CHAPTER 14

LOAN REPAYMENT PLAN

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14.1 BASIC CONSIDERATIONS

(1) Generally speaking, in implementation of a development project having a public interest character such as an energy-related undertaking, a huge amount of advance investment is made in a comparatively short period of time, and many years are required for the capital invested to be recovered with the income from the project. Consequently, the statutory service life including the period for recovery of the invested capital will become long, so that for the capital to be invested, a soft loan of low interest rate and long repayment period must be considered. The economic stagnation of advanced nations which began with the oil crisis has severely effected on the economic management of developing countries. In these countries, along with high inflation rates, the interest rates charged on loans by city banks are extremely high compared with advanced countries.

When the above situation is considered, obtaining the funds required through borrowings of comparatively low interest rates from international financing institutions, and government-to-government aid will be absolutely necessary for implementation of the Project.

(2) When this Project is considered at the national economy level, it is a public interest undertaking with the purpose of securing irrigation water for existing cultivated land along with being a hydroelectric development project, and when making an economic analysis, the benefits of both are measurable, and both must be included in calculations. However, when considered at the level of the enterprise implementing the Project, while electricity charge revenues can be recovered through ELECTROPERU, to consider recovery of agricultural income at existing farmland

at the enterprise level is not realistic. From a financial standpoint, the latter should actually be considered by providing a subsidy against national taxes, but here, a repayment plan based on electricty charge revenues only will be studied.

14.2 FUND REQUIREMENT AND PROCUREMENT

The fund requirement (initial investment amount) for implementation of the Project is estimated to be a total of US$67.4 million based on the commodity prices level as of the end of December 1982. Of this amount the foreign currency portion will be US$34.1 million and the local currency portion US$33.3 million. The fund requirements by year are as shown in Table 14-2, and although these include interest during construction and contingency costs due to variations in quantities, they do not include contingency cost due to price escalation.

Regarding sources from which the funds would be procured, as previously described, the foreign currency portion and the local currency portion would be borrowed from government-to-government development aid funds and international financing institutions, respectively. The interest rates and repayment conditions would be the following:

Foreign Currency Portion

Interest rate	4.5%
Repayment period	25 yr (including grace 7-yr period)
Repayment method	Principal in equal installments

Local Currency Portion

Interest rate	10.5%
Repayment period	20 yr (including 5-yr

	grace period)
Repayment method	Principal and interest in equal installments
Commitment charge	0.75% per annum

14.3 TARIFF RATE AND REVENUE

(1) Electricity Rate

In the study regarding repayment of loans, the electricity rate is important since it determines the source of repayment. As previously described in the economic analysis, the averaged sales rate as of the end of December 1982 was taken to be 33 mills/kWh (US$0.033/kWh). This is considered as having been decided based on the generating costs of power from existing hydro and thermal power generating facilities, and it would be normal for the rate according to new power sources to be higher than for that according to existing sources. The electricity rate at the primary substation according to the energy produced by the project is shown in Table 14-1 as well the one by alternative thermal plant and so on.

Table 14-1 Estimated Tariff Rates

(mills/kWh)

	Present Average *1	Alternative Thermal Plant *2	Prime Cost by the Project *3	Most Probable Rate to pay *4
Rate	33	49	45	50
Kind	Customer End	Equivalent one to *3	Transmission End	Customer End

Note: 1. The value *1 shows average tariff rate in the southwestern region.

2. The value *2 shows only kWh value due to the alternative thermal power plant based on fuel cost and OM cost

3. Ten (10) percent of the rate is included in the value *3 as annual indirect cost.

The sales cost at the demand end include the transmission cost to the demand end and the indirect cost of sales. In a case of providing a transmission and distribution network to new consumers, it is considered that about 40 to 30% of sales rates correspond to this. Here, the rate at the primary transforming end increased 10% to 50 mills/kWh (US$0.05/kWh) is taken as the source of new electric energy and a financial study is made.

Needless to say, the actual sales rate is something determined by the entire demand of the Aricota-SPCC System, and is different from the above-mentioned sales rates.

