by the proposed improvement in OSN management, referred to in clause (a)(ii), paragraph 8 of the Recommendations (Appendix II of the Loan Proposal).

J. External control

- 5.32 As noted earlier, the OSN is an independent agency, although its status is granted without prejudice to control by the Executive Branch and the provisions set forth originally in the OSN Organic Law (1973) with respect to the National Accounts Tribunal. The Corporación de Empresas Nacionales was established in 1974, and made responsible for inspection of all state enterprises. Later on, Law 21801 of 1978 set up an independent auditing body belonging to the National Executive Branch (situated functionally under the Ministry of Economic Affairs), entitled the Auditor General for State Corporations (SIGEP).
- 5.33 This agency is responsible for issuing annual opinions embodied in a report of the Inspection Committee composed of the Auditing, Legal, and Management Control Officers. The first is responsible for auditing of the financial statements, which is performed by six or eight auditors, some of whom work at the OSN on a full-time basis. The Legal Officer establishes the juridical validity of management action in the context of the company's statutes and other applicable legislation. Finally, the Management Control Officer is responsible for semiannual preparation of a management report, examining the agency's compliance with its goals and programs which are essentially included in the Budget and Action Plan.
- 5.34 As noted in Section D of this chapter, the SIGEP has been unable in recent years to obtain sufficient and reliable data to form an opinion as to the reasonable nature of OSN financial statements, and has therefore abstained from issuing such opinions. The scope and depth of the prospective Operational Improvement Program ensures the future introduction of improvements that will correct the numerous structural deficiencies that have prevailed in recent years. A prominent feature of the work to be performed will be implementation

of a management information system, including the issue of timely and accurate financial statements warranting a technical opinion without reservations. This could be feasible once the implementation stage for the new accounting and administrative system is completed, possibly in 1991.

- 5.35 For purposes of the operation under review here, it is recommended that the OSN financial statements throughout the life of the loan and those of the project during the execution period be submitted annually by the executing agency within 120 days of the close of operations for the corresponding fiscal year, duly audited by the Auditor General for State Corporations and pursuant to Bank requirements in this respect. The first financial statements would be those corresponding to the fiscal year when project works are started (see Recommendations).
- 5.36 A second factor in the external control process involves Ministerial Resolution 872. It was issued jointly on January 8, 1983 by the Economic Affairs and the Public Works and Services Ministries, empowering both to exercise control over budgetary execution, indebtedness and debt maturity matters and the execution of OSN capital investment. Decree 2194 was approved in November 1986. It created the Directorio de Empresas Públicas (DEP--State Corporations Board), whose relations with the Executive Branch are conducted through the Interministerial Committee consisting of the Minister of Public Works and Services and the Minister of Economic Affairs. The decree delegates responsibility for approval of the budgets and action plans of the enterprises included, by means of a joint resolution of that Committee, subject to prior intervention of the DEP, to the Ministers of Public Works and Services and Economic Affairs. It also provides that the Board shall verify timely publication of the results of company operations and that the annual report and balance sheet for each fiscal year be made available to interested third parties and the public in general, at the times stipulated by the Board.
- 5.37 The Directorio de Empresas Públicas consists of a Chairman and nine Directors, all of whom are appointed by the Executive Branch at the suggestion of the Interministerial Committee. In turn, the Interministerial Committee will be composed of the Minister of Public Works and Services and the Minister of Economic Affairs. The Chairman of the DEP ^{1/} will be a permanent member and other Secretaries of State will serve as associate members. The decree in question establishes the duties of the Interministerial Committee, some of the most important of which are: (a) coordination of general and sectoral

^{1/} In view of the recent resignation of the DEP Chairman and while the functions of that agency are undergoing possible redefinition, the Minister of Public Works and Services will serve as DEP Chairman.

policies concerning the conduct of the agencies included; ^{1/} (b) definition of the price and rate policies and labor guidelines of those companies; (c) consideration and approval of the program-agreements between the National Government and each of the companies. The major functions of the Directorio de Empresas Públicas will be the following: (a) presentation of program-agreements to the Committee; (b) definition of policy lines for procurement, contracting and financing; (c) establishment of analysis and evaluation criteria for the companies' organizational structures and information systems; and (d) presentation of the findings of its critical evaluation of results obtained by the entities included in the system, for consideration by the Interministerial Committee.

- 5.38 Despite the important duties assigned to the DEP, it is still undergoing organization and finding its place within the Executive Branch system. This may be due to the fact that the nature of its powers is such that full operation would entail a relative loss of power on the part of the 13 companies affected and certain state agencies which have until now exercised relatively indirect control over the action of such companies.

K. Rate system

- 5.39 The OSN Organic Charter indicates that the determination of rates "...shall be made in accordance with the operating costs of the company operating at peak efficiency. The system to determine the rates will be established by regulatory channels." The regulatory channel referred to is the Company Tariff System (Decree 9022/63 and amendments). Article 12 thereof provides that the coefficient for updating the tariff formula shall be determined on the basis of variations in its operating costs. That factor will be established by the PEN (issued since 1973 in the form of ministerial resolutions in keeping with the powers delegated) and as proposed by the OSN. Although both regulations establish the coverage of operating costs as the general criterion for the rate policy, it is nevertheless evident in the section of this document dealing with historical financial analysis that the rates charged have not sufficed to cover all operating costs, despite progressive revenue increases in the past three years.
- 5.40 The main characteristic of the OSN commercial system is billing on the basis of a fixed fee that takes into account presumable consumption--not actual consumption--by the users. In other words,

^{1/} The corporations included in the new management system are: YPF, YCF, Gas del Estado, Agua y Energía Eléctrica, Segba, Ferrocarriles Argentinos, Aerolíneas Argentinas, Administración General de Puertos, Líneas Marítimas Argentinas, Obras Sanitarias de la Nación, ENTEL, ENCOTEL and HIDRONOR.

it is assumed that the greater or lesser use of these services in a given building is directly in proportion to the number of persons living there; and that number is correlated with the area covered by the building, i.e., the larger the area, the greater the number of residents and the more extensive the consumption. The constructed area has a sharp impact on the basic fee. Fixed fees, also weighted, for storm and sanitary sewerage are added to the basic fee billing, in applicable cases.

5.41 The basic formula applied to compute the rates is:

$$Cb = 2 (Sc.t.E+St.t/10) Z.K.F Cms$$

Where:

Cb = bimonthly fee

Sc = area covered

t = general rates per m² for basic services (water, sewerage and stormwater drainage) and combinations thereof

E = coefficient according to type and age of building

St = area of the lot

Z = zone coefficient determined by building's location

K = rate adjustment coefficient

F = coefficient of Facility Renewal Fund

Cms = minimum fee for service provided

5.42 If the result of the calculation is higher than the "minimum fee", that amount is billed; if it is lower, the minimum fee is billed. The factors in the formula vary according to the parameters listed above. Coefficient K is especially interesting. OSN proposals for updating of this factor are based on financing needs as shown in the annual budget, anticipated costs, social impact of the increment, short and medium-term rate changes, and comparison with the price of other public services. Approval of the K coefficient was the purview of the Nation's Executive Branch until 1973; between 1974 and 1980, it was assigned to the Ministry of Economic Affairs; and from 1981 until the present, to the Ministry of Public Works and Services. Starting in the fourth quarter of 1983, coefficient K was broken down into:

K1: Category "A" of general public (private) users, with a fixed fee.

K2: Categories "B" and "C" of general public (private) users with a fixed fee; all official users (national, provincial or municipal); metered excess water use; and other contingent uses (water for construction, etc.).

5.43 Despite OSN proposals, the evolution of coefficient K depends on the government's overall tariff policies and general policy. The evolution of coefficient K, as discussed in the section on historical financial analysis (Income statement II.(b)), is the main cause of OSN tariff deterioration. As stated earlier, the OSN rate structure

features a system of minimum fees, which vary according to the type of service (drinking water, sewerage, storm water and combinations thereof) and in general, the rates rise in direct proportion to coefficient K. The minimum-fee system leads to inefficient and inequitable distribution of the tariff charges, which do not correspond to the service rendered and results in subsidies for certain users, certain geographic areas and certain services, with no economic or social justification.

- 5.44 The current rate system is approved by Decree 9022/63 and its amendments, and consists of two major parts: (a) Classification of users by category; and (b) collection modalities (fixed fee and meter-based). "User" is understood to mean the building (already constructed) or lot without construction located within the area served by OSN. For purposes of user classification, these properties are divided into three groups: category A or General, which consists essentially of residential buildings; category B, or Commercial and Industrial, which is divided into three classes in accordance with the higher presumed value of water; and category C, or Special, for those buildings where there is no a priori correlation between the constructed area and presumed service utilization. From the operational standpoint, there is a further differentiation between the so-called general public user (private users) and the official user (national, provincial and municipal governments).
- 5.45 The fixed-fee system is used to bill category A and B buildings. While those in the B category have compulsory metering, installation of meters for the A category is optional for the company. Metered billing of categories A and B is based on consumption that exceeds the minimum. No fixed fee is applied to category C, where collection is based solely on the meter system. When excess use of water is metered, basic consumption for the A and B categories is billed in accordance with the constructed area. Additional consumption over the basic level is billed at a price per m³ that differs by category: the unit amount is lower for category A users, and the price increases progressively for category B, according to the various subcategories under this heading. Approximately 5% of all OSN revenue comes from the billing of excess consumption.
- 5.46 As established in its organic charter, the OSN is empowered to "...propose the establishment of rates covering the services it delivers ...". The procedure applied for tariff adjustments may be outlined as follows: (a) contact is established with officials of the Programming and Budget Directorate and the Coordination Secretariat under the Ministry of Public Works and Services, indicating the need for adjustment; (b) a study is made of the tariff situation, including evolution of historical levels, and the corresponding adjustment program is proposed; (c) meetings are held to discuss and work with representatives of the agencies involved; (d) the company is advised of the levels agreed on; and (e) notes on the agreement are presented to the Ministry of Public Works and Services and the Department of the Secretary of Water Resources

together with the legal premises and proposed Ministerial Resolution, which is finally signed by the corresponding Minister. In the near future, participation of the Directorio de Empresas Públicas will be meshed into the mechanism since, as indicated in the preceding section, it is responsible, inter alia, for defining the rate policy of such corporations.

- 5.47 The Operational Improvement Program will entail alteration of the OSN rate structure only in areas that already have or will soon have metered service of consumption--areas that logically include the zones to be served by the project under review here. 1/ Other services will continue to be billed in the meantime, based on the fixed-fee system described above.

L. Historical financial analysis

1. Background

(a) General

- 5.48 As mentioned in earlier paragraphs, the National Sanitation Works (OSN) has legal standing, and is a public agency which is financially and technically independent, although its plans must conform to the directives issued by the Office of the Undersecretary of Water Resources of the Ministry of Public Works and Services.

(b) Financial system

- 5.49 As established in its Organic Charter, the OSN finances its budget with ordinary and special resources. The former include those collected for providing the various services in accordance with rates approved by the Executive Branch; fines, surcharges, and interest payments; any taxes and contributions specifically earmarked for the OSN; the proceeds of the sale of goods; and contributions from the National Treasury. The special resources are those stemming from the use made of credit; state contributions for works of all types entrusted to the company; contributions for the execution of works for the account of third parties; and grants of any nature.

(c) Taxation

- 5.50 According to the OSN Organic Charter, the work it performs, the services it renders and the assets it possesses are exempt from all national, provincial or municipal taxes, except for those on services actually rendered. It is also exempt from any basic or additional

1/ Within 36 months of the effective date of the contract, the OSN is to submit evidence to the Bank that it has implemented a rate structure based on metered service. See Recommendations.

customs duties on the importation of goods earmarked for the construction of works or rendering of its services. On January 1, 1980, however, Law 22016 abolished that status and made the OSN and other state corporations subject to taxes. At present the OSN pays the tax on gross income assessed by the Municipality of Buenos Aires, which amounts to 3%. It is also responsible for payment of the value added tax.

(d) Use assigned to profits

- 5.51 Its Organic Charter provides that the OSN shall determine the results of its economic management on the basis of generally accepted accounting principles; and that, should it have liquid realized profits, the use thereof shall be established by the Executive Branch at the proposal of the OSN.

2. Analysis of OSN financial statements

- 5.52 As explained in the preceding sections, the external audit agency, SIGEP, has not been satisfied that the OSN's financial statements fairly present its situation in recent years and it, therefore, has abstained from issuing an opinion. Accordingly, it has been impossible to conduct a formal technical analysis to assess OSN economic and financial performance. To provide an idea of the volume of the company's business and its historical evolution, a summary analysis has been made of the information appearing in those financial statements. They have been adjusted to reflect some of the SIGEP observations, but must not be interpreted as representing the OSN's economic, financial and equity position.

(a) Balance sheets

- 5.53 These statements covering the 1984-1986 period appear in Annex V-3, expressed in constant U.S. dollars for December 1986, at an exchange rate of $\text{A}1.257 = \text{US}\1.00 . In other words, the accounting information has been adjusted to eliminate the influence of monetary devaluation so that the currency used has the same purchasing power throughout the period.
- 5.54 As is usual with public service companies, an analysis of the structure shows a high incidence of noncurrent assets including fixed assets representing approximately 90% of the total. The change observed in the total values for plant and equipment is attributable to the incorporation of various expansion works, including those corresponding to water service for the La Matanza system partially financed by loans 526/SF-AR and 14/IC-AR, as well as the monetary correction performed every year, using the mechanism for adjusting financial statements for inflation.
- 5.55 Under current assets, the most important item is the one that represents receivables from users, which accounted for 4.4% of total

assets as of December 31, 1986. Because of the shortcomings indicated by SIGEP auditors, which affect the administrative procedures of billing and collection, discrepancies have arisen between the information supplied by general accounting and the commercial sector; these have not been systematically identified and reconciled. Under such circumstances, the information available cannot be used for timely managerial decision-making, but it is hoped that this situation will change as a result of the Operational Improvement Program described in earlier paragraphs.

- 5.56 Recent studies made by the Office of the Commercial Manager indicate that by now the handling of collection is acceptably efficient, since it amounts to an overall 86% of billings. 1/ Despite the presumed acceptable status of collection, some outstanding balances are still in arrears, and efforts have been intensified to collect them or write them off. In this context, the policy currently being applied by the company is to cancel outstanding balances of more than 10 years' standing at periodic intervals. 2/ According to data from the Finance and Accounting Department, balances pending collection for government and nongovernment users represent the equivalent of US\$64,000,000 at March 1987 prices. It is recommended that the operation under review here require total cancellation (collection or write-off) of the receivables pending as of December 31, 1986, by December 31, 1991 at the latest (see Recommendations). Follow-up of collections would be conducted on the basis of audited financial statements and annual OSN financial projections (see Recommendations).
- 5.57 There are three main ways of recovering overdue debts: (a) enforced and out-of-court collection; (b) legal requirement for cancellation of debts owed to the company as a prerequisite for deeds transferring ownership of buildings; and (c) periodic sweeps to recover amounts owed from large-scale debtors--which are not always effective. Under Article 38 of its organic law, the OSN is empowered to cut off sanitation services to a building after the third month of arrears in payment of an invoice. The general principle established in this respect is to apply it to buildings for commercial or industrial use and, in exceptional instances, to family dwellings or other residential properties. In the operation under review, and to ensure continuity of efficient collection of overdue accounts, both past and future, from individuals and official sectors, it is recommended that the prospective loan contract include the customary clause regarding accounts receivable, whereby the borrower undertakes to maintain an effective collection ratio of no less than 85% of all accounts due in

1/ This indicator is consistent with the figure agreed upon with the World Bank for that year. See Annex V-1.

2/ It is recommended that the terms of the prospective loan contract require the OSN to submit an annual statement showing the age of balances due from all of its clients, both individual and official.

any given year, including the uncollected balance at the start of the year for OSN services. Not to be classified as outstanding accounts for this purpose are accounts receivable for which the standard payment term has not elapsed and amounts owing as of December 31, 1986, which the OSN would be required to have collected or written off by December 31, 1991 (see Recommendations). Given the unreliable nature of the accounting data, difficulties are anticipated for exact assessment of compliance with this clause, perhaps persisting throughout the execution period of the proposed project. Once the benefits stemming from implementation of the Operational Improvement Program take effect in the accounting and commercial administration areas, compliance with that clause can be evaluated with a reasonable degree of accuracy.

- 5.58 The composition of the OSN financial structure shows the significant weight of its net worth. According to Law 20324 of 1973, the OSN capital consists of the figure from the balance sheet of December 31, 1974, plus contributions from the national government and the product of the revaluation of nominal historical values using the technique for adjusting financial statements for inflation. During the period under review, cumulative losses as of December 31, 1983 and freely available cumulative reserves up to 1984 were also transferred to the capital. The OSN's total assets at year-end 1986 were the equivalent of US\$1,284,000,000. Its net worth, the equivalent of US\$1,163,000,000 was equal to 90% of the asset figure; liabilities equivalent to US\$121,000,000 were equal to the other 10%. Total OSN liabilities thus are relatively insignificant. It is also important to note that a substantial portion thereof--approximately US\$59 million deriving from foreign debts--would be assumed by the National Treasury in accordance with the provisions of article 8 of Law 18586 concerning the nation's external debt. 1/

(b) Income statements

- 5.59 These statements for the 1984-1986 period appear in Annex V-4.

(1) Operating revenue

- 5.60 Statistics provided by the Commercial Office show the following comparative situation as to the number of accounts for the three basic services rendered by the OSN:

1/ Until the transfer of debt is effected, the US\$59 million will remain on the OSN's books as equivalent offsetting amounts.

<u>NUMBER OF ACCOUNTS</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>
1. <u>Water</u>			
1.1 As of January 1	1,896,660	1,962,338	2,017,051
1.2 As of December 31	1,962,338	2,017,051	2,068,846
1.3 Average number of accounts	1,929,499	1,989,694	2,042,949
2. <u>Sewerage</u>			
2.1 As of January 1	1,625,958	1,704,820	1,762,166
2.2 As of December 31	1,704,820	1,762,166	1,795,246
2.3 Average number of accounts	1,665,389	1,733,493	1,778,706
3. <u>Stormwater drainage</u>			
3.1 As of January 1	1,263,396	1,303,617	1,343,240
3.2 As of December 31	1,303,617	1,343,240	1,364,285
3.3 Average number of accounts	1,283,507	1,323,429	1,353,763
Total average number of accounts	4,878,395	5,046,616	5,175,418

5.61 The current structure of operating revenue is shown below:

<u>By service 1/</u>	<u>%</u>	<u>By category</u>	<u>%</u>	<u>By area</u>	<u>%</u>
Water	51.5	General public	84.5	Capital	69.5
Sewerage	28.8	Official users	6.0	Greater B. Aires	30.5
Stormwater sewerage	8.9	Metered excess water, government and nongovernment	5.4		
Other	10.8	Misc. and indemnities	4.1		
Total services	100.0	All categories	100.0	Total areas	100.0

5.62 Analysis and interpretation of the OSN's economic position is difficult because of the failure to apply generally accepted accounting principles when preparing the financial statements. In addition, the company's tariff system is not based on cost and actual consumption. For these two reasons, an analysis must be made of OSN revenue based on data that afford a more objective evaluation. In selecting those data it was taken into account, as has been explained in this chapter, that when setting its rates, the OSN uses factors such as the constructed area of the building being serviced (it being assumed

1/ Average for the three-year period 1984-1986.

that the greater the area the more persons and the greater the consumption); the type, age, and location of the building; the lot area; the minimum rate that would be charged, and a rate adjustment coefficient. As its name suggests, this latter factor in the calculation is the factor that is adjusted to change a rate in light of changes that can arise, primarily in the general price level. It thus is possible to determine the OSN's rate behavior by tracing the performance of that adjustment coefficient, which is also known as the "K" coefficient, and relating it to changes in the Overall Wholesale Nonagricultural Price Index (PMNAT), which is widely used in Argentina. ^{1/} The relationship is shown in the following table.

OSN: Tariff indicator
(Base: Year 1980 = 100)

<u>Year</u>	<u>Nominal tariff indicator</u>	<u>PMNAT Indicator</u>	<u>Constant tariff Indicator</u>
1981	271.96	317.72	85.60
1982	566.36	1,298.12	43.63
1983	2,550.66	6,453.08	39.53
1984	20,007.44	46,697.48	42.84
1985	143,147.91	241,109.50	59.37
1986	317,145.69	366,577.33	86.52
1987	799,243.78	1,065,808.56	74.99

5.63 The disparity between the performance of these two indicators meant that, despite progressive recovery starting in 1984, the real rate (i.e., net after inflation) suffered an average downturn of 25% in the past seven years. To correct that situation, agreement was reached in April 1986 on a program that consisted essentially of doubling the average OSN real rate and adjusting the distribution of the tariff burden. To accomplish this, certain parameters of the fixed-rate tariff formula were modified--including the K factor, the zone coefficients and the minimum fees--while the metered services were updated. This program resulted in steady progress until December 1986, but began to experience difficulties in the first two months of 1987, when the Ministry of Public Works and Services called for cumulative monthly overall increases that fell short of the amounts required to carry out the program. In the second two-month period of 1987, the situation was further complicated by the general freezing of rates decreed starting March 1. However, rate adjustments decreed in the last quarter provided for a reasonable rate level that yielded significant recovery between 1984 and 1987.

5.64 As was noted in chapter II, the nature of the OSN's accounting system made it impossible to implement the rate provisions provided for in

^{1/} In the period under review, annual percentage changes in the PMNAT were consistent with changes in the consumer price index.

the urban subprogram funded with IDB loans 526/SF-AR and 14/IC-AR. For the same reason, it has not been possible to determine whether the coverage that was to be achieved by the urban waterworks system being set in place with that IDB financing has in fact been achieved through OSN general rates.

(ii) Operating expenses

- 5.65 The lack of a cost system that allows operating costs to be broken down by services and systems also prevents presentation of data on the operating margin by type of service. Based on the information available--which may distort the true circumstances considerably--cumulative OSN operating losses for the 1984-1986 period would represent more than 70% of the operating revenue for that period. Assistance from the National Treasury was required on several occasions to cover an amount estimated by the OSN as approximately US\$27 million for the 1984-1986 period.

(c) Statement of source and use of funds

- 5.66 These statements for the 1984-1986 period appear in Annex V-5. As may be seen, internal generation of funds was negative for that interval. Given this circumstance, external sources --including contributions from the National Treasury-- had to provide the funds needed, the most important use of which was spending on works construction. Among those items were outlays for the La Matanza project, partially financed with IDB resources. As a result of the period's financial transactions there was a marginal increase in cash available (funds on hand and in banks), representing about 3-1/2% of the total resources received during the three-year period under review.

(d) Conclusions of the historical financial analysis

- 5.67 Since the OSN's financial statements were not drawn up in accordance with generally accepted accounting practice, the analysis and interpretation thereof can only provide very general data as a basis for global conclusions. Consequently, the preliminary examination conducted suggests that despite negative operating results, the OSN has managed to maintain a low indebtedness level, although the National Treasury has had to provide financial assistance a number of times. Problems stemming from the severely decreasing value of the rates charged have also been identified, but they were partially resolved through contributions from the National Treasury, systematic postponement of expansion and rehabilitation works, and stringent restraints on operating activities and system maintenance. The tariff's loss of purchasing power has been aggravated by an inadequate rate system, along with the failure to meter consumption and the high levels of unaccounted-for water, which account for over 50% of the supply. The forthcoming Operational Development Program and the decision to apply a tariff recovery plan in the near future may reverse the trend of recent OSN experience.

VI. PROJECT JUSTIFICATION

A. Technical feasibility

- 6.01 The project to supply water to the western zone, including rehabilitation and expansion of the San Martín treatment plant, was prepared in accordance with generally accepted technical criteria and corresponds in both cases to the least-cost technical alternative. Final designs are available at the construction levels. Consequently, work can start as soon as the financing is approved. The five-year schedule for works execution can easily be met according to the PEP prepared for this purpose.
- 6.02 The project cost was estimated around the basis of a final design, complete with the schedules of quantities, an analysis of unit prices, and construction specifications and plans. Accordingly, the resulting figures are considered realistic, 10% having been added for contingencies and national escalation in accordance with the rates recommended by the Bank.
- 6.03 The execution methodology and system for the proposed works, plus the organization and staff for the supervisory units envisaged, would permit permanent surveillance of the contractors' performance and strict compliance with construction plans. The project calls for execution of the service mains. Furthermore, it includes a program for the promotion of community participation which will be carried out by the company to ensure that these mains and household connections are also completed within the scheduled period of five years.
- 6.04 The company has an adequate organizational set-up and sufficient staff to perform the operating and maintenance work on the water system for Greater Buenos Aires. These activities will be further strengthened under the Operational Improvement Program to be carried out with financing from the World Bank.
- 6.05 The project calls for training of OSN technical staff and specialized studies on technical cooperation. These areas will be entrusted to a consulting firm or entity with recognized capacity in the field.
- 6.06 The project also includes provision for the necessary studies for installation of sewerage service in the western zone, including treatment of both domestic and industrial wastes. It is hoped that execution of the works resulting from those studies will eliminate pollution of Morón creek. This is the principal source of contamination of the Reconquista river, which in turn is the source of much of the River Plate pollution.
- 6.07 In short, the technical and environmental aspects have been taken into account and it may be concluded that the project is well conceived from the technical standpoint and can be executed and operated without technical difficulties, in light of the planned Operational Improvement Program and strengthening of management.

B. Financial feasibility

- 6.08 The financing plan for the Buenos Aires water supply project calls for a local contribution equivalent to US\$147 million, to be made available over the 1988-1992 period. These contributions, which would be complemented by the prospective IDB loan amounting to US\$98 million, would come from the OSN, although the company intends to cover no less than US\$19,700,000 equivalent from the fees for connection to project works in 1991 and 1992. That figure would very possibly be increased by US\$28,700,000 corresponding to the distribution networks, which will also be covered by contributions from the beneficiaries. The sections that follow examine the feasibility of such contributions.

1. OSN financial projections

- 6.09 The following basic criteria were applied for the preparation of these projections, which cover the period from 1987 to 1996:

- (a) constant currency, expressed in United States dollars, computed on the basis of the September 30, 1987 exchange rate of A2.6355 = US\$1.00.
- (b) measurement of the performance of various items in the financial statements based exclusively on physical volumes and real monetary worth, i.e., eliminating the influence of possible future variations in general price levels.
- (c) the price level corresponding to September 30, 1987, applied uniformly except in determining the cost of the project under review, which includes provision for price escalation, pursuant to the rates recommended by the IDB Economic and Social Development Department and used by the Project Analysis Department. 1/

2. Projected income statement

- 6.10 This statement appears on the following page and the premises used for its preparation appear in Annex VI-1. If the projections hold true, the results would be the following: 2/

1/ Memorandum LO-6 from the Office of the PRA Manager, revision dated July 16, 1987.

2/ Nos. 1, 2 and 3 under units sold, mean revenues, and amount of sales in the projected income statement represent water supply, sanitary sewerage, and storm sewerage services, respectively.

OBRAS SAN.NACION
PROYECCION-ESTADO DE RESULTADOS
(MILES/THOUSANDS) 1/

135		OBRAS SAN.NACION										
136		PROYECCION-ESTADO DE RESULTADOS										
137		(MILES/THOUSANDS) 1/										
138		1	2	3	4	5	6	7	8	9	10	TOTAL
139		---	---	---	---	---	---	---	---	---	---	---
140												
155	VENTAS											
156	-----											
157	CONEXIONES #1	1930800	1998462	2114141	2213573	2286752	2483722	2639085	2675533	2723383	2828864	23894315
158	CONEXIONES #2	1655984	1694508	1734048	1777503	1822094	1864986	1936181	2016137	2139045	2268159	18908645
159	CONEXIONES #3	1218435	1241107	1264215	1287767	1311773	1336241	1348688	1361254	1373941	1386751	13130172
161												
162	TOTAL UNIDADES VENDIDAS	4805219	4934077	5112404	5278843	5420619	5684949	5923954	6052924	6236369	6483774	55933132
163												
164	INGRESO MEDIO #1	55	55	54	54	54	53	52	52	52	51	
165	INGRESO MEDIO #2	42	42	41	41	41	41	41	41	40	40	
166	INGRESO MEDIO #3	16	16	16	16	16	16	16	16	16	16	
168												
169	INGRESO MEDIO PROMEDIO	40.527	40.437	40.399	40.363	40.340	40.279	40.094	40.015	39.847	39.665	
170												
171	VENTAS #1	106529	109549	114626	119096	122574	130805	137108	138857	141047	145448	1265638
172	VENTAS #2	68957	70370	71937	73623	75351	77043	79069	81812	85707	89780	773648
173	VENTAS #3	19255	19601	19973	20354	20742	21137	21337	21540	21745	21952	207637
175												
176	TOTAL VENTAS	194742	199520	206536	213072	218667	228985	237514	242209	248499	257180	2246923
178	OTRS INGRESOS EXPLOTACION	12282	16649	23194	30703	33714	35231	35668	35753	35842	35934	294969
179	OTRS INGRESOS EXPLOTACION	13807	20087	23322	20428	18828	25127	24814	21883	23766	26462	218524
180												
181	TOT. INGRESOS EXPLOTACION	220831	236255	253053	264204	271208	289342	297996	299846	308107	319576	2760416
182												
183	GASTOS DE EXPLOTACION											
184	-----											
185	SALARIOS Y C.SOCIALES	79841	81962	84614	87264	89916	92565	95218	97869	100521	103172	912943
186	ENERGIA ELECTRICA	16153	16153	16153	16153	16888	18459	20422	21482	21482	21482	184825
187	MATERIAS PRIMAS	22977	22977	22977	22977	23323	23464	23604	23665	23665	23665	233294
193	DEPREC.ACT.FIJ.EN SERV.	23034	23521	24336	25666	29302	32923	33926	34452	35536	38584	301281
198	CUENTAS INCOBRABLES	5769	10498	3651	1378	407	305	229	172	129	96	22634
199	COMERCIAL. Y ADMINISTRAC.	16562	17719	18979	19815	20341	21701	22350	22488	23108	23968	207031
200	IMPUESTOS GENERALES	7734	8173	8652	8970	9169	9686	9933	9986	10221	10548	93072
201	OTROS GASTOS EXPLOTACION	12095	12337	12583	12835	13092	13354	13621	13893	14171	14454	132435
203	OTROS GASTOS	411	704	704	704	704	704	704	704	704	704	6747
204												
205	TOTAL GASTOS EXPLOTACION	184575	194044	192648	195762	203143	213162	220007	224711	229537	236674	2094262
206												
207	INGRESOS NETO EXPLOTACION	36256	42211	60405	68442	68065	76180	77989	75135	78570	82902	666154
208	ING.(EGRES.)AJENOS EXP.											
209	-----											
210	OTROS INGRESOS	1569	1585	1600	1617	1633	1649	1665	1682	1699	1716	16415
211	OTROS EGRESOS	1751	1769	1786	1804	1822	1840	1859	1877	1896	1915	18320
212												
213	TOT.ING.(EGRS)AJENOS EXP.	-182	-184	-186	-188	-190	-191	-193	-195	-197	-199	-1905
214												
215	UTILIDAD ANTE GTOS.FINANC	36074	42027	60219	68254	67876	75988	77796	74939	78373	82702	664249
216	GASTOS FINANCIEROS											
217	-----											
219	GTOS.FINANCIEROS LGO.PLZO	856	785	681	580	1566	1431	8516	7993	7470	6949	36827
221												
222	TOTAL GTOS.FINANCIEROS	856	785	681	580	1566	1431	8516	7993	7470	6949	36827
232												
233	UTILIDAD (PERDIDA) META	35217	41242	59538	67674	66310	74557	69280	66946	70903	75753	627421
234												

1/ Tasa de cambio: A2.6355=US\$1.00.

