

Annex IV-6

SENSITIVITY ANALYSIS OF FINANCIAL STRUCTURE BY CHANGES IN EQUITY/DEBT RATIO AND INTEREST RATES ON LOAN

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1. Introduction

This Annex IV-6 presents the result of sensitivity analysis which has been made on financial structure of the project affected by changes in equity/debt ratio and interest rates on long-term loan. Assumptions taken for financial projections of the base case are:

- Equity/debt ratio: 30:70
- Interest rate on long-term loan: 5% p.a.

Alternative cases set for the sensitivity analysis are as follows:

<u>Alternative Cases</u>	<u>Equity/Debt Ratio</u>	<u>Interest Rate</u>
A - 1	30:70	7% p.a.
A - 2	30:70	9% p.a.
A - 3	30:70	11% p.a.
B - 1	20:80	5% p.a.
B - 2	20:80	7% p.a.
B - 3	20:80	9% p.a.
B - 4	20:80	11% p.a.

For all cases the financial projections are based on the assumption that electricity price be 40% of the present tariff rate.

2. Project cost

Changes in equity/debt ratio and interest rate would affect the project cost itemized as "interest during construction". Table IV-5(1) tabulates the project costs estimated for alternative cases. The sensitivity analysis is based on these estimated project costs.

3. Affects on Production Cost and Profitability

Adoption of higher interest rates as well as a greater debt ratio, would cause increases in the production cost due to increases in annual interest payments and increases in amortization of the interest-during-construction portion. Table IV-6(3) tabulates the production cost estimated for each case. Increases of the aforesaid costs would not affect the internal rate of return of the project, because annual interest payments and amortization are accounted as a portion of returns on investment.

4. Affects on Financial Structure

The above-mentioned factors would not affect financial returns of the project, but they would adversely affect financial structure, particularly cash-flow and debt service capacity of the project.

Table IV-6(4) summarized the financial projections and analysis made on each case. If higher rates of interest are applied, the cost of sales would increase due to increases in the amortization of "interest during construction", which interest on loans would increase. In addition, if a greater ratio of debt is applied, these increases would be greater, because of increases in loan amounts. These factors would adversely affect cash-flow, since payments of greater interest cause deficits in net profit and eventually shortage of operating cash, requiring the borrowing of short-term loans which results in the payments of additional interest. Assuming an equity/debt ratio of 30:70 and if a 7% p.a. interest rate is applied, the net profit after tax would be in deficit for the initial five years and the accumulated retained-earnings therefore would be in deficit for the initial nine years. If a higher interest rate is applied, these structure would become worse. If a higher ratio of debt is applied, as shown in Table IV-6(4), a similar position would accrue.

Application of a longer grace period would improve the cash-flow during the initial few years, because cash requirements for the repayment of loan are reduced during such a grace period.

Assuming the repayment