(2) Cost

a) Depreciation Cost

The depreciation cost of facilities involved in the Project is determined by the straight line method with residual price as zero.

The service lives of facilities were decided as listed below.

Civil structure	50 yr
Electrical equipment	25 yr
Transmission line	25 yr
Gate equipment	25 yr

The replacement cost of electrical equipment and the transmission line of the existing power station group was made the part corresponding to the extended service life. Therefore, the replacement costs of existing facilities for the first time are not included.

b) Operation and Maintenance Cost

Regarding operation and maintenance costs, the maintenance and repair costs of the overall facilities are included. This consists of estimating the operation and maintenance costs of the newly provided Aricota No. 3 Power Station as shown in Table 14-5, and as the expense corresponding to the additional electric energy of the existing power stations, those of the new power station are allocated in according with installed capacity and energy production. According to the overall evaluation of existing and new combined, the ratios in the water supply and power generation projects to the construction project cost are 0.5% and 1%, respectively.

Table 14-5 Ratios of Operation and Maintenance Costs

Civil Structure Facil.	Generating and Transforming Equip.	Transmission Facil.
1.0%	2.0%	1.5%

14.4 REPAYMENT PLAN

The depreciation costs of fixed assets of the power generating facilities are handled as costs from the standpoint of accounting, but actually, they do not constitute an expense that is disbursed in reality, but a reserve. Therefore, in the loan repayment plan, this can be included in repayment funds. Accordingly, the net profit (operating profit) in the current account and the above-mentioned depreciation cost will be the funds which can be set aside for repayment, and these amounts are shown in Table 14-3.

On the other hand, the expenses of the individual years in which repayments must be made to the lenders based on the loan terms described in 14.2 are shown in Table 14-4. As can be seen in this table, it will be the seventeenth year after start of operation that the capital invested and the profit produced by the invested capital are balanced, at which time the capital invested will have been recovered following which profit will be born. As previously described, the financial repayment plan was evaluated based on repayment with electricity charge revenues only. This Project is a public interest undertaking and is to be evaluated base on electric power and agriculture. The agricultural benefit should be evaluated on a corresponding allocation of costs, and should be reevaluated in the future in accordance with the conditions concerning funds actually applied.

Table 14-2 Amortization Schedule

Unit; 10^3 US$

No.	Year	Borrowing				Redemption								Outstanding Balance
								Principal			Interest			
		Foreign Currency	Local Currency	Interest for L.C	Total	Interest for F.C	Commitment charge	F.C	L.C	Total	F.C	L.C	Total	Total	
1	1984	2,400	2,669	140	5,209	54	228							282	
2	1985	6,313	6,167	604	13,084	250	178							428	
3	1986	11,100	8,409	1,370	20,879	642	104							746	
4	1987	9,763	10,572	2,415	22,750	1,168								1,168	
5	1988	2,443	921		3,364						1,440.9	3,493.0	4,933.9	4,933.9	65,286
6	1989								1,006.3	1,006.3	1,400.9	3,493.0	4,933.9	5,940.2	64,297.7
7	1990								1,111.9	1,111.9	1,440.9	3,387.4	4,828.3	5,940.2	63,167.8
8	1991							1,778.8	1,228.7	3,007.5	1,440.9	3,270.6	4,711.5	7,719.0	60,160.3
9	1992							1,778.8	1,357.7	3,136.5	1,360.8	3,141.6	4,502.4	7,638.9	57,023.8
10	1993							1,778.8	1,500.2	3,279.0	1,280.8	2,999.1	4,279.9	7,558.9	53,744.8
11	1994							1,778.8	1,657.8	3,436.6	1,200.7	2,841.5	4,042.2	7,478.8	50,308.2
12	1995							1,778.8	1,831.8	3,610.6	1,120.7	2,667.5	3,788.2	7,398.8	46,697.6
13	1996							1,778.8	2,024.2	3,803	1,040.6	2.475.1	3,515.7	7,318.7	42,894.6
14	1997							1,778.8	2,236.7	4,015.5	960.6	2,262.6	3,223.2	7,238.7	38,879.1
15	1998							1,778.8	2,471.6	4,250.4	880.5	2,027.7	2,908.2	7,158.6	34,628.7
16	1999							1,778.8	2,731.1	4,509.9	800.5	1,768.2	2,568.7	7,078.6	30,118.8
17	2000							1,778.8	3,017.9	4,796.7	720.4	1,481.4	2,201.8	6,998.5	25,322.1
18	2001							1,778.8	3,334.7	5,113.5	640.4	1,164.6	1,805.0	6,918.5	20,208.6
19	2002							1,778.8	3,684.9	5,463.7	560.3	814.4	1,374.7	6,838.4	14,744.9
20	2003							1,778.8	4,071.5	5,850.3	480.3	427.8	908.1	6,758.4	8,894.6
21	2004							1,778.8		1,778.8	400.3		400.3	2,179.1	7,115.8
22	2005							1,778.8		1,778.8	320.2		320.2	2,099.0	5,337.0
23	2006							1,778.8		1,778.8	240.2		240.2	2,019.0	3,558.2
24	2007							1,778.8		1,778.8	160.1		160.1	1,938.9	1,779.4
25	2008							1,779.4		1,779.4	80.0		80.0	1,859.4	0
TOTAL		32,019	28,738	4,529	65,286	2,114	510	32,019	33,267	65,286	18,011.0	37,715.5	55,726.5	123,636.5	