(a) Number of accounts

- 6.11 The total average number of accounts would rise at the rate of 3.4% a year. The average number for water services would increase by 4.3%, based on the goals established for water supply service coverage, which would rise from 67% in 1986 to 88% of the population in 1996. This is consistent with the goals set by the company in its 10-year service expansion plan, which assigns priority to the project under review. That growth in coverage appears to be adequately justified by the construction program submitted by the OSN.

(b) Average operating revenue

- 6.12 Average income from operations of the different services has been computed on the basis of values corresponding to billing in the fourth two-month period (July-August 1987), subsequently adjusted by the general price index of September 30, 1987, plus real increases granted to the company in October; all of these figures are expressed in constant monetary values in the forecast. As may be seen, there would nevertheless be a slight marginal downturn in some of these values, stemming from incorporation of peripheral zones to which lower zonal coefficients apply and where the type and age of the buildings result in smaller rate charges, as noted earlier. 1/
- 6.13 In addition, and as a separate item, operating income from the billing of metered excess use of water by the general public (private customers) and government users and bulk sales of water, primarily to the Municipality of Quilmes and the Central Market, was included. The bulk sales are metered supplies outside the OSN service area, under special price agreements. The operating revenue would also be supplemented by various other items such as fees for indemnities, surcharges, interest and the like.

(c) Operating costs

- 6.14 The operating expenses were projected in accordance with the constant monetary criteria described above. This means that, although the unit prices of basic inputs remain unchanged, the physical units show changes in anticipated activity levels due to increased production of water, the addition of new users, and better maintenance. The projected costs also reflect greater operating efficiency which it is hoped will result from the project under review, through savings in the coagulant that will be produced in the General San Martín plant. Consideration was also given to the heightened operating efficiency that would be triggered by the Operational Improvement Plan to be partially financed by the World Bank, which would benefit the operating, maintenance, administrative and commercial areas.

1/ See Section K of Chapter V, Rate System.

(d) Financing charges

- 6.15 The financing charges correspond to Caja Nacional de Ahorro y Seguro, which acted as financial agent in partial financing of the La Matanza Water Supply project (loans 15/IC-AR and 526/SF-AR); to the IBRD for loan 2641/AR covering the Operational Improvement Program and, finally, to the possible loan under review here. The amount thereof is relatively insignificant over the period in question, since it would barely exceed 1% of the total operating revenue.

(e) Net profit

- 6.16 The combined impact of the various items discussed would produce annual net profit up to 1996 amounting to a cumulative 23% of all revenue as of that date.
- 6.17 As may be seen in the forecast of results, the IDB rate policy requirements would be met by coverage of all operating expenses, including depreciation. In the operation under review here, it is recommended (see Proposed Resolution) that the customary rate clause include the additional requirement that the revenues from rates charged contribute no less than 35% of the investment plan. Based on the reasons explained here, no significant problems are anticipated in compliance with those requirements.

3. Projected statement of source and use of funds

- 6.18 The statements of source and use of funds for the 1987-1996 period appear on the following page. In accordance with the premises used, as listed in Annex VI-1, internal sources of funding account for 83% of all sources. External sources (primarily resources of the possible IDB loan) would finance the remaining 17% scheduled for the 10-year period. The major uses are construction costs, including financing charges, most of them payable to the Bank. The construction plan's highest priority target and most prominent item is the project under review, which accounts for approximately one fifth of the total. The rest of the program consists of expansion works and system renovation and rehabilitation, execution of which would make it possible to accomplish the goals established in terms of service coverage.

OBRAS SAN.NACION
PROYECCION-ORIGEN Y APLICACION DE FONDOS
(MILES/THOUSANDS) ^{1/}

	1	2	3	4	5	6	7	8	9	10	TOTAL
FUENTES	----	----	----	----	----	----	----	----	----	----	----
FUENTES INTERNAS	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
INGRESO NETO EXPLOTACION	36256	42211	60405	68442	68065	76180	77989	75135	78570	82902	666154
TOT.ING.(EGRS)AJENOS EXP.	-182	-184	-186	-188	-190	-191	-193	-195	-197	-199	-1905
DEPREC.Y AMORT.DIFERIDOS.	23034	23521	24336	25666	29302	32923	33926	34452	35536	38584	301281
CUENTAS INCOBRABLES	5769	10498	3651	1378	407	305	229	172	129	96	22634
TOTAL FUENTES INTERNAS	64876	76046	88206	95298	97585	109217	111951	109563	114038	121383	988164
FUENTES EXTERNAS	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
APORTES CONEX.SIST.DESTE	0	0	0	0	9838	9838	0	0	0	0	19676
PTMO(S).BID PROPUESTO(S)	0	5006	24803	37215	22659	8317	0	0	0	0	98000
OTROS PRESTAMOS	1367	4244	4317	3330	3408	0	0	0	0	0	16666
COBRO CUENTAS/C.VENCIDAS	6410	15575	12921	4636	815	509	305	172	86	33	41460
TOTAL FUENTES EXTERNAS	7777	24825	42041	45180	36719	18664	305	172	86	33	175802
TOTAL FUENTES	72653	100871	130247	140479	134304	127881	112256	109734	114124	121416	1163966
APLICACIONES	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
SERVICIO DEUDAS	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
GTS.FIN.L/P.PROY.PTMO.BID	0	0	0	0	0	0	7258	6891	6523	6156	26828
GTS.FIN.L/P.PROY.OTRO PTM	856	785	681	580	1566	1431	1258	1103	947	793	10000
GTS.FIN.CONST.NO FINANC.	0	991	1107	1563	258	52	0	0	0	0	3970
AMORTIZACION PTMO(S) BID	0	0	0	0	0	0	4900	4900	4900	4900	19600
AMORT.PRESTAMOS (OTROS)	1447	1489	2776	2887	2887	2499	2109	2109	2109	2109	22423
TOTAL SERVICIO DEUDA	2303	3265	4564	5030	4711	3982	15525	15002	14479	13958	82820
COSTOS CONSTRUCCION	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
PROYECTO BID PROPUESTO	0	11871	62364	79280	50824	18906	0	0	0	0	223245
GASTOS FINANC.PTMO.BID	0	1369	2477	4368	6202	7154	0	0	0	0	21569
OTRAS OBRAS	33973	42543	60802	70822	76670	97692	106100	116748	118068	95121	818539
GTS.FINANC.OTRAS OBRAS	131	449	749	943	13	0	0	0	0	0	2285
TOT.COSTO CONSTRUCCION	34105	56232	126391	155412	133709	123751	106100	116748	118068	95121	1065638
OTRAS APLICACIONES	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
COSTOS DIFERIDOS	200	329	318	289	294	0	0	0	0	0	1431
INCREM(DISHIN)CAP.TRAB.	31755	29264	27112	20938	18397	10831	1330	-5087	-1655	738	133622
GTS.FIN.CONST.NO FINANC.	0	-991	-1107	-1563	-258	-52	0	0	0	0	-3970
TOT.OTRAS APLICACIONES	31955	28602	26323	19664	18434	10779	1330	-5087	-1655	738	131082
TOTAL APLICACIONES	68363	88100	157278	180106	156854	138512	122955	126663	130892	109817	1279540
SUPERAVIT(DEFICIT)ANUAL	4290	12771	-27031	-39628	-22550	-10631	-10699	-16929	-16768	11599	
SUPERAVIT(DEFICIT)ACUM.	4290	17062	-9969	-49597	-72147	-82778	-93476	-110405	-127174	-115575	

1/ Tasa de cambio:A2.6355=US\$1.00.

- 6.19 The amount of debt servicing would be insignificant, amounting to only 8% of the use scheduled for funds over the period, so that it can easily be covered by internally generated funds. The limited extent of debt servicing is explained primarily by the official aim of OSN financial self-sufficiency, with limited participation of outside capital in the financing of its activities, although certain difficulties would arise in connection with that intent, at least during the project execution period.
- 6.20 As a result of anticipated flows of funds, the OSN would post a shortfall amounting to a cumulative total roughly equivalent to US\$83,000,000 until the end of the execution period for the project under review, thereafter rising to US\$116,000,000 at the end of the projected period.

4. Proforma income statements

- 6.21 These statements for the ten-year period 1987-1996 appear on the following page. The premises used here, as with the preceding statements, were used to formulate certain basic indicators affording a better interpretation of the possible financial, economic and equity situation of the OSN.

<u>Year</u>	<u>Current ratio</u>	<u>Debt Service Coverage (times)</u>	<u>Debt ratio</u>	<u>Return on Net worth</u>
1987	1.47	28.17	--	3.10
1988	1.87	23.29	--	3.52
1989	1.96	19.33	0.02	4.87
1990	1.48	18.95	0.05	5.26
1991	1.37	20.71	0.06	4.88
1992	1.31	27.43	0.06	5.18
1993	1.23	7.21	0.06	4.57
1994	1.09	7.30	0.05	4.23
1995	1.00	7.88	0.05	4.29
1996	1.07	8.70	0.04	4.39

- 6.22 The current ratio suggests that there should, in principle, be no difficulty in covering short-term obligations to suppliers and contractors. In addition, the OSN's own funds may be seen to suffice for debt servicing.
- 6.23 The correlation between its own capital and investment funds provided by short- and long-term loans points to distinct OSN solvency during the next decade. When combined with the debt coverage index, this indicator shows ample margin for eventual additional financial commitments that, when combined with other measures, permit execution of the ten-year construction program envisaged by the OSN without the cuts that otherwise inevitably result from the financial problems foreshadowed by the projected statement of source and use of funds, as discussed earlier.

OBRAS SAN. NACION											
PROYECCION-ESTADOS DE SITUACION											
(MILES/THOUSANDS) 1/											
	0	1	2	3	4	5	6	7	8	9	10
	REAL										
335											
336											
337											
338											
339											
340											
341	ACTIVO										
342	-----										
343	ACTIVO FIJO										
344	-----										
350	ACTIVO FIJO EN SERV. BRUTO	1142400	1161003	1191132	1242481	1324137	1406067	1486283	1706270	1738921	1814704
351	MENOS: DEPREC. SERV. ACUM.	400575	423609	447131	471467	497133	526435	559358	593284	627736	663272
352											
353	ACTIVO FIJO EN SERV. NETO	741825	737394	744001	771014	827004	1079632	1126925	1112986	1111185	1151432
354	ACTIVO FIJO EN CONSTRUC.	325724	341226	367329	442371	516127	367906	411441	497554	581652	623937
355											
356	ACTIVO FIJO TOTAL NETO	1067548	1078619	1111330	1213385	1343131	1447538	1538366	1610540	1692836	1775369
357											
358	ACTIVO CORRIENTE										
359	-----										
360	CAJA Y BANCOS	4734	4782	4829	4878	4926	4976	5025	5076	5126	5178
361	INVERSION FACIL REALIZAR	6445	6445	6445	6445	6445	6445	6445	6445	6445	6445
362	CUENTAS A COBRAR CONSUM.	0	35554	65443	92870	113343	127468	138595	141250	136730	134643
364	INVENTARIOS	23946	23220	23823	24850	26483	32121	33726	34125	34776	36294
365	OTROS ACTIVOS CORRIENTES	26249	26249	26249	26249	26249	26249	26249	26249	26249	26249
366											
369	TOTAL ACTIVO CORRIENTE	61374	96249	126789	155292	177447	197259	210640	213145	209328	208809
370											
371	OTROS ACTIVOS										
372	-----										
373	OTRAS DISPONIBILIDADES		4290	17062	0	0	0	0	0	0	0
374	CARGOS DIFERIDOS	39536	39736	40065	40383	40672	40966	40966	40966	40966	40966
377	CUENTAS VENCIDAS A COBRAR	64094	51915	25643	9271	3257	2036	1221	687	344	129
379											
380	TOTAL OTROS ACTIVOS	103629	95942	82970	49654	43929	43002	42188	41653	41310	41095
381											
382	TOTAL ACTIVO	1232552	1270810	1321089	1418331	1564507	1687799	1790593	1865338	1943475	2025273
383											
384	PATRIMONIO Y PASIVO										
385	-----										
386	PATRIMONIO										
387	-----										
388	CAPITAL	618	618	618	618	618	10456	20294	20294	20294	20294
390	RESERVA REVALUACION	648901	648901	648901	648901	648901	648901	648901	648901	648901	648901
394	UTILIDAD (PERDIDA) RETENIDA	467295	502512	543754	603292	670966	737276	811833	881113	948060	1018563
395											
396	TOTAL PATRIMONIO	1116814	1152031	1193274	1252811	1320486	1396634	1481029	1556309	1617255	1688158
397											
398	PASIVO LARGO PLAZO										
399	-----										
400	DEUDA LARGO PLAZO - BID	0	0	5006	29809	67024	89683	93100	88200	83300	78400
401	DEUDA LARGO PLAZO - OTRAS	51473	53480	54948	56376	56820	57729	55620	53511	51401	49292
405											
406	TOTAL PASIVO LARGO PLAZO	51473	53480	59954	86187	123844	147412	148720	141711	134701	127692
407											
408	PASIVO CORRIENTES										
409	-----										
410	PRESTAMO TRANSITORIO	0	0	0	9969	49597	72147	82776	93476	110405	127174
412	PORCION CTE. LARGO PLAZO	3575	1489	2776	2887	2887	2499	7009	7009	7009	7009
414	CUENTAS A PAGAR	43446	46732	48007	49398	50615	52030	53980	55756	57026	58162
418	OTROS PASIVOS CORRIENTES	17243	17078	17078	17078	17078	17078	17078	17078	17078	17078
419											
420	TOTAL PASIVO CORRIENTE	64264	65299	67861	79333	120178	143753	160845	173319	191519	209422
421											
433	TOTAL PASIVO	115738	118779	127815	165520	244022	291165	309565	315030	326220	337114
434											
435	TOTAL PATRIMONIO Y PASIVO	1232552	1270811	1321089	1418331	1564508	1687799	1790594	1865339	1943475	2025273
436											

1/ Tasa de cambio: A2.6355=US\$1.00.

- 6.24 The prospective profits result in an acceptable rate of return on net worth, particularly in the light of the company's past experience, amounting to more than 4% during the projection period.

3. Feasibility of the local contribution

- 6.25 Analysis of the OSN financial prognosis for the period extending through 1996 indicates that, especially during the execution period for the Buenos Aires Water Supply Project, internally generated resources, net of debt servicing, would not suffice to meet the needs of the construction program that are not financed by third parties, plus additional needs for working capital. The cumulative annual shortfalls of funds until 1992--the date scheduled for completion of the project under review here--would amount to the equivalent of US\$83,000,000. The deficit could possibly be corrected by: rate increases; partial financing of the construction program through additional loans; participation of private efforts in the OSN expansion program under a special system of concessions; postponement of construction; possible aid from the National Treasury; or an appropriate combination of these measures, which should be clearly specified and quantified in the financial strengthening plan that must be submitted to the Bank as a condition precedent to the first disbursement (see Proposed Resolution).
- 6.26 Given the financial forecast for the executing agency, it is recommended that the prospective loan contract also include a clause whereby the OSN will agree, throughout the execution period for the project under review, to submit a report within the first 60 days of each calendar year updating the investment plan presented as a condition precedent to disbursement, plus projections in constant dollars of the statements of income, source and application of funds and balance sheets corresponding to a period of at least five years, in accordance with models agreed upon with the Bank. (See Recommendations.) Those projections must be satisfactorily supported by the premises used to formulate them and by detailed and complete calculation figures for each item, accompanied by remarks and explanatory notes to facilitate the interpretation thereof, particularly in regard to financing of the construction program and the way possible deficits will be absorbed. Supplementary information will be presented, also expressed in constant dollars and comparable to and consistent with the financial projections, for the two immediately preceding fiscal years, accompanied by a list of the measures implemented during that period to strengthen the OSN's economic and financial situation, including rate increases, loans assumed (including the financial conditions thereof), and similar items.

C. Institutional capacity

- 6.27 The executing agency for the project would be Obras Sanitarias de la Nación (OSN) which has served in this capacity for various programs partially financed by the Bank. Until its decentralization in 1980, the OSN had analyzed the feasibility, projected and executed or

supervised various works involving water supply and sanitation throughout the Republic of Argentina, although starting in that year, its jurisdiction was reduced to the city of Buenos Aires and the area known as Greater Buenos Aires.

- 6.28 Among the largest-scale works in its present service area, mention should be made of the General San Martín and General Belgrano purification plants; the extensive network of underground watercourses; the corresponding pumping stations; and all types of supplementary works needed to operate the systems; and, finally, sanitation works. In addition, it should be remembered that the company's present total assets are estimated as the equivalent of US\$1,200,000,000; it bills approximately US\$220,000,000/year; and provides some 5.5 million residents with water supply. All of these factors point to vast capability and experience in the execution of physical works.
- 6.29 Its administrative and accounting areas, however, lag behind the company's progress in other areas, with numerous organizational flaws and operational defects which have affected almost all of its functions. To resolve some of those problems, the OSN has entered into a contract with the World Bank for an ambitious Operational Improvement Program, the scope and depth of which should strengthen the company's performance in accordance with suitable guidelines for administrative, financial, technical and commercial effectiveness and efficiency. The IDB would make disbursement of the financing proposed here contingent on effective execution of that program, as scheduled. In addition to the operational program, consideration must be given to the efforts instituted by the country's government itself for managerial improvement in critical areas as agreed upon with the Bank earlier. The foregoing reasons and the existence of adequate experience in carrying out projects similar to the one proposed here lead to the conclusion that there would be no significant institutional problems in execution of this project.

D. Economic evaluation

- 6.30 The chapter on the frame of reference indicates that the present project holds priority under the OSN Ten-Year Plan. The purpose of this section is to estimate the project's benefits and costs in order to determine its economic rate of return and the proportion of its net benefits that can be assigned to low-income users. The economic feasibility of the General San Martín purifying plant is the subject of a separate analysis.

1. Water supply for the western zone

(a) Costs

- 6.31 The costs of the potable water project for Morón and Tres de Febrero in terms of engineering, direct costs and contingencies were corrected to express them in border prices. To this end taxes were eliminated and conversion factors of 0.54 were used for unskilled labor; 0.59 for

electric power; and a standard conversion factor of 0.83. ^{1/} Once those corrections have been made, an economic cost of US\$136.7 million results, which is compared to the cost of US\$170.1 million at market prices. These figures also include 30% of the investment cost envisaged in the project to expand the San Martín plant, since the supply of water to the western zone requires raising the capacity of that plant. That percentage corresponds to the share of water resulting from the expansion which would be used to supply the western zone.

- 6.32 The variable economic costs for production and distribution of water were estimated on the basis of OSN data, taking into account the characteristics of the project. Using these data, a unit cost of US\$0.012/m³ resulted for production and US\$0.010/m³ for distribution of water. Additional fixed costs of US\$170,000/year were also considered.

(b) Benefits

- 6.33 The project benefits come essentially from two factors: first, the replacement of present water sources (wells) by the OSN surface water network; and second, the consumer surplus corresponding to additional water consumption. To evaluate these benefits accurately, the western zone was divided into three districts, defined in terms of the level of depletion and pollution of the underground waters that would be replaced in each area. (See Annex VI-2.)
- 6.34 Zone 1 includes areas that now have severe problems with the quality and quantity of available underground water. If the project is not carried out, the consumers who use individual wells will be obliged to resort to tank trucks. The OSN will also have to replace the underground source by a very expensive system for transporting water. Zone 2 includes areas where the medium term (approximately 10 years) will bring problems of capacity and quality of the subterranean aquifer. The benefits accrue from the savings in costs stemming from replacement of wells by a more economical source. Zone 3 includes areas where there are no problems with the capacity and quality of the aquifer. The project benefits here are derived exclusively from the savings of funds resulting from replacement of the source.
- 6.35 Current residential demand for water was estimated on the basis of the population of the zones and average daily consumption per inhabitant. To estimate supplies to residential consumers, information was used from a survey ^{2/} conducted by the OSN in 1986 in La Matanza, close to the project area, where a water supply network now operates with metered service similar to the one that would be established in the situation with the project.

^{1/} Source: "Study on Economic Analysis of Credit Applications", L. Lucángeli, July 1985.

^{2/} The survey points to a change of only 11% in consumption. It has a reliability level of 95%.

- 6.36 Preference was given to the use of data from the neighboring district to evaluate present demand, instead of estimated real consumption data in the project area, since the latter correspond to defective service conditions, rationing and the absence of metered service. Nonresidential demand was estimated by means of surveys. After adjustment to take into account differences of income and sewerage service in La Matanza district and the project area, the estimate presented in the following table was obtained.

<u>Western Zone Project</u> <u>1986 Water Demand</u>				
	<u>Residents</u>	<u>Average Consumption</u> (l/res/day)	<u>Residential Demand</u> (m3/year)	<u>Nonresidential Demand</u> (m3/year) <u>a/</u>
Zone 1	617,000	262	59,004,000	7,618,000
Zone 2	209,800	253	19,374,000	1,857,000
Zone 3	176,700	282	18,188,000	1,715,000
Total	1,003,500	264	96,566,000	11,190,000

a/ Water consumed by industry was not taken into account since it cannot be served by the network and would continue to be provided by wells.

- 6.37 To project future water demand, a prudent hypothesis was adopted to the effect that consumption would remain constant during the analysis period, thus ignoring probable growth of demand resulting from income elasticity. Only vegetative population growth amounting to 0.4%/year was considered, in accordance with the OSN ten-year plan.
- 6.38 It was not possible to obtain a satisfactory demand curve for price elasticity of demand, mainly because the small existing variation in water prices (the marginal cost of extracting it, in the case of wells) did not allow identification of the curve. To arrive at a sample of greater variation in water prices, aggregate consumption data from OSN users receiving metered service over a period of 22 months were used. This statistical analysis also failed to provide an acceptably reliable evaluation of elasticity, so that a value of -0.40 (-0.20 for nonresidential consumers) was assumed. The sensitivity analysis nevertheless shows that project profitability is not very sensitive to the value of this parameter, since the most important benefits come from the replacement of present water sources.
- 6.39 Savings in cost corresponding to the source of water in the situation without the project were assessed in accordance with OSN data for users connected to the well network and user data for private wells. In addition, the cost of transporting water in tank trucks was estimated, since under the situation without the project, it was assumed that underground water in Zone 1 would be replaced by water transported from the Saavedra pumping plant. These costs are summarized below, and Annex VI-3 contains details of those estimates.

Costs of Water Sources in the Situation Without the Project
(US\$ per m3)

	<u>Market Price</u>	<u>Border Price</u>
OSN well network	0.035	0.025
Well networks--neighborhood cooperatives	0.136	0.113
Private wells	0.577	0.463
Tank trucks--OSN	1.016	0.840
Tank trucks--private users	1.547	1.296

(c) Consumer ability to pay

- 6.40 A comparative calculation (see Annex VI-4) shows that users with private wells using electric pumps derive a financial advantage from connection to the project network at the scheduled rate. A connection cost of US\$406 (including meter) would allow the consumer savings of 78% on the average cost of water. At the consumer level, the internal rate of return is 23%. In addition to this advantage the user has an incentive for hook-up because of the greater convenience of service and the guarantee of water quality. Consumers in Zones 1 and 2 have no alternative because of the problems of depletion and the quality of the aquifer.
- 6.41 For the low-income population with wells where water is pumped by hand, there is little financial incentive for connection to the project network since the average costs of water are substantially the same, with a difference of only 15% in favor of the OSN network. In Zone 1, these users have no choice because of depletion of the aquifer, but in Zone 2 it would be advisable to apply the rule of "compulsory radius" to oblige them to be hooked up to the network because of the pollution level of underground water. The surveys point to a decrease in the depth of wells in direct proportion to the drop in the socioeconomic level, obviously due to the cost of drilling. This trend has serious social implications, since contamination is greater in the more shallow soil layers. For Zone 3, the sensitivity analysis considered the possibility that part of the low-income residents might not be hooked up to the project network.
- 6.42 For users who are already connected to the network for water distribution (OSN well network or neighborhood network), the substitute source does not change the cost of water to the consumer. In conclusion, it may be said that the population is able to pay for connection to the network, since the cost of water will decline. Without the project, 82% of the families spend more than 3% of their incomes for water, while with the project, the figure would drop to 19% of those families.

(d) Results and sensitivity analysis

- 6.43 The economic evaluation indicates the advisability of executing the project, since the internal economic rate of return (IERR) is far more than 12% for the three project zones, as shown in the following table:

<u>Western Zone Project</u> <u>Present Value (at 12% in US\$000) and IERR</u>			
	<u>Zone 1</u>	<u>Zone 2</u>	<u>Zone 3</u>
Costs: Investment	59,182	31,865	18,685
Operating	10,363	3,233	2,669
Total	69,545	35,098	21,354
Benefits	273,985	43,856	42,387
Net present value	204,440	8,758	21,033
Internal rate of return	42.7%	15.3%	23.1%

- 6.44 The results of the sensitivity analysis, presented in the following table for each zone, indicate that the project IERR is higher than 12% in case of a change in values of the most important project parameters. The analysis also shows that the IERR is not very sensitive to the price elasticity figure, the parameter which was the hardest to evaluate and which was adopted as an assumption.

<u>Western Zone Project</u>				
<u>Sensitivity Analysis</u>				
		<u>IERR (%)</u>		
		<u>Zone 1</u>	<u>Zone 2</u>	<u>Zone 3</u>
Price elasticity	+ 25%	40.0	14.1	21.9
	- 25%	45.4	15.9	24.3
Initial consumption of water	+ 20%	48.6	17.0	26.7
	- 20%	35.2	12.2	19.2
Rate of increase in demand for water	+ 20%	48.6	17.0	26.7
	- 20%	35.2	12.2	19.2
Savings from replacement of source	+ 20%	49.3	18.2	26.9
	- 20%	35.6	12.2	19.0
Investment	+ 20%	37.1	12.8	19.9
	- 20%	50.5	18.8	27.6

- 6.45 In Zone 3, where there are no problems of depletion or underground water quality, some of the low-income residents might not be connected to the project network because of the lack of incentives. The IERR was computed with the hypothesis that no low-income user would be connected with the network, although the master network has already been built. In this case, the IERR drops to 21.6%. The slight drop

is due to the fact that the low-income population represents only 20% of the overall population of the zone. For the same reason, a simulation was made considering the worst-case scenario that 50% of all consumers (residential and nonresidential), would not be connected to the network despite existence of the distribution mains. In this case, the IERR falls to 15.7%.

(e) Timing of the project

- 6.46 Based on an analysis of the variation in net present value, it was determined for each of the zones that the date for starting the project should not be postponed.

2. Rehabilitation and expansion of the San Martín plant

(a) Costs

- 6.47 At present the plant works at full capacity and the project is needed to meet future vegetative growth in water demand on the part of consumers already connected to the OSN network and to include consumers connected to existing well systems or who have private wells in critical areas where the aquifer is contaminated. For the economic analysis it was therefore necessary to consider all investment costs needed for distribution of the additional water supply produced by the project, in addition to the cost of the present project.
- 6.48 Thirty percent (30%) of the additional plant production capacity would be used to provide the western zone with water, and the remainder to serve other zones. For purposes of the analysis, the investment costs shown in the OSN Ten-Year Plan were used. The unit costs of water production and distribution are the same as for the western zone, while the total cost at border prices ^{1/} (unadjusted) is the following:

	<u>US\$000</u>
San Martín Plant	24,605
Western zone distribution	129,368
Distribution other zones	<u>168,388</u>
	322,361

(b) Benefits

- 6.49 As for the western zone, the project benefits stem mainly from replacement of one source of water (wells) by another, and the consumer surplus corresponding to additional consumption of water. Furthermore, the project for plant rehabilitation would result in substantial savings, amounting to about US\$1,800,000/year in economic terms, from the reduced use of coagulant afforded by the scheduled system for dosage of that input.

