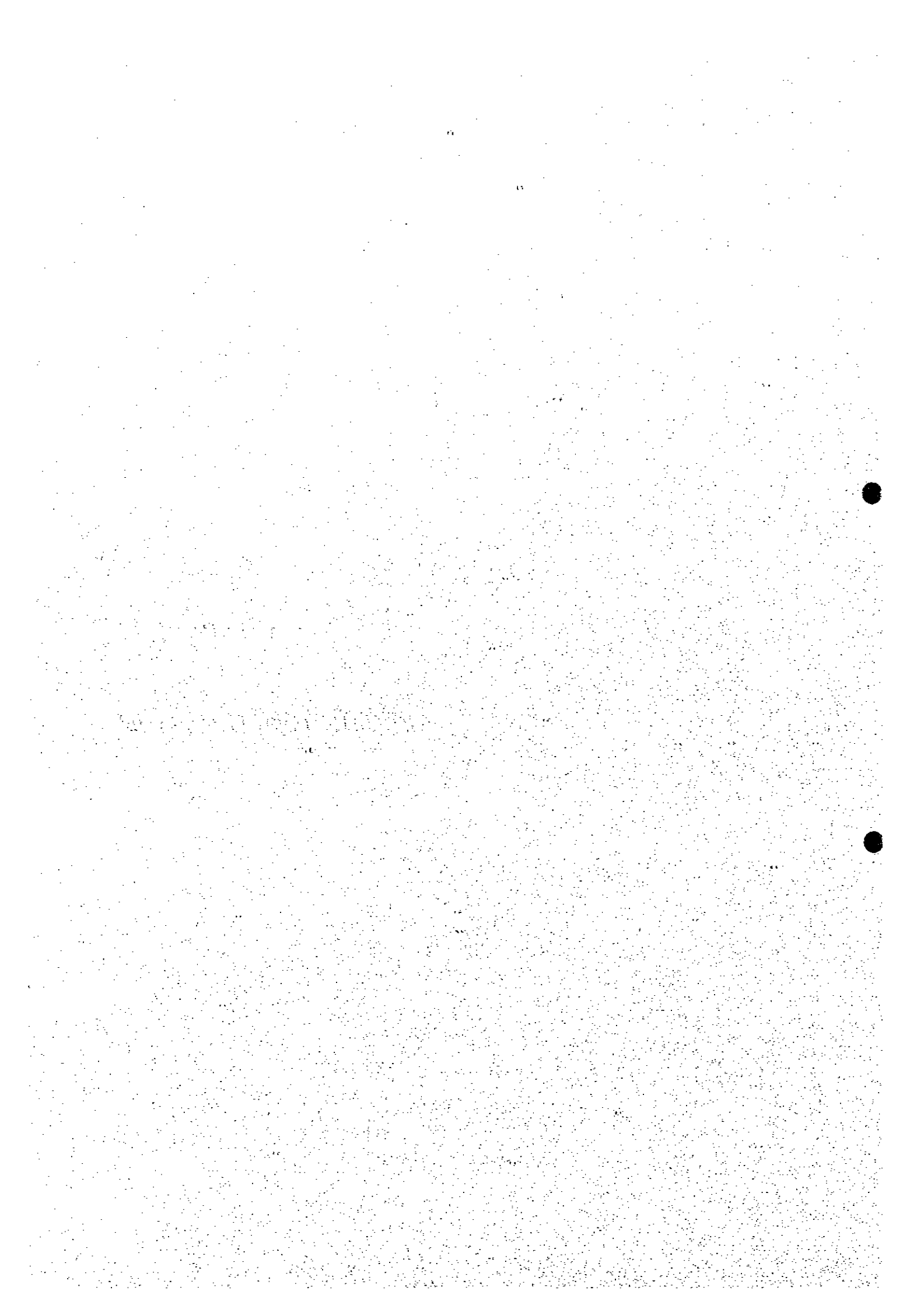


CHAPTER 14

PROJECT EVALUATION



CHAPTER 14 PROJECT EVALUATION

14.1 Technical Evaluation

14.1.1 Justification of Proposed System

At present the wastewater from the Western District of Abidjan City is directly discharged into the Lagoon without treatment. The existing sewerage Master Plan of Abidjan proposes that the sewage flow from the Western District should be connected to the Central Trunk Sewer and discharged into the Gulf of Guinea through the ocean outfall after pre-treatment.

The proposed priority sewerage project covers an area of 5,260 ha and serves a population of 791,500 of Yopougon and Attécoubé areas.

After implementation of this project, the sewerage Master Plan Project of Abidjan will be completed serving a population of three million of the City.

The proposed project is expected to contribute an environment improvement in the Area and its vicinity as described below:

- 1) Total sewage flow of the Project area in 2003 is estimated to be about 83,200 m³/day which is about one third of total sewage flow of the entire Abidjan City. The pollution load of 21,100 kg/day is expected to be reduced in the Lagoon.
- 2) The existing damaged/lost trunk sewers in the Study Area cause serious environmental problem to the riverine people and the Lagoon water quality. These trunk sewers will be rehabilitated to connect to the new interceptor. This will contribute to improvement of sanitary conditions especially in the downstream area.
- 3) In connection with this sewerage project, rehabilitation and improvement of the storm water drainage canals, which cause serious soil erosion and bank failures, will be executed. This related works will improve the conditions of danger of slope failure and degradation of the Lagoon water quality due to excessive sediment run-off.

- 4) At present, the existing sewerage facilities of the Central Trunk Sewer does not efficiently function because of insufficient sewage flow due to sewer low connection ratio in the other districts of the City. As a sewer connection ratio in the Western Area is relatively high (about 60 %), an efficient operation of these sewerage facilities is expected after connection of the new interceptor from the Project Area.

Overall, the proposed priority project is justified to be technically sound and will contribute to a large extent to the improvement of the currently deteriorated public sanitation and environment in the Western District.

14.1.2 Project Execution

The Department of Construction and Sewerage, MLU will be the Executing Agency for the Project, in association with Yopougon and Attécoubé cities, and will assume responsibility for the project implementation. BNETD, the major organization which has substantial sewerage technology, may assist with the planning and supervision of the new construction work and the large scale rehabilitation of sewerage services under contract with the government.

14.1.3 Procurement

The civil works contract is to be awarded through competitive bidding for the construction of interceptor sewers, pumping stations and small pumping units. This includes mechanical and electrical contracts for plants and equipment.

14.1.4 Consulting Services

Consulting services will be required in one tender package for assistance in project implementation, construction supervision, and to undertake training courses for local staff involved in the Project. Detailed design work for the Project will be undertaken by consultants appointed and funded under a budget allocation from the international cooperation agency.

14.1.5 Implementation Schedule

It is envisaged that implementation of the Project will proceed rapidly together with rehabilitation of existing trunk sewers, improvement of the drainage canal and urban road. It is planned that urgent work will be implemented over a period of three years by the end of 2002.

14.1.6 Operation and Maintenance

Operation and maintenance work of the urban water piped system such as sewerage and storm water drainage system of Abidjan are executed by SODECI under a contract with the Government. SODECI has enough capability and experiences in these services and is expected to undertake operation and maintenance work in the western district of Abidjan. Operation and maintenance work in the western district will be similar in the other districts of Abidjan. Rehabilitation of the existing trunk sewers, which is absolutely required to be connected with the new interceptor, is to be executed by SODECI using part of loan which SODECI borrows from the France Development Agency.

14.1.7 Land Acquisition and Rights

Most part of new interceptor sewers will be constructed within proposed or existing road reserves. However, most of the pumping stations and one part of the new interceptor sewer will need to be constructed on privately owned land, which will be purchased as part of the Project. A total of two (2) large pumping stations and three (3) small manhole type pumping units are proposed to be constructed. Pumping station sites have been selected so that no resettlement will be required.

14.2 Economic and Financial Evaluation

The sewerage service in the Western District of Abidjan will be remarkably improved with this project in addition to the accompanying rehabilitation program and new sewerage tariff system. While it will take long period before the improvement of connection rate and collection rate, this project is major break through for the sewerage service in Abidjan.

14.2.1 Financial Evaluation of Project

The financial plan in Chapter 14 assumed full coverage of public fund (domestic or international) for initial investment. But from the conservative point of view, as any aid program requires some portion of internal burden, the Team assumes here ten percent of initial investment must be covered by the hypothetical entity.

The Team has developed the pro forma financial statements (fund flow table, income statement and balance sheet) until 2060. Interest rate is assumed to be 1.5% and annual inflation rate is assumed to be 3% (same as 1996-1997 level).

According to Table 14.1, it is required to prepare some working capital until 2003. The effect of assumed tariff increase at 2011 to 40% level of water charge is tremendous. If this assumption is realized, this hypothetical entity is financially feasible.

14.2.2 FIRR of Project

Under several assumptions, FIRR is 8 % in long run, which support the project positively from the financial point of view. The revenue and expenditure which is used in the calculation are shown in Table 14.2

14.2.3 Sensitivity Analysis

The Team has examined the sensitivity analysis in both initial cost overrun and O&M cost overrun.

1) Investment cost overrun (Case A, Table 14.3)

10% of investment cost overrun or 11% sharing of initial investment will reduce the FIRR to 3%. This means the hypothetical entity is hardly able to accommodate any initial investment cost over 10%. The investment cost should be provided mainly from outside of the entity.

2) O&M cost overrun (Case B through Case C, Table 14.4 through 14.6)

The Team examined three cases: 10%, 20% and 30% O&M cost overrun.

The FIRR is 7%, 5%, and 4% respectively. The entity has same degree of robustness in the area of O&M cost but every effort should be made to keep O&M cost under control.

14.2.4 Socio-Economic Evaluation of Project

From the Socio-Economic point of view, the benefit of this project is tremendous but it is very hard to quantify them while it is surely and visible. Some of them are as follows.

- The improvement of sanitary condition
- The increase of land value
- Industrial promotion
- Amenity
- Tourism
- Fishery in lagoon

Using available data, we have estimated the economic benefits in the land value increase the fishery in Lagoon and Tourism.

1) The increase of Land value

The industrial district in the study area (47 ha) as a whole is paying property tax 29.572 M FCFA twice annually according to individual lot sizes. Annual property tax is assumed to be two percent of land value. If this project increase the land value of the industrial district by ten percent, the economic benefit in 2004 will be 296 M FCFA.