Table 14-3 Statement of Income

Unit: 10^3 US$

		1 1988	2 1989	3 1990	4 1991	5 1992	6 1993	7 1994	8 1995	9 1996	10 1997	11 1998
(A) Energy Sales												
Energy Sold	(GWh)	150	150	150	150	150	150	150	150	150	150	150
Electricity rate per kWh	(US$/$10^3$ kWh)	50	50	50	50	50	50	50	50	50	50	50
Gross revenue	(US$$10^3$)	7,515	7,515	7,515	7,515	7,515	7,515	7,515	7,515	7,515	7,515	7,515.
(B) Total Operating Cost	(US$$10^3$)	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4
Operation & Maintenance	(US$$10^3$)	798	798	798	798	798	798	798	798	798	798	798
Depreciation	(US$$10^3$)	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4
(C) Operating Income (A) - (B)	(US$$10^3$)	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6
(D) Financial Expenses	(US$$10^3$)	4,933.9	4,933.9	4,828.9	4,711.5	4,502.4	4,279.9	4,042.2	3,788.2	3,515.7	3,223.2	2,908.2
Interest on F.C	(US$$10^3$)	1,440.9	1,440.9	1,440.9	1,440.9	1,360.8	1,280.8	1,200.7	1,120.7	1,040.6	960.6	880.5
Interest on L.C	(US$$10^3$)	3,493.0	3,493.0	3,387.4	3,270.6	3,141.6	2,999.1	2,841.5	2,667.5	2,475.1	2,262.6	2,027.7
(E) Net Income (C) - (D)	(US$$10^3$)	570.7	570.7	676.3	793.1	1,002.2	1,224.7	1,462.4	1,716.4	1,988.9	2,281.4	2,516.4

		12 1999	13 2000	14 2001	15 2002	16 2003	17 2004	18 2005	19 2006	20 2007	21 2008
(A) Energy Sales											
Energy Sold	(GWh)	150	150	150	150	150	150	150	150	150	150
Electricity rate per kWh	(US$/$10^3$ kWh)	50	50	50	50	50	50	50	50	50	50
Gross revenue	(US$$10^3$)	7,515	7,515	7,515	7,515	7,515	7,515	7,515	7,515	7,515	7,515
(B) Total Operating Cost	(US$$10^3$)	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4	2,010.4
Operation & Maintenance	(US$$10^3$)	798	798	798	798	798	798	798	798	798	798
Depreciation	(US$$10^3$)	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4
(C) Operating Income (A) - (B)	(US$$10^3$)	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6	5,504.6
(D) Financial Expenses	(US$$10^3$)	2,568.7	2,201.8	1,805.0	1,374.7	908.1	400.3	320.2	240.2	160.1	80.0
Interest on F.C	(US$$10^3$)	800.5	720.4	640.4	506.3	480.3	400.3	320.2	240.2	160.1	80.0
Interest on L.C	(US$$10^3$)	1,768.2	1,481.4	1,164.6	814.4	427.8					
(E) Net Income (C) - (D)	(US$$10^3$)	2,935.9	3,302.8	3,699.6	4,129.9	4,596.5	5,104.3	5,184.4	5,264.4	5,344.5	5,424.6