^{1/} The values at border prices were obtained in the same way as for the western zone project. (See Annex VI-5.)

- 6.50 Present demand of users connected with the network is substantially similar to plant capacity (net of losses). Vegetative growth of that population was considered to be 0.4%/year, in accordance with the OSN Ten-Year Plan. The project will also allow inclusion of 2,132,118 users who are currently getting their water from the subsoil, at the rate of incorporation established by the Ten-Year Investment Plan. The costs of the sources of water in the situation without the project and the figures for price elasticity of demand are identical to those utilized for evaluation of the western zone.

(c) Results and sensitivity analysis

- 6.51 The economic evaluation indicates the advisability of carrying out the project, since the IERR is far more than 12%, as shown in the following table.

San Martín Plant Project
Present Value at 12% and IERR
(US\$000)

Costs: Investment	218,041
Operating	34,588
Total	252,629
Benefits	1,003,130
Net present value	750,501
Internal rate of return	40.8%

- 6.52 The IERR for the coagulant dosage subproject is 20.8%, and this component has therefore been included in the overall project.
- 6.53 The results of the sensitivity analysis, shown in the following table, indicate that the project IERR continues to be higher than 12%.

San Martín Plant Project
Sensitivity Analysis

		<u>IERR (%)</u>
Price elasticity	+ 25%	40.8
	- 25%	40.7
Initial consumption of water	+ 20%	46.2
	- 20%	34.8
Rate of increase in demand for water	+ 20%	46.2
	- 20%	34.8
Savings from replacement of source	+ 20%	46.2
	- 20%	34.7
Investment	+ 20%	35.9
	- 20%	47.4

- 6.54 It should be noted that 97.8% of the project benefits come from the addition of new users, and are therefore dependent on implementation of the OSN Ten-Year Investment Plan. To evaluate the impact of a possible delay in carrying out this plan, a simulation was used that featured a delay of five years in the program incorporating new users (other than those of the western zone). In this case, the IERR drops to 31.2%.

(d) Timing of the project

- 6.55 An analysis of variations in net present value showed the advisability of not postponing the project starting date.

3. Analysis of distributive impact

(a) Low-income population

- 6.56 In accordance with the figures agreed upon by the Bank and Argentina, individuals would be classified as having low incomes when their annual per capita income is less than 813 australes (March 1986). The figures provided by the OSN socioeconomic study conducted in the western zone during that month show 55% of the population of that area below this level. In evaluating the project, low-income groups and other consumers were considered separately to compute their respective benefits directly.
- 6.57 No surveys or recent data were available for the other zones that would be served by the additional water supply produced in the San Martín plant project. Consequently, the analysis of distributive impact does not include the portion (70%) of the San Martín project corresponding to water supply for those zones.

(b) Distribution of benefits

- 6.58 In considering the project benefits accruing to residential consumers, the portion transferred to the government sector--in this case the OSN--from payments for service was calculated first. The balance was assigned directly to each group.
- 6.59 For the benefits of the group comprising the public sector, industry and commerce, the portion accruing to the OSN for payment of rate charges was calculated in the same way. Distribution of the balance among the two categories was assumed to be proportional to the level of current consumption, i.e. 72% for commercial and industrial use and 28% for public consumption. The 28% for public consumption (schools, hospitals, etc.) was assumed to go to the overall population so that again 55% thereof would accrue to the low-income sector. It was assumed that the 72% representing commercial and industrial use would go in its entirety to higher income groups.

(c) Distribution of costs

6.60 The costs are absorbed by the public sector, although there are transfers among different agencies within the sector. For part of the costs there would be a transfer from the OSN to the low-income sector through the jobs for unskilled labor resulting from the project.

(d) Coefficient of distributive impact

6.61 The following table shows the distribution of net benefits by group:

Western Zone Project - Distributive Analysis
(US\$000)

	PRIVATE SECTOR			PUBLIC SECTOR		
	Unskilled workers	Consumers		OSN	Government	Economic benefits
		Low-income	Other			
I. <u>Costs</u>						
Investment	+ 5,890			-136,857	+ 21,235	-109,732
Operating	+ 7,520			- 34,765	+ 10,980	- 16,265
II. <u>Benefits</u>		+ 85,293	+127,941	+223,634	- 76,640	+360,228
Total:	+13,410	+ 85,293	+127,941	+ 52,012	- 44,425	+234,231

6.62 The distributive impact (DI) was measured by observing the proportion of overall private-sector benefits accruing to low-income consumers and unskilled workers. The results obtained show that 44% ^{1/} of those benefits go to the low-income sector. For the reason stated above, this coefficient does not correspond to the entire project, but to 91% thereof in terms of costs.

$$\frac{1/}{DI} = \frac{13,410 + 85,293}{13,410 + 85,293 + 127,941} = 0.44$$

ARGENTINA

Marco de Referencia

A. Situación económica reciente

- 1.01 La pronunciada desaceleración en el crecimiento del consumo, causada en buena medida por la abrupta aceleración de la inflación, combinada con una significativa caída de los ingresos por exportaciones, fueron los factores principales en el deterioro de la economía argentina durante 1987. Mientras que el crecimiento real del producto interno bruto (PIB) se redujo al 1,6 por ciento, la fuerte caída en el superávit de la balanza de mercancías determinó una pérdida de reservas internacionales substancialmente mayor que la del año anterior. El déficit fiscal pasó de un 2,7 por ciento del PIB en 1986 a un 6,3 por ciento en 1987, en tanto que el ritmo promedio de la inflación se incrementó de 90,1 por ciento en 1986 a un 131,3 por ciento en 1987.
- 1.02 La brusca aceleración del proceso inflacionario ocurrió entre junio y noviembre y deterioró con rapidez el poder de compra de sueldos, salarios y otros ingresos, lo que se reflejó en una caída del salario real del 7,6 por ciento. Las exportaciones de granos, principalmente maíz y soya, por su parte, sufrieron una severa contracción como consecuencia de una baja en los precios internacionales, que se combinó con condiciones climáticas adversas.
- 1.03 El sector agropecuario logró mostrar un modesto crecimiento (1,8 por ciento), que sin duda estuvo influido por las inundaciones de la primera mitad del año. El sector manufacturero, desaceleró su crecimiento en la primera mitad de 1987 para entrar en una etapa recesiva el segundo semestre del año, con lo cual su valor agregado se redujo un 0,6 por ciento. La construcción, en cambio, registró un aumento de casi 15 por ciento. La inversión, por su parte, al incrementarse en 16,1 por ciento continuó la significativa recuperación iniciada el año anterior. El desempleo urbano, con todo, aumentó levemente de 5,6 a 5,9 por ciento.
- 1.04 La acelerada expansión del valor nominal del gasto interno y de los medios de pago asociados con los crecientes desequilibrios fiscales de las provincias y la Administración Nacional, así como las pérdidas operacionales del Banco Central (que se redujeron del 1,7 por ciento del PIB en 1986 al 1 por ciento en 1987), produjeron entre junio y noviembre de 1987 una agudización de las ya fuertes presiones inflacionarias. La tasa media de incremento de los precios, que había logrado ser contenida a un 90,1 por ciento en 1986, se elevó al 131,3 por ciento en 1987. Los propósitos de mantener bajo control la expansión monetaria fueron, en general, desbordados por las necesidades financieras de las provincias y del sector público.

nacional; hacia fines de año se hicieron esfuerzos para restringir el crédito interno, pero ello resultó principalmente en un aumento de las tasas de interés.

- 1.05 El sector público no tuvo éxito en los esfuerzos para reducir su déficit. Por un lado, los ingresos fueron afectados por la aceleración inflacionaria, la eliminación de los impuestos a las exportaciones y el retraso en la adopción de medidas tributarias. Con todo, los ingresos corrientes del sector público no financiero mostraron una reducción relativa pasando del 25,9 al 24,4 por ciento del PIB entre 1986 y 1987. Por otro lado, la fuerte inflación, combinada con retrasos en el reajuste de los precios y las tarifas de las empresas públicas, determinaron una expansión significativa de los subsidios y transferencias de la Administración Nacional, lo que sumado al aumento de los intereses de la deuda pública y la expansión del gasto de las provincias, produjeron un aumento de los gastos corrientes del sector público, que pasaron del 23,2 por ciento del PIB en 1986 al 24,4 por ciento en 1987. Puesto que los gastos de capital se incrementaron del 5,4 al 6,3 por ciento del PIB, el resultado fue que el déficit global, en vez de reducirse en 1987, se incrementó hasta representar un 6,3 por ciento del PIB.
- 1.06 A pesar de que el aumento del tipo de cambio real contribuyó a un incremento de cerca del 10 por ciento en las exportaciones manufactureras, las exportaciones totales sufrieron una disminución del 9,5 por ciento, como consecuencia de las malas cosechas de granos a comienzos de 1987 y la caída de los precios internacionales de los principales productos de exportación del país. Las importaciones, reflejando el incremento de la demanda de bienes de capital e intermedios, se incrementaron un 28,4 por ciento. Con estas transacciones, el superávit de la balanza de mercancías se redujo de \$2.457 millones en 1986 a sólo \$558 millones, y a pesar de un ingreso neto de capital registrado de \$1.850 millones (y de capital no registrado por otros \$643 millones), la economía argentina debió hacer frente a una pérdida de reservas internacionales por \$2.209 millones, que contrasta con una pérdida de \$874 millones el año anterior.

B. Políticas económicas

- 2.01 La estrategia económica seguida en 1987 procuró estimular el desarrollo de las exportaciones, reducir las regulaciones, integrar internacionalmente la actividad productiva y resolver problemas estructurales en los sectores público y financiero. Al mismo tiempo, el manejo de la política económica de corto plazo estuvo orientado a contener la expansión del déficit público, el desequilibrio de la situación de pagos con el exterior y las presiones inflacionarias.
- 2.02 Con relación a la promoción de exportaciones se ha seguido una política de incremento gradual del tipo de cambio real, se introdujo un régimen de admisión temporal libre para la importación de insumos

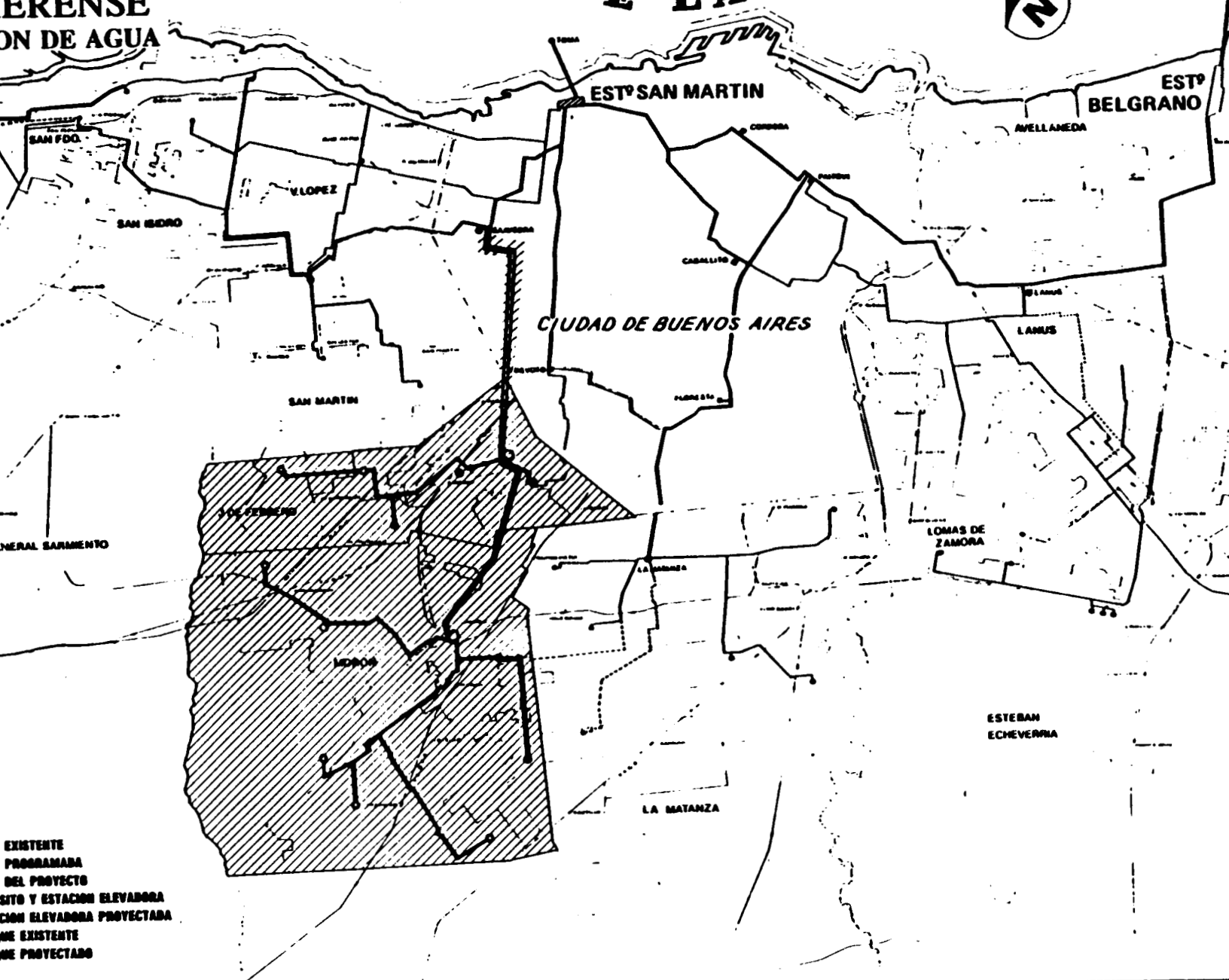
destinados a la manufactura de productos destinados a la exportación y se eliminaron los gravámenes a la exportación hasta entonces vigentes. Para mejorar la competitividad del aparato productivo se introdujo una reforma al sistema arancelario, modernizando la determinación de esos gravámenes y reduciendo la dispersión en las tasas aplicables. Simultáneamente, se implantaron modificaciones al sistema financiero y bancario, que incluyeron la eliminación de las tasas de interés reguladas y del subsidio implícito otorgado a través de la tasa de redescuento. Por otra parte, se adoptó un conjunto de medidas para reformar el sector energético y las empresas públicas, abriéndose el campo de los servicios públicos de telecomunicaciones a la participación de la empresa privada.

- 2.03 Con el propósito de controlar los desajustes de la balanza de pago y las fuertes presiones inflacionarias, se mantuvo una política destinada a reducir el déficit del sector público. Dicha política procuró elevar los ingresos por la vía de restringir las deducciones al impuesto sobre la renta, de hacer reajustes periódicos a las tarifas públicas y los combustibles, y con la reimplantación del sistema de ahorro obligatorio; se hicieron esfuerzos para contener la expansión del gasto público y para mejorar la administración de las empresas y otros entes del Gobierno. Por otro lado, tanto los precios, las tarifas, los sueldos y salarios como el tipo de cambio fueron sometidos a lo largo del año a sucesivas etapas de congelamiento y flexibilización correctiva.
- 2.04 Otra área de política económica que demandó especial atención fue la del manejo de la situación de pagos de la Argentina con el exterior. Con el acuerdo logrado con el Fondo Monetario Internacional (FMI) en enero, se obtuvo el compromiso de apoyo financiero de esta institución y de los bancos internacionales de desarrollo, para una reprogramación de \$30.200 millones de la deuda con la banca internacional privada, que incluyó postergación por cuatro años de las amortizaciones, reducción de la sobretasa aplicada a los intereses y fondos frescos por un total de \$1.950 millones. A su vez, se modificó el régimen de capitalización de las deudas con el exterior, ampliando la financiación hasta el 70 por ciento del costo de nuevos proyectos con la conversión de títulos.

C. Perspectivas

- 3.01 A comienzos de 1988 el Congreso aprobó una versión modificada de las medidas tributarias que constituían la base del programa económico de octubre de 1987; las modificaciones, sin embargo, resultaron en incrementos de los impuestos menores a los originalmente previstos en la iniciativa del Poder Ejecutivo. Se estableció, además, un sistema automático de asignación de los fondos recaudados de ciertos impuestos entre la Administración Nacional y los gobiernos provinciales. A pesar de estas medidas no se ha logrado hacer recortes significativos en el tamaño relativo del gasto público.

- 3.02 No obstante los repetidos ataques directos a las alzas de precios, las perspectivas inflacionarias se mantienen elevadas. Los fuertes desequilibrios de las finanzas públicas afectan al crédito interno (al sector público) y a la tasa de interés real. La expansión monetaria resultante, a su vez, convalida las presiones inflacionarias existentes, que derrotan una y otra vez los programas temporales de congelamiento o control de precios y salarios.
- 3.03 En un tercer frente, las restricciones impuestas al consumo y la inversión públicos se conjugan con un deterioro persistente del ingreso real de los trabajadores para crear condiciones de débil o nula expansión de la demanda interna efectiva. En cambio, en el ámbito de las exportaciones, se prevén mejorías de consideración. La cosecha de granos de 1988 se estima que no sufrirá los efectos del clima del año anterior; los precios internacionales de algunos de los productos más importantes tienen perspectivas de recuperación; los incentivos cambiarios y de otros mecanismos oficiales deberán continuar estimulando las exportaciones de manufacturas.
- 3.04 En estas condiciones, es posible que vuelvan a experimentarse dificultades para cumplir las metas establecidas con respecto al déficit del sector público y la expansión monetaria. Es probable, además, que la inflación mantenga, en promedio para todo el año, un ritmo básicamente similar al de 1987. Dada la combinación de consumo debilitado y un crecimiento importante de las exportaciones, acompañado por una eventual continuación del moderado proceso de recuperación de la inversión, que ya se ha prolongado por dos años, es posible prever un crecimiento modesto del producto real, tal vez levemente superior al registrado en 1987.
- 3.05 El resultado de las cuentas externas dependerá en buena medida del apoyo que otorguen al país las fuentes internacionales de financiamiento. La recuperación del superávit en la cuenta de mercancías podría alcanzar a un nivel superior a los \$2.000 millones. A pesar de ello, el elevado nivel de los pagos netos por servicios (incluidos los intereses de la deuda externa) puede generar un déficit en la cuenta corriente de la balanza de pagos por un monto entre \$2.000 y \$3.000 millones. Puesto que las reservas internacionales se encuentran en niveles críticamente bajos, en ausencia de un retorno masivo de capitales argentinos y de un aumento substancial de la inversión directa extranjera, la brecha de la cuenta corriente deberá ser cubierta con recursos provenientes de entidades multilaterales y de la banca comercial internacional. Parte del apoyo financiero externo requerido ya se encuentra comprometido (FMI-bancos acreedores), pero los desembolsos previstos para 1988 están condicionados al cumplimiento del programa económico. La obtención de los recursos adicionales dependerá de arduas negociaciones que podrían involucrar nuevos compromisos de política económica para tener acceso a facilidades de financiamiento de rápido desembolso o lograr alteraciones substanciales en las condiciones actuales del servicio de la deuda externa.



**DATOS UTILIZADOS PARA LA VERIFICACION DE LA CAPACIDAD
DE CONDUCCION Y DE LAS OBRAS BASICAS**

ESTACION ELEVADORA	PARTIDO	P O B L A C I O N					D E M A N D A m ³ /s		C A P A C I D A D m ³ /s		
		CENSO 1980	F U T U R A		A S E R V I R		1990	2013	N E C E S A R I A		MAXIMA CAPACIDAD PREVISTA E. ELEVAD.
			1990	2013	1990	2013			1990	2013	
VILLA ADELINA	Vte. LOPEZ	291.072	323.361	392.365	291.043	392.365	1.18	1.59			
	SAN MARTIN	385.625	428.429	519.823	385.586	519.823	1.56	2.11			
	SANISIDRO	289.170	321.268	389.801	289.141	389.801	1.17	1.58			
	SAN FERNANDO	133.624	148.456	180.125	133.611	180.125	0.54	0.73			
	TIGRE	206.349	229.253	278.158	206.328	278.158	0.84	1.13	5.29	7.14	7.59
LANUS	LANUS	486.980	518.815	629.489	486.933	629.489	1.89	2.55			
	AVELLANEDA	334.145	371.235	450.427	334.112	450.427	1.35	1.82	3.24	4.37	9.13
LOMAS DE ZAMORA	LOMAS DE ZAMORA	510.130	566.754	687.655	510.079	687.655	2.07	2.79			
	ALTE. BROWN	331.919	368.762	447.427	331.886	447.427	1.34	1.81			
	E. ECHEYERRIA	188.923	209.893	254.668	188.904	254.668	0.77	1.03	4.18	5.63	5.12
LA MATANZA	LA MATANZA	949.566	1054.968	1280.015	949.471	1280.015	3.85	5.18	3.85	5.18	6.00
OESTE	MORON	598.420	664.845	806.670	598.360	806.670	2.42	3.27			
	3 DE FEBRERO	345.424	383.766	465.632	345.389	465.632	1.40	1.89	3.82	5.16	5.54
SUMA (1)	—	5.031.347	5.589.824	6.782.255	5.030.843	6.782.255	20.38	27.48	20.38	27.48	33.38
CABALLITO	CAP. FEDERAL	802.293	891.348	1.081.491	891.348	1.081.491	7.22	8.76	7.22	8.76	10.38
CORDOBA	CAP. FEDERAL	441.064	490.022	594.554	490.022	594.554	3.97	4.82	3.97	4.82	6.81
FLORESTA	CAP. FEDERAL	386.967	429.920	521.632	429.920	521.532	3.48	4.23	3.48	4.23	6.68
PAITOVÍ	CAP. FEDERAL	321.190	356.842	432.964	356.842	432.964	2.89	3.51	2.89	3.51	7.46
SAAVEDRA	CAP. FEDERAL	584.554	649.439	787.979	649.439	787.979	5.26	6.38	5.26	6.38	6.60
DEVOTO	CAP. FEDERAL	386.761	429.691	521.354	429.691	521.354	3.48	4.22	3.48	4.22	5.48
SUMA (2)	—	2.922.829	3.247.262	3.939.874	3.247.262	3.939.874	26.30	31.92	26.30	31.92	43.41
SUMA (1) + (2)		7.954.176	8.837.086	10.722.129	8.970.717	10.722.129	46.68	59.40	46.68	59.40	76.79
SUR	DERAZATIGUI	201.862	224.269	272.110	201.842	272.110	0.82	1.10			
	QUILMES	446.587	496.158	601.999	446.542	601.999	1.81	2.44			
	F. VARELA	173.452	192.705	233.813	173.435	233.813	0.70	0.95	3.33	4.49	—
EXTREMO OESTE	MERLO	292.587	325.064	394.407	292.558	394.407	1.19	1.60			
	MORENO	199.440	221.578	268.845	199.420	268.845	0.81	1.09			
	BAL. SARMENTO	502.926	558.751	677.944	502.876	677.944	2.04	2.75	4.04	5.44	—
SUMA (3)		1.818.854	2.018.525	2.447.408	1.816.673	2.447.408	7.37	9.93	7.37	9.93	
TOTAL (1)+(2)+(3)		9.771.030	10.855.611	13.169.537	10.787.390	13.169.537	54.05	69.33	54.05	69.33	76.79
ESTABLECIMIENTOS	NECESIDADES DE PRODUCCION PARA CUBRIR LAS DEMANDAS ESTIMADAS EN EL CUADRO SUPERIOR										
SAN MARTIN									32.79	34.99	52.38
BELGRANO									13.89	24.41	24.41
SUMA (1) * (2)									46.68	59.40	76.79
SAN MARTIN									40.16	44.92	52.38
BELGRANO									13.89	24.41	24.41
TOTAL (1) * (2) * (3)									54.05	69.33	76.79

ALTERNATIVAS ESTUDIADAS PARA ABASTECER LA ZONA OESTE

a) Fuente de Abastecimiento

En lo referente a la fuente de abastecimiento se han estudiado dos alternativas: una continuar con el abastecimiento superficial es decir con el Plan de Expansión, y la otra, el abastecimiento independiente para el proyecto con una fuente subterránea la cual sería captada fuera del área del proyecto. Una vez elegida la alternativa de mínimo costo para la captación y conducción, se ha planteado también dos alternativas para la red matriz de distribución y tanques elevados.

1. Alternativa de Abastecimiento Superficial

El proyecto del sistema Oeste complementaría el sistema de distribución existente en Morón y Tres de Febrero. En el ramal del río subterráneo existente de 4.20 m que, actualmente alimenta las estaciones elevadoras de Saavedra y Villa Adelina, se ha previsto efectuar una derivación cuya capacidad de conducción es de 10.60 m³/seg. A partir de este punto, se han planteado dos sub-alternativas: a) conducción por río subterráneo y b) conducción por línea de impulsión a presión.

No. 1-A Sub Alternativa de Conducción por río subterráneo

Consiste en la ejecución de un río subterráneo con un diámetro de 3,30 m y 8,90 km hasta la estación elevadora Tres de Febrero y capacidad de conducción de 8.7 m³/seg, que continúa con el mismo diámetro y longitud de 7,6 km hasta la estación elevadora de Morón; en este tramo la capacidad de conducción del río se reduce a 7.26 m³/seg: Este río sería instalado entre 20 y 30 metros de profundidad. Se incluye dos estaciones elevadoras y sus correspondientes tanques elevados. La energía requerida en esta alternativa es para elevar el agua del nivel del río subterráneo, a su correspondiente tanque elevado, en cada estación elevadora. La alternativa tiene un costo anual equivalente de US\$6.4 millones.

No. 1-B Sub-alternativa de conducción por línea de impulsión

Básicamente el sistema consiste en 3 estaciones elevadoras con sus correspondientes tanques elevados y 2 tramos de tuberías de impulsión de 1,60 m de diámetro, 9,2 km de longitud y 4.7 m³/seg de capacidad, y 1,20 m en diámetro, 7,6 km y 3.1 m³/seg de capacidad. La energía requerida en esta alternativa es para elevar el agua desde la derivación de la estación Saavedra a su correspondiente tanque elevado, de donde se conducirá a la estación de bombeo Tres de Febrero, en donde se impulsará a su tanque elevado repitiendo el mismo

concepto en la estación elevadora de Morón. La alternativa cuesta anualmente el equivalente de US\$7.1 millones.

La comparación económica de sub-alternativas mediante la obtención de los costos anuales de inversión y de operación se detallan en el Cuadro II-1. Se ha utilizado un interés del 12% anual y un factor de recuperación del capital de 0,14682 a 20 años. Se puede apreciar que, aun cuando la diferencia de costo no es muy grande 11%, la sub-alternativa No-1A es la más económica a lo cual deberá agregarse las ventajas en lo referente a contar con una mayor capacidad de conducción para el abastecimiento futuro a zonas vecinas, y además mantener una reserva de agua importante dentro de un río que funciona por gravedad.

2. Alternativa Aguas Subterráneas

Para esta alternativa se considera que, los pozos serían ubicados en el partido vecino de Merlo, siendo necesario para el caudal de 4,7 m³/seg y rendimiento por pozo de 50m³/hora, un número total de 338 pozos. Esta alternativa tiene los siguientes elementos: a) campo de pozos con 15 baterías cada una con 21 pozos y sus correspondientes conducciones a la cisterna; b) cisterna de 16.000 m³ para recolectar el agua del campo de pozos; c) río subterráneo de 18 km de longitud y diámetro 3,30 m para una capacidad de conducción de 4.7 m³/seg; d) estación elevadora en Morón y e) estación elevadora en 3 de Febrero.

En el Cuadro II-2 se presenta el detalle de los costos anuales capitalizados de esta alternativa obteniéndose U.S.\$12.287.315 que es 100% mayor que la alternativa 1-A con aguas superficiales. Se concluye por lo tanto que, como resultado de la comparación técnica-económica, se ha adoptado para este proyecto, la Alternativa 1-A que es la de mínimo costo entre las alternativas analizadas.

b) Alternativas Estudiadas para la Red Matriz de Distribución

Para elegir la alternativa de mínimo costo para la red matriz de distribución, se ha planteado, a partir de la ubicación de los tanques elevados de 3 de Febrero y Morón, dos alternativas cuyos diámetros han sido calculados hidráulicamente por computadora, utilizándose criterios y parámetros de diseño aceptables; las alternativas son:

- (a) comprende la instalación de redes matrices en diámetros entre 0.1 m y 0.80 m con dos tanques elevados en Tres de Febrero y cinco tanques elevados en Morón.
- (b) comprende la instalación de redes matrices con diámetros entre 0.4 m y 1.10 m con un tanque elevado en Tres de Febrero y tres tanques elevados en Morón.

La comparación de costos indica que, no existe diferencias sustanciales entre ambas alternativas habiéndose seleccionado la alternativa (a) que tiene un costo de US\$26.964.000 por ser la de mínimo costo y además por conveniencia operativa al disponerse de un mayor número de centros de control especialmente para la determinación de los valores de agua no contabilizada.

C. Alternativas Estudiadas para la Ampliación de la Planta de Tratamiento San Martín

1. Antecedentes

El componente crítico del sistema es la capacidad del tratamiento y la planta San Martín es el mayor centro de producción. O.S.N. en 1985 inició el desarrollo de un Plan Director de reacondicionamiento y ampliación para establecer el cronograma de estudios, proyectos y ejecución de obras así como la extensión y el detalle de los trabajos experimentales tanto para medir la eficiencia de funcionamiento de la planta actual, como para determinar los parámetros de diseño. A partir de abril de 1986, un consultor experto en plantas de tratamiento de agua contratado con recursos del convenio ATN/SF-2629 PAHO/BID, ha venido asesorando al personal técnico en todas las áreas del Plan Maestro habiendo concluido sus servicios en junio del presente año.

2. Estudios de Laboratorio Realizados

Los objetivos básicos fueron la determinación de los criterios técnicos y de los parámetros que debían adoptarse para los diseños de los proyectos específicos. Los estudios fueron realizados por un equipo técnico de O.S.N. conformado por representantes de Estudios y Proyectos, Establecimientos y Conducciones, Establecimiento San Martín, Laboratorios y Desarrollo Tecnológico. Se llevaron a cabo los estudios siguientes:

- No. 1 variación de dosis óptima de coagulante;
- No. 2 determinación de la gradiente de velocidad para la mezcla rápida (GT);
- No. 3 influencia de la concentración de coagulante en la calidad del agua decantada;
- No. 4 análisis del proceso de floculación para diferentes tiempos;
- No. 5 obtención de parámetros de diseño (GT) para la floculación;
- No. 6 influencia de perturbaciones de alto gradiente durante la floculación;
- No. 7 influencia de perturbaciones de bajo gradiente al inicio de la floculación;
- No. 8 estudios de sedimentación;
- No. 9 análisis del efecto del espesamiento del barro sedimentado;
- No. 10 influencia de la pre-cloración en el agua cruda;

- No. 11 influencia de la pre-cloración en la dosis óptima de coagulante;
- No. 12 formación de trihalometanos con pre-cloración;
- No. 13 formación de trihalometanos con dióxido de cloro;

Como resultado de los estudios se puede concluir los siguiente:

- a) La definición de la dosis óptima de coagulante para diferentes condiciones de mezcla, que demostró claramente la necesidad de mezclar correctamente/ el ahorro de coagulante que puede lograrse con una buena mezcla, una determinada concentración de coagulante y el uso de la pre-cloración.
- b) La definición de los GT óptimos para mezcla y floculación.
- c) la definición de la tasa óptima de sedimentación.
- d) el efecto mínimo en la formación de trihalometanos por la aplicación de la pre-cloración y la recomendación del uso de dióxido de cloro para reducir aún este efecto. Sin embargo quedó definido durante la misión que, las condiciones naturales del agua del río de La Plata con alto contenido de materia orgánica y el manejo peligroso del dióxido de cloro hacían muy aconsejable continuar con investigaciones más profundas respecto al tratamiento óptimo que deberá utilizarse en la planta para la desinfección del agua. La alternativa de usar ozono no ha sido descartada pero dado su alto costo del orden de US\$15 millones, se justifica realizar mayores estudios. En la cooperación técnica prevista en esta operación, se ha incluido recursos para llevar a cabo estudios adicionales y en la sub-categoría de tratamiento se incluye el costo de la compra de un equipo para determinación de gases.

3. Alternativas de Tratamiento

Se han planteado y comparado tres alternativas:

- a) Alternativa I que comprende mantener las instalaciones del sector "B" con 350,000 m3/día y construir una nueva planta de 2.950.000 m3/día, dejando fuera de servicio los sectores "A" y "C". Capacidad total 3,300.000 m3/día,
- b) Alternativa II que comprende mantener las instalaciones del sector "B" con 350,000 m3/día, mejorar los sectores "A" de

1/ La planta actual no cuenta con unidades de mezcla.

decantación para 1,000,000 m³/día, renovar los filtros existentes para una capacidad de 1,850,000 m³/día (baterías IX a XII), rehabilitar el sector "C" para una capacidad de 865,000 m³/día y construir una planta independiente de 1,100,000 m³/día. Capacidad total 3,300,000 m³/día.

- c) Alternativa III que comprende mantener la instalación del sector "B" con 350,000 m³/día, y mejorar y ampliar el sector A1 para 1,100,000 m³/día y el sector "A2" para 1,100,000 m³, renovar y remodelar los actuales filtros baterías IX a XII para trabajar con las unidades de decantación A1 y A2, instalar filtros nuevos en el sector "C" con capacidad de 865,000 m³/día. Capacidad total 3,415,000 m³/día.

El costo estimado a precios de marzo 87 para la alternativa I es del equivalente de US\$76,624,000 para la alternativa II es de US\$37,912,000 y para la alternativa III es de US\$25,607,000.

La alternativa III, es la alternativa de mínimo costo y ha sido adoptada. Tiene además la ventaja de su utilización al máximo de las instalaciones existentes y su facilidad operativa pues prácticamente se tendría tres plantas independientes en cuanto a la macromedición, pero completamente interconectadas y produciendo la misma calidad de agua potable en cada una de ellas.

CUADRO No. II-1
COMPARACION ECONOMICA
SUB-ALTERNATIVAS 1A y 1B
COSTOS ANUALES

Sub Alternativa No. 1-A
Inversiones

a) Rfo subterráneo 16,5 km x	US\$1.617.600	<u>26.688.000</u>
b) Estación elevadora 3 de Febrero		
obra civil	1.132.000	
obra eletromecánica	2.974.000	<u>6.883.000</u>
Sub-total		
c) Estación elevadora de Morón		
obra civil	2.258.000	
obra electromecánica	4.625.000	<u>4.106.000</u>
Sub-total		<u>37.677.000</u>
		=====

Costo Anual de Energía (CAE)

a) Estación elevadora 3 de Febrero		
Q = 1,6 m3/seg		
H = 66,85 m		
CAE = 15x8760x66,85x1,6xUS\$,022		<u>309.200</u>
b) Estación elevadora de Morón		
Q = 3,1 m3/seg		
H = 66,66		
CAR = 15x8760x66,66x3,1xUS\$0,022		<u>597.372</u>
Sub-total		<u>906.572</u>

Costo anual capitalizado

Inversión \$37.677.000 x 0,14682	5.531.737
Costo anual energía	<u>906.572</u>
Total	<u>6.438.309</u>
	=====

Sub Alternativa No. 1-B
Inversiones

a)	Líneas de impulsión	
	Ø 1,6 9,2 km x US\$ 1.200.000 =	11.040.000
	Ø 1,2 7,6 km x US\$ 900.000 =	6.840.000
b)	Estación elevadora Saavedra	
	Obra civil	2.935.000
	Obra electromecánica	6.012.000
c)	Estación elevadora 3 de Febrero	
	Obra civil	1.132.000
	Obra electromecánica	2.974.000
d)	Estación elevadora Morón	
	Obra civil	2.258.000
	Obra electromecánica	<u>4.625.000</u>
	Sub-total	<u>37.816.000</u> =====

Costo anual de energía (CAE)

a)	Estación elevadora Saavedra	
	Q = 4,7 m3/seg	
	H = 52,0 m	
	CAE = 15x8760x52x4,7xUS\$0,022	706.511
b)	Estación elevadora 3 de Febrero	
	Q = 1.6 m3/seg	
	H = 66.85 m	
	CAE = 15x8760x66.85x1.6xUS\$0,022	309.200
c)	Estación elevadora Morón	
	Q = 3,1 m3/seg	
	H = 66.66 m	
	CAE = 15x8760x66.66x3,1x US\$0,022	<u>597.372</u>
	Sub-total	<u>1.613.083</u>

Costo anual capitalizado

Inversión US\$37.816.000x0,14682	5.552.145
Costo anual energía	<u>1.613.083</u>
Total	<u>7.165.228</u> =====

CUADRO No. II-2

COMPARACION ECONOMICA
ALTERNATIVA No.2
COSTOS ANUALES

Inversión

a) Campo de pozos

- 338 x US = 32.500	=	10.985.000
- Terrenos	=	414.000
- Subestación y líneas eléctricas	=	2.111.000

b) Líneas de interconexión
entre pozos y a la cisterna

= 21.975.000

c) Cisterna

= 1.995.000

d) Río subterráneo 18,0 km x 1.617.454

= 29.114.172

e) Estaciones elevadoras de Morón y
Tres de Febrero= 10.988.000

Sub-total

= 77.582.172Costo anual de energía (CAE)CAE = $15 \times 8760 \times 66,0 \times 4,7 \times US\$0,022$ = 896.726Costo anual capitalizado

Inversión US\$77.582,172 x 0,14682

= 11.390.589

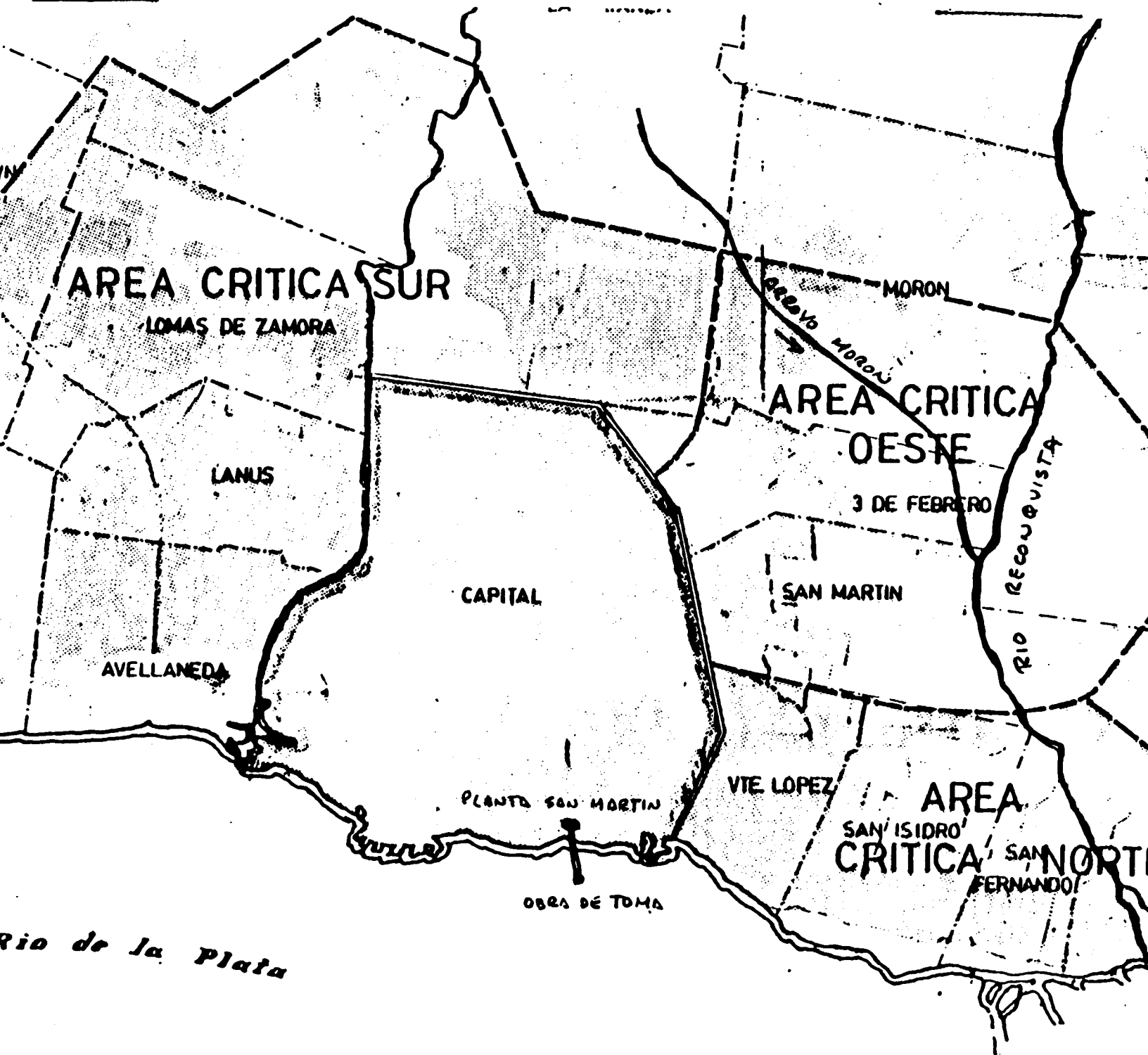
Costo anual de energía

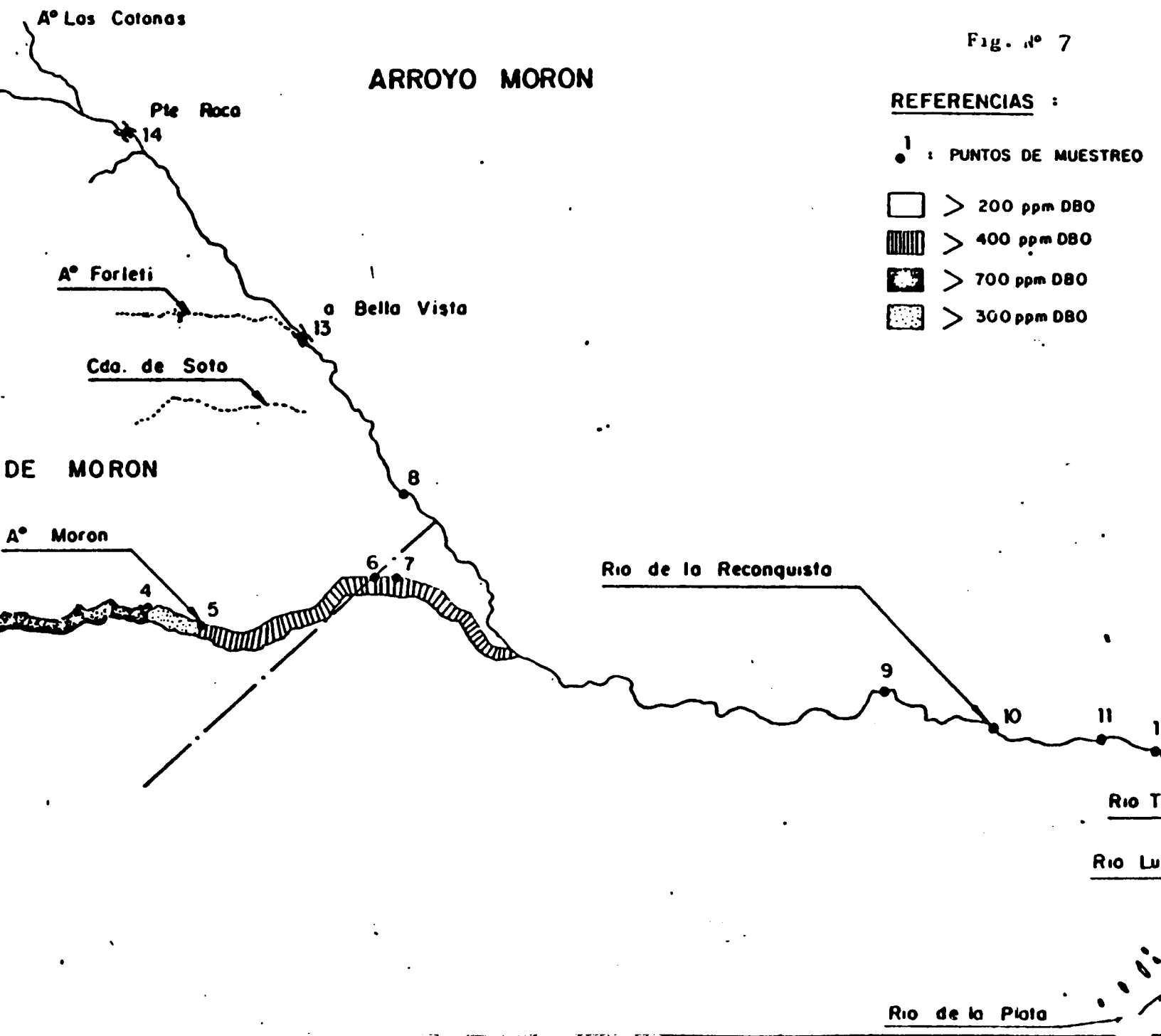
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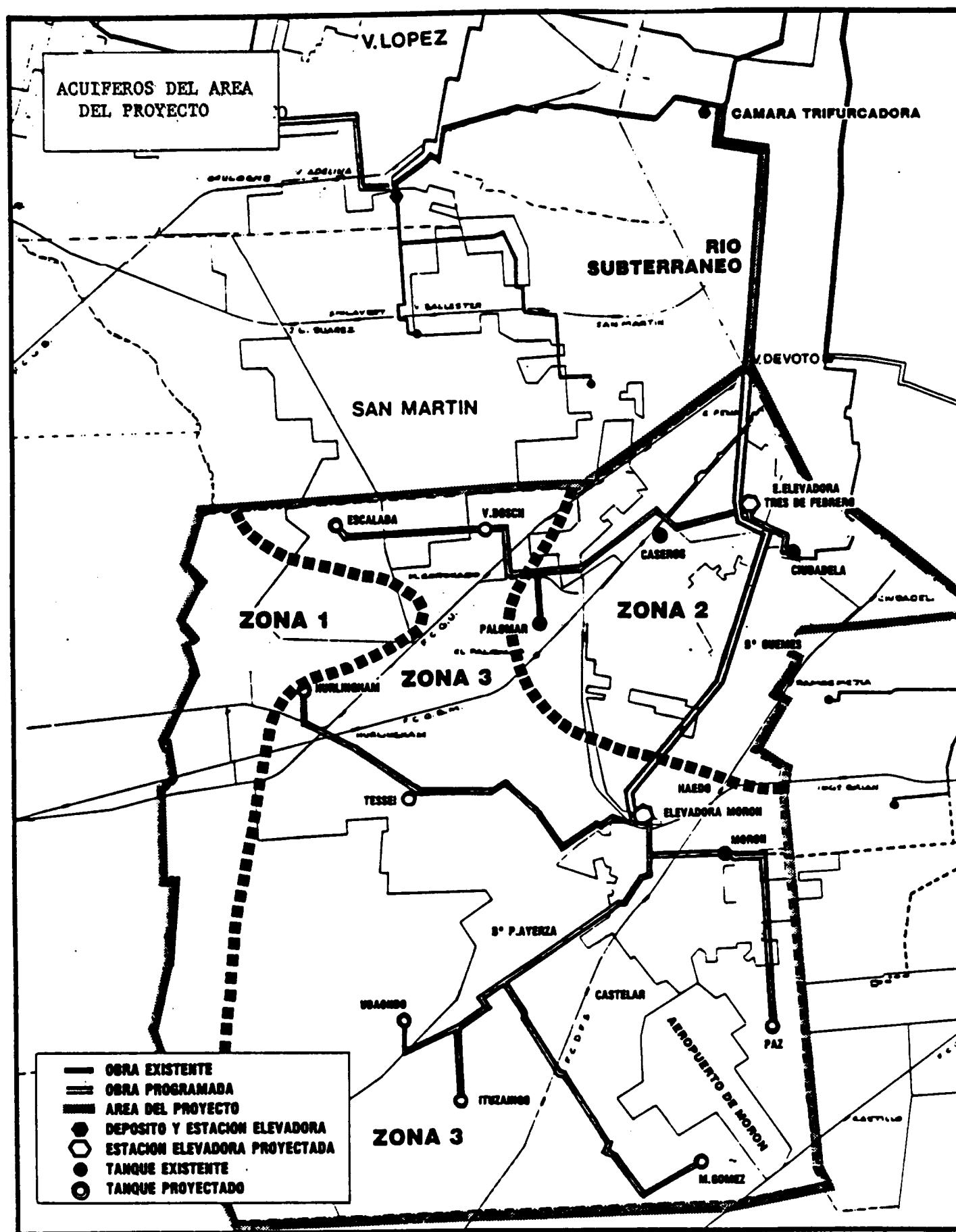
Total

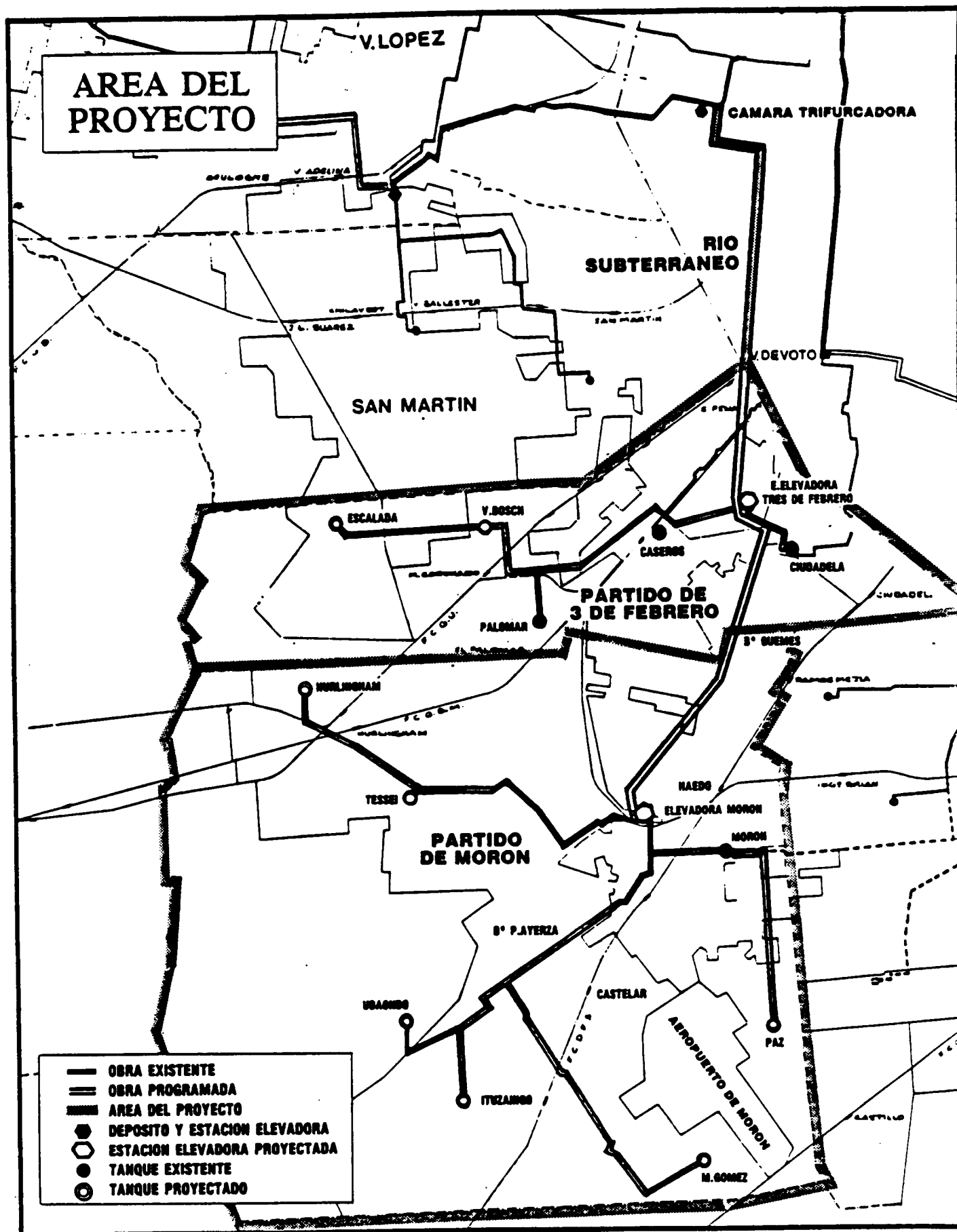
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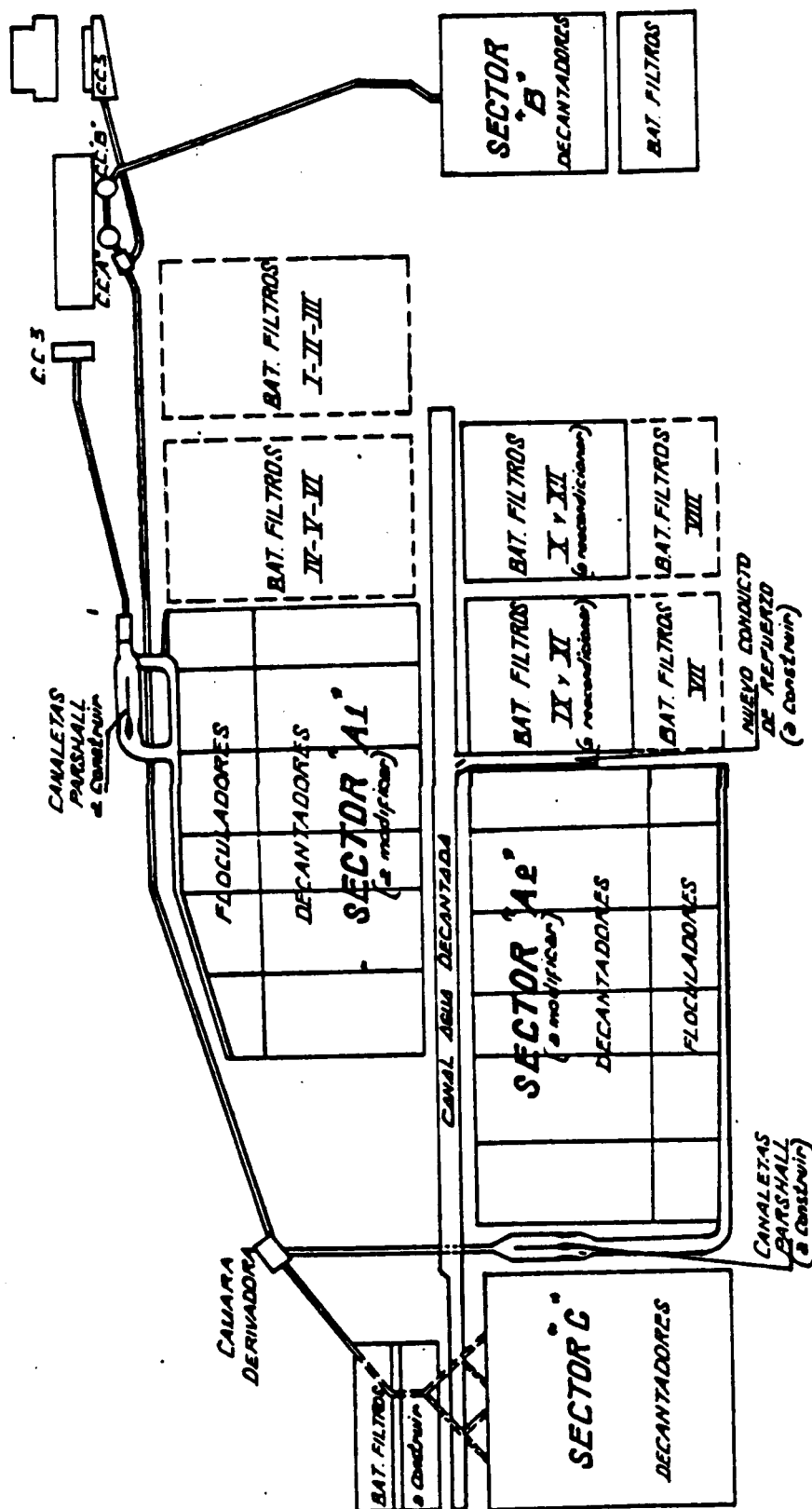
PLANO DE AREAS CRITICAS











ESQUEMA GENERAL DE LA SOLUCION PROPUESTA
PLAN DIRECTOR DE RECONDICIONAMIENTO Y
AMPLIACION DE LAS INSTALACIONES DEL
ESTABLECIMIENTO DE POTABILIZACION
GENERAL SAN MARTIN

Cooperación Técnica
Términos de Referencia

- 1.0 Objetivos.— La cooperación técnica tiene por objeto adiestrar al personal de OSN en áreas técnicas muy especializadas para aumentar su capacidad técnica en la preparación, conducción, operación y mantenimiento de proyectos de agua potable y alcantarillado y preparar un estudio tarifario.
- 2.0 Organismo Ejecutor.— Se contrataría una firma consultora o un organismo especializado que cuente con la experiencia apropiada para llevar a cabo esta asesoría especializada.
- 3.0 Actividades a ser Desarrolladas

3.1 Planta de Tratamiento San Martín

Objetivo:

Adquisición de experiencias del personal técnico de OSN, responsables de los aspectos de diseño, construcción, operación y mantenimiento en la Planta de Tratamiento de agua "General San Martín" en Palermo (Buenos Aires, Argentina).

Actividades:

Se considera becas de técnicos de OSN, a plantas de características técnicas similares en Brasil, Colombia y México durante el primer año y luego dos becas similares por año durante los otros dos años. Además se considera la realización de dos talleres de discusión, que incluirá personal de todo el país durante el segundo y tercer año.

3.2 Estructuras Hidráulicas Sanitarias

Objetivo:

Analizar con los técnicos de OSN, la tecnología última de cálculo estructural, métodos constructivos, nuevos materiales y programas de conservación de estructuras en obras tales como: construcción de cierta envergadura de acueductos, tanques enterrados y en altura; plantas de tratamiento de agua y alcantarillado, etc.

Actividades:

Realización de un taller internacional de duración de una semana, durante el segundo semestre (lapso 6-12 meses) en coordinación con la Universidad de Buenos Aires; participarían dos expertos del más

alto nivel; cuatro becas, durante un mes c/u; dos de ellas durante el lapso (0-12 meses), y una durante c/año del proyecto.

3.3 Laboratorio:

Objetivo:

- a) Colaborar al mejoramiento del equipamiento y desarrollo del laboratorio de OSN. Se debe tener en cuenta la terminación de la implementación relativa a virología del agua.
- b) Colaborar en el estudio que permita la instalación dentro del laboratorio de OSN en la Planta San Martín, de un sistema de muestreo, que cubra desde la toma hasta el agua tratada. El sistema debe permitir la toma de muestras dentro de los laboratorios a fin de concentrar y facilitar esa labor en una planta de tanta importancia.
- c) Colaborar en un estudio que permita definir el tipo de desinfección del agua más conveniente a instalar en la Planta San Martín. Este estudio no sólo deberá definir el sistema o combinación de sistemas de desinfección, sino debería llegar al nivel de prediseño y a confección de los términos de referencia para el diseño final del sistema a proponer.

Actividades:

a) Mejoramiento del desarrollo del Laboratorio

Actualmente se tiene destinados aproximadamente US\$170.000.00 para la adquisición de un cromatógrafo en fase gaseosa con detector de masa y un espectrofotómetro de infrarojo que se complementan y tienen por finalidad la identificación de contaminantes orgánicos en el agua cruda que son especialmente importantes por la cercanía de arroyos con fuerte contaminación industrial y doméstica que descargan en el Río de La Plata, a la toma de la Planta San Martín.

Contempla la contratación de un experto internacional, un mes, lapso 0-6 mes del proyecto, que canalice y programe la evolución del laboratorio en lo que se refiere a volumen de muestras, tipo de equipamiento, programa de adquisición, estudio de virus, etc.

Considera tres becas, una por año de proyecto, un mes de duración, de laboratorio, una beca adicional para aspectos de virus, un mes, durante el primer año del proyecto.

- b) Estudio y prediseño de sistema de muestreo dentro del laboratorio de OSN, que concentre en el mismo las muestras necesarias:

Contempla la venida de un experto internacional durante dos períodos, uno de un mes (lapso 6-12 meses) para colaborar en el inicio del estudio, sistema de las bases del mismo y otro de una semana para evaluar el estudio que se calcula tendrá una duración de tres meses, este estudio llevará al diseño y construcción posterior, de una red interna con equipos de bombeo indispensables para conseguir el objetivo.

- c) Estudio del sistema final de desinfección

Dentro del programa de mejoramiento de la Planta San Martín, se hace necesario estudiar cual sería el sistema o combinación de sistemas más adecuado para la desinfección del agua.

Se calcula que este estudio, dado los aspectos estacionales de la cal del agua, necesita 18 meses, los últimos seis de los cuales se dedicaría al prediseño. Para ello contempla la venida de un experto internacional en cuatro períodos, el primero de un mes antes de iniciar el mismo (lapso 0-6 meses), que colabore en el desarrollo del programa de investigación y la metodología de su implementación; los otros tres períodos, de una semana cada uno, se harán al final del segundo, tercer y cuarto semestre para su evaluación; durante el tercer año se podrá implementar el proyecto. Asimismo contempla una suma necesaria para colaborar en la investigación; equipamientos experimentales; subcontratos programados; talleres de discusión, etc. que en su oportunidad deberán ser debidamente programados.

4.0 Estudios Técnicos Específicos

- a) Estudio de contaminación de la costa del Río de la Plata entre Tigre y el Centro, con énfasis en el conjunto Arroyo Morón - Río Reconquista para analizar su posible influencia en la toma de agua cruda de la Planta San Martín y el saneamiento del sector:

Objetivo:

Este estudio abarcaría un período de 24 meses del proyecto, y deberá establecer un programa implementable para la eliminación progresiva de la contaminación Morón-Reconquista y las afueras ribereñas de la costa del Río de la Plata, entre Tigre y el Centro a fin de analizar su posible influencia en la toma y naturalmente el control de esta contaminación.

Actividades:

Se colaboraría con la venida de un experto durante cinco períodos, el primero de un mes al inicio para analizar y establecer las bases del estudio; y cuatro visitas durante el resto del estudio de dos semanas cada uno (final del segundo, tercero y cuarto semestre) para ir evaluando conjuntamente con los nacionales los avances del proyecto, incluiría además dos becas, un mes cada una durante los dos años del proyecto. Se organizaría dos talleres de discusión amplias con todos los sectores, una al terminar los estudios y otra al ser presentado el programa.

b) Estudio del sistema de alcantarillado de Morón y 3 de Febrero

Objetivo:

Colaborar con el estudio que deberá llevar a cabo Obras Sanitarias de la Nación para el estudio de alternativas, y diseño del sistema de alcantarillado sanitario de los partidos de Morón y 3 de Febrero, incluyendo el tratamiento de los desagues domésticos e industriales de la zona.

Actividades:

Consistiría en la venida de un experto internacional para la realización del análisis final del proyecto, durante el último mes de los estudios.

c) Disposición de lodos en la Planta de Tratamiento San Martín y recuperación de coagulante

Objetivo:

El problema de disposición de lodos principalmente de la sedimentación, es técnica-económicamente de magnitud para la Planta San Martín. Se colaboraría con Obras Sanitarias de la Nación en un estudio para resolverlo.

Actividades:

El estudio podría ser realizado en un plazo de 18 meses. Se colaboraría con la venida de un experto internacional durante cuatro períodos, el primero de un mes para la programación del mismo, luego tres asesorías de dos semanas cada una, periódicas al fin de cada semestre. Considera tres becas, un mes cada una, una durante cada año del proyecto para trabajar en una planta fuera del Argentina que tenga este sistema.

d) Metodología de aspectos ambientales

Objetivos:

En la actualidad constituye parte indispensable de un proyecto de inversión, y más si tiene posibilidades de financiamiento internacional, el estudio del impacto que la obra a ejecutar puede tener sobre el medio ambiente.

Actividades:

Para este programa, se organizarían tres talleres sobre metodología, aspectos de evaluación rápida y de cursos. Cada taller, sería de dos semanas (una teoría y otro de cursos) contando con asesoría internacional.

5.0 Estudio de Tarifas con Servicio Medido

Antecedentes:

En el programa operativo de la empresa se contempló la instalación de micromedidores con una meta de 400.000 unidades a los 60 meses desde la firma del eventual contrato de préstamo.

Actividades:

Para este estudio se contrataría un consultor por 3 meses, quien diseñaría la estructura tarifaria con base en el servicio medido que resulte más adecuada, para lo cual también tomará en cuenta la capacidad económica de los usuarios.

6.0 Plazo.- El plazo total de la cooperación técnica será de tres años.

7.0 Presupuesto:

El presupuesto ha sido estimado de común acuerdo con el personal técnico de OSN. El costo total es del equivalente de US\$800.000, de los cuales el Banco financiaría la venida de expertos y becas por un máximo de US\$500.000 y el país efectuaría un aporte de US\$300.000.

TERMINOS DE REFERENCIA
PROYECTO DE ALCANTARILLADO CLOACAL

ZONA OESTE

1. GENERALIDADES

Como complemento de la ejecución de las Obras de Abastecimiento de Agua para la Zona Oeste del Gran Buenos Aires, que se realizará con financiamiento del Banco Interamericano de Desarrollo, Obras Sanitarias de la Nación desarrollará el diseño del alcantarillado cloacal que abarcará a las correspondientes cuencas de desagües del arroyo Morón y Río Reconquista en los partidos de Morón, 3 de Febrero y parte del partido de San Martín, para una población total estimada de 800.000 de personas actualmente sin servicios.

2. ALCANCE

El diseño comprenderá los estudios preliminares, la evaluación de alternativas, y el proyecto ejecutivo de la red o redes de desagües (colectores y colectoras) y de las estaciones de bombeo y del sistema (o los sistemas) de depuración, incluyendo las documentaciones para la licitación de las obras.

3. METODOLOGIA

3.1 Estudios Preliminares

1. Situación actual

Se efectuará una recopilación de la información detallada sobre los siguientes aspectos:

a) Catastro de sistemas existentes

Se complementará estableciendo su alcance, el grado de cobertura de los sistemas y la existencia de conexiones clandestinas.

b) Desagües industriales en la zona

Se recopilará información básica sobre su ubicación, caudal de descarga y características de las descargas.

2. Datos de Campo

a) Topografía

Se recopilará la información topográfica existente complementándose con trabajos auxiliares de campo.

b) Existencia de conducciones pluviales y otras instalaciones enterradas que pudieran interferir con los desagües cloacales

Se efectuará una campaña para observar y medir en terreno la existencia, ubicación y profundidad de los desagües pluviales y otras interferencias.

Se recopilará información de las Municipalidades y otros organismos nacionales y provinciales.

c) Estudios de suelos

Se efectuarán para las trazas de los posibles colectores principales (se completarán durante el proyecto definitivo) y para los establecimientos de bombeo y depuración.

3. Parámetros de diseño

a) Demanda

Se determinará la demanda de alcantarillado cloacal y sus variaciones en el futuro en función de la demanda de agua ya establecida para los proyectos de abastecimiento de agua.

Se estimarán además variaciones diarias y horarias de caudales por hectómetro para toda la zona del sistema cloacal.

b) Análisis de las Condiciones de Descarga

Se fijará la calidad de los efluentes para su descarga a los cursos de agua (arroyo Morón y río Reconquista) y al sistema cloacal central existente.

3.2 Diseños Básicos Preliminares y Análisis de Alternativas

1. Los diseños básicos preliminares comprenderán el estudio de diferentes soluciones para la ubicación de colectores principales y plantas depuradoras.
2. La elección de alternativas a estudiar se efectuará teniendo en cuenta la configuración topográfica de las cuencas y las posibilidades de descarga.

3. Se plantean en principio varias situaciones por analizar, entre otras posibles:
 - a) Un solo sistema con descarga a través de una única planta de depuración en el arroyo Morón (manteniendo las actuales descargas en el sistema central, o no).
 - b) Varios sistemas aislados con plantas de depuración independientes en el arroyo Morón y río Reconquista y sistema central.
 - c) Varios sistemas contruidos por etapas que se incorporen en definitiva en un único sistema final interconectado.
 - d) La incorporación total o parcial de los desagües industriales en sistemas conjuntos de recolección y depuración.
 - e) La posibilidad de entubar el arroyo Morón y tratar sus aguas (que son mayoritariamente, y en especial en épocas de estiaje, desagües industriales crudos) en conjunto con los desagües domésticos.
4. En la elección de la Alternativa técnica de mínimo costo se considerarán las condiciones técnicas y costos de instalación, así como los problemas y los costos de operación y mantenimiento.
5. Se prevé la participación de un experto de corta duración contratado con los recursos del Banco, para colaborar en el análisis económico de las alternativas y elección de la alternativa de mínimo costo, por un plazo total de dos meses.

3.3 Diseño Definitivo

Se realizará el proyecto definitivo de la alternativa elegida que comprenderá:

Memoria Descriptiva
Planos de redes de colectoras
Planos de estaciones de bombeo
Planos hidráulicos, estructurales y electromecánicos de la (o las) estación (es) de bombeo y de tratamiento.
Memorias técnicas
Especificaciones técnicas
Cómputos y presupuestos detallados
Pliego y demás Documentos para las licitaciones.

Los planos de las redes de colectoras se dibujarán por zona teniendo en cuenta que, su construcción pudiera efectuarse por el sistema de "Obras por Terceros" a cargo de los vecinos, con inspección técnica de Obras Sanitarias de la Nación.

Los colectores se diseñarán teniendo en cuenta la topografía y los obstáculos existentes tales como cañerías enterradas (desagues pluviales y otros), los ferrocarriles, autopistas y rutas nacionales y provinciales, etc.

El diseño del sistema de tratamiento se realizará previo estudio de alternativas.

Los documentos de licitación podrán prever otras soluciones siempre que resulten más adecuadas que el sistema diseñado por Obras Sanitarias de la Nación.

4. FORMA DE EJECUCION DE LOS ESTUDIOS Y PROYECTOS

4.1 Responsabilidad

Obras Sanitarias de la Nación dispone de una capacidad técnica propia de estudio y diseño.

Los estudios y proyectos serán realizados por lo tanto a través de los Departamentos de Estudios y Proyectos Civiles y Electromecánicos.

Esto, sin desmedro de subcontratar, si es necesario aspectos como topografía, estudios de suelos, cálculos estructurales, diseño de redes colectoras y estaciones de bombeo.

4.2 La ejecución se efectuará en cuatro etapas:

1a. Etapa: Estudios preliminares

2a. Etapa: Análisis de alternativas

3a. Etapa: Proyecto ejecutivo y especificaciones técnicas

4a. Etapa: Documentos de licitación, incluyendo cómputo y presupuestos definitivos.

4.3 Plazo

El plazo total previsto será de 24 meses (a partir de la firma del eventual contrato de préstamo con el BID).

4.4 Cronograma

Se adjunta en hoja aparte.

4.5 Informes

Se presentarán informes al Banco Interamericano de Desarrollo al final de cada etapa y al concluirse cada proyecto específico.

5. PRESUPUESTO PARA EL DESARROLLO DE LOS TRABAJOS

El presupuesto total de los estudios y proyectos asciende a US\$2.088.000. como se detalla a continuación:

COSTO ESTIMADO RESUMEN

<u>DESCRIPCION</u>		<u>TOTAL US\$</u>
A. PERSONAL	A.1 Profesionales	
	A.2 Técnicos	
	A.3 Dibujantes	
	Cargas Sociales 30%	
	Gastos Administrativos 60%	\$ 900.000
B. CONTRATACIONES	B.1 Est. Topográficos	
	B.2 Est. de suelos	
	B.3 Dis. Estaciones de Bombeo	
	B.4 Dis. Estructurales	
	Gastos Administrativos 25%	\$ 800.000
C. EQUIPOS ESPECIALES Y GASTOS DE OFICINAS	C.1 Equipos de Hardware	
	C.2 Utilización de Software	
	C.3 Copias de Planos	
	C.4 Informes y pliegos	
	C.5 Misceláneos	
	Gastos Administrativos	\$ 300.000
TOTAL GENERAL		\$ 2,000.000

6. CRONOGRAMA

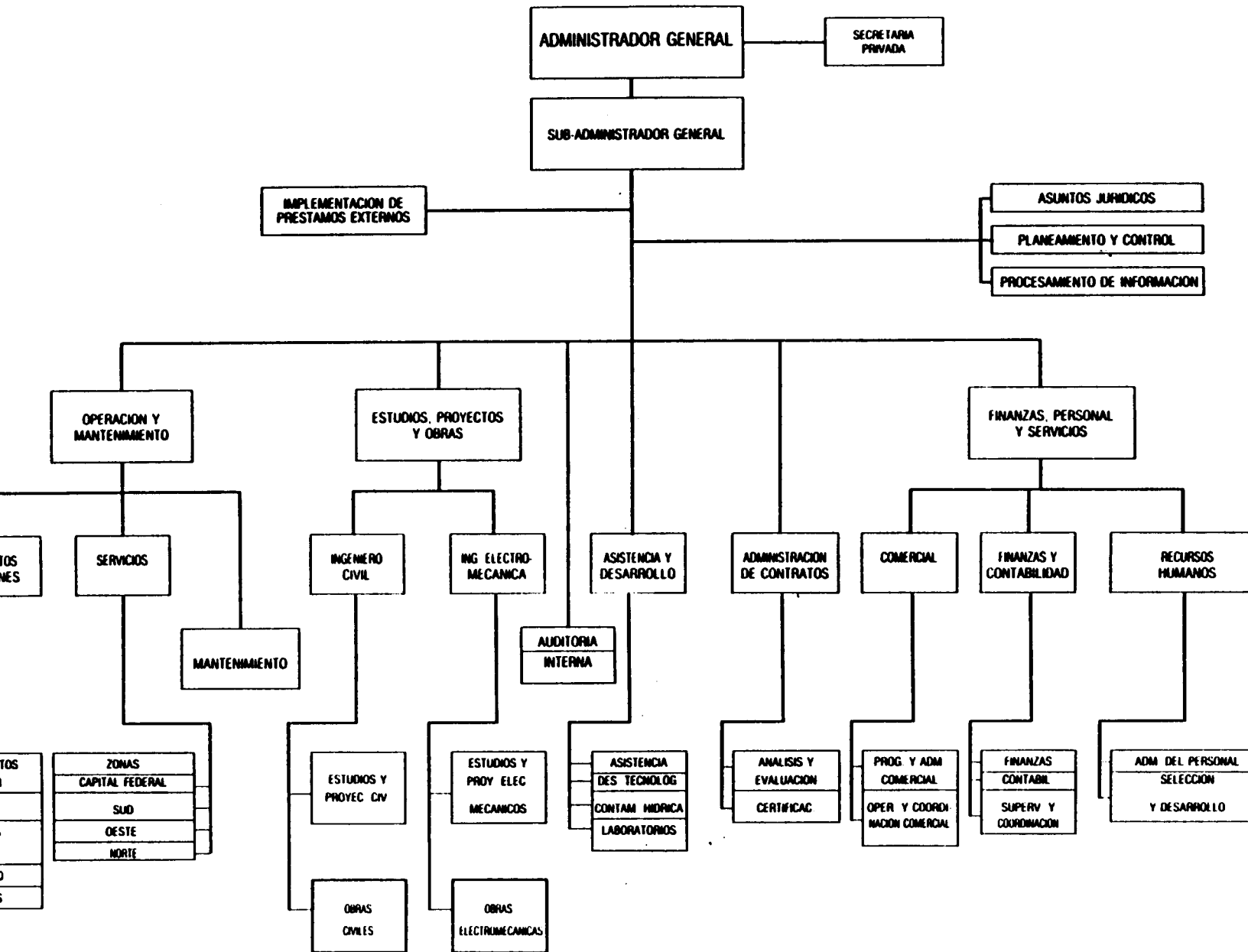
Se adjunta el cronograma correspondiente a la ejecución de los estudios.

PRESUPUESTO PARA LAS (6) SEIS
INSPECCIONES DE OBRA

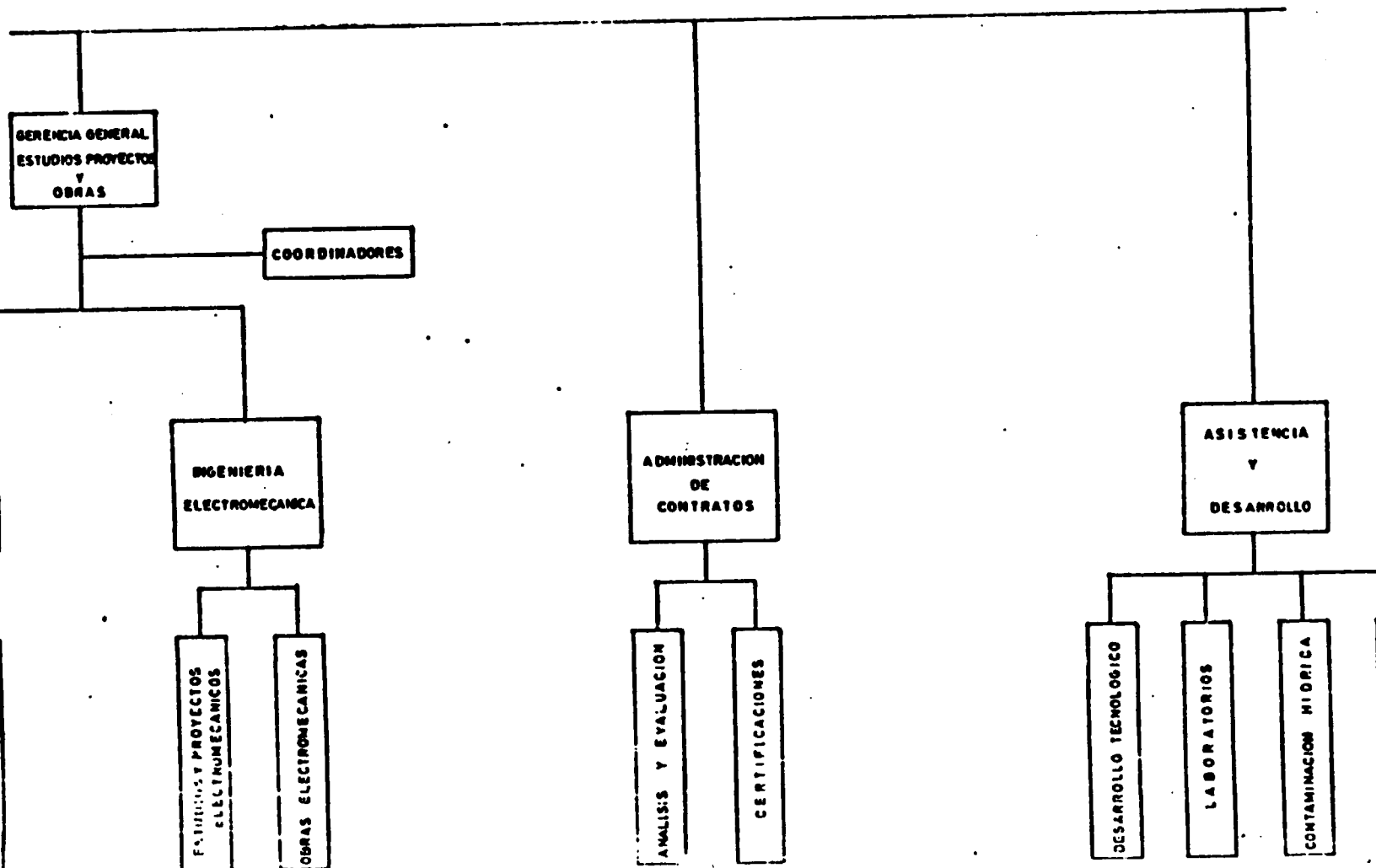
<u>PERSONAL</u>	<u>PLAZO</u> <u>(AÑOS)</u>	<u>COSTO ANUAL</u> <u>US\$</u>	<u>MONTO</u>
<u>Inspección No. 1 - Planta San Martín</u>			
1 Ingeniero Civil Jefe	4	18,840	75.360
2 Ingeniero Civil Asistente	4	12.984	103.872
3 Ingeniero Civil Inspectores	4	10.500	126.000
3 Ingeniero Civil Auxiliar Inspección	4	5.172	62.064
3 Ingeniero Civil Técnico	4	9.108	109.296
3 Informante	4	3.984	47.808
1 Ingeniero Electromecánico	4	18.840	75.360
4 Ingeniero Contralor	4	12.984	207.744
4 Inspector	4	10.500	168.000
	Sub-Total		975.504
<u>Inspeccion No. 2 Río Subterráneo</u>			
1 Ingeniero Civil Jefe	4	18.840	75.360
1 Ingeniero Civil Asistente	4	12.984	51.936
1 Ingeniero Civil Inspector Principal	4	10.506	42.000
2 Ingeniero Civil Auxiliar Inspector	4	5.172	41.376
3 Auxiliares	4	9.108	109.296
1 Topógrafo	4	3.984	15.936
1 Técnico	4	3.984	15.936
	Sub-Total		351.840
<u>Inspección No. 3 Estaciones Elevadoras, 3 de Febrero y Morón</u>			
1 Ingeniero Civil Jefe	4	18.840	75.360
2 Ingeniero Civil Asistente	4	12.984	103.872
1 Ingeniero Civil Inspector Principal	4	10.500	42.000
1 Ingeniero Civil Auxiliar	4	5.172	20.688
1 Inspector Técnico	4	9.108	36.432
3 Informante	4	3.984	47.808
1 Ingeniero Electromecánico	4	18.840	75.360
2 Contralor	4	12.984	103.872
2 Inspectores	4	9.108	72.864
	Sub-Total		578.256

<u>PERSONAL</u>	<u>PLAZO</u> <u>(AÑOS)</u>	<u>COSTO ANUAL</u> <u>US\$</u>	<u>MONTO</u>
<u>Inspección No. 4. Líneas de Interconexión 3 de Febrero</u>			
1 Ingeniero Civil Jefe	4	18.840	75.350
1 Ingeniero Civil Asistente	4	12.984	51.936
1 Ingeniero Civil Inspector Principal	4	10.500	42.000
4 Auxiliares	4	9.108	145.728
1 Informante	4	3.984	15.936
	Sub-Total		330.960
<u>Inspección No. 5 Líneas de Interconexión Morón</u>			
1 Ingeniero Civil Jefe	4	18.840	75.360
1 Ingeniero Civil Asistente	4	12.984	51.936
1 Ingeniero Civil Inspector Principal	4	10.500	42.000
6 Auxiliares	4	9.108	218.592
1 Informante	4	3.984	15.936
	Sub-Total		403.824
<u>Inspección No. 6 Redes Matrices</u>			
1 Ingeniero Civil Jefe	5	18.840	94.200
1 Ingeniero Civil Asistente	5	12.984	64.920
2 Ingeniero Inspector Principal	5	10.500	105.000
2 Auxiliares	5	9.108	91.080
2 Sobrestantes	5	3.984	39.840
1 Informante	5	3.984	19.920
	Sub-Total		414.960
	SUB-TOTAL		3.055.344
Dirección técnica, Leyes			
Sociales, transporte, etc.			2.644.656
T O T A L			<u>5.700.000</u>

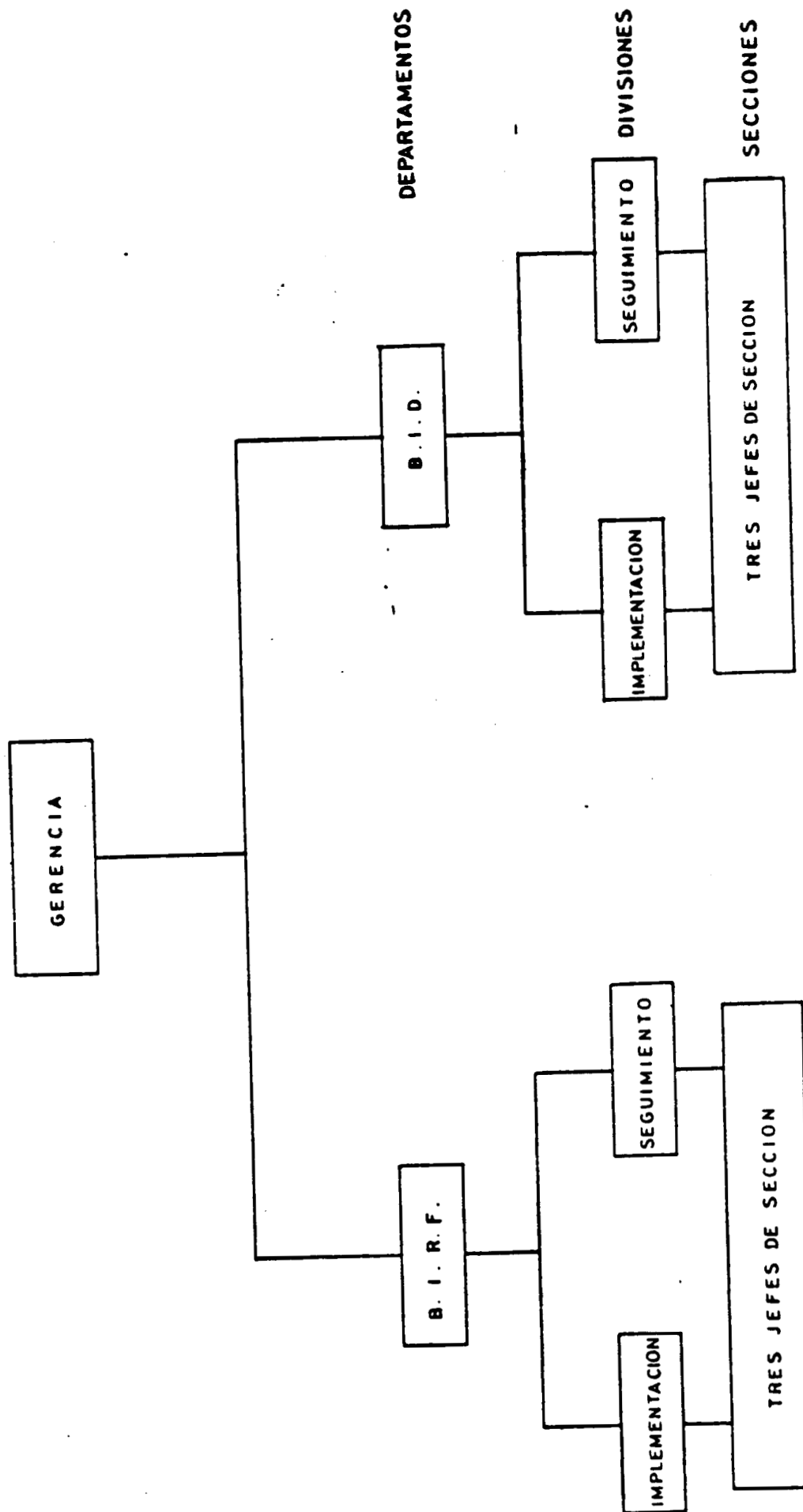
ORGANIGRAMA DE OSN



ORGANIGRAMA DE OSN
UNIDADES PARTICIPANTES EN LA EJECUCION



GERENCIA IMPLEMENTACION DE PRESTAMOS EXTERNOS



PARAMETROS DE DISEÑOS Y CRITERIOS TECNICOS

OSN cuenta con criterios técnicos para la preparación y ejecución de proyectos, los cuales han sido revisados y encontrados adecuados. Se presenta un breve resumen a continuación:

- a) consumo promedio anual: 350 lts/persona/día
- b) día de máximo consumo: $K_1 = 1.2$
- c) hora de máximo consumo: $K_2 = 1.25$ $k_1 = 1.5$
- d) presión mínima = 12 m
- e) presión máxima = 50 m
- f) reserva para la hora máxima = 25% del día máximo
- g) reserva contra incendios = entre 5% y 15% del consumo promedio anual
- h) diámetro mínimo tuberías matrices = 0.10 m
- i) diámetro tuberías de relleno = 0.075 m
- j) velocidades máximas en tuberías maestras = entre 0.8 m y 2.30 m
- k) coeficiente de fricción cálculo tuberías = formula de Manning entre $n = 0.012$ y $n = 0.015$
- l) materiales para las tuberías: fierro fundido norma Internacional, cemento asbesto clases 5 y 7, según norma OSN, PVC según norma A.S.T.M., fibra de vidrio reforzada (PRFV) según norma A.S.T.M.
- m) grifos contra incendio: en tuberías de 0.075 y 0.10 m
- n) conexión domiciliaria: PVC

PEP

MA SEGUIMIENTO PROYECTOS PMS--

EL PROYECTO NAAR (AR-0039) AGUA POTABLE BUENOS AIRES

ENDARIO DE ACTIVIDADES POR ACTIVIDAD

DE ORGANIZACION

CALENDARIO DE ACTIVIDADES

INICIO PROYECTO 15 DIC 87 FECHA ACTUA: 15 DIC 87

TERM. PROYECTO 13 MAR 93 PROX. ACTUALIZ. 30 SET 87

RANGO MINIMO 15 DIC 87 FECHA PROC. 28 JUL 87

RANGO MAXIMO 13 MAR 93 SEC. PROCESO 0

PAG.

IVIDAD	DESCRIPCION DE ACTIVIDAD	DUR. REMAN	% CUM	INICIO TEMP.	INICIO TARDIO	DEMORA MAX	TERM. TEMP.	TERM. TARDIO	DEMORA DISPON.
	APROBACION DIRECTORIO EJECUTIVO	0.	3	15DIC87	15DIC87	NADA	15DIC87	15DIC87	NADA 71
	NEGOCIAR, SUSCRIBIR CONTRATO PRESTAMO	90.0	0	15DIC87	15DIC87	NADA	13MAR88	13MAR88	NADA 71
	ELABORAR INFORME JURIDICO	12.0	3	14MAR88	9DIC92	1731.	25MAR88	20DIC92	NADA 71
	APROBACION BID INFORME JURIDICO	6.0	3	26MAR88	21DIC92	1731.	31MAR88	26DIC92	11. 71
	DESIGNAR PERSONEROS LEGALES	12.0	0	14MAR88	9DIC92	1731.	25MAR88	20DIC92	NADA 71
	APROBACION BID PERSONEROS LEGALES	6.0	3	26MAR88	21DIC92	1731.	31MAR88	26DIC92	11. 71
	ELEGIBILIDAD PARA DESEMBOLSOS	0.	3	12ABR88	26DIC92	1719.	12ABR88	26DIC92	NADA 71
	VIGENCIA CONTRATO	0.	0	13MAR88	13MAR88	NADA	13MAR88	13MAR88	NADA 71
	TRAMITAR Y RECIBIR PRIMER DESEMBOLSO	17.0	3	13ABR88	27DIC92	1719.	29ABR88	12ENE93	1719. 71
	DEMOST. SUF. RECURSOS LOCALES AÑO 1	20.0	3	14MAR88	7DIC92	1729.	2ABR88	26DIC92	9. 71
	ELABORAR PLAN DE CUENTAS	15.0	0	14MAR88	12DIC92	1734.	28MAR88	26DIC92	14. 71
	TRAMITAR Y REC. ULT. DESEMBOLSO	60.0	3	13ENE93	13ENE93	NADA	13MAR93	13MAR93	NADA 71
	PREPARAR, APROB. PEP INICIAL	30.0	3	14MAR88	27NOV92	1719.	12ABR88	26DIC92	NADA 71
	RECIBIR OBRAS Y LIQUIDAR CONTRATOS	1750.0	0	14MAR88	14MAR88	NADA	27DIC92	27DIC92	NADA 71
	FIN DEL PROYECTO	0.	3	13MAR93	13MAR93	NADA	13MAR93	13MAR93	NADA 71
	RIO SUBTERRANEO:PRERREQUISITOS LIC.	90.0	3	14MAR88	15JUN89	458.	11JUN88	12SET89	NADA 71
	RIO SUBTERRANEO:CONV. REC. OFERTAS	60.0	0	12JUN88	13SET89	458.	10AGO88	11NOV89	NADA 71
	RIO SUBTERRANEO:EVAL.ADJUD.OFERTAS	60.0	3	11AGO88	12NOV89	458.	9OCT88	13ENE90	NADA 71
	RIO SUBTERRANEO:SUSCRIBIR CONTRATO	60.0	0	10OCT88	11ENE90	458.	8DIC88	11MAR90	NADA 71
	RIO SUBTERRANEO:EJECUTAR OBRAS	1022.0	0	9DIC88	12MAR90	458.	26SET91	27DIC92	457. 71
	ESTACIONES ELEVADORAS:PRERREQUISITOS LIC	90.0	0	23ABR88	21OCT89	546.	21JUL88	18ENE90	NADA 71
	ESTACIONES ELEVADORAS:CONV. REC. OFTAS	60.0	0	22JUL88	19ENE90	546.	19SET88	19MAR90	NADA 71
	ESTACIONES ELEVADORAS:EVAL.ADJUD.OFTAS	60.0	0	23SET88	20MAR90	546.	18NOV88	18MAY90	NADA 71
	ESTACIONES ELEVADORAS:SUSCRIBIR CONTRATO	60.0	0	19NOV88	19MAY90	546.	17ENE89	17JUL90	NADA 71
	ESTACIONES ELEVADORAS:EJECUTAR OBRAS	894.0	0	18ENE89	18JUL90	546.	30JUN91	27DIC92	545. 71
	LINEAS INTERCONEXION:PRERREQUISITOS LIC.	90.0	3	1OCT88	31MAR90	546.	29DIC88	28JUN90	NADA 71
	LINEAS INTERCONEXION:CONV. REC. OFERTAS	60.0	0	30DIC88	29JUN90	546.	27FEB89	27AGO90	NADA 71
	LINEAS INTERCONEXION:EVAL. ADJUD. OFTAS	60.0	0	28FEB89	28AGO90	546.	28ABR89	26OCT90	NADA 71
	LINEAS INTERCONEXION:SUSCRIBIR CONTRATO	60.0	0	29ABR89	27OCT90	546.	27JUN89	25DIC90	NADA 71
	LINEAS INTERCONEXION:EJECUTAR OBRAS	733.0	0	28JUN89	26DIC90	546.	30JUN91	27DIC92	545. 71
	REDES MATRICES I:PRERREQUISITOS LIC	90.0	3	23ABR88	20ABR90	727.	21JUL88	18JUL90	NADA 71
	REDES MATRICES I:CONV. REC. OFTAS	60.0	3	22JUL88	19JUL90	727.	19SET88	16SET90	NADA 71
	REDES MATRICES I:EVAL. ADJUD. OFTAS	60.0	0	20SET88	17SET90	727.	18NOV88	15NOV90	NADA 71
	REDES MATRICES I:SUSCRIBIR CONTRATO	60.0	3	19NOV88	16NOV90	727.	17ENE89	14ENE91	NADA 71
	REDES MATRICES I:EJECUTAR OBRAS	713.0	0	18ENE89	15ENE91	727.	31DIC90	27DIC92	726. 71
	REDES MATRICES II:PRERREQUISITOS LIC	90.0	3	1OCT88	31MAR90	546.	29DIC88	28JUN90	NADA 71

UNIDAD DE TIEMPO DEL INFORME = DIAS

() REALIZADA

HOLGURA

() REALIZADA

HOLGURA

TOTAL

DISPON.

SEGUIMIENTO PROYECTOS PMS--

CALENDARIO DE ACTIVIDADES

PROYECTO NAAR (AR-0039) AGUA POTABLE BUENOS AIRES

INICIO PROYECTO 15 DIC 87 FECHA ACTUA: 15 DIC 87
 TERM. PROYECTO 13 MAR 93 PROX. ACTUALIZ. 30 SET 88

CALENDARIO DE ACTIVIDADES POR ACTIVIDAD

E ORGANIZACION

RANGO MINIMO 15 DIC 87 FECHA PROC. 28 JUL 87
 RANGO MAXIMO 13 MAR 93 SEC. PROCESO 0
 PAG. 2

ACTIVIDAD	DESCRIPCION DE ACTIVIDAD	DUR. REMAN	% CUM	INICIO TEMP.	INICIO TARDIO	DEMORA MAX	TERM. TEMP.	TERM. TARDIO	DEMORA DISPON.	CAL
REDES MATRICES II: CONV. REC. OFTAS		60.0	0	30DIC88	29JUN90	546.	27FEB89	27AGO90	NADA	71 0
REDES MATRICES II: EVAL. ADJUD. OFTAS		60.0	0	28FEB89	28AGO90	546.	28ABR89	26OCT90	NADA	71 0
REDES MATRICES II: SUSCRIBIR CONTRATO		60.0	0	29ABR89	27OCT90	546.	27JUN89	25DIC90	NADA	71 0
REDES MATRICES II: EJECUTAR OBRAS		733.0	0	28JUN89	26DIC90	546.	30JUN91	27DIC92	545.	71 0
TANQUES ELEVADOS: PRERREQUISITOS LIC		90.0	0	22JUL88	23OCT89	458.	19OCT88	20ENE90	NADA	71 0
TANQUES ELEVADOS: CONV. REC. OFTAS		60.0	0	29OCT88	21ENE90	458.	18DIC88	21MAR90	NADA	71 0
TANQUES ELEVADOS: EVAL. ADJUD. OFTAS		60.0	0	19DIC88	22MAR90	458.	16FEB89	20MAY90	NADA	71 0
TANQUES ELEVADOS: SUSCRIBIR CONTRATO		60.0	0	17FEB89	21MAY90	458.	17ABR89	19JUL90	NADA	71 0
TANQUES ELEVADOS: EJECUTAR OBRAS		892.0	0	18ABR89	20JUL90	458.	26SET91	27DIC92	457.	71 0
REDES DE RELLENO: INSTALACION		1617.0	0	22JUL88	25JUL88	3.	24DIC92	27DIC92	2.	71 0
MEDIDORES: PRERREQUISITOS LIC		90.0	0	25OCT89	23ABR90	180.	22ENE90	21JUL90	NADA	71 0
MEDIDORES: CONV. REC. OFTAS		60.0	0	23ENE90	22JUL90	180.	23MAR90	19SET90	NADA	71 0
MEDIDORES: EVAL. ADJUD. OFTAS		60.0	0	24MAR90	20SET90	180.	22MAY90	18NOV90	NADA	71 0
MEDIDORES: SUSCRIBIR CONTRATO		60.0	0	23MAY90	19NOV90	180.	21JUL90	17ENE91	NADA	71 0
MEDIDORES: ENTREGA RECEPCION		710.0	0	22JUL90	18ENE91	180.	30JUN92	27DIC92	179.	71 0
CAJAS DE MEDIDOR: PRERREQUISITOS LIC		90.0	0	23ABR89	4MAY89	376.	21JUL88	1AGO89	NADA	71 0
CAJAS DE MEDIDOR: CONV. REC. OFTAS		60.0	0	22JUL88	2AGO89	376.	19SET88	30SET89	NADA	71 0
CAJAS DE MEDIDOR: EVAL. REC. OFTAS		60.0	0	20SET88	1OCT89	376.	18NOV88	29NOV89	NADA	71 0
CAJAS DE MEDIDOR: SUSCRIBIR CONTRATO		60.0	0	19NOV88	30NOV89	376.	17ENE89	28ENE90	NADA	71 0
CAJAS DE MEDIDOR: ENTREGA RECEPCION		1064.0	0	18ENE89	29ENE90	376.	17DIC91	27DIC92	375.	71 0
PSM-DOSIFICACION: PRERREQUISITOS LIC		90.0	0	15DIC87	13DIC90	1094.	13MAR88	12MAR91	NADA	71 0
PSM-DOSIFICACION: CONV. REC. OFTAS		60.0	0	14MAR88	13MAR91	1094.	12MAY88	11MAY91	NADA	71 0
PSM-DOSIFICACION: EVAL. REC. OFTAS		60.0	0	13MAY88	12MAY91	1094.	11JUL88	10JUL91	NADA	71 0
PSM-DOSIFICACION: SUSCRIBIR CONTRATO		60.0	0	12JUL88	11JUL91	1094.	9SET88	8SET91	NADA	71 0
PSM-DOSIFICACION: ENTREGA RECEPCION		476.0	0	10SET88	9SET91	1094.	29DIC89	27DIC92	1093.	71 0
PSM-CANALETAS PARSHALL: PRERREQUIST. LIC		90.0	0	15DIC87	13DIC90	1094.	13MAR88	12MAR91	NADA	71 0
PSM-CANALETAS PARSHALL: CONV. REC. OFTAS		60.0	0	14MAR88	13MAR91	1094.	12MAY88	11MAY91	NADA	71 0
PSM-CANALETAS PARSHALL: EVAL. REC. OFTAS		60.0	0	13MAY88	12MAY91	1094.	11JUL88	10JUL91	NADA	71 0
PSM-CANALETAS PARSHALL: SUSCRIBIR CONTRATO		60.0	0	12JUL88	11JUL91	1094.	9SET88	8SET91	NADA	71 0
PSM-CANALETAS PARSHALL: ENTREGA RECEPCION		476.0	0	10SET88	9SET91	1094.	29DIC89	27DIC92	1093.	71 0
PSM-DECANTADORES 1-6: PRERREQUISITOS LIC		90.0	0	15DIC87	13DIC90	1094.	13MAR88	12MAR91	NADA	71 0
PSM-DECANTADORES 1-6: CONV. REC. OFTAS		60.0	0	14MAR88	13MAR91	1094.	12MAY88	11MAY91	NADA	71 0
PSM-DECANTADORES 1-6: EVAL. REC. OFTAS		60.0	0	13MAY88	12MAY91	1094.	11JUL88	10JUL91	NADA	71 0
PSM-DECANTADORES 1-6: SUSCRIBIR CONTRATO		60.0	0	12JUL88	11JUL91	1094.	9SET88	8SET91	NADA	71 0
PSM-DECANTADORES 1-6: ENTREGA RECEPCION		476.0	0	10SET88	9SET91	1094.	29DIC89	27DIC92	1093.	71 0
PSM-DECANTADORES 16-21: PRERREQUIS. LIC		90.0	0	27JUL87	28OCT90	458.	24OCT89	25ENE91	NADA	71 0

CANTIDAD DE TIEMPO DEL INFORME = DIAS

() REALIZADA

HOLGURA
TOTAL

() REALIZADA

HOLGURA
DISPON.

SENA SEGUIMIENTO PROYECTOS PMS+--

DEL PROYECTO NAA9 (AR-0039) AGUA POTABLE BUENOS AIRES

LENDARIO DE ACTIVIDADES POR ACTIVIDAD

DE ORGANIZACION

CALENDARIO DE ACTIVIDADES

INICIO PROYECTO 15 DIC 87 FECHA ACTUA: 15 DIC 8

TERM. PROYECTO 13 MAR 93 PROX. ACTUALIZ. 30 SET 8

RANGO MINIMO 15 DIC 87 FECHA PROC. 28 JUL 8

RANGO MAXIMO 13 MAR 93 SEC. PROCESO 0

PAG.

ACTIVIDAD	DESCRIPCION DE ACTIVIDAD	DUR. REMAN	% CUM	INICIO TEMP.	INICIO TARDIO	DEMORA MAX	TERM. TEMP.	TERM. TARDIO	DEMORA DISPON.
PSM-DECANTADORES	16-21:CONV. REC. OFTAS	60.0	0	25OCT87	26ENE91	458.	23DIC89	26MAR91	NADA
PSM-DECANTADORES	16-21:EVAL. REC. OFTAS	60.0	0	24DIC87	27MAR91	458.	21FEB90	25MAY91	NADA
PSM-DECANTADORES	16-21:SUSCRIBIR CONTRAT	60.0	0	22FEB89	26MAY91	458.	22ABR90	24JUL91	NADA
PSM-DECANTADORES	16-21:ENTREGA RECEPC	522.0	0	23ABR93	25JUL91	458.	26SET91	27DIC92	457.
PSM-FILTROS IX Y XI	:PRERREQUISITOS LIC	90.0	0	14MAR88	13DIC90	1004.	11JUN88	12MAR91	NADA
PSM-FILTROS IX Y XI	:CONV. REC. OFTAS	60.0	0	12JUN88	13MAR91	1004.	10AGO88	11MAY91	NADA
PSM-FILTROS IX Y XI	:EVAL. REC. OFTAS	60.0	0	11AGO88	12MAY91	1004.	9OCT88	10JUL91	NADA
PSM-FILTROS IX Y XI	:SUSCRIBIR CONTRATO	60.0	0	10OCT88	11JUL91	1004.	8DIC88	8SET91	NADA
PSM-FILTROS IX Y XI	:ENTREGA RECEPCION	476.0	0	9DIC88	9SET91	1004.	29MAR90	27DIC92	1033.
PSM-FILTROS X Y XII	:PRERREQUISITOS LIC	90.0	0	27JUL87	28OCT90	458.	24OCT89	25ENE91	NADA
PSM-FILTROS X Y XII	:CONV. REC. OFTAS	60.0	0	25OCT87	26ENE91	458.	23DIC89	26MAR91	NADA
PSM-FILTROS X Y XII	:EVAL. REC. OFTAS	60.0	0	24DIC87	27MAR91	458.	21FEB90	25MAY91	NADA
PSM-FILTROS X Y XII	:SUSCRIBIR CONTRATO	60.0	0	22FEB89	26MAY91	458.	22ABR90	24JUL91	NADA
PSM-FILTROS X Y XII	:ENTREGA RECEPCION	522.0	0	23ABR93	25JUL91	458.	26SET91	27DIC92	457.
PSM-FILTROS "C"	:PRERREQUISITOS LIC	90.0	0	1OCT88	2OCT89	366.	29DIC88	30DIC89	NADA
PSM-FILTROS "C"	:CONV. REC. OFTAS	60.0	0	30DIC88	31DIC89	366.	27FEB89	28FEB90	NADA
PSM-FILTROS "C"	:EVAL. REC. OFTAS	60.0	0	28FEB87	1MAR90	366.	28ABR89	29ABR90	NADA
PSM-FILTROS "C"	:SUSCRIBIR CONTRATO	60.0	0	29ABR87	30ABR90	366.	27JUN89	28JUN90	NADA
PSM-FILTROS "C"	:ENTREGA RECEPCION	913.0	0	28JUN87	29JUN90	366.	27DIC91	27DIC92	365.
PSM-DRENAJE "A"	:PRERREQUISITOS LIC	90.0	0	1OCT88	2OCT90	731.	29DIC88	30DIC90	NADA
PSM-DRENAJE "A"	:CONV. REC. OFTAS	60.0	0	30DIC88	31DIC90	731.	27FEB89	28FEB91	NADA
PSM-DRENAJE "A"	:EVAL. REC. OFTAS	60.0	0	28FEB87	1MAR91	731.	28ABR89	29ABR91	NADA
PSM-DRENAJE "A"	:SUSCRIBIR CONTRATO	60.0	0	29ABR87	30ABR91	731.	27JUN89	28JUN91	NADA
PSM-DRENAJE "A"	:ENTREGA RECEPCION	548.0	0	28JUN87	29JUN91	731.	27DIC90	27DIC92	730.
COOPERACION TECNICA		1085.0	0	8ENE87	8ENE90	365.	28DIC91	27DIC92	364.
EST. ALCANT. ZONA OESTE		548.0	0	14MAR88	29JUN87	1202.	12SET89	27DIC91	1201.
TERMINO OBRAS		0.	0	27DIC92	27DIC92	NADA	27DIC92	27DIC92	NADA

UNIDAD DE TIEMPO DEL INFORME = DIAS

() REALIZADA

HOLGURA

() REALIZADA

HOLGURA

TOTAL

DISPON.

FIN DEL INFORME

DURACION DEL PROYECTO = 1916.0 DIAS

ANEXO B

PROCEDIMIENTO DE LICITACIONES

Toda contratación a financiarse con los recursos del Préstamo del Banco se realizará conforme al siguiente procedimiento de licitación (en adelante denominado "Procedimiento"):

Artículo 1o. Aplicación: Deberá utilizarse el sistema de licitación pública para la adquisición de bienes y/o la contratación de obras o servicios, en todos los casos en que el valor de las adquisiciones o de las contrataciones exceda del equivalente de doscientos mil dólares de los Estados Unidos de América (US\$200.000).

Artículo 2o. Ambito de licitaciones: Las licitaciones se limitarán a los países miembros del Banco.

Artículo 3o. Modalidad de licitaciones: Cuando para financiar total o parcialmente las contrataciones indicadas en el Artículo 1o., deban utilizarse dólares o monedas de otros países distintos a la Argentina, y siempre que el valor de las contrataciones supere el monto determinado en el Artículo 1o., el procedimiento de licitación deberá tener carácter internacional. Cuando se utilicen exclusivamente recursos de contrapartida local, las licitaciones podrán restringirse al ámbito nacional de Argentina.

Artículo 4o. Otras modalidades: En las contrataciones y adquisiciones que se realicen por debajo del monto fijado en el Artículo 1o., la Empresa Obras Sanitarias de la Nación (OSN) aplicará procedimientos competitivos, como concurso de precios u otros métodos similares, que aseguren la debida atención a los aspectos de economía y eficiencia en la utilización de los recursos destinados al Proyecto. Cuando se utilicen recursos provenientes del Préstamo, esos concursos o métodos competitivos similares deberán ser internacionales y deberán permitir la oferta de bienes, maquinaria y equipos originarios de países miembros.

Artículo 5o. Precalificación: En los casos de ejecución de obras que formen parte del Proyecto, financiadas con recursos del Banco, se efectuará la precalificación de las firmas proponentes con referencia a su experiencia e idoneidad técnica y financiera. El Banco y la OSN podrán acordar la exención a la presente norma. Las aplicaciones del sistema de precalificación podrán regularse por el procedimiento de precalificación simultánea a la oferta, mediante el mecanismo del "doble sobre", en los casos de contrataciones de mediana importancia o de urgencia calificada por el Banco y la OSN. Los llamados a la precalificación se publicarán en la forma señalada en el Artículo 7o. y contendrán la información indicada en el Artículo 6o., en lo

que corresponda. Los interesados dispondrán de un plazo mínimo de treinta días, contado a partir de la última publicación, para presentar a la OSN sus antecedentes. Los formularios y las bases para la precalificación serán acordados entre la OSN y el Banco previamente a la publicación del llamado a precalificación. Con los datos proporcionados por los interesados, la OSN verificará, estudiará y analizará el informe de cada uno de ellos y determinará como elegibles solamente a aquellos que sean capacitados técnica, financiera, legal y administrativamente para ejecutar las obras de acuerdo con las especificaciones requeridas y en el plazo fijado. Copia de los análisis hechos y de las listas de las firmas se presentará a la consideración del Banco, junto con los criterios generales que se utilizaron para la selección de los eventuales contratistas. En estos casos, la licitación de las obras se efectuará únicamente entre las firmas precalificadas y la adjudicación se hará a la oferta de precios y condiciones más convenientes, prescindiendo de los factores de experiencia e idoneidad técnica y financiera ya evaluados en la precalificación, salvo para considerar hechos sobrevinientes con posterioridad a la presentación de los datos de la respectiva precalificación. Para el llamado a licitación bastará una notificación fehaciente a las firmas que hayan sido calificadas, la cual se cumplirá el mismo día. La OSN deberá exigir a las firmas notificadas un acuse de recibo por escrito y enviará copia de todo lo actuado al Banco.

Artículo 6o. Convocatoria a licitación: La convocatoria a licitación deberá indicar como mínimo el ámbito de la licitación, el organismo licitante respectivo, la prestación que motiva el llamado, el lugar, hora y fecha en que pueden obtenerse las bases de licitación, la oficina, lugar, hora y fecha en que deban presentarse las ofertas, el importe de la garantía, la fuente de financiamiento y las restricciones sobre los países de origen de las ofertas. En los casos de ejecución de obras debe indicarse además el lugar de emplazamiento de las obras. Dicho llamado deberá ser aprobado por la OSN y el Banco antes de que se publique, a menos que la licitación vaya a ser financiada con recursos de contrapartida exclusivamente.

Artículo 7o. Publicidad: Las convocatorias a licitación se publicarán, como mínimo, en dos diarios de los de mayor circulación en la Capital Federal, así como en dos diarios y por lo menos una revista técnica de circulación internacional, debiendo mediar, cuando menos, un intervalo de tres días entre cada publicación del correspondiente aviso de licitación, en el que se indicará como plazo para el recibo de las ofertas, un mínimo de treinta días corridos, contados a partir de la fecha de la última publicación. Cuando la licitación sea nacional bastará que la publicación se efectúe en sólo dos diarios de la Capital Federal.

Artículo 8o. Avisos a Embajadas y Consulados: Simultáneamente con la publicación de las convocatorias a licitación pública internacional, se cursarán invitaciones a cada una de las Embajadas de los países miembros del Banco, o en su defecto a los respectivos Consulados, que tuvieran representación acreditada ante el Gobierno de la Nación Argentina. Las invitaciones deberán contener copia de la convocatoria.

Artículo 9o. Pliego de condiciones: El pliego de condiciones, que incluye los planos y especificaciones de la licitación, será redactado por la OSN y se

entregará a los postores elegibles, al precio que la OSN fije, una vez que el pliego haya sido acordado entre la OSN y el Banco antes de cada licitación. Las modificaciones y adiciones a dicho pliego que sean sustanciales, serán acordadas en la misma forma que el pliego original y automáticamente se prorrogará el plazo de presentación de ofertas por la mitad, por lo menos, del plazo original, contado desde la fecha de notificación de esas modificaciones o adiciones a los posibles oferentes, la cual deberá efectuarse por los mismos medios de publicidad usados por la primera convocatoria. Las consultas que evacúe la OSN serán puestas en conocimiento de todos los posibles oferentes y del Banco y no producirán efecto suspensivo sobre el plazo de presentación de oferta.

Artículo 10o. Apertura de las ofertas: Las ofertas serán recibidas en el lugar, día y hora establecidos en las convocatorias a licitación, momento en que se abrirán en acto público anunciándose en tal oportunidad únicamente los nombres de los oferentes y los precios totales de cada oferta. Finalizada la apertura de ofertas, se levantará un acta en la que constarán los nombres de los oferentes y los precios de sus ofertas y que será suscrita por autoridades de la OSN y los oferentes presentes que desearan hacerlo. A partir de la hora indicada para la apertura de las ofertas, los proponentes no podrán alterar ni retirar las mismas. La OSN podrá, con posterioridad a la apertura, solicitar a los proponentes aclaración de cualquier aspecto de las ofertas y los proponentes podrán formular las aclaraciones pertinentes siempre que no modifiquen las condiciones de la licitación o de la oferta.

Artículo 11o. Análisis de las ofertas y preselección: Presentadas las ofertas, la OSN procederá a elaborar el cuadro comparativo de las mismas con los dictámenes correspondientes, los que serán enviados al Banco para su conformidad, antes de que sea comunicado el resultado a la firma así preseleccionada, junto con la indicación de la oferta que la OSN ha evaluado como la de valor más bajo y las razones que tiene para llegar a dicha conclusión. Este requisito no rige cuando las licitaciones se financien exclusivamente con recursos de contrapartida adicionales a los financiamientos del Banco.

Artículo 12o. Modificación de la selección: Si se decidiera adjudicar la licitación a un oferente diferente al recomendado y respecto del cual el Banco hubiera dado su conformidad, o se introdujeran otros cambios sustanciales en el informe, se enviarán nuevamente al Banco los documentos pertinentes para su conformidad, debiéndose proceder de acuerdo a lo establecido en el artículo anterior.

Artículo 13o. Adjudicación: Obtenido el acuerdo del Banco, la OSN adjudicará la licitación comunicándolo a quien correspondiera según lo previsto en los pliegos de licitación. La OSN enviará al Banco copia de la notificación de adjudicación, y además le enviará para su aprobación, copia del proyecto de contrato que firmará con el adjudicatario.

Artículo 14o. Licitación desierta: La OSN podrá declarar desierta la licitación en los casos en que no pueda adjudicar el contrato por falta de oferentes. Asimismo, se podrá declarar desierta la licitación en los casos en

que no se presente oferta alguna con precio aceptable o ajustada a las condiciones del pliego o si la adjudicación no conviniera a los intereses de la OSN. Esta deberá reservarse expresamente estos derechos en los pliegos de licitación. En las situaciones antedichas, la OSN deberá oír al Banco, antes de pronunciarse al respecto, salvo que la licitación se prevea financiarla con recursos distintos a los del financiamiento del Banco. En todos los casos en que se declare desierta una licitación a ser financiada con recursos del financiamiento del Banco se efectuará una segunda, salvo que la OSN y el Banco convengan en otra forma de proceder para la selección del adjudicatario.

Artículo 15o. Rescisiones: Cuando un contrato haya sido rescindido por falta de cumplimiento del contratista, ya sea que se trate de la calidad de la obra o del plazo de la ejecución, o de la calidad o plazo de entrega de la maquinaria, equipo y otros bienes, u otras causales establecidas en el respectivo contrato, la OSN y el Banco deberán acordar el curso a tomar frente a esta situación.

Artículo 16o. Márgenes de preferencia: En la evaluación y adjudicación de las ofertas que se reciban como consecuencia de una licitación internacional para la adquisición de bienes (maquinaria, equipo, materiales, etc.), se podrá reconocer a los bienes de origen argentino u originarios de países pertenecientes a la Asociación Latinoamericana de Integración (ALADI), un margen de preferencia conforme con las siguientes normas:

(a) Margen de preferencia nacional

- (i) Se considerará que un bien es originario de Argentina cuando el costo de los materiales, mano de obra y servicios argentinos empleados en su fabricación represente por lo menos un 40% del costo total del bien.
- (ii) A los efectos de la comparación de ofertas, se tendrá como precio de la oferta de productos de origen argentino, el precio de entrega del producto puesto al pie de la obra, una vez deducido lo siguiente: (1) los derechos de importación pagados sobre materias primas principales o sobre componentes manufacturados; y (2) los impuestos nacionales sobre ventas al consumo y al valor agregado, incorporados al costo del artículo ofertado.

El oferente deberá proporcionar la prueba documentada de las cantidades que de conformidad con los subincisos (1) y (2) anteriores, deben deducirse, con el solo objeto de facilitar el cotejo de ofertas.
- (iii) También a los efectos de esa comparación, se tendrá como precio de la oferta de productos de origen extranjero, el precio CIF del mismo producto (excluidos derechos de importación, consulares y portuarios), al cual deberá sumarse el importe de los gastos siguientes: (1) los de manipulación en puerto; y (2) los de transporte local, desde el puerto o lugar fronterizo de entrada hasta el pie de la obra.

- (iv) Para efectuar el cotejo de precios entre ofertas de origen nacional y extranjero se estará a lo siguiente:
 - (1) los costos expresados en moneda extranjera se convertirán a su equivalente en australes, para lo cual se utilizará el tipo de cambio acordado por el Banco, a la fecha de comparación; y
 - (2) al precio de las ofertas de productos extranjeros, calculado conforme se estipula en el inciso (iii), y expresado en el equivalente en australes, se sumará un margen de preferencia del 15% o el derecho aduanero real, según cual sea menor.
- (v) Cuando al aplicar las normas anteriores resulte que la oferta del producto nacional es más conveniente que la del producto extranjero, podrá hacerse uso para su adquisición de las divisas que formen parte del Préstamo.

(a) Margen de preferencia regional

- (i) Se considerará que un bien es de origen regional cuando: (1) se lo produzca en un país miembro de la ALADI y cumpla con los requisitos establecidos en los instrumentos jurídicos que gobiernan esa asociación en cuanto a origen y otras materias vinculadas con los programas de liberalización del comercio regional; y (2) el costo de los materiales, mano de obra y servicios, empleados en su fabricación en el país originario, sea por lo menos el 40% del costo total del bien.
- (ii) Se sumarán al costo CIF del producto ofertado los costos locales referidos en (iii)(1) y (2) del párrafo (a) (margen de preferencia nacional) de este artículo.
- (iii) Para efectuar el cotejo de precios entre ofertas de bienes originarios de países de la ALADI y las de bienes originarios de otros países extranjeros elegibles, se estará a lo siguiente:
 - (1) también se convertirán a su equivalente en australes los precios expresados en moneda extranjera, sobre la misma base de cálculo establecida en el inciso (a)(iv)(1) anterior; y
 - (2) se sumará a las ofertas de bienes originarios de países que no sean parte de la ALADI, y expresadas en el equivalente en australes, un margen del 15%, o bien la diferencia entre los derechos de importación aplicables a bienes originarios de países que integran esa asociación y los derechos aplicables a bienes originarios de países extranjeros elegibles que no sean parte de la ALADI, según cual sea menor.
- (iv) Cuando, al aplicar las normas anteriores, resulte que la oferta del producto originario de un país miembro de la ALADI es más conveniente que la del producto originario de un país que no sea

miembro de la ALADI, podrá hacerse uso para su adquisición de las divisas que formen parte del Préstamo.

Artículo 17o. Pronunciamiento oportuno del Banco: El Banco deberá pronunciarse sobre los documentos que se someten a su consideración en forma oportuna, para que no sufra perjuicio la marcha normal del Proyecto y se respeten los calendarios de ejecución oportunamente programados.

Artículo 18o. Origen de los bienes: El origen de los materiales y/o equipos a adquirirse, es el país en el cual el material y/o equipo ha sido extraído, cultivado o producido ya sea por manufactura, procesamiento o ensamble. El origen del artículo "producido", necesariamente es el país en el cual, como resultado de dicho procedimiento, manufactura o ensamble, resulta en otro artículo, comercialmente reconocido, que difiere sustancialmente en sus características básicas, en su propósito o finalidad de cualesquiera de sus componentes importados. La nacionalidad de la firma que produce o vende los bienes o el equipo es irrelevante para determinar el origen de tales bienes y equipos.

Artículo 19o. Nacionalidad de firmas: Para determinar la nacionalidad de una firma constructora y su elegibilidad para participar en licitaciones de contratos financiados con recursos del Banco, se aplicarán las siguientes normas:

- (a) que esté constituida u organizada de otra manera, en un país elegible;
- (b) que tenga la sede principal de sus negocios en un país elegible;
- (c) (i) que más del 50% de su capital sea propiedad de una empresa o empresas en uno o más países elegibles (dicha empresa o empresas también deberán calificar en cuanto a su nacionalidad) y/o de nacionales o residentes "bona-fide" de esos países elegibles, y (ii) que constituya una parte integral de la economía del país elegible en que está domiciliada;
- (d) que no exista arreglo alguno en virtud del cual una parte sustancial de las utilidades netas o de otros beneficios tangibles de las empresas sean acreditados o pagados a personas que no sean nacionales o residentes "bona-fide" de los países elegibles; y
- (e) que por lo menos el 80% de todas las personas que prestan servicios conforme al contrato de construcción en el país donde ésta se lleva a cabo ya estén empleadas directamente por el contratista o por un subcontratista, sean ciudadanos de un país elegible. Para los efectos de este cómputo, y respecto de una firma proveniente de un país que no sea el de la localidad de la construcción, no se tendrán en cuenta nacionales o residentes permanentes del país donde se lleve a cabo la construcción.

Las normas anteriores se aplicarán a cada uno de los miembros de un "joint venture" o consorcio (asociación de dos o más empresas) y a cada empresa que se proponga para subcontratar parte del trabajo.

Artículo 20o. Criterios básicos: La aplicación de los anteriores procedimientos se basará en los principios de competencia, publicidad e igualdad entre oferentes.

Artículo 21o. Alcance del presente procedimiento: El presente instrumento es complementario de lo que disponen las respectivas cláusulas del contrato de préstamo, de manera que en el caso de omisión o pugna entre unas y otras prevalecerán las disposiciones del contrato de préstamo.

Artículo 22o. Concurso de precios: Se entiende por concurso de precios el procedimiento por medio del cual se invita a presentar ofertas para la adquisición de bienes y/o para la construcción de obras, a personas naturales o jurídicas nacionales o extranjeras suficientemente calificadas.

En las invitaciones se indicarán las características, especificaciones técnicas de las obras que se desea construir o de los bienes a adquirir y se señalará el lugar en que se hará entrega de los documentos pertinentes a los interesados. Se indicará además el lugar en el que se suministrará la información relacionada con la invitación, y la dirección y el nombre de la entidad ante la cual se presentarán las ofertas, así como la fecha y hora de su presentación. Las oferentes dispondrán de un plazo de treinta días para presentar sus ofertas, contado a partir de la fecha de la invitación.

Las ofertas se abrirán en acto público con asistencia de los proponentes si así lo desean. Se levantará un acta del acto de apertura de ofertas en la que se indicarán los nombres de los oferentes y los montos de sus respectivas propuestas. La selección de la mejor oferta y la adjudicación se efectuarán de acuerdo a lo establecido en este Procedimiento para los casos de licitaciones públicas.

ANEXO C

SELECCION Y CONTRATACION DE FIRMAS CONSULTORAS
Y/O EXPERTOS INDIVIDUALES

En la selección y contratación de firmas consultoras, instituciones especializadas y/o expertos individuales (en adelante denominados indistintamente los "consultores"), necesarios para la ejecución del Proyecto, se estará a lo siguiente:

I. DEFINICIONES

Se establecen las siguientes definiciones:

- 1.01 Experto individual es todo profesional o técnico en alguna ciencia, arte u oficio.
- 1.02 Firma consultora es toda asociación legalmente constituida, integrada principalmente por personal profesional, para ofrecer servicios de consulta, asesoría, dictámenes de expertos y servicios profesionales de diversa índole.
- 1.03 Para los propósitos de este Anexo, las organizaciones sin fines de lucro tales como universidades, fundaciones, organismos autónomos o semiautónomos u organizaciones internacionales que ofrezcan servicios de consulta, se considerarán como firmas consultoras.

II. INCOMPATIBILIDADES

- 2.01 No podrán utilizarse recursos del Banco para contratar Consultores del país del Prestatario si ellos pertenecen al personal permanente o temporal del Estado o de la institución que recibe el Financiamiento o que es beneficiario de los servicios de consultoría, o si han pertenecido a cualesquiera de ellos dentro de los seis meses previos a la fecha de la presentación de la solicitud o a la fecha de la selección del consultor individual, a menos que el Banco acuerde reducir ese plazo.
- 2.02 Una firma consultora plenamente calificada que sea filial o subsidiaria de un contratista de construcciones, un proveedor de equipos o una sociedad de cartera ("holding company"), generalmente se considerará aceptable sólo si conviene, por escrito, en limitar sus funciones a los servicios de consulta profesional y acepta, en el contrato que suscriba, que la firma y sus asociados no podrán participar en la construcción del proyecto, en el suministro de materiales y equipos para el mismo ni en el aporte de recursos financieros.

III. ELEGIBILIDAD Y REQUISITOS SOBRE NACIONALIDAD

- 3.01 No se podrán introducir en la aplicación de los procedimientos establecidos en este Anexo, disposiciones o condiciones que restrijan o impidan la participación de consultores originarios de países miembros del Banco.
- 3.02 Sólo podrán contratarse consultores que sean nacionales de países miembros del Banco.
- 3.03 Para determinar la nacionalidad de una firma consultora se considerarán los siguientes criterios:
- (a) El país en el cual la firma esté debidamente constituida o legalmente organizada.
 - (b) El país en el cual la firma tenga establecido el asiento principal de sus negocios.
 - (c) La nacionalidad de las firmas o la nacionalidad o residencia "bona fide" de las personas que tengan en la firma la propiedad, con derecho a participar en las utilidades de dicha firma en exceso del 50%, conforme con lo establecido mediante certificación extendida por un funcionario de la firma, debidamente autorizado.
 - (d) La existencia de arreglos en virtud de los cuales una parte sustancial de las utilidades o beneficios tangibles de la firma se destina a firmas o personas de una determinada nacionalidad.
 - (e) La determinación por parte del Banco de que la firma constituye una parte integral de la economía de un país, comprobado por la residencia "bona fide" en él de una parte sustancial del personal ejecutivo, técnico y profesional de la firma, y de que la firma cuenta en el país con el equipo operativo u otros elementos necesarios para llevar a cabo los servicios por contratar.
- 3.04 Los requisitos de nacionalidad exigidos por el Banco serán también aplicables a las firmas propuestas para prestar una parte de los servicios requeridos, en virtud de asociación conjunta o de un subcontrato con una firma consultora calificada que satisfaga los requisitos de nacionalidad.
- 3.05 Para establecer la nacionalidad de un consultor individual se estará a la que se determine en su pasaporte u otro documento oficial de identidad. El Banco, sin embargo, podrá admitir excepciones a esta regla en aquellos casos en que el experto individual, no siendo elegible por razón de nacionalidad: (a) tenga domicilio establecido en un país elegible, esté en situación legal de poder trabajar en él (fuera del "status" de funcionario internacional) y haya declarado que no tiene intenciones de regresar a su país de origen en un futuro inmediato; o bien (b) haya fijado su domicilio permanente en un país elegible y haya residido en él por cinco años como mínimo.

IV. CALIFICACIONES PROFESIONALES

- 4.01 El análisis de las calificaciones profesionales de una firma consultora tendrá en cuenta la experiencia de la firma y de su personal directivo, en la prestación de servicios de consultoría satisfactorios en proyectos o programas de dimensión, complejidad y especialidad técnica comparables a los de los trabajos respectivos; el número asignado de personal profesionalmente calificado; la experiencia previa en la región y en las zonas extranjeras; el conocimiento del idioma; la capacidad financiera; la carga actual de trabajo; la capacidad para organizar a un número suficiente de personal para realizar los trabajos dentro del plazo previsto; la buena reputación ética y profesional; y la desvinculación absoluta de todo posible conflicto de intereses.

V. PROCEDIMIENTOS DE SELECCION Y CONTRATACION

A. Selección y contratación de firmas consultoras

- 5.01 En el caso de selección y de contratación de una firma consultora se seguirá el siguiente procedimiento:

- (a) Antes de efectuarse la selección de la firma, el Prestatario y/o el Organismo Ejecutor deberán someter a la aprobación del Banco lo que sigue:

- (i) El procedimiento que se utilizará en la selección y contratación de la firma. Si se estima que el costo de los servicios no excederá de cien mil dólares de los Estados Unidos de América (US\$100.000) o su equivalente, calculado de acuerdo con lo dispuesto en el Artículo 3.05(a) de las Normas Generales, bastará que se efectúe un concurso privado de servicios de consultoría, o que se aplique otro método similar. Si se prevé, en cambio, que el costo excederá esa suma, la selección y contratación deberá anunciarse en la prensa nacional y, si así procediere por la complejidad y grado de especialización del asesoramiento solicitado, también en publicaciones extranjeras especializadas. Además, deberá informarse al Banco sobre esos anuncios y enviársele recortes de los mismos, con especificación de la fecha y del nombre de la publicación en que hayan aparecido.
 - (ii) Los términos de referencia (especificaciones) que describan los trabajos que realizará la firma, junto con una estimación del costo.
 - (iii) Una lista de por lo menos tres y no más de seis firmas a las cuales se proyecta cursar invitación para que presenten propuestas de trabajo.
- (b) Una vez que el Banco haya dado su conformidad respecto a los requisitos anteriores, se solicitará, a todas las firmas aprobadas

la presentación de propuestas, conforme con los procedimientos y términos de referencia convenidos.

- (c) En las invitaciones a presentar propuestas deberá establecerse el uso de una de las modalidades siguientes, según sea pertinente:

- (i) En el primer caso, se presentará un solo sobre cerrado que contendrá la propuesta técnica, sin cotización de precios. Se analizarán las propuestas recibidas y se establecerá el orden de mérito de éstas. Si la complejidad del caso así lo requiera, el Prestatario y/o el Organismo Ejecutor podrá recurrir por su propia cuenta a un grupo de consultores tanto para que examine las propuestas como para que proporcione un asesoramiento técnico y especializado en la clasificación por mérito.

Una vez establecido este orden de mérito de las firmas, se invitará a negociar un contrato a la firma clasificada en primer lugar. En estas negociaciones se examinarán en forma completa los detalles de los términos de referencia, a fin de que exista un pleno y recíproco entendimiento con la firma, se examinarán los requisitos contractuales y legales del acuerdo y, por último, se elaborarán costos detallados. Si no pudiese llegarse a un acuerdo con esta firma respecto de las condiciones contractuales, se le notificará por escrito que se ha rechazado su propuesta y se iniciarán negociaciones con la segunda firma, y así sucesivamente, hasta que se llegue a un acuerdo satisfactorio.

- (ii) En el segundo caso deberán presentarse dos sobres cerrados, de los cuales el primero contendrá la propuesta técnica, sin indicación de costos, y el segundo el costo propuesto por los servicios.

Se analizarán las propuestas técnicas y se establecerá el orden de mérito de éstas. La negociación contractual comenzará con la firma que ofrezca la mejor propuesta técnica. El segundo sobre presentado por esta firma se abrirá en presencia de uno o más representantes de la misma, y se le utilizará en la negociación contractual. Todos los segundos sobres presentados por las otras firmas continuarán cerrados y, de llegarse a un acuerdo con la primera firma, serán devueltos a las firmas respectivas. De no llegarse a un acuerdo con la primera firma respecto de las condiciones contractuales, se le notificará por escrito ese desacuerdo y se iniciará la negociación con la segunda firma, y así, sucesivamente, hasta llegar a un acuerdo satisfactorio.

El no poder llegar a un acuerdo respecto de los costos detallados o de la remuneración de los servicios, o el que se considere que dichos costos o remuneración son inapropiados o excesivos, será causa suficiente para

notificar el rechazo de la propuesta e iniciar negociaciones con la firma que le siga en el orden de mérito. Cuando se haya rechazado a una firma, no se la volverá a llamar para ulteriores negociaciones correspondientes a ese contrato.

- (d) El texto del proyecto de contrato negociado con la firma deberá ser sometido a la aprobación del Banco, antes de su firma y de la iniciación de los servicios. Copia fiel del texto firmado deberá enviarse prontamente al Banco.

B. Selección y contratación de expertos individuales

5.02 En el caso de selección y de contratación de expertos individuales:

- (a) Antes de efectuarse la selección de los expertos, el Prestatario y/o el Organismo Ejecutor deberán someter a la aprobación del Banco lo que sigue:
 - (i) el procedimiento de selección;
 - (ii) los términos de referencia (especificaciones) y el calendario referentes a los servicios a ser proporcionados;
 - (iii) los nombres de los expertos tentativamente seleccionados, señalando en forma detallada su nacionalidad y domicilio, sus antecedentes, su experiencia profesional y su conocimiento de idiomas; y
 - (iv) el formulario del contrato que se utilizará para contratar a los expertos.
- (b) Una vez que el Prestatario y/o el Organismo Ejecutor y el Banco hayan dado su conformidad respecto a los requisitos anteriores, deberá procederse a la contratación de los expertos. El contrato que haya de suscribirse con cada uno de ellos deberá ajustarse al modelo de contrato que el Prestatario y/o el Organismo Ejecutor y el Banco hayan acordado. Copia fiel del texto firmado de cada contrato deberá enviarse prontamente al Banco.

5.03 No obstante lo establecido en los párrafos 5.01 y 5.02 anteriores, y a solicitud del Prestatario y/o del Organismo Ejecutor, el Banco podrá colaborar en la selección de los Consultores, lo mismo que en la elaboración de los contratos respectivos. Es entendido, sin embargo, que la negociación final de los contratos y su suscripción, en términos y condiciones aceptables al Banco, corresponderán exclusivamente al Prestatario y/o el Organismo Ejecutor, sin que el Banco asuma responsabilidad alguna al respecto.

VI. MONEDAS DE PAGO A LOS CONSULTORES

6.01 Se establecen las siguientes modalidades en cuanto a las monedas con que se pagará a los consultores:

(a) Pagos a firmas consultoras: Los contratos que se suscriban con las firmas deberán reflejar una de las siguientes modalidades, según sea el caso:

- (i) Si la firma está domiciliada en la República Argentina, su remuneración se pagará exclusivamente en australes, con excepción de los gastos incurridos en divisas para el pago de pasajes externos o de viáticos en el exterior, los que se reembolsarán en dólares de los Estados Unidos de América o en su equivalente en otras monedas que formen parte del Financiamiento, excepto la del país del estudio.
- (ii) Si la firma no está domiciliada en la República Argentina, el máximo porcentaje posible de su remuneración se pagará en australes, y el resto en dólares de los Estados Unidos de América, o en su equivalente en otras monedas que formen parte del Financiamiento, excepto la de ese país, en el entendido que la partida correspondiente a viáticos deberá pagarse en la moneda del país o países en los cuales los respectivos servicios han de ser prestados. En caso de que el porcentaje que vaya a pagarse en australes, sea inferior al 30% del total de la remuneración de la firma, una justificación completa y detallada se someterá, según corresponda, al Banco para su examen y comentarios.
- (iii) Si se trata de un consorcio integrado por firmas domiciliadas en la República Argentina y firmas no domiciliadas en dicho país, la parte de la remuneración que corresponda a cada una de las firmas integrantes del consorcio se pagará de acuerdo con las reglas señaladas en los subpárrafos (i) y (ii) anteriores.
- (iv) Se aplicará lo dispuesto en el Artículo 3.05(a) de las Normas Generales respecto al tipo de cambio.

(b) Pagos a expertos individuales. Deberán seguirse las mismas reglas del párrafo (a) anterior.

VII. RECOMENDACIONES DE LOS CONSULTORES

7.01 Queda establecido que las opiniones y recomendaciones de los consultores no comprometen ni al Prestatario y/o al Organismo Ejecutor, ni a los beneficiarios, ni al Banco, los que se reservan el derecho de formular al respecto las observaciones o salvedades que consideren apropiadas.

VIII. ALCANCE DEL COMPROMISO DEL BANCO

8.01 Queda establecido que el Banco no asume compromiso alguno de financiar total o parcialmente ningún programa o proyecto que, en forma directa o indirecta, pudiera resultar de los servicios prestados por los consultores o de las recomendaciones formuladas por ellos.

IX. CONDICIONES ESPECIALES

9.01 En los contratos que suscriban con los consultores deberá estipularse que:

- (a) los consultores deberán desempeñar sus trabajos en forma integrada con el personal profesional local que, conforme a lo estipulado en el respectivo contrato, se asigne o contrate para participar en la realización del Proyecto, a fin de alcanzar a la terminación de los trabajos un adiestramiento técnico y operativo de dicho personal; y
- (b) el último pago acordado en el contrato estará sujeto a la aceptación del informe final de los consultores por el Prestatario y/o el Organismo Ejecutor y el Banco. Dicho pago final constituirá por lo menos un 10% del monto total de la suma que por concepto de honorarios se convenga en el contrato.

CARACTERISTICAS DEL AGUA POTABLE

	<u>Valor</u> <u>Aconsejable</u>	<u>Valor</u> <u>Aceptable</u>	<u>Límite</u> <u>Tolerable</u>	<u>Norma</u> <u>OMS</u>
<u>CARACTERISTICAS FISICAS</u>				
Color (unidades)	2	5	12	15
Turbiedad (unidades)	0,2	1	3	5
Olor (umbral a 60° C)	1	5	10	-
Saber (l)	-	-	-	-

CARACTERISTICAS QUIMICAS

	<u>Ph2</u>	<u>Phs ± 0,2</u>	<u>Ph ± 0,5</u>	<u>-</u>
Ph (2)				
Sólidos disueltos totales mg/l	50-600	1.000	2.800	1.000
Dureza total (en CaCO 3)	30-100	200	400	500
Alcalinidad total (CaCO3)	30-200	400	800	-
Cloruro (Cl-)	< 100	250	700	250
Sulfato (SO4=)	< 100	200	400	400
Nitrato (NO3-)	< 45	45	(3)	10
Nitrito (NO2-)	< 0,01	< 0,10	0,10	-
Amoníaco (NH4+)	< 0,05	0,20	0,50	-
Fluoruro (F -)	(4)	0,7-1,2	2,0	1,5
Arsénico (As)	< 0,01	0,01	0,10	0,05
Hierro total (Fe)	< 0,05	0,10	0,20	0,3
Manganeso (Mn)	< 0,01	0,05	0,10	0,1
Plomo (Pb)	< 0,01	0,01	0,05	0,05
Vanadio (5)	-	-	-	-
Fenoles (en fenol)	-	-	0,001	-
Cobre (Cu)	< 0,1	0,5	1,5	1,0
Cromo total (en Cr 6+)	-	-	0,05	0,05

CARACTERISTICAS BACTERIOLOGICAS

Bacterias aerobias (Agar a 37° C 24 hs.) por ml más 100
 Bacterias coliformes por 100 ml < 2
 Pseudomonas aeruginosa no debe contener

CRONOGRAMA DE DESEMBOLSOS
(en miles de US\$)

CATEGORIAS	1			2			3		
	IC/OC	LOCAL	TOTAL	IC/OC	LOCAL	TOTAL	IC/OC	LOCAL	TOTAL
I I.-INGENIERIA Y ADMINISTRACION	0	0	0	0	0	0	0	0	0
I 1.1 INGENIERIA	0	1000	1000	0	1000	1000	0	1000	1000
I 1.2 SUPERVISION	0	600	600	0	1700	1700	0	1700	1700
I 1.3 ADMINISTRACION	0	700	700	0	700	700	0	700	700
I II.-COSTOS DIRECTOS	0	0	0	0	0	0	0	0	0
I 2.1 RIO SUBTERANEO	1630	670	2300	1660	840	2500	0	840	3340
I 2.2 ESTACIONES ELEVADORAS	0	0	0	1700	2000	3700	2700	1000	4800
I 2.3 LINEAS INTERCONEXION	0	0	0	1060	1240	2300	3720	2400	6200
I 2.4 REDES MATRICES	0	0	0	4100	4120	8220	0	0	8220
I 2.5 TANQUES ELEVADOS	0	0	0	100	320	420	660	140	1100
I 2.6 REDES DE ALLENADO	0	0	0	0	3890	3890	0	0	3890
I 2.7 PLANTA SAN MARTIN	1980	1300	3280	4302	4830	8132	3780	4170	12302
I 2.8 MEDIDORES Y CONEXIONES	0	0	0	0	2740	2740	1700	8000	11740
I 2.9 PROMOCION COMUNAL	0	300	300	0	400	400	0	100	500
I III.-COSTOS CONCURRENTE	0	0	0	0	0	0	0	0	0
I 3.1 TERREMOS	0	700	700	0	700	700	0	0	700
I 3.2 COOPERACION TECNICA	100	0	100	200	100	300	200	0	500
I 3.3 ESTUDIOS ALC ZONA OESTE	0	900	900	0	1000	1000	0	0	2000
I SUB TOTAL	3600	8700	12300	10302	30700	41002	25470	36302	76772
I SIM ASIGNACION ESPECIFICA	943	1470	2413	4932	6241	11173	4380	3940	15113
I IMPREVISTOS DE COSTOS	300	570	870	1030	3070	4100	2040	3630	7730
I ESCALAMIENTO DE COSTOS	870	1470	2340	3034	9102	12136	4311	5810	10221
I COSTOS FINANCIEROS	370	990	1360	1400	1007	2407	3740	610	4364
I INTERESES	102	0	102	1272	0	1272	3840	0	5212
I COMISION DE CREDITO	190	990	1180	190	1007	1197	190	610	1967
I P.I.V.	190	0	190	190	0	380	190	0	570
I TOTAL	8001	9230	17231	24702	40087	64789	37103	46161	110950
I X YEAR/PROJECT	0	0	0	0	0	0	0	0	0
I X PUND/YEAR	0	62.2	100.0	30.2	61.0	100.0	44.0	85.0	100.0

CATEGORIAS	IC/OC	LOCAL	TOTAL	IC/OC	LOCAL	TOTAL	IC/OC	LOCAL	TOTAL
I 1.-INGENIERIA Y ADMINISTRACION.....	0	0	0	0	0	0	0	0	0
I 1.1 INGENIERIA.....	0	1000	1000	0	0	0	0	0	0
I 1.2 SUPERVISION.....	0	1100	1100	0	0	0	0	1800	1800
I 1.3 ADMINISTRACION.....	0	700	700	0	800	800	0	3500	3500
I	0	0	0	0	0	0	0	0	0
I 11.-COSTOS DIRECTOS.....	0	0	0	0	0	0	0	0	0
I 2.1 RIO SUBTERRANEO.....	1000	2720	6000	0	0	0	14030	15470	27300
I 2.2 ESTACIONES ELEVADORAS.....	1320	900	2200	0	0	0	8720	9100	11200
I 2.3 LINEAS INTERCOMUNION.....	1060	1240	3100	0	0	0	7440	10500	12400
I 2.4 REDES MATRICES.....	1100	1400	2500	1000	0	1000	16840	17840	27600
I 2.5 TANQUES ELEVADOS.....	940	340	900	0	0	0	1600	1320	2000
I 2.6 REDES DE RIEGO.....	0	0	0	0	0	0	0	0	0
I 2.7 PLANTA SAN MARTIN.....	2700	3475	6101	0	0	0	12719	15401	20500
I 2.8 MEDIDORES Y CONEXIONES.....	1700	8604	7384	0	8400	8400	3400	19400	23000
I 2.9 PROMOCION COMUNAL.....	0	400	400	0	0	0	0	1800	1800
I	0	0	0	0	0	0	0	0	0
I 111.- COSTOS CONCURRENTE.....	0	0	0	0	0	0	0	0	0
I	0	0	0	0	0	0	0	0	0
I 3.1 TERRENOS.....	0	0	0	0	0	0	0	0	0
I 3.2 COOPERACION TECNICA.....	0	0	0	0	0	0	0	1400	1400
I 3.3 ESTUDIOS ALC ZONA OESTE.....	0	0	0	0	0	0	500	100	600
I SUB TOTAL.....	13300	2722	40330	1000	14800	18060	62049	114651	172500
I 81M ASIGNACION ESPECIFICA.....	3300	6314	10314	214	3124	3330	16420	29337	49749
I IMPREVISTOS DE COSTOS.....	1331	2722	4033	100	1072	1857	6205	15158	18015
I ESCALAMIENTO DE COSTOS.....	2043	4192	6235	114	1674	1788	10143	17032	24820
I COSTOS FINANCIEROS.....	9392	248	6347	7094	92	7149	10639	2933	21882
I INTERESES.....	8784	248	9036	6900	0	6900	17602	0	17602
I COMISION DE CREDITO.....	196	0	196	243	82	325	200	293	723
I P.I.V.....	196	0	196	196	0	196	0	293	493
TOTAL.....	22640	34301	87021	6310	17744	26054	27916	116001	217797
X YEAR-PROJECT.....	25.3	1	25.3	1	10.6	10.6	10	60	100.0
K FUND-YEAR.....	3.7	60.3	100.0	31.9	60.1	100.0	1	60	100.0

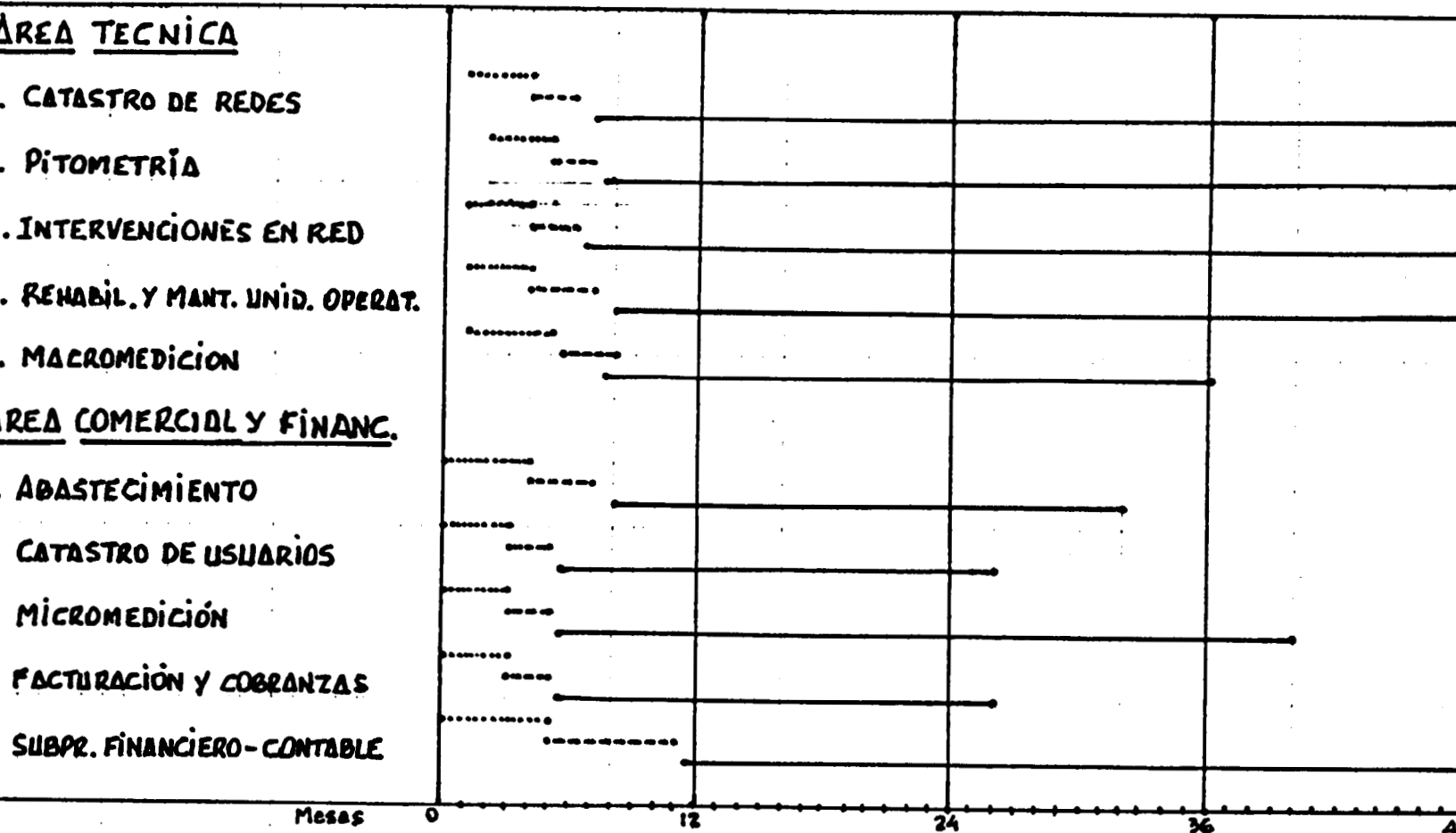
WATER SUPPLY PROJECTMONITORING INDICATORSPreparation of a National and Sanitation Plan

1. Activities under this component would be monitored through a critical path study.

Operational Improvements and Technical Assistance Programs

			Year					
			1986	1987	1988	1989	1990	1991
1. Number of Employees per 1000/water connections	Buenos Aires		9.9	9.5	9.0	8.5	8.0	7.5
	Cordoba		7.5	7.1	6.8	6.4	6.1	5.8
	Rosario		4.7	4.5	4.5	4.5	4.5	4.5
2. Number of water meters installed	Buenos Aires		-	30,000	60,000	60,000	50,000	-
	Cordoba		10,000	13,000	17,000	20,000	-	-
	Rosario		200	1,000	1,000	1,000	800	-
3. Kilometers of distrib- ution network built/ replaced/rehabilitated	Buenos Aires		-	400	400	600	600	-
	Cordoba		-	200	350	-	-	-
	Rosario		-	100	100	200	-	-
4. Revenues collected to Amounts Billed (%)	Buenos Aires		90	92	93	94	95	96
	Cordoba		86	90	93	94	95	96
	Rosario		86	90	93	94	95	96
5. Metered connections to total connections (%)	Buenos Aires		10	13	15	19	22	22
	Cordoba		6	13	19	21	23	24
	Rosario		5	6	7	8	8	8

PROGRAMA DE MEJORAMIENTO OPERATIVO *



men del cronograma de tareas (Plan de trabajos) que forma parte del contrato celebrado entre OBRAS SANITARIAS DE LA NACION y el consorcio RHENAG-LAHMEYER Y ASOCIADOS, el 9 de mayo de 1988 (Iniciación de los trabajos: 1/06/88).

Legenda:

- Diagnóstico
- Diseño
- Implementación

ACTIVO	1984	%	1985	%	1986	%
Activos Corrientes						
Disponibilidades	1,806,694	0.21	3,310,157	0.31	4,931,145	0.41
Inversiones	2,712,734	0.21	4,250,818	0.31	6,712,492	0.51
Creditos	22,216,046	1.91	31,186,843	2.51	94,097,464	7.31
Deudores usuarios	12,568,957	1.11	25,027,858	2.01	56,546,725	4.41
Deudores eventuales	829,973	0.11	1,001,459	0.11	10,211,242	0.81
Otros creditos	8,817,116	0.71	5,157,526	0.41	9,534,755	0.71
Otros cred. Tes. Mac. Art.8	0	0.01	0	0.01	17,804,743	1.41
Bienes de cambio	76,356,546	6.41	28,749,727	2.31	24,940,735	1.91
Total Activos Corrientes	103,092,020	8.71	67,497,545	5.41	130,681,835	10.21
Activos No Corrientes						
Creditos	63,292,879	5.31	59,703,871	4.81	41,178,040	3.21
I.V.A.	11,964,318	1.01	7,416,231	0.61	0	0.01
Otros cred. Tes.Mac.Art. 8	0	0.01	0	0.01	41,175,324	3.21
Otros creditos	51,328,561	4.31	52,287,640	4.21	2,717	.01
Bienes de uso	1,022,628,808	86.01	1,126,962,303	89.91	1,111,914,478	86.61
Obras e instalaciones	986,637,618	83.01	1,107,915,568	88.31	1,189,876,737	92.71
Menos:						
Depreciacion acua. ant.	(281,252,907)	-23.71	(333,406,167)	-26.61	(391,515,228)	-30.51
Depreciacion de ejercicio	(20,755,414)	-1.71	(24,119,712)	-1.91	(25,707,837)	-2.01
Depreciacion total	(302,008,321)	-25.41	(357,525,879)	-28.51	(417,223,064)	-32.51
Neto resultante	684,629,297	57.61	750,389,688	59.81	772,653,672	60.21
Obras en ejecucion	337,999,511	28.41	376,572,615	30.01	339,260,806	26.41
Total Activos No Corrientes	1,085,921,687	91.31	1,186,666,174	94.61	1,153,092,518	89.81
TOTAL ACTIVO	1,189,013,707	100.01	1,254,163,720	100.01	1,283,774,353	100.01
PASIVO						
Pasivo Corriente						
Deudas comerciales	32,621,580	2.71	28,172,782	2.21	18,463,827	1.41
Deudas Bancarias	1,849,412	0.21	4,492,062	0.41	21,528,519	1.71
Moneda Nacional	430,123	.01	1,766,853	0.11	1,637,303	0.11
Moneda extranjera	1,419,289	0.11	2,725,209	0.21	19,891,216	1.51
Sociales y Fiscales	6,597,173	0.61	7,445,041	0.61	16,872,722	1.31
Otras deudas	125,296	.01	7,837	.01	10,067,925	0.81
Total Pasivo Corriente	41,193,461	3.51	40,117,722	3.21	66,932,992	5.21
Pasivo No Corriente						
Deudas bancarias	68,022,692	5.71	66,884,504	5.31	53,612,867	4.21
Moneda nacional	16,694,131	1.41	14,597,943	1.21	12,437,543	1.01
Moneda extranjera	51,328,561	4.31	52,286,562	4.21	41,175,324	3.21
Deudas Comerciales	3,587,024	0.31	522,240	.01	0	0.01
Total Pasivo No Corriente	71,609,716	6.01	67,406,744	5.41	53,612,867	4.21
TOTAL PASIVO	112,803,177	9.51	107,524,466	8.61	120,545,859	9.41
PATRIMONIO NETO						
Capital	1,384,525,462	116.41	1,059,595,384	84.51	676,513,261	52.71
Capital	1,272,262	0.11	1,671,791	0.11	644,466	0.11
Ajuste de Capital	1,383,253,200	116.31	1,057,923,594	84.41	675,868,795	52.61
Reservas	18,531,919	1.61	36,085,144	2.91	0	0.01
Constibuciones de usuarios	17,875,220	1.51	33,342,879	2.71	0	0.01
Otras	656,700	0.11	2,742,265	0.21	0	0.01
Resultados Acumulados	(326,846,851)	-27.51	50,958,725	4.11	486,715,234	37.91
Saldo inicial	(21,364,014)	-1.81	0	0.01	68,177,823	5.31
Resultante del ejercicio	(305,482,837)	-25.71	50,958,725	4.11	418,537,411	32.61
TOTAL PATRIMONIO	1,076,210,530	90.51	1,146,639,253	91.41	1,163,228,494	90.61
TOTAL PASIVO Y PATRIMONIO NETO	1,189,013,707	100.01	1,254,163,720	100.01	1,283,774,353	100.01

ARGENTINA - OBRAS SANITARIAS DE LA NACION
ESTADO COMPARATIVO DE RESULTADOS 1984-1986
(En US\$ constantes a Diciembre 1986) 1/

ANEXO V-4

Ingresos Explotacion	1984		1985		1986		Total 1984-1986	
		%		%		%		%
Servicios principales								
Agua	43,417,792	57.6%	57,320,594	52.0%	82,984,354	47.9%	183,722,740	51.2%
Desagues cloacales	18,885,797	25.1%	37,198,864	33.8%	49,333,791	28.5%	105,418,452	29.4%
Desagues Pluviales	7,488,714	9.9%	10,829,916	9.8%	13,166,347	7.6%	31,484,976	8.8%
Otros	5,579,366	7.4%	4,810,460	4.4%	27,594,149	15.9%	37,983,975	10.6%
Total Ingr. Explotacion	75,371,669	100.0%	110,159,833	100.0%	173,078,641	100.0%	358,610,143	100.0%
Gastos de Explotacion								
Gastos de Personal (incl. cargos soc.)	56,864,165	75.4%	56,641,004	51.4%	75,834,108	43.8%	189,339,276	52.8%
Energia electrica	30,764,648	40.8%	22,646,285	20.6%	16,587,701	9.6%	69,998,634	19.5%
Materias primas y prod. para tratamiento agua	33,722,321	44.7%	30,851,907	28.0%	21,927,697	12.7%	86,501,925	24.1%
Depreciacion	20,755,414	27.5%	24,119,712	21.9%	25,707,837	14.9%	70,582,962	19.7%
Otros gastos explot.	64,224,111	85.2%	11,178,675	10.1%	12,647,970	7.3%	88,050,756	24.6%
Imp. s/ingresos brutos	0	0.0%	894,956	0.8%	7,866,348	4.5%	8,761,305	2.4%
Gastos administracion y comercializacion	56,856,969	75.4%	31,738,804	28.8%	17,515,566	10.1%	106,111,339	29.6%
Total gastos explotacion	263,187,628	349.2%	178,071,344	161.6%	178,087,226	102.9%	619,346,198	172.7%
Ingreso neto explotacion	(187,815,959)	-249.2%	(67,911,511)	-61.6%	(5,008,585)	-2.9%	(260,736,054)	-72.7%
Otros ingresos/egresos no operativos	781,683	1.0%	(864,892)	-0.8%	(182,161)	-0.1%	(265,370)	-0.1%
Resultado antes gastos finan. y ajust. infl.	(187,034,276)	-248.1%	(68,776,402)	-62.4%	(5,190,746)	-3.0%	(261,001,424)	-72.8%
Gastos financieros	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Ajuste inflacion	(293,873,945)	-389.9%	103,884,759	94.3%	62,737,959	36.2%	(127,251,227)	-35.5%
Resultado del ejercicio	(480,908,221)	-638.0%	35,108,356	31.9%	57,547,213	33.2%	(388,252,652)	-108.3%
Ajuste resultados ejercicios anteriores	175,425,385	232.7%	15,850,369	14.4%	360,983,031	208.6%	552,258,784	154.0%
Resultado final	(305,482,837)	-405.3%	50,958,725	46.3%	418,530,243	241.8%	164,006,132	45.7%
	=====	=====	=====	=====	=====	=====	=====	=====

1/ Tasa de cambio: Australes 1.257 = US\$1.00

O.S.N.

Bases para las Proyecciones Financieras

I. Estado de Resultados

1. Datos de operación: El número de "cuentas" 1/ fue estimado para cada clase de servicio (agua potable, alcantarillado sanitario y pluvial) con base en la evolución esperada de la población y en la relación histórica de cuatro habitantes/cuenta.
2. Ingreso medio: Los ingresos medios por tipo de servicio son los resultantes de la relación de los datos acumulados de ventas al mes de mayo de 1987, más una estimación del posible comportamiento de las ventas hasta el fin de ese año, con el número medio de cuentas correspondiente a cada servicio. A los valores así calculados, se aplicó un 10% que es el impacto que, sobre los valores de la facturación en términos reales, se espera habrá de tener la reanudación, a partir del 1ro. de julio de 1987, de la actualización de los coeficientes zonales dentro del plan de recuperación tarifaria. Esos valores unitarios medidos se mantuvieron en magnitudes constantes en el pronóstico preparado.
3. Ingreso de Explotación: Estos son los resultantes del producto de las magnitudes indicadas en los incisos 1. y 2. anteriores. Adicionalmente, se incluyeron partidas operacionales diversas cuyo concepto se explica en los comentarios a las proyecciones financieras en el Capítulo VI del Informe.
4. Egresos de Explotación: A partir de los valores fijados en el presupuesto de OSN para el año 1987, se ha considerado el posible crecimiento vegetativo real que afectaría a algunos rubros, las variaciones en el nivel físico de actividad y el efecto favorable que se espera habrá de tener el proyecto bajo estudio y el Programa de Mejoramiento Operativo a ejecutarse con apoyo del Banco Mundial.
 - a. Salarios y cargas sociales: el aumento vegetativo anual promedio toma en cuenta coeficientes por antigüedad, calificaciones y subsidios, y se lo ha calculado en el equivalente de US\$2.692 miles/año.

1/ Cada cuenta representa un inmueble (usuario).

- b. **Energía eléctrica:** el precio promedio constante usado es US\$0.0363/kwh y fue aplicado a los consumos anuales estimados de energía los cuales incluyen, a partir de 1991, la mayor producción de agua en el Establecimiento General San Martín y las necesidades derivadas de la puesta en marcha de la Cuarta Cloaca Máxima.
 - c. **Materias primas:** son las necesarias para el tratamiento del agua (sulfato de aluminio, cal, ácido sulfúrico, cloro, etc.). El costo anual estimado es de US\$23.831/año el cual, para reflejar la mayor producción de agua a partir de 1991, aumenta -neto del ahorro en coagulante a producirse en el Establecimiento General San Martín- en un 3% anual.
 - d. **Depreciación:** el cargo anual resulta de la aplicación de una tasa media compuesta del 2% sobre la planta en servicio.
 - e. **Cuentas incobrables:** los cargos se calcularon aplicando un porcentaje, sobre los saldos pendientes de cobro al 31/12/86, representativo de los saldos dados de baja más los gastos de cobranza correspondiente a la porción cobrada.
 - f. **Gastos comerciales y de administración:** se han estimado a razón de un 8% sobre el total de ingresos operativos.
 - g. **Impuestos, tasas y contribuciones:** incluyen el Impuesto sobre los Ingresos Brutos, calculado a razón del 3% sobre los ingresos totales, más US\$1.500/año en concepto de tasas y contribuciones diversas.
 - h. **Otros gastos de explotación:** Comprende conceptos tales como materiales y repuestos, conservación y reparación y combustibles y lubricantes. Se ha considerado un incremento del 2% anual.
 - i. **Operación y mantenimiento de la concesión:** incluye un quinceavo de los costos totales de operación y mantenimiento y de administración e impuestos, correspondiente a la concesión del Sistema Cloacal Norte, con base en el presupuesto elaborado por la Empresa.
5. **Otros ingresos y egresos:** se estimaron con base en un crecimiento del 1% anual para los ingresos y 0,6% anual para los egresos.
6. **Gastos financieros:** reflejan los gastos correspondientes a los financiamientos existentes y a contratar.

II. Estado de Origen y Aplicación de Fondos

1. Préstamos: corresponden a los desembolsos de los préstamos No.2641/AR del BIRF y del posible financiamiento del Banco para la operación bajo estudio.
2. Cobro de cuentas vencidas: representa la recuperación anual porcentual de los saldos pendientes al 31/12/86, neta de los dados de baja por incobrables.
3. Servicio de la deuda: resulta del cuadro de servicio de la deuda calculado conforme las condiciones financieras pactadas o que se estima pactar. Las condiciones supuestas para el posible préstamo del Banco son:

<u>Concepto</u>	<u>BID OC/IC</u>
Monto recursos (US\$ miles, en divisas)	104.596
Intereses (%)	7-1/2
Plazos (años)	
1. gracia	4-1/2
2. amortización	20-1/2
3. total	<u>25</u>
Inspección y Vigilancia (%)	1,0
Comisión de crédito (%)	1,25
Desembolso (años)	5

4. Programa de construcción: constituye el Plan Decenal de Inversiones de OSN que incluye además del proyecto en estudio, otras obras de expansión y rehabilitación de los servicios, así como adiciones por equipamiento. En los costos, actualizados al mes de septiembre de 1987, se ha incluido, excepto para el proyecto con posible financiamiento del Banco, la incidencia del Impuesto al Valor Agregado a cargo de OSN. Asimismo, se halla contempladas partidas por imprevistos pero no así, excepto para el proyecto BID, por escalamiento de precios.
5. Requerimientos por Capital de Trabajo:
 - a. Disponibilidades: crecimiento del 1% anual sobre el saldo al fin del ejercicio inmediato anterior.
 - b. Cuentas a cobrar por usuarios: el saldo respectivo representa los siguientes porcentajes con relación a las ventas:

<u>Año</u>	<u>%</u>
1987	16
1988	15
1989	15
1990	15
1991	14
1992	14
1993	13
1994	12
1995	11
1996	11

- c. Inventarios: 2% sobre el Activo Fijo al cierre de cada ejercicio.
- d. Cuentas a pagar: 30% de los costos desembolsados en efectivo.

Proyecto Zona Oeste
Descripción de las Tres Zonas

a) Zona 1

Incluye la totalidad del Partido de Tres de Febrero y las siguientes zonas de distribución en Moron: Moron, Haedo, Palomar, Barrio Paz y parte de Ayerza.

Habitantes: 617.000 (1986)
Población de bajos ingresos: 64%

b) Zona 2

Incluye las siguientes zonas de Moron: Atepan, parte de Ayerza, Villa Tessei y Hurlingham.

Habitantes: 209.800 (1986)
Población de bajos ingresos: 57%

c) Zona 3

Incluye las zonas Merlo Gómez e Ituzaingo. Se dejó fuera la zona de Udaondo donde abundan las casas de residencia temporal, y se dispone de la batería de pozos de Parque Laloir, pues O.S.N. ha decidido postergar la extensión de la red a dicha zona.

Habitantes: 176.700 (1986)
Población de bajos ingresos: 20%

d) Forma de servicio en las tres zonas:

	<u>Zona 1</u>	<u>Zona 2</u>	<u>Zona 3</u>	<u>Total</u>
.Usuarios conectados a la red O.S.N.	373.500	-	-	373.500
.Usuarios conectados a red vecinal	26.500	14.400	4.000	44.900
.Usuarios con perforaciones individ.	<u>217.000</u>	<u>195.400</u>	<u>172.700</u>	<u>585.100</u>
T o t a l :	617.000	209.800	176.700	1.003.500

Estimación de los Costos de Fuentes de Agua en la
Situación sin Proyecto

a) Usuarios Conectados a la Red O.S.N.

Según datos de O.S.N., los gastos variables de producción y distribución de agua en la Zona Oeste, en 1986, fueron los siguientes:

<u>Costo Anual</u> (A. Dic.1986)			
<u>Producción de Agua</u>	<u>Precio de Mercado</u>	<u>CF</u>	<u>Precio de Frontera</u>
Mano de Obra	289.100	0,755	218.270
Energía	556.400	0,590	328.280
Productos Químicos	19.000	0,830	15.770
Otros Gastos	34.200	0,830	28.400
	898.700		590.720
<u>Distribución</u>			
Mano de Obra	274.100	0,755	206.950
Total:	1.172.800		797.670

El agua producida por O.S.N. en 1986 fue de 38,4 millones de m³ y el agua distribuida a la red en mismo año fue de 45,7 millones de m³. Considerando un 20% de pérdidas en red, el costo variable unitario es de 0,0368 A/m³ (0,0249 A/m³ a precios de frontera).

Además del ahorro de estos costos unitarios, el proyecto permitirá que O.S.N. no incurra en costos de perforación de nuevos pozos y en costos de mantenimiento y reposición de bombas utilizadas en la captación de agua subterránea. Considerando valores de reposición (diciembre 1986) de 18.000 A. para la perforación (vida útil 30 años) y de 3270 A. para la bomba (vida útil 10 años) y un caudal promedio de 54,36 m³/hora, se obtiene un costo unitario de 0,0091 A/m³ (0,0075 A/m³ a precios de frontera).

El ahorro total, en US\$ de marzo 1987, es entonces de 0,035 US\$/m³ (0,025 US\$ a precios de frontera).

b) Usuarios Conectados a Redes Cooperativas Vecinales

Se determinó que los usuarios pagan un precio promedio (incluidos cargos fijos) de 0,180 A./m³, que expresado a precio de frontera equivale a aproximadamente 0,150 A./m³. Este precio promedio fue considerado como un indicador aceptable del ahorro total de costos por m³ asociado al reemplazo de las cooperativas de usuarios. Estos ahorros son respectivamente 0,136 US\$/m³ y 0,113 US\$/m³ a precios de marzo 1987.

c) Consumidores con Perforaciones Privadas

Costo Variable

- Energía. Considerando una profundidad de 60 m. más 10 m. adicionales de elevación de agua, se puede estimar que el requerimiento de electricidad es de 0,636 kwh por cada m³ de agua captada. El costo unitario de energía es entonces de 0,045 US\$/m³ (0,026 US\$ a precios de frontera).
- Químicos. Considerando un gasto anual por perforación de 13,6 US\$ en cloro y 3,8 US\$ en lubricantes, se obtiene un costo de 0,044 US\$/m³ (0,037 US\$ a precios de frontera) suponiendo una extracción promedio de agua de 1,08 m³/día.
- Mano de Obra. Considerando un requerimiento anual de 20 horas para limpieza del tanque y reemplazo y verificación de elementos, se obtiene un costo unitario de 0,085 US\$/m³ (0,068 US\$ a precios de frontera).
- Reparaciones. Cada 2,5 años: reparación menor en que se reemplazan cueros, empaquetaduras, vástagos y correas; y cada cinco años: reparación mayor (motor, cilindro, engranajes, etc.). Costo total: 0,134 US\$/m³ (0,110 US\$ a precios de frontera).

Costo Fijo: Considerando un valor de reposición de 830 US\$ con una vida útil de 15 años y una tasa de interés de 9,5%, se obtiene un costo de anualidad de 106 US\$, o sea, un costo de 0,269 US\$/m³ (0,221 US\$ a precios de frontera).

d) Camiones Tanques - O.S.N.

Se consideró que el servicio es atendido por camiones tanques que tienen las siguientes características:

- | | |
|-------------------------|--|
| - Capacidad: | 25 m ³ |
| - Valor de reposición: | 75.000 Australes de dic.1986. |
| - Vida útil: | 10 años. |
| - Valor residual: | 7.500 Australes (10%). |
| - Mantenimiento: | 5% del valor de reposición cada año. |
| - Tiempo por viaje: | 2,5 horas/viaje. |
| - Mano de obra: | 3,89 A/hr (700 A./180 h). |
| - Viajes diarios: | 5 viajes/día. |
| - Días de operación: | 300 días al año. |
| - Kilómetros por viaje: | 50 kms (ida, vuelta, reparto y otros). |
| - Consumo combustible: | 0,25 l/km. |
| - Precio combustible: | 0,40 A/l. |
| - Lubricantes y otros: | 1.500 A/año. |
| - Consumo bomba: | 33% de consumo por transporte. |
| - Agua entregada: | 23,75 m ³ /viaje (5% pérdidas). |
| - Accidentes: | 5% del gasto total. |

En base a estos datos se pueden obtener los siguientes costos de transporte por m³ de agua entregada:

Reposición:	0,331
Mantenimiento:	0,100
Mano de Obra:	0,365
Combustible:	0,200
Consumo bomba:	0,067
Lubricantes:	0,040
Imprevistos:	<u>0,011</u>
Total:	1,114 A/m3

Considerando un 15% de pérdidas, se obtiene un costo unitario de 1,31 A/m3. A este valor hay que sumar el costo unitario de producción y distribución de agua de 0,041 A/m3. Se obtiene, entonces, un total de 1,35 A/m3, o sea 1,016 US\$/m3 a precios de marzo 1987 (0,840 US\$ a precios de frontera).

e) Camiones Tanques - Usuarios Privados

En el caso de los usuarios con perforaciones individuales, se supusieron antecedentes iguales a los recién entregados, excepto que sólo se permitieron tres viajes por día y cinco horas por cada viaje. En base a estos supuestos se obtuvieron los siguientes costos unitarios:

Reposición:	0,552
Mantenimiento:	0,167
Mano de Obra:	0,778
Combustible:	0,200
Consumo bomba:	0,067
Lubricantes:	0,067
Imprevistos:	<u>0,019</u>
Total :	1,850 A/m3

Considerando un 10% de pérdidas, se obtiene un costo unitario de 2,035 A/m3 de agua consumida. A ello hay que sumar el costo variable de producción de agua, que puede estimarse en 0,0203 A/m3. Se obtiene entonces un total de 2,055 A/m3, o sea 1,547 US\$/m3 a precios de marzo 1987 (1,296 US\$ a precios de frontera).

Comparación del Costo de una Perforación
Privada con la Tarifa de O.S.N.

a) Pozos con Bombas Eléctricas

Para un consumidor que ya tiene su propio pozos, el costo promedio del agua captada es de 0,308 US\$/m³ - sin costo fijo - (véase Anexo VI-2), que se compara con el costo promedio del agua O.S.N. de 0,069 US\$/m³ para los consumidores con medidores. Este ahorro de 0,239 US\$/m³ representa 94 US\$/año. El usuario podría entonces recuperar el costo de conectarse a la red O.S.N. (406 US\$) en 4,3 años.

Si además se tiene en cuenta el hecho de que el usuario, de conectarse a la red O.S.N., no deberá sufragar los gastos de reposición, el período de recuperación será más corto (éste depende de la edad del pozo en servicio). Se estimó que la TIR es de un 23% para los usuarios.

b) Pozos con Bombas a Mano

Para esos pozos, utilizados por la población de bajos ingresos, se estimó el costo de captación considerando un mínimo de gastos (la mitad del uso de cloro y 15% de los costos de reparaciones y mano de obra - véase el Anexo VI-2). Se obtiene un costo promedio de 0,047 US\$/m³ que se compara con el costo promedio de agua O.S.N. de 0,040 US\$/m³.

Si el consumidor de bajos ingresos no tiene que pagar para conectarse 1/, la ventaja financiera será muy escasa, pero desaparecerá si este usuario tiene que pagar el costo (o una parte) de la conexión.

1/ La Ordenanza General 165 (Art.36) estipula que la contribución del propietario (al costo total de conexión) no podrá exceder del 33% del valor real del inmueble con la mejora incluida.

Proyecto Planta San Martín

Desglose del Costo Económico de Inversión
(miles de US\$)

	<u>Población</u> <u>Incorporada</u> <u>1/</u>	<u>Obras</u> <u>Básicas</u>	<u>Red</u> <u>Maestra</u>	<u>Red de</u> <u>Distribución</u>	<u>Total</u>
Planta San Martín	-	24.605	-	-	24.605
Zona Oeste	700.000 <u>2/</u>	63.977	23.901	41.490	129.368
Partido Lomas de Zamora	360.440	24.857	12.483	22.795	60.135
Partido Villa Adelina	413.327	2.801	14.314	26.139	43.254
Partido Matanza	404.112	565	13.995	25.556	40.116
Partidos Lanus y Avellaneda	<u>254.239</u>	<u>-</u>	<u>8.805</u>	<u>16.078</u>	<u>24.883</u>
T o t a l :	2.132.118	116.805	73.498	132.058	322.361

1/ Población que en la actualidad tiene pozos privados.
Incorporación, según el Plan Decenal O.S.N., desde 1988 hasta 1995.

2/ Incorporación por el proyecto.