2) Fishery in Lagoon

The output of fishery in Lagoon was 8,372 M FCFA in 1990 (La Cote d'Ivoire en Chiffres,

edition 96-97). After 1990, the output in Lagoon has been disappeared from the official statistics for some reason while other fishery such as ocean and inland fishery has been increasing in output. If we assume five percent of the output in 1990 is increased by this project and the net economic benefit is twenty percent of the output, the net increase of economic benefit in Lagoon fishery is estimated as 84 M FCFA annually.

3) Tourism

In 1995, the whole output in tourism in this country amounted to 100,112 M FCFA. Among them, Vacation tourism and Family tourism made up 56,505 M FCFA (La Cote d'Ivoire en Chiffres, edition 96-97). If we assume five percent of the output in Vacation and Family tourism (1995) is increased by this project and the net economic benefit is twenty percent of the output, the net increase of economic benefit in tourism is estimated as 565 M FCFA annually.

For example, in case of the cruising service (about one hour, 2000 FCFA per person) in Lagoon, if five ships travel five times a day, five passengers for every trip, 150 days operation annually will make 37.5 M FCFA (1875 passengers). In addition, the opening of the bay bridge will increase visitors.

Only above three economic benefits contribute 944 M FCFA in 2004 and 649 M FCFA (after 2005). Under these very conservative assumption EIRR (economic internal rate of return) will be 39.42 % (Table 14.7) based on the same assumption as financial evaluation. Even if fifty percent or one hundred percent of the investment is shared by the project, EIRR is still 9.41% (Table 14.8) or 3.78 % (Table 14.9). Actually the increase of land value is not confined in the industrial district but is surely extended to whole study area. The whole net economic benefit will exceed the above estimate and EIRR in Table 14.9 (Case 3) will be far higher than 3.78 %. It means this project is surely justified from socio-economic point of view too.

14.3 Institutional Evaluation

Institutionally, the whole system is working pretty well but the following points are significantly important also and continuous effort is required;

- The approval of current sewerage tariff proposal
- The increase of sewerage tariff up to 40% of water charge until 2011
- The organizational action to improve both connection rate and collection rate
- To maintain the internal subsidy from Central Business District and international hotels.
- The capital budgeting area to be transferred to SODECI gradually in order to strengthen the organizational capability of SODECI.
- The effective regulatory framework to be developed.

14.4 Environmental Evaluation

Environmental Impact Assessment (EIA) was conducted to study, forecast and evaluate the environmental impacts of this project. The EIA study items were defined through IEE conducted during the stage of review of the existing plan. The study items were evaluated not only in the project area but also in any area that might be directly or indirectly affected during the construction.

As result of IEE, major study items evaluated to study are followings; 1) resettlement of inhabitants land acquisition for pumping station and sewer, 2) water pollution of the Banco Bay, 3) surplus excavated materials disposal 4) odors and screenings/grit disposal 5) effect of industrial wastewater on the material of the sewer 6) pollution from wastewater disposal in the Gulf of Guinea.

Among these study items, the following are due to impacts during construction and were evaluated as follows:

1) Resettlement of inhabitants and land acquisition

The major resettlement problem occurs due to the Urban Road Project and will be solved by that project. For the proposed sewerage facilities such as the pumping station and sewer, the sites were selected avoiding residential area. And acquisition will not cause problem as most part of the land is public land.

2) Water Pollution of the Banco Bay

Water pollution of the Banco Bay during the construction of the Bay crossing structures, the construction does not cause pollution problem because the pile supported pipe laying method, which will minimize the diffusion of silts in the waterway, will be adopted.

3) Surplus excavated material disposal

The most surplus excavated materials will be of natural soil without any harmful material and disposal sites will be easily obtained nearby.

4) Odors and screenings/grit disposal

Odor problem is expected mainly at the pumping station. To prevent odors problem, ventilation pipe for suction and exhaust will be installed by using deodorization device.

The quantity of grit and screenings generated in the pumping stations is expected to be approximately 0.3 m³ and 0.06m³ per day, respectively, and these can be disposed of in the sanitary landfill since the amount is not much to cause any extra problem to the landfill.

5) Effect of industrial wastewater on the material of the sewer

In Abidjan, the prevailing practices of most of the industries are direct discharge to the sewerage system almost without any effective treatment. The untreated industrial wastewater may be containing some harmful compounds to cause corrosion of the sewer.

The new regulations and legislation under formation is expected to be enforced strictly to prevent discharge of industrial wastewater unacceptable to the sewerage system in the future.

As for pollution of the Gulf of Guinea, the Team prepared the T.O.R. for EIA to evaluate environmental impacts on the Gulf of Guinea due to ocean outfall, which discharges the increased wastewater in the stage of operation of the Project. This EIA study will be made by Ivorian side.

TABLE 14.1 PRO FORMA FINANCIAL STATEMENTS (1/3)

	(in mill FCF)																						
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
Flow Table																							
Annual Sales	0.0	0.0	0.0	0.0	1,619.5	1,668.1	1,718.1	1,769.7	1,822.8	1,877.5	1,933.8	2,231.3	2,298.3	2,367.2	2,438.2	2,511.4	2,586.7	2,664.3	2,744.2	2,826.6	2,911.4	2,998.7	
Loan (1.5% Interest)	20.2	122.7	1,069.0	516.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cash Inflow	20.2	122.7	1,069.0	516.8	1,619.5	1,668.1	1,718.1	1,769.7	1,822.8	1,877.5	1,933.8	2,231.3	2,298.3	2,367.2	2,438.2	2,511.4	2,586.7	2,664.3	2,744.2	2,826.6	2,911.4	2,998.7	
Capital Investment	20.2	126.6	1,069.0	516.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Interest Payment (1.5%)	0.3	2.1	18.1	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.8	24.8	23.6	22.3	21.0	19.7	18.4	17.1	15.8	14.5	13.2	
Annual Loan Repayment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	7.0	60.4	86.2	86.2	86.2	86.2	86.2	86.2	86.2	86.2	86.2	
Existing Expense	0.0	0.0	0.0	0.0	1,246.2	1,283.6	1,322.1	1,361.8	1,402.6	1,444.7	1,488.1	1,532.7	1,578.7	1,626.0	1,674.8	1,725.1	1,776.8	1,830.1	1,885.0	1,941.6	1,999.8	2,059.8	
O & M for Interceptor	0.0	0.0	0.0	0.0	263.4	271.3	279.4	287.4	295.4	303.4	311.3	319.3	327.3	335.3	343.3	351.3	359.3	367.3	375.3	383.3	391.3	399.3	
Cash Outflow	20.5	128.7	1,087.2	542.7	1,535.5	1,580.8	1,627.4	1,737.5	1,788.9	1,841.8	1,897.2	1,959.2	2,069.5	2,153.6	2,213.6	2,278.5	2,339.2	2,405.0	2,472.7	2,542.5	2,614.4	2,688.5	
Net Cash Inflow	(0.3)	(6.0)	(18.1)	(25.9)	84.0	87.3	90.7	32.1	33.9	35.7	36.5	272.1	228.7	213.6	224.6	235.9	247.5	259.4	271.6	284.1	297.0	310.2	
Cum. Cash	(0.3)	(6.3)	(24.4)	(50.3)	33.7	121.1	211.8	243.9	277.8	313.5	350.0	622.1	850.9	1,064.5	1,289.1	1,524.9	1,772.4	2,031.7	2,303.3	2,587.4	2,884.4	3,194.6	
Income Statement																							
Annual Sales	0.0	0.0	0.0	0.0	1,619.5	1,668.1	1,718.1	1,769.7	1,822.8	1,877.5	1,933.8	2,231.3	2,298.3	2,367.2	2,438.2	2,511.4	2,586.7	2,664.3	2,744.2	2,826.6	2,911.4	2,998.7	
Existing Expense	0.0	0.0	0.0	0.0	1,246.2	1,283.6	1,322.1	1,361.8	1,402.6	1,444.7	1,488.1	1,532.7	1,578.7	1,626.0	1,674.8	1,725.1	1,776.8	1,830.1	1,885.0	1,941.6	1,999.8	2,059.8	
O & M for Interceptor	0.0	0.0	0.0	0.0	263.4	271.3	279.4	287.4	295.4	303.4	311.3	319.3	327.3	335.3	343.3	351.3	359.3	367.3	375.3	383.3	391.3	399.3	
Annual Depreciation	0.0	0.4	3.1	24.0	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	
Interest Payment (1.5%)	0.3	2.1	18.1	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.8	24.8	23.6	22.3	21.0	19.7	18.4	17.1	15.8	14.5	13.2	
Net Income	(0.3)	(2.5)	(21.2)	(49.9)	47.4	50.7	54.1	(4.5)	(2.8)	(1.0)	0.9	242.4	252.5	263.2	274.2	285.5	297.0	308.9	321.2	333.7	346.6	359.8	
Balance Sheet																							
Cash	(0.3)	(6.3)	(24.4)	(50.3)	33.7	121.1	211.8	243.9	277.8	313.5	350.0	622.1	850.9	1,064.5	1,289.1	1,524.9	1,772.4	2,031.7	2,303.3	2,587.4	2,884.4	3,194.6	
Capital Investment (10%)	20.2	139.0	1,208.1	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	
Less Accum. Depreciation	0.0	0.4	3.6	27.6	64.2	100.9	137.6	174.2	210.9	247.5	284.2	320.9	357.5	394.2	430.8	467.5	504.2	540.8	577.5	614.1	650.8	687.5	
Land (10%)	0.0	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Total Assets	19.9	132.7	1,180.5	1,647.3	1,694.7	1,745.3	1,799.4	1,794.9	1,792.1	1,791.1	1,791.0	2,026.5	2,218.5	2,395.5	2,583.4	2,782.6	2,993.4	3,216.1	3,451.0	3,698.5	3,958.8	4,232.4	
Loan Balance	20.2	130.0	1,208.1	1,724.9	1,724.9	1,724.9	1,724.9	1,724.9	1,724.9	1,724.9	1,723.9	1,716.9	1,656.5	1,570.3	1,484.0	1,397.8	1,311.5	1,225.3	1,139.0	1,052.8	966.6	880.3	
Reserved Fund	(0.3)	(6.3)	(27.5)	(77.6)	(30.2)	20.5	74.5	70.0	67.2	66.3	67.1	309.6	562.0	825.2	1,099.4	1,384.8	1,681.9	1,990.8	2,312.0	2,645.7	2,992.2	3,352.0	
Total Liab. & Capital	19.9	132.7	1,180.5	1,647.3	1,694.7	1,745.3	1,799.4	1,794.9	1,792.1	1,791.1	1,791.0	2,026.5	2,218.5	2,395.5	2,583.4	2,782.6	2,993.4	3,216.1	3,451.0	3,698.5	3,958.8	4,232.4	

TABLE 14.1 PRO FORMA FINANCIAL STATEMENTS (2/3)

(in 1 mill FCFA)

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	
Fund Flow Table																								
Annual Sales	3,088.7	3,181.3	3,276.8	3,375.1	3,476.3	3,580.6	3,688.0	3,798.7	3,912.6	4,030.0	4,150.9	4,275.4	4,403.7	4,535.8	4,671.9	4,812.0	4,956.4	5,105.1	5,258.2	5,416.0	5,578.5	5,745.8	5,918.2	
Loan (1.5% Interest)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cash Inflow	3,088.7	3,181.3	3,276.8	3,381.9	3,535.0	3,754.8	4,036.8	3,798.7	3,912.6	4,030.0	4,150.9	4,275.4	4,403.7	4,535.8	4,671.9	4,812.0	4,956.4	5,105.1	5,258.2	5,416.0	5,578.5	5,745.8	5,918.2	
Capital Investment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Interest Payment (1.5%)	11.9	10.6	9.3	8.1	7.7	9.0	13.0	11.7	10.4	9.2	8.8	8.8	8.8	8.8	8.8	8.8	8.0	7.3	6.7	6.1	5.5	4.9	4.2	
Annual Loan Repayment	80.2	86.2	86.2	86.2	86.2	86.2	86.2	86.2	85.2	79.3	25.8	0.0	0.0	0.0	3.5	12.2	41.3	41.3	41.3	41.3	41.3	41.3	41.3	
Existing Expense	2,121.6	2,185.3	2,250.8	2,318.3	2,387.9	2,459.5	2,533.3	2,609.3	2,687.6	2,768.2	2,851.3	2,936.8	3,024.9	3,115.6	3,209.1	3,305.4	3,404.6	3,506.7	3,611.9	3,720.2	3,831.9	3,946.8	4,065.2	
O & M for Interceptor	545.1	561.5	578.3	595.7	613.5	631.9	650.9	670.4	690.5	711.2	732.6	754.0	777.2	800.5	824.5	849.3	874.7	901.0	928.0	955.8	984.5	1,014.1	1,044.5	
Cash Outflow	2,704.9	2,843.6	2,924.7	3,015.2	3,154.1	3,360.9	3,632.2	3,377.6	3,473.7	3,568.0	3,618.5	3,700.2	3,810.9	3,925.5	4,045.9	4,175.4	4,328.5	4,486.3	4,649.7	4,829.9	5,027.0	5,231.0	5,452.2	
Net Cash Inflow	323.8	337.8	352.1	366.7	380.9	395.9	404.6	421.0	438.9	462.0	522.4	575.3	592.8	610.3	626.0	636.6	627.9	648.8	670.3	692.5	715.3	738.8	763.0	
Cum. Cash	3,518.4	3,856.2	4,208.3	4,575.0	4,955.9	5,349.8	5,754.4	6,175.4	6,614.3	7,076.3	7,608.7	8,184.0	8,776.8	9,387.0	10,013.0	10,649.6	11,277.5	11,926.3	12,596.6	13,289.1	14,004.5	14,743.3	15,506.2	
Income Statement																								
Annual Sales	3,088.7	3,181.3	3,276.8	3,375.1	3,476.3	3,580.6	3,688.0	3,798.7	3,912.6	4,030.0	4,150.9	4,275.4	4,403.7	4,535.8	4,671.9	4,812.0	4,956.4	5,105.1	5,258.2	5,416.0	5,578.5	5,745.8	5,918.2	
Existing Expense	2,121.6	2,185.3	2,250.8	2,318.3	2,387.9	2,459.5	2,533.3	2,609.3	2,687.6	2,768.2	2,851.3	2,936.8	3,024.9	3,115.6	3,209.1	3,305.4	3,404.6	3,506.7	3,611.9	3,720.2	3,831.9	3,946.8	4,065.2	
O & M for Interceptor	545.1	561.5	578.3	595.7	613.5	631.9	650.9	670.4	690.5	711.2	732.6	754.0	777.2	800.5	824.5	849.3	874.7	901.0	928.0	955.8	984.5	1,014.1	1,044.5	
Annual Depreciation	36.7	36.7	36.7	36.7	36.8	38.0	41.7	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	
Interest Payment (1.5%)	11.9	10.6	9.3	8.1	7.7	9.0	13.0	11.7	10.4	9.2	8.8	8.8	8.8	8.8	8.8	8.8	8.0	7.3	6.7	6.1	5.5	4.9	4.2	
Net Income	373.4	387.3	401.7	416.3	430.4	442.1	449.2	458.3	475.2	492.4	509.3	526.3	543.8	561.9	580.5	599.8	620.2	641.1	662.7	684.8	707.7	731.1	755.3	
Balance Sheet																								
Cash	3,518.4	3,856.2	4,208.3	4,575.0	4,955.9	5,349.8	5,754.4	6,175.4	6,614.3	7,076.3	7,608.7	8,184.0	8,776.8	9,387.0	10,013.0	10,649.6	11,277.5	11,926.3	12,596.6	13,289.1	14,004.5	14,743.3	15,506.2	
Capital Investment (10%)	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	1,724.8	
Less Accum. Depreciation	724.1	760.8	797.4	824.1	870.9	908.9	950.6	999.5	1,048.5	1,097.5	1,146.4	1,195.4	1,244.3	1,293.3	1,342.2	1,391.2	1,440.2	1,489.1	1,538.1	1,587.0	1,636.0	1,684.9	1,733.9	
Land (10%)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Total Assets	4,519.5	4,820.6	5,136.0	5,472.9	5,875.7	6,405.7	7,117.5	7,489.5	7,879.5	8,292.6	8,776.0	9,302.3	9,846.1	10,407.4	10,984.4	11,572.1	12,151.0	12,750.8	13,372.2	14,015.8	14,682.1	15,372.0	16,086.0	
Loan Balance	794.1	707.8	621.6	542.2	514.6	602.6	665.1	778.9	693.6	614.3	588.5	588.5	588.5	588.5	584.4	572.2	530.9	489.6	448.4	407.1	365.8	324.5	283.2	
Reserved Fund	3,725.4	4,112.8	4,514.4	4,930.7	5,361.1	5,803.2	6,252.4	6,710.7	7,185.8	7,678.2	8,187.5	8,713.8	9,257.6	9,819.5	10,400.0	10,999.0	11,620.1	12,261.2	12,923.8	13,608.7	14,316.3	15,047.5	15,802.8	
Total Liab. & Capital	4,519.5	4,820.6	5,136.0	5,472.9	5,875.7	6,405.7	7,117.5	7,489.5	7,879.5	8,292.6	8,776.0	9,302.3	9,846.1	10,407.4	10,984.4	11,572.1	12,151.0	12,750.8	13,372.2	14,015.8	14,682.1	15,372.0	16,086.0	

TABLE 14.1 PRO FORMA FINANCIAL STATEMENTS (3/3)

Year	(in 1 mill FCFA)															
	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060
Fund Flow Table																
Annual Sales	6,095.7	6,278.6	6,467.0	6,661.0	6,860.8	7,066.6	7,278.6	7,497.0	7,719.9	7,953.0	8,192.2	8,437.9	8,691.1	8,951.8	9,220.4	9,497.0
Loan (1.5% Interest)	0.0	0.0	0.0	0.0	79.7	467.2	4,217.9	2,038.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cash Inflow	6,095.7	6,278.6	6,467.0	6,661.0	6,860.8	7,146.3	7,485.9	11,714.9	9,760.5	7,953.6	8,192.2	8,437.9	8,691.1	8,951.8	9,220.4	9,497.0
Capital Investment	0.0	0.0	0.0	0.0	0.0	79.7	467.2	4,217.9	2,038.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest Payment (1.5%)	3.6	3.0	2.4	1.8	1.2	1.7	8.1	70.8	100.7	100.1	99.5	98.9	98.5	98.5	98.5	98.4
Annual Loan Repayment:	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	41.3	40.7	37.8	29.1	0.0	0.0	4.0
Existing Expense	4,187.2	4,312.8	4,462.2	4,575.4	4,712.7	4,854.1	4,999.7	5,149.7	5,304.2	5,463.3	5,627.2	5,796.0	5,969.9	6,149.0	6,333.5	6,523.5
O & M for Interceptor	1,075.8	1,105.1	1,141.3	1,175.6	1,210.8	1,247.2	1,284.6	1,323.1	1,362.8	1,403.7	1,445.8	1,489.2	1,533.8	1,579.9	1,627.3	1,676.1
Cash Outflow	5,307.9	5,465.2	5,627.2	5,794.1	5,966.0	6,223.9	6,800.9	10,802.8	8,847.6	7,008.4	7,215.2	7,421.9	7,633.3	7,827.4	8,059.2	8,302.0
Net Cash Inflow	787.9	813.5	839.8	866.9	894.8	922.4	945.0	912.1	912.9	945.2	979.0	1,016.0	1,059.8	1,124.4	1,161.1	1,195.0
Cum. Cash	16,294.1	17,107.5	17,947.4	18,814.3	19,709.1	20,631.5	21,576.5	22,488.6	23,461.5	24,346.7	25,325.7	26,341.7	27,401.5	28,525.9	29,687.0	30,892.0
Income Statement																
Annual Sales	6,095.7	6,278.6	6,467.0	6,661.0	6,860.8	7,066.6	7,278.6	7,497.0	7,719.9	7,953.6	8,192.2	8,437.9	8,691.1	8,951.8	9,220.4	9,497.0
Existing Expense	4,187.2	4,312.8	4,462.2	4,575.4	4,712.7	4,854.1	4,999.7	5,149.7	5,304.2	5,463.3	5,627.2	5,796.0	5,969.9	6,149.0	6,333.5	6,523.5
O & M for Interceptor	1,075.8	1,105.1	1,141.3	1,175.6	1,210.8	1,247.2	1,284.6	1,323.1	1,362.8	1,403.7	1,445.8	1,489.2	1,533.8	1,579.9	1,627.3	1,676.1
Annual Depreciation	49.0	49.0	49.0	49.0	49.0	49.0	50.3	58.1	125.3	160.7	160.7	160.7	160.7	160.7	160.7	160.7
Interest Payment (1.5%)	3.6	3.0	2.4	1.8	1.2	1.7	8.1	70.8	100.7	100.1	99.5	98.9	98.5	98.5	98.5	98.4
Net Income	780.2	805.8	832.1	859.3	887.2	914.7	936.0	895.3	828.9	825.7	858.9	893.1	928.1	963.7	1,000.4	1,038.3
Balance Sheet																
Cash	16,294.1	17,107.5	17,947.4	18,814.3	19,709.1	20,631.5	21,576.5	22,488.6	23,461.5	24,346.7	25,325.7	26,341.7	27,401.5	28,525.9	29,687.0	30,892.0
Capital Investment (10%)	2,313.3	2,313.3	2,313.3	2,313.3	2,313.3	2,392.9	2,890.2	2,078.1	9,116.7	9,116.7	9,116.7	9,116.7	9,116.7	9,116.7	9,116.7	9,116.7
Less Accum. Depreciation	1,782.8	1,831.8	1,880.8	1,929.7	1,978.7	2,027.6	2,077.9	2,126.0	2,261.3	2,422.0	2,582.7	2,743.4	2,904.1	3,064.9	3,225.8	3,386.3
Land (10%)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Total Assets	16,824.9	17,589.4	18,380.3	19,196.2	20,044.1	20,997.2	22,359.2	27,431.1	30,257.4	31,041.8	31,860.1	32,715.4	33,614.4	34,578.2	35,578.6	36,612.8
Loan Balance	242.0	200.7	159.4	118.1	76.9	115.3	541.2	4,717.9	6,713.2	6,673.9	6,633.2	6,595.4	6,566.4	6,566.4	6,566.4	6,562.4
Reserved Fund	16,582.9	17,388.7	18,220.8	19,080.1	19,967.3	20,862.0	21,818.0	22,713.2	23,542.2	24,307.9	25,226.9	26,119.9	27,048.1	28,011.8	29,012.2	30,050.5
Total Liab. & Capital	16,824.9	17,589.4	18,380.3	19,196.2	20,044.1	20,997.2	22,359.2	27,431.1	30,257.4	31,041.8	31,860.1	32,715.4	33,614.4	34,578.2	35,578.6	36,612.8

TABLE 14.2 ESTIMATE OF FIRR

(1 Million FCFA, Price in 1999)

Year	Existing Sales	Sew. Tariff	Annual Sales	INV(10%)	Existing Exp.	O&M(Int erceptor)	Total Exp.	Net Cash Inflow	FIRR
2000	0.0	0.0	0.0	19.6		0.0	19.6	-19.6	
2001	0.0	0.0	0.0	112.0		0.0	112.0	-112.0	
2002	0.0	0.0	0.0	978.3		0.0	978.3	-978.3	
2003	0.0	0.0	0.0	459.1		0.0	459.1	-459.1	
2004	1,118.0	279.0	1,397.0	0.0	1,075.0	227.2	1,302.2	94.8	
2005	1,118.0	279.0	1,397.0	0.0	1,075.0	227.2	1,302.2	94.8	
2006	1,118.0	279.0	1,397.0	0.0	1,075.0	227.2	1,302.2	94.8	
2007	1,118.0	279.0	1,397.0	0.0	1,075.0	276.2	1,351.2	45.8	
2008	1,118.0	279.0	1,397.0	0.0	1,075.0	276.2	1,351.2	45.8	
2009	1,118.0	279.0	1,397.0	0.0	1,075.0	276.2	1,351.2	45.8	
2010	1,118.0	279.0	1,397.0	0.0	1,075.0	276.2	1,351.2	45.8	
2011	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2012	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2013	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2014	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2015	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2016	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2017	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2018	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2019	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2020	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2021	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2022	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2023	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2024	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2025	1,118.0	447.0	1,565.0	3.2	1,075.0	276.2	1,354.4	210.6	
2026	1,118.0	447.0	1,565.0	26.4	1,075.0	276.2	1,377.6	187.4	
2027	1,118.0	447.0	1,565.0	76.1	1,075.0	276.2	1,427.3	137.7	
2028	1,118.0	447.0	1,565.0	148.0	1,075.0	276.2	1,499.2	65.8	
2029	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2030	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2031	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2032	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2033	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2034	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2035	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2036	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2037	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2038	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2039	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2040	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2041	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2042	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2043	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2044	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2045	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2046	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2047	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2048	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2049	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2050	1,118.0	447.0	1,565.0	17.6	1,075.0	276.2	1,368.8	196.2	
2051	1,118.0	447.0	1,565.0	100.5	1,075.0	276.2	1,451.7	113.3	
2052	1,118.0	447.0	1,565.0	880.5	1,075.0	276.2	2,231.7	-666.7	
2053	1,118.0	447.0	1,565.0	413.2	1,075.0	276.2	1,764.4	-199.4	
2054	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2055	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2056	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2057	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2058	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2059	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2060	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	8.58%

Note 1: Life of M&E is 25 years and life of Civil works is 50 Years.

Note 2: Salvage value is assumed 10 % in both M&E and Civil Works.

TABLE 14.3 ESTIMATE OF FIRR
CASE A : 10% COST INCREASE IN INVESTMENT

(I mill FCFA, Price in 1999)

Year	Existing Sales	Sew. Tariff	Annual Sales	INV(11%)	Existing Exp.	O&M(Int crepeter)	Total Exp.	Net Cash Inflow	FIRR
2000	0.0	0.0	0.0	21.6		0.0	41.2	-41.2	
2001	0.0	0.0	0.0	123.2		0.0	235.2	-235.2	
2002	0.0	0.0	0.0	1,076.2		0.0	2,054.5	-2,054.5	
2003	0.0	0.0	0.0	505.0		0.0	964.0	-964.0	
2004	1,118.0	279.0	1,397.0	0.0	1,075.0	227.2	1,302.2	94.8	
2005	1,118.0	279.0	1,397.0	0.0	1,075.0	227.2	1,302.2	94.8	
2006	1,118.0	279.0	1,397.0	0.0	1,075.0	227.2	1,302.2	94.8	
2007	1,118.0	279.0	1,397.0	0.0	1,075.0	276.2	1,351.2	45.8	
2008	1,118.0	279.0	1,397.0	0.0	1,075.0	276.2	1,351.2	45.8	
2009	1,118.0	279.0	1,397.0	0.0	1,075.0	276.2	1,351.2	45.8	
2010	1,118.0	279.0	1,397.0	0.0	1,075.0	276.2	1,351.2	45.8	
2011	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2012	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2013	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2014	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2015	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2016	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2017	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2018	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2019	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2020	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2021	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2022	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2023	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2024	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2025	1,118.0	447.0	1,565.0	3.5	1,075.0	276.2	1,357.9	207.1	
2026	1,118.0	447.0	1,565.0	29.1	1,075.0	276.2	1,406.7	158.3	
2027	1,118.0	447.0	1,565.0	83.7	1,075.0	276.2	1,511.1	53.9	
2028	1,118.0	447.0	1,565.0	162.8	1,075.0	276.2	1,662.0	-97.0	
2029	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2030	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2031	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2032	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2033	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2034	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2035	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2036	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2037	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2038	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2039	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2040	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2041	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2042	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2043	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2044	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2045	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2046	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2047	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2048	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2049	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2050	1,118.0	447.0	1,565.0	19.4	1,075.0	276.2	1,388.2	176.8	
2051	1,118.0	447.0	1,565.0	110.5	1,075.0	276.2	1,562.2	2.8	
2052	1,118.0	447.0	1,565.0	968.5	1,075.0	276.2	3,200.2	-1,635.2	
2053	1,118.0	447.0	1,565.0	454.5	1,075.0	276.2	2,218.8	-653.8	
2054	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2055	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2056	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2057	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2058	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2059	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	
2060	1,118.0	447.0	1,565.0	0.0	1,075.0	276.2	1,351.2	213.8	3.79%

Note 1: Life of M&E is 25 years and life of Civil works is 50 Years.

Note 2: Salvage value is assumed 10 % in both M&E and Civil Works.

TABLE 14.4 ESTIMATE OF FIRR
CASE B : 10% INCREASE OF O&M COST

(1 mill FCFA, Price in 1999)

Year	Existing Sales	Sew. Tariff	Annual Sales	INV(10%)	Existing Exp.	O&M(Int erceptor)	Total Exp.	Net Cash Inflow	FIRR
2000	0.0	0.0	0.0	19.6		0.0	19.6	-19.6	
2001	0.0	0.0	0.0	112.0		0.0	112.0	-112.0	
2002	0.0	0.0	0.0	978.3		0.0	978.3	-978.3	
2003	0.0	0.0	0.0	459.1		0.0	459.1	-459.1	
2004	1,118.0	279.0	1,397.0	0.0	1,075.0	249.9	1,324.9	72.1	
2005	1,118.0	279.0	1,397.0	0.0	1,075.0	249.9	1,324.9	72.1	
2006	1,118.0	279.0	1,397.0	0.0	1,075.0	249.9	1,324.9	72.1	
2007	1,118.0	279.0	1,397.0	0.0	1,075.0	303.8	1,378.8	18.2	
2008	1,118.0	279.0	1,397.0	0.0	1,075.0	303.8	1,378.8	18.2	
2009	1,118.0	279.0	1,397.0	0.0	1,075.0	303.8	1,378.8	18.2	
2010	1,118.0	279.0	1,397.0	0.0	1,075.0	303.8	1,378.8	18.2	
2011	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2012	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2013	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2014	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2015	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2016	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2017	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2018	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2019	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2020	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2021	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2022	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2023	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2024	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2025	1,118.0	447.0	1,565.0	3.2	1,075.0	303.8	1,382.0	183.0	
2026	1,118.0	447.0	1,565.0	26.4	1,075.0	303.8	1,405.3	159.7	
2027	1,118.0	447.0	1,565.0	76.1	1,075.0	303.8	1,454.9	110.1	
2028	1,118.0	447.0	1,565.0	148.0	1,075.0	303.8	1,526.8	38.2	
2029	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2030	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2031	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2032	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2033	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2034	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2035	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2036	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2037	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2038	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2039	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2040	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2041	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2042	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2043	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2044	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2045	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2046	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2047	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2048	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2049	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2050	1,118.0	447.0	1,565.0	17.6	1,075.0	303.8	1,396.5	168.5	
2051	1,118.0	447.0	1,565.0	100.5	1,075.0	303.8	1,479.3	85.7	
2052	1,118.0	447.0	1,565.0	880.5	1,075.0	303.8	2,259.3	-694.3	
2053	1,118.0	447.0	1,565.0	413.2	1,075.0	303.8	1,792.0	-227.0	
2054	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2055	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2056	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2057	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2058	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2059	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	
2060	1,118.0	447.0	1,565.0	0.0	1,075.0	303.8	1,378.8	186.2	7.29%

Note 1: Life of M&E is 25 years and life of Civil works is 50 Years.

Note 2: Salvage value is assumed 10 % in both M&E and Civil Works.

TABLE 14.5 ESTIMATE OF FIRR
CASE C : 20% OF INCREASE OF O&M COST

(I mill FCFA, Price in 1999)

Year	Existing Sales	Sew. Tariff	Annual Sales	INV(10%)	Existing Exp.	O&M(Int erceptor)	Total Exp.	Net Cash Inflow	FIRR
2000	0.0	0.0	0.0	19.6		0.0	19.6	-19.6	
2001	0.0	0.0	0.0	112.0		0.0	112.0	-112.0	
2002	0.0	0.0	0.0	978.3		0.0	978.3	-978.3	
2003	0.0	0.0	0.0	459.1		0.0	459.1	-459.1	
2004	1,118.0	279.0	1,397.0	0.0	1,075.0	272.6	1,347.6	49.4	
2005	1,118.0	279.0	1,397.0	0.0	1,075.0	272.6	1,347.6	49.4	
2006	1,118.0	279.0	1,397.0	0.0	1,075.0	272.6	1,347.6	49.4	
2007	1,118.0	279.0	1,397.0	0.0	1,075.0	331.4	1,406.4	-9.4	
2008	1,118.0	279.0	1,397.0	0.0	1,075.0	331.4	1,406.4	-9.4	
2009	1,118.0	279.0	1,397.0	0.0	1,075.0	331.4	1,406.4	-9.4	
2010	1,118.0	279.0	1,397.0	0.0	1,075.0	331.4	1,406.4	-9.4	
2011	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2012	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2013	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2014	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2015	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2016	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2017	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2018	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2019	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2020	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2021	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2022	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2023	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2024	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2025	1,118.0	447.0	1,565.0	3.2	1,075.0	331.4	1,409.6	155.4	
2026	1,118.0	447.0	1,565.0	26.4	1,075.0	331.4	1,432.9	132.1	
2027	1,118.0	447.0	1,565.0	76.1	1,075.0	331.4	1,482.6	82.4	
2028	1,118.0	447.0	1,565.0	148.0	1,075.0	331.4	1,554.4	10.6	
2029	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2030	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2031	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2032	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2033	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2034	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2035	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2036	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2037	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2038	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2039	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2040	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2041	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2042	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2043	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2044	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2045	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2046	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2047	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2048	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2049	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2050	1,118.0	447.0	1,565.0	17.6	1,075.0	331.4	1,424.1	140.9	
2051	1,118.0	447.0	1,565.0	100.5	1,075.0	331.4	1,506.9	58.1	
2052	1,118.0	447.0	1,565.0	880.5	1,075.0	331.4	2,286.9	-721.9	
2053	1,118.0	447.0	1,565.0	413.2	1,075.0	331.4	1,819.6	-254.6	
2054	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2055	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2056	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2057	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2058	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2059	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	
2060	1,118.0	447.0	1,565.0	0.0	1,075.0	331.4	1,406.4	158.6	5.93%

Note 1: Life of M&E is 25 years and life of Civil works is 50 Years.

Note 2: Salvage value is assumed 10 % in both M&E and Civil Works.

TABLE 14.6 ESTIMATE OF FIRR
CASE D : 30% INCREASE OF O&M COST

(1 mill FCFA, Price in 1999)

Year	Existing Sales	Sew. Tariff	Annual Sales	INV(10%)	Existing Exp.	O&M(Int receptor)	Total Exp.	Net Cash Inflow	FIRR
2000	0.0	0.0	0.0	19.6		0.0	19.6	-19.6	
2001	0.0	0.0	0.0	112.0		0.0	112.0	-112.0	
2002	0.0	0.0	0.0	978.3		0.0	978.3	-978.3	
2003	0.0	0.0	0.0	459.1		0.0	459.1	-459.1	
2004	1,118.0	279.0	1,397.0	0.0	1,075.0	295.4	1,370.4	26.6	
2005	1,118.0	279.0	1,397.0	0.0	1,075.0	295.4	1,370.4	26.6	
2006	1,118.0	279.0	1,397.0	0.0	1,075.0	295.4	1,370.4	26.6	
2007	1,118.0	279.0	1,397.0	0.0	1,075.0	359.1	1,434.1	-37.1	
2008	1,118.0	279.0	1,397.0	0.0	1,075.0	359.1	1,434.1	-37.1	
2009	1,118.0	279.0	1,397.0	0.0	1,075.0	359.1	1,434.1	-37.1	
2010	1,118.0	279.0	1,397.0	0.0	1,075.0	359.1	1,434.1	-37.1	
2011	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2012	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2013	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2014	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2015	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2016	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2017	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2018	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2019	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2020	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2021	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2022	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2023	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2024	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2025	1,118.0	447.0	1,565.0	3.2	1,075.0	359.1	1,437.2	127.8	
2026	1,118.0	447.0	1,565.0	26.4	1,075.0	359.1	1,460.5	104.5	
2027	1,118.0	447.0	1,565.0	76.1	1,075.0	359.1	1,510.2	54.8	
2028	1,118.0	447.0	1,565.0	148.0	1,075.0	359.1	1,582.1	-17.1	
2029	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2030	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2031	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2032	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2033	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2034	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2035	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2036	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2037	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2038	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2039	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2040	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2041	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2042	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2043	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2044	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2045	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2046	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2047	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2048	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2049	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2050	1,118.0	447.0	1,565.0	17.6	1,075.0	359.1	1,451.7	113.3	
2051	1,118.0	447.0	1,565.0	100.5	1,075.0	359.1	1,534.5	30.5	
2052	1,118.0	447.0	1,565.0	880.5	1,075.0	359.1	2,314.6	-749.6	
2053	1,118.0	447.0	1,565.0	413.2	1,075.0	359.1	1,847.2	-282.2	
2054	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2055	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2056	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2057	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2058	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2059	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	
2060	1,118.0	447.0	1,565.0	0.0	1,075.0	359.1	1,434.1	130.9	4.45%

Note 1: Life of M&E is 25 years and life of Civil works is 50 Years.

Note 2: Salvage value is assumed 10 % in both M&E and Civil Works.

TABLE 14.7 ESTIMATE OF EIRR (CASE 1)

I Million FCFA, Price in 1999)

Year	Existing Sales	Ser. Tariff	Annual Sales	Other Economic Benefit	Total Economic Benefit	INV (10%)	Existing Exp.	O&M(Inte receptor)	Total Exp.	Net Economic Inflow	EIRR
2000	0.0	0.0	0.0		0.0	19.6		0.0	19.6	-19.6	
2001	0.0	0.0	0.0		0.0	112.0		0.0	112.0	-112.0	
2002	0.0	0.0	0.0		0.0	978.3		0.0	978.3	-978.3	
2003	0.0	0.0	0.0		0.0	459.1		0.0	459.1	-459.1	
2004	1,118.0	279.0	1,397.0	944.0	2,341.0	0.0	1,075.0	227.2	1,302.2	1,038.8	
2005	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	227.2	1,302.2	743.8	
2006	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	227.2	1,302.2	743.8	
2007	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2008	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2009	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2010	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2011	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2012	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2013	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2014	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2015	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2016	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2017	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2018	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2019	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2020	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2021	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2022	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2023	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2024	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2025	1,118.0	447.0	1,565.0	649.0	2,214.0	3.2	1,075.0	276.2	1,354.4	859.6	
2026	1,118.0	447.0	1,565.0	649.0	2,214.0	26.4	1,075.0	276.2	1,377.6	836.4	
2027	1,118.0	447.0	1,565.0	649.0	2,214.0	76.1	1,075.0	276.2	1,427.3	786.7	
2028	1,118.0	447.0	1,565.0	649.0	2,214.0	148.0	1,075.0	276.2	1,499.2	714.8	
2029	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2030	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2031	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2032	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2033	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2034	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2035	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2036	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2037	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2038	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2039	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2040	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2041	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2042	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2043	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2044	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2045	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2046	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2047	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2048	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2049	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2050	1,118.0	447.0	1,565.0	649.0	2,214.0	17.6	1,075.0	276.2	1,368.8	845.2	
2051	1,118.0	447.0	1,565.0	649.0	2,214.0	100.5	1,075.0	276.2	1,451.7	762.3	
2052	1,118.0	447.0	1,565.0	649.0	2,214.0	880.5	1,075.0	276.2	2,231.7	-17.7	
2053	1,118.0	447.0	1,565.0	649.0	2,214.0	413.2	1,075.0	276.2	1,764.4	449.6	
2054	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2055	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2056	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2057	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2058	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2059	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2060	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	39.42%

Note 1: Life of M&E is 25 years and life of Civil Works is 50 years.

Note 2: Salvage value is assumed 10% in both M&E and Civil Works.

TABLE 14.8 ESTIMATE OF EIRR (CASE 2)

1 Million FCFA, Price in 1999)

Year	Existing Sales	Ser. Tariff	Annual Sales	Other Economic Benefit	Total Economic Benefit	INV (50%)	Existing Exp.	O&M(Inte rceptor)	Total Exp	Net Economic Inflow	EIRR
2000	0.0	0.0	0.0		0.0	98.0		0.0	98.0	-98.0	
2001	0.0	0.0	0.0		0.0	560.0		0.0	560.0	-560.0	
2002	0.0	0.0	0.0		0.0	4,891.5		0.0	4,891.5	-4,891.5	
2003	0.0	0.0	0.0		0.0	2,295.5		0.0	2,295.5	-2,295.5	
2004	1,118.0	279.0	1,397.0	944.0	2,341.0	0.0	1,075.0	227.2	1,302.2	1,038.8	
2005	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	227.2	1,302.2	743.8	
2006	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	227.2	1,302.2	743.8	
2007	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2008	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2009	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2010	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2011	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2012	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2013	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2014	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2015	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2016	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2017	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2018	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2019	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2020	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2021	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2022	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2023	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2024	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2025	1,118.0	447.0	1,565.0	649.0	2,214.0	16.0	1,075.0	276.2	1,367.2	846.8	
2026	1,118.0	447.0	1,565.0	649.0	2,214.0	132.0	1,075.0	276.2	1,483.2	730.8	
2027	1,118.0	447.0	1,565.0	649.0	2,214.0	380.5	1,075.0	276.2	1,731.7	482.3	
2028	1,118.0	447.0	1,565.0	649.0	2,214.0	740.0	1,075.0	276.2	2,091.2	122.8	
2029	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2030	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2031	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2032	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2033	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2034	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2035	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2036	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2037	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2038	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2039	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2040	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2041	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2042	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2043	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2044	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2045	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2046	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2047	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2048	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2049	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2050	1,118.0	447.0	1,565.0	649.0	2,214.0	88.0	1,075.0	276.2	1,439.2	774.8	
2051	1,118.0	447.0	1,565.0	649.0	2,214.0	502.5	1,075.0	276.2	1,853.7	360.3	
2052	1,118.0	447.0	1,565.0	649.0	2,214.0	4,402.5	1,075.0	276.2	5,753.7	-3,539.7	
2053	1,118.0	447.0	1,565.0	649.0	2,214.0	2,066.0	1,075.0	276.2	3,417.2	-1,203.2	
2054	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2055	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2056	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2057	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2058	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2059	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2060	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	9.41%

Note 1: Life of M&E is 25 years and life of Civil Works is 50 years.

Note 2: Salvage value is assumed 10% in both M&E and Civil Works.

TABLE 14.9 ESTIMATE OF EIRR (CASE 3)

1 Million FCFA, Price in 1999)

Year	Existing Sales	Ser. Tariff)	Annual Sales	Other Economic Benefit	Total Economic Benefit	INV (100%)	Existing Exp.	O&M(Inte rceptor)	Total Exp	Net Economic Inflow	EIRR
2000	0.0	0.0	0.0		0.0	196.0		0.0	196.0	-196.0	
2001	0.0	0.0	0.0		0.0	1,120.0		0.0	1,120.0	-1,120.0	
2002	0.0	0.0	0.0		0.0	9,783.0		0.0	9,783.0	-9,783.0	
2003	0.0	0.0	0.0		0.0	4,591.0		0.0	4,591.0	-4,591.0	
2004	1,118.0	279.0	1,397.0	944.0	2,341.0	0.0	1,075.0	227.2	1,302.2	1,038.8	
2005	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	227.2	1,302.2	743.8	
2006	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	227.2	1,302.2	743.8	
2007	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2008	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2009	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2010	1,118.0	279.0	1,397.0	649.0	2,046.0	0.0	1,075.0	276.2	1,351.2	694.8	
2011	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2012	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2013	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2014	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2015	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2016	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2017	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2018	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2019	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2020	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2021	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2022	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2023	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2024	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2025	1,118.0	447.0	1,565.0	649.0	2,214.0	32.0	1,075.0	276.2	1,383.2	830.8	
2026	1,118.0	447.0	1,565.0	649.0	2,214.0	264.0	1,075.0	276.2	1,615.2	598.8	
2027	1,118.0	447.0	1,565.0	649.0	2,214.0	761.0	1,075.0	276.2	2,112.2	101.8	
2028	1,118.0	447.0	1,565.0	649.0	2,214.0	1,480.0	1,075.0	276.2	2,831.2	-617.2	
2029	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2030	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2031	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2032	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2033	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2034	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2035	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2036	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2037	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2038	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2039	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2040	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2041	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2042	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2043	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2044	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2045	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2046	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2047	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2048	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2049	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2050	1,118.0	447.0	1,565.0	649.0	2,214.0	176.0	1,075.0	276.2	1,527.2	686.8	
2051	1,118.0	447.0	1,565.0	649.0	2,214.0	1,005.0	1,075.0	276.2	2,356.2	-142.2	
2052	1,118.0	447.0	1,565.0	649.0	2,214.0	8,805.0	1,075.0	276.2	10,156.2	-7,942.2	
2053	1,118.0	447.0	1,565.0	649.0	2,214.0	4,132.0	1,075.0	276.2	5,483.2	-3,269.2	
2054	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2055	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2056	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2057	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2058	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2059	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	
2060	1,118.0	447.0	1,565.0	649.0	2,214.0	0.0	1,075.0	276.2	1,351.2	862.8	3.78%

Note 1: Life of M&E is 25 years and life of Civil Works is 50 years.

Note 2: Salvage value is assumed 10% in both M&E and Civil Works.

CHAPTER 15

RECOMMENDATIONS

CHAPTER 15 RECOMMENDATIONS

The success of a short term strategy for sanitation improvement and environment protection of the western district of Abidjan City and its surrounding areas (the Study area) require the implementation of a range of actions. Recommendations include:

- 1) Rehabilitation of the existing damaged trunk sewers to connect them to a new interceptor.
- 2) Improvement and rehabilitation of the existing drainage canal for erosion and sediment run-off control, protection of river bank and for securing the safety of riverine people.
- 3) Early Implementation of a proposed urban road where the new interceptor will be installed.
- 4) Early onset of procedures for resident relocation in the proposed urban road area.
- 5) Increase in the connection ratio to the trunk sewers in the northern, eastern and central districts of Abidjan City for environment protection and effective use of sewerage facilities.
- 6) Connection of the Interceptor from the Western District to the Central Trunk Sewer and also the increase of the connection ratio in the other districts of Abidjan City imply the increase of the pollution load to be discharged through the Ocean Outfall. To cope with this problem, the construction of the Primary/secondary Treatment Plant, instead of the present Pre-treatment Plant, should be necessary in the future.
- 7) Implementation of sediment run-off control works especially in the 35-36 Trunk Sewer basin for protection of sewerage and drainage facilities.
- 8) Introduction of public education programs to promote community participation and understanding of the importance and benefits of public sanitation works;
- 9) Training of personnel in project management, financial management, and the operation and maintenance of wastewater and drainage facilities.

APPENDIX

MUNITES OF MEETING

MINUTES OF MEETINGS
ON
SCOPE OF WORK
FOR
THE FEASIBILITY STUDY
ON
SEWERAGE FACILITIES IN WESTERN DISTRICT OF ABIDJAN CITY
IN
THE REPUBLIC OF COTE D'IVOIRE
AGREED UPON BETWEEN
MINISTRY OF HOUSING AND CITY PLANNING
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

P. Le Ministre et par Délégation
Le Directeur de Cabinet

D. NANOU

Mr. Albert KAKOU TIAPANI
Minister for Housing and City
Planning,
Republic of Cote d'Ivoire



Abidjan, November 4, 1998

H. Nakajima
Mr. Hideichiro NAKAJIMA
Team Leader,
Preparatory Study Team,
Japan International Cooperation
Agency (JICA)

In response to the official request of the Government of the Republic of Cote d'Ivoire (hereinafter referred to as "the Government of Cote d'Ivoire"), the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Study Team, headed by Mr. Hideichiro NAKAJIMA (hereinafter referred to as "the Team"), to Cote d'Ivoire from October 25 to November 13, 1998 to discuss the Scope of Work (hereinafter referred to as "S/W") for the Feasibility Study on Sewerage Facilities in Western District of Abidjan City in the Republic of Cote d'Ivoire (hereinafter referred to as "the Study"). During its stay in Cote d'Ivoire, the Team held a series of meetings with Ministry of Housing and City Planning (hereinafter referred to as "MLU") and other authorities concerned of the Government of Cote d'Ivoire and conducted a reconnaissance on the Study area. The list of those who attended these meetings is shown in the Appendix I.

The Minutes of Meetings have been prepared for the better understanding of the S/W agreed upon between MLU and the Team on November 4, 1998. The main items which were discussed and agreed by both sides are as follows.

1. Study Title

Both sides agreed that the Study title would be "the Feasibility Study on Sewerage Facilities in Western District of Abidjan City in the Republic of Cote d'Ivoire" as described in the S/W.

2. Target Year

Both sides agreed that the target year in the Study would be 2003.

3. Sewerage Facilities to be covered in the Study

Both sides agreed that, when the existing sewer trunk (from Adjame Commune to existing Koumassi wastewater treatment plant) is insufficient to accept the wastewater from the Study area, the Study would cover the improvement plan for the insufficient sewer trunk. Both sides also confirmed that the following items would be out of the scope and carried out by the Ivorian side:

- (1) expansion and improvement of the existing sewer system in the Study area,
- (2) improvement of existing Koumassi wastewater treatment plant and ocean outfall diffuser, and

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- (3) planning of pre-treatment facilities for the industrial wastewater.
4. Wastewater to be covered in the Study
- As for the wastewater, both sides agreed the following matters:
- (1) the Study would cover domestic wastewater and industrial wastewater which flew into the existing sewerage facilities in the Study area,
 - (2) the industrial wastewater accepted to the sewer network should satisfy the existing water quality standards within the Study,
 - (3) rainwater would be out of the scope, because rainwater and wastewater were collected in different sewer systems.
5. Environmental Impact Assessment (EIA)
- Both sides agreed that EIA would be conducted in regard to the impact by new sewerage facilities under construction in the Study area. Therefore the impact by ocean outfall diffuser would be out of the scope and carried out by the Ivorian side.
6. Procedures to be taken by the Ivorian side
- For the smooth implementation of the Study, Both sides confirmed that MLU would be responsible for taking following procedures:
- (1) to acquire the lands for the new sewerage facilities,
 - (2) to permit topographic and geological survey on land and/or on the lagoon,
 - (3) to get neighbors' consent for the Study, and
 - (4) to get consent from the authorities concerned to the construction plan of sewerage facilities across lagoon, when necessity arises.
7. Reports
- (1) The Team explained that JICA would prepare and submit the following reports in English in the course of the Study:
 - a. Inception Report, Interim Report and Draft Final Report: twenty (20) copies in English,
 - b. Final Report: fifty (50) copies in English.
- However, the Ivorian side expressed the need to prepare the following reports in French, instead of reports in English, as

the reference materials for the better understanding of the Study result:

- c. Inception Report and Interim Report: five (5) copies in English and twenty (20) copies in French,
- d. main report and summary of Draft Final Report: five (5) copies in English and twenty (20) copies in French, and
- e. main report and summary of Final Report: ten (10) copies in English and forty (40) copies in French.

The team recognized this necessity and mentioned that the Team would convey this request to JICA.

- (2) Both sides agreed that all the reports would be open to the public in order to achieve maximum use of the Study results.

8. Counterpart Training

The Ivorian side requested that JICA conduct the counterpart training in Japan for the smooth technology transfer related to sewerage planning. The Team answered to convey this request to JICA.

9. Technology Transfer Seminar

The Ivorian side requested that JICA hold the seminar for the technology transfer and public awareness in the course of the Study. The Team recognized the necessity and promised to convey this request to JICA.

10. Steering Committee

Both sides agreed that the Ivorian side would organize the steering committee which would be responsible for overall supervision of the Study and decision making on policy matter related to the Study. The member of the steering committee would be, at least, from authorities concerned as listed in Appendix II, and would be assigned at the commencement of the Study.

11. Undertakings of the Ivorian side

- (1) Both sides agreed that the Ivorian side would organize the counterpart team which would cooperate with the Study Team. The members of the counterpart team would be finalized by Ivorian side.

and the Study Team throughout discussions at the commencement of the Study. In addition, ability of English conversation is preferable qualification for the counterpart personnel.

- (2) Both sides confirmed that the Ivorian side would provide a suitable office space with necessary equipment such as furniture and telephone line before the commencement of the Study. However, the Ivorian side expressed the difficulty to bear the international telephone call charge. The Team recognized this situation and promised to convey it to JICA.
- (3) The Team requested the Ivorian side to provide sufficient numbers of vehicles with drivers. However, the Ivorian side answered that it would be difficult due to the budgetary constraint. The Team mentioned that the Team would convey this situation to JICA.

12. Explanation of JICA's program

The Team explained JICA's Development Study program and the Ivorian side fully understood the Program.

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Appendix I

List of Participants

(Ivorian side)

Ministry of Housing and City Planning (MLU)

Mr. Nanou Desire	Director of Cabinet
Mr. Djigbenou Firmin	Sub-Director , Department of sewerage construction

National Bureau of Technical Studies and Development (BNETD)

Mr. Bamba Aboubakar	Chief, Sewerage Section
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Service for Inspection of Classified Facilities (SIIC)

Mr. Serret Trobia	Inspector of classified facilities
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(Japanese side)

Preparatory Study Team

Mr. Hideichiro NAKAJIMA	Team Leader / Sewerage Planning
Mr. Masahiro UEKI	Member / Project Officer
Mr. Fumio FUKUDA	Member / Sewerage Facility
Ms. Hiroko KAMATA	Member / Sewage & Industrial wastewater / Environmental Consideration
Mr. Masao MATSUBARA	Member / Interpreter

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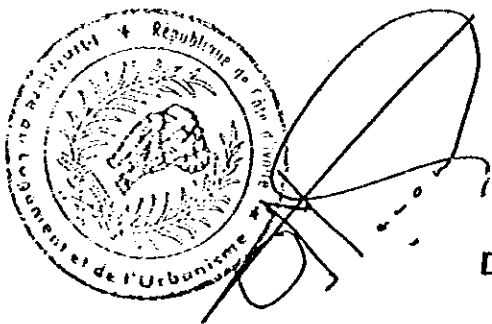
LISTE DES MEMBRES DU COMITE DE PILOTAGE

- 3 représentants du Ministère du Logement et de l'Urbanisme (Direction de la Construction et de l'Assainissement, Direction de Cadre de Vie)
- 1 représentant du BNETD
- 3 représentants du Ministère de l'Environnement et de la Forêt (Direction de l'Environnement, SIIC, CIAPOL)
- 1 représentant du Ministère des Infrastructures Economiques
- 1 représentant du Ministère de l'Intérieur et de l'Intégration Nationale
- 1 représentant du Ministère de la Santé Publique
- 1 représentant de la SODECI
- 1 représentant de la Mairie de Yopougon
- 1 représentant de la Mairie d'Attécoubé



MINUTES OF MEETINGS
ON
INCEPTION REPORT
FOR
THE FEASIBILITY STUDY
ON
SEWERAGE FACILITIES IN WESTERN DISTRICT OF ABIDJAN CITY
IN
THE REPUBLIC OF COTE D'IVOIRE
AGREED UPON BETWEEN
MINISTRY OF HOUSING AND CITY PLANNING
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

P. Le Ministre et par Délégation
Le Directeur de Cabinet



D. NANOU

Mr. Albert KAKOU TIAPANI
Minister of Housing and City Planning
Republic of Côte d'Ivoire

Abidjan, April 6, 1999

Mr. Yoshiaki KANEKO
Team Leader
JICA Study Team

The Japan International Cooperation Agency (JICA) has dispatched the Study Team headed by Mr. Yoshiaki KANEKO to conduct the Feasibility Study on Sewerage Facilities in Western District (Yopougon and Attécoubé) of Abidjan City in the Republic of Côte d'Ivoire.

The JICA Study Team had a series of meeting with the Ministry of Housing and City Planning (MLU) and other authorities concerned of the Government of Côte d'Ivoire, and performed site reconnaissance survey from April 1 to April 6, 1999.

The Minutes of Meetings have been prepared for the better understanding of the Inception Report. The main items discussed and agreed by both sides are as follows:

1. Counterpart Training

The Ivorian side requested JICA to conduct the counterpart training in Japan for the smooth technology transfer related to sewerage planning. JICA answered that the counterpart training in Japan would be organized during the Stage II (between middle of August to middle of October in 1999). The number of trainee will be one and the duration will be one month. JICA pointed that the application shall be made in an early stage.

2. Technology Transfer Seminar

Both sides confirmed that the technology transfer seminar would be held during the Stage III, beginning of November 1999.

3. Steering Committee

Ivorian side organized the Steering Committee, which is composed of thirteen (13) members from related ministries and authorities for the Study. The list is shown in Appendix II.

4. Undertaking of Ivorian Side

(1) The Study Team requested Ivorian side to nominate counterpart personnel indicated in the Inception Report. Ivorian side agreed to organize the counterpart team. The

assignment and member is listed in Appendix III.

- (2) Ivorian side agreed to provide necessary office space for the Study Team in the Tower D building where the Ministry of Housing and City Planning has the main office.

5. The requests by Ivorian side

- (1) Ivorian side requested the Study Team to conduct water quality survey in the lagoon to evaluate positive impacts on the lagoon by the Project. The Study Team answered that the request was unacceptable because the survey is out of Scope of Work.
- (2) Ivorian side requested the Study Team to carry out odor survey at Port-Bouet Pumping Station. The Study Team answered that the request was unacceptable because the odor survey is out of Scope of Work.

APPENDIX I
LIST OF ATTENDANTS

IVORIAN SIDE

Ministry of Housing and City Planning

Cabinet

Mr. NANOU Désiré

Directeur de cabinet

Direction de l'Assainissement

Mr. ADJA Adiko Laurent

Directeur

Mr. DIIGBENOU Firmin

Sous-Directeur des Etudes

Mr. TOTO Lorou Adrien

Chargé de projets

Ministry of Environment and Forestry

Direction de l'Environnement

Mr. KOUA Léon

Sous-Directeur

CIAPOL

Mr. DIBI Niagne Martin

Sous-Directeur

SIIC

Mr. SERRET Trobia Albert

Inspecteur

Bureau National d'Etudes Techniques et de Développement (BNETD)

Mr. DIOMANDE Drissa

Chargé d'Etudes

Société de Distribution d'Eau de la Côte d'Ivoire (SODECI)

Mr. TAPE Zékéré Pascal

Directeur

Mr. KOFFI Théia

Sous-Directeur

JAPANESE SIDE

Japan International Cooperation Agency (JICA)

Mr. SEKINE Sota

JICA Study Team

Mr. KANEKO Yoshiaki

Mr. HAGIWARA Judo
Mr. NAKAMURA Mamoru
Dr. N'GUESSAN Bi Tozan Michel
Mr. SATO Nobuyuki
Mr. MATSUBARA Masao

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APPENDIX II
LIST OF STEERING COMMITTEE MEMBER

Ministry of Housing and City Planning

Direction de l'Assainissement

Mr. ADJA Adiko Laurent	Directeur
Mr. DJIGBENOU Firmin	Sous-Directeur des Etudes
Mr. TOTO Lorou Adrien	Chargé de projets

Ministry of Environment and Forestry

Direction de l'Environnement

Mr. KOUA Léon	Sous-Directeur
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CIAPOL

Mr. DIBI Niagne Martin	Sous-Directeur
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SIIC

Mr. SERRET Trobia Albert	Inspecteur
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Bureau National d'Etudes Techniques et de Développement (BNETD)

Mr. DIOMANDE Drissa	Chargé d'Etudes
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Société de Distribution d'Eau de la Côte d'Ivoire (SODECI)

Mr. TAPE Zékré Pascal	
-----------------------	--

Ministère des Infrastructures Economiques

Direction de l'Eau

Mr. GADOU Abel	
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Ministère d'Etat, Ministère de l'Intérieur et de la Décentralisation

To be assigned.	
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Ministère de la Santé

To be assigned.	
-----------------	--

Commune de YOPOUGON

To be assigned.	
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Commune d'Attécoubé

To be assigned.	
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APPENDIX II (SUITE)

**Ministère d'Etat, Ministère de l'Intérieur et de la Décentralisation
Direction de l'Animation de l'Action Régionale et du Développement des
Collectivités Territoriales**

YEMAN François

**Ministère de la Santé
Direction de l'Equipement**

KASSI N'GOUAN

Commune de Yopougon

KASSI KAN

Commune d'Attécoubé

KOFFI KOUADIO Gaston

**Ministère de l'Environnement et de la forêt
Direction de l'Environnement**

GUEHI Gilbert

**APPENDIX III
LIST OF COUNTERPART**

1. Sewerage Planning
Mr. DIOMANDE Drissa BNETD

2. Sewerage Facility Planning (1)
Mr. DJIGBENOU Firmin Ministry of Housing and City Planning

3. Sewerage Facility Planning (2)
Mr. GUIHY Benoît Ministry of Housing and City Planning

4. Topographic, Geo-technical, and Sewerage Survey
Mr. KOFFI Téhia SODECI

5. Construction Planning/Cost Estimate
To be assigned. BNETD

6. Financial Plan/Organization and Institution
Mr. BAMBA Aboubakar BNETD

7. Urban Planning
To be assigned. Ministry of Housing and City Planning

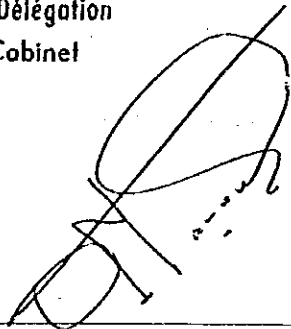
8. Environmental Evaluation
To be assigned. Ministry of Environment and Forestry

MINUTES OF MEETINGS
ON
INTERIM REPORT
FOR
THE FEASIBILITY STUDY
ON
SEWERAGE FACILITIES IN WESTERN DISTRICT OF ABIDJAN CITY
IN
THE REPUBLIC OF COTE D'IVOIRE

AGREED UPON BETWEEN
MINISTRY OF HOUSING AND CITY PLANNING
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

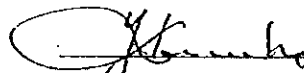
P. Le Ministre et par Délégation
Le Directeur de Cabinet

D. NANOU



Mr. Albert KAKOU TIAPANI
Minister of Housing and City Planning
Republic of Côte d'Ivoire

Abidjan, 9 August 1999



Mr. Yoshiaki KANEKO
Team Leader,
JICA Study Team



Mr. Ichiro SETO
Chairman,
JICA Advisory Committee

JICA Study Team headed by Mr. Yoshiaki KANEKO has conducted the Feasibility Study on Sewerage Facilities in Western District of Abidjan City (Yopougon and Attécoubé) since April 1999 in Côte d'Ivoire.

The JICA Study Team prepared the Interim Report which describes the intermediate study results and had a series of meetings with the Ministry of Housing and City Planning (MIU) and other authorities concerned of the Government of Côte d'Ivoire.

The Minutes of Meetings have been prepared for the better understanding of the Interim Report and confirm the direction of further Feasibility Study (F/S). The main items discussed and agreed by both sides are as follows:

1. Interceptor Route

- (1) The Alternative-II, which cross the Banco Bay at inner side, was selected as an optimum route of the interceptor based on the comprehensive evaluation.
- (2) Both sides confirmed that alignment and longitudinal profile of the proposed interceptor along the planned urban road should be reviewed according to the definitive road plan.

2. Consideration of Future Connection from East Attécoubé Area

Ivorian side requested that the East Interceptor of the Plateau side should have the structure for future connection from the east Attécoubé area which is outside of the Study Area. The Study Team agreed on this matter considering the existing conditions of the area.

3. Objective Facilities for Feasibility Study

- (1) Ivorian side agreed to exclude the 35-36 Trunk Sewer from the objective facilities for F/S considering the existing conditions of its basin.
- (2) Both sides confirmed that the number of pumps at each pumping station would be reduced for planned one taking into account actual inflow of sewage and efficient pump operation.

4. Recommendation to Ivorian side by Japanese side

- (1) The Japanese side recommended that the existing damaged trunk sewers should be rehabilitated/reconstructed to connect with the new interceptor as soon as possible.
- (2) Japanese side recommended that the land acquisition and resettlement plan should be prepared as soon as possible to implement the proposed urban road where the

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interceptor will be installed.

5. Ivorian Side's Efforts for Rehabilitation of the Existing Sewers

The Ivorian side announced to the JICA Study Team that rehabilitation of the existing trunk sewers in the Study Area is to be executed by SODECI using parts of the loan of 10 billion FCFA which SODECI borrows from France Development Agency.

6. Proposed Urban Road

The Ivorian side informed the JICA Study Team that the study on the proposed urban road will be conducted by MLU and BNETD.

7. Preparation of the Seminar

- (1) Both sides confirmed that the technology transfer seminar would be held on 10th and 11th November during the Stage III.
- (2) The Ivorian side was requested to take charge of compilation and printing the materials for the seminar such as text, programme, brochure, invitation card and agreed.

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APPENDIX
LIST OF ATTENDANTS

IVORIAN SIDE

Ministère du Logement et de l'Urbanisme

Direction de l'Assainissement

Mr. ADJA Adiko Laurent	Directeur
Mr. DJIGBENOU Firmin	Sous-Directeur des Etudes
Mr. TOTO Lorou Adrien	Chargé de projets
Mr. SOA Anatole	Service d'Exploitation

Ministère de l'Environnement et de la Forêt

Direction de l'Environnement

Mr. KOUA Léon Ex-Sous-Directeur

CIAPOL

Mr. DIBI Niagne Martin Sous-Directeur

SIIC

Mr. SERRET Trobia Albert Inspecteur

Bureau National d'Etudes Techniques et de Développement (BNETD)

Mr. BAMBA Aboubakar Chef Secteur Assainissement

Société de Distribution d'Eau de la Côte d'Ivoire (SODECI)

Mr. KOFFI Téhia Chargé d'Etude

Commune d'Attécoubé

Mr. KOFFI Kouadio Gaston Chef Service Technique
(Mairie d'Attécoubé)

Commune de Yopougon

Mr. KASSI Kan Essoin A. Chef Service Technique
(Mairie de Yopougon)

JAPANESE SIDE

Advisory Committee

Mr. SETO Ichiro Chairman

Japan International Cooperation Agency (JICA)

Mr. NAKAMOTO Masaru
Mr. SASADATE Koichi
Mr. EDY Y. Bruno

Task Management
Adjoint à Representant Resident

JICA Study Team

Mr. KANEKO Yoshiaki
Mr. HAGIWARA Judo
Mr. HIDAKA Shimao
Mr. OKUTSU Sachio
Mr. NAKAMURA Mamoru
Mr. KASHIMA Kazutoshi
Mr. NISHIAGAYA Kunimasa
Dr. Lalit K. AGRAWAL
Mr. MATSUBARA Masao

Team Leader

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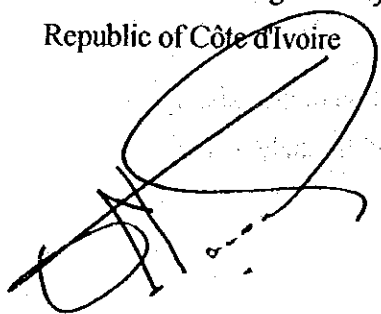
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**MINUTES OF MEETINGS
ON
DRAFT FINAL REPORT
FOR
THE FEASIBILITY STUDY
ON
SEWERAGE FACILITIES IN WESTERN DISTRICT OF ABIDJAN CITY
IN
THE REPUBLIC OF COTE D'IVOIRE**

**AGREED UPON BETWEEN
MINISTRY OF HOUSING AND CITY PLANNING
AND
JAPAN INTERNATIONAL COOPERATION AGENCY**

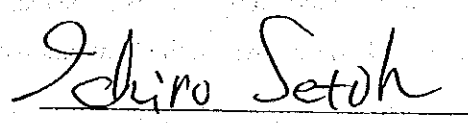
Abidjan, 12 November, 1999

Mr. Albert KAKOU TIAPANI
Minister of Housing and City Planning
Republic of Côte d'Ivoire



D. NANOU

Mr. Yoshiaki KANEKO
Team Leader,
JICA Study Team



Mr. Ichiro SETO
Chairman,
JICA Advisory Committee



JICA Study Team headed by Mr. Yoshiaki KANEKO has conducted the Feasibility Study on Sewerage Facilities in Western District of Abidjan City (Yopougon and Attécoubé) since April 1999 in Côte d'Ivoire.

The JICA Study Team prepared the Draft Final Report which describes all the study results and had a series of meetings with the Ministry of Housing and City Planning (MLU) and other authorities concerned of the Government of Côte d'Ivoire.

The Minutes of Meetings have been prepared for the better understanding of the Draft Final Report and finalization of the Feasibility Study Report. The main items discussed and agreed by both sides are as follows:

1. Objective Facilities for the Priority Project

Ivorian side agreed to the proposed facilities for the Priority Project.

2. Implementation Programme

Ivorian side agreed to the proposed implementation programme with one year study period and three years construction period.

3. Economic and Financial Analysis

Ivorian side understood the basic assumption and results of economic and financial analysis of the Priority Project.

4. Recommendation to Ivorian side by Japanese side

- (1) The Japanese side insisted that the existing damaged trunk sewers should be rehabilitated/reconstructed to connect with the new interceptor as soon as possible.
- (2) The Japanese side insisted that the land acquisition and resettlement plan should be prepared as soon as possible to implement the proposed urban road where the interceptor will be installed.

5. Ivorian Side's Efforts for Rehabilitation of the Existing Sewers

The Ivorian side announced to the JICA Study Team that rehabilitation of the existing trunk sewers in the Study Area is to be executed after completion of the study on the proposed urban road where the New Interceptor is planned.

6. Proposed Urban Road

The Ivorian side informed the JICA Study Team that the request letter on the study of

the proposed urban road has been transmitted from MLU to BNETD, and the study will be commenced soon and should be completed until April 2000.

7. Seminar Programme

Both sides agreed that the technology transfer seminar will be held on 12th November instead of 10th and 11th November.

8. Comments on the Draft Final Report

Both sides confirmed that comments on the Draft Final Report from the Ivorian Side would be submitted to the Japanese Side within one month.

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APPENDIX
LIST OF ATTENDANTS

IVORIAN SIDE

Ministère du Logement et de l'Urbanisme

Direction de l'Assainissement

Mr. DJIGBENOU Firmin	Sous-Directeur des Etudes
Mr. TOTO Lorou Adrien	Chargé de projets
Mr. SOA Anatole	Service d'Exploitation
Mr. GUIHY Benoit	Chef de Service d'Exploitation

Ministère de l'Environnement et de la Forêt

Direction de l'Environnement

Mr. GUEHI Gilbert	Service Etude Impact
<u>SIIC</u>	
Mr. SERRET Trobia Albert	Inspecteur

Bureau National d'Etudes Techniques et de Développement (BNETD)

Mr. BAMBA Aboubakar	Chef Secteur Assainissement
Mr. DIOMANDI Drissa	Service Assainissement

Société de Distribution d'Eau de la Côte d'Ivoire (SODECI)

Mr. KOFFI Téhia	Chargé d'Etude
Mr. TAPE Zekre	Directeur de l'assainissement

JAPANESE SIDE

Advisory Committee

Mr. SETO Ichiro	Chairman
-----------------	----------

JICA Study Team

Mr. KANEKO Yoshiaki	Team Leader
Prof. NISHIAGAYA Kunimasa	
Mr. HAGIWARA Judo	
Mr. HIDAKA Shima	
Mr. MATSUBARA Masao	