Table 14-4 Statement of Cash Flow

Unit: 10^3 US$

	1 1984	2 1985	3 1986	4 1987	5 1988	6 1989	7 1990	8 1991	9 1992	10 1993	11 1994
(A) Cash Receipt	5,491	13,512	21,625	23,918	5,147.1	1,783.1	1,888.7	2,005.5	2,214.6	2,437.1	2,674.8
1) Net income					570.7	570.7	676.3	793.1	1,002.2	1,224.7	1,462.4
2) Depreciation					1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4
3) Borrowing	5,209	13,084	20,879	22,750	3,364						
Foreign currency	2,400	6,313	11,100	9,763	2,443						
Local currency	2,809	6,771	9,779	12,987	921						
4) CORDETACNA's fund	282	428	746	1,168							
(B) Cash Disbursement	5,491.0	13,512	21,625	23,918	3,364	1,006.3	1,111.9	3,007.5	3,136.5	3,279.0	3,436.6
1) Construction expenditure	5,491	13,512	21,625	23,918	3,364						
Foreign currency	2,400	6,313	11,100	9,763	2,443						
Local currency	2,809	6,771	9,779	12,987	921						
Interest for F.C	54	250	642	1,168							
Commitment charge	228	178	104								
2) Repayment of Debit						1,006.3	1,111.9	3,007.5	3,136.5	3,279.0	3,436.6
Principle of governmental credit								1,778.8	1,778.8	1,778.8	1,778.8
Principle of IFI credit						1,006.3	1,111.9	1,228.7	1,357.7	1,500.2	1,657.8
(C) Cash Balance (A) - (B)	0	0	0	0	1,783.1	776.8	776.8	-1,002	- 921.9	- 841.9	- 761.8
(D) Accumulated Total					1,783.1	2,559.9	3,336.7	2,334.7	1,412.8	570.9	- 190.9

	12 1995	13 1996	14 1997	15 1998	16 1999	17 2000	18 2001	19 2002	20 2003	21 2004
(A) Cash Receipt	2,928.8	3,201.3	3,493.8	3,808.8	4,148.3	4,515.2	4,912.0	5,342.3	5,808.9	6,316.7
1) Net income	1,716.4	1 988.9	2,281.4	2,596.4	2,935.9	3,302.8	3,699.6	4,129.9	4,596.5	5,104.3
2) Depreciation										
3) Borrowing	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4	1,212.4
Foreign currency										
Local currency										
4) CORDETACNA's fund										
(B) Cash Disbursement	3,610.6	3,803.0	4,015.5	4,250.4	4,509.9	4,796.7	5,113.5	5,463.7	5,850.3	1,778.8
1) Construction expenditure										
Foreign currency										
Local currency										
Interest for F.C										
Commitment charge										
2) Repayment of Debit	3,610.6	3,803.0	4,015.5	4,250.4	4,509.9	4,796.7	5,113.5	5,463.7	5,850.3	1,778.8
Principle of governmental credit	1,778.8	1,778.8	1,778.8	1,778.8	1,778.8	1,778.8	1,778.8	1,778.8	1,778.8	1,778.8
Principle of IFI credit	1,831.8	2,204.2	2,236.7	2,471.6	2,731.1	3,017.9	3,334.7	3,684.9	4,071.5	
(C) Cash Balance (A) - (B)	- 681.8	- 601.7	- 521.7	- 441.6	- 361.6	- 281.5	- 201.5	- 121.4	- 41.4	4,537.9
(D) Accumulated Total	- 872.7	-1,474.4	-1,996.1	-2,437.7	-2,799.3	-3,080.8	-3,282.3	-3,403.7	-3,445.1	1,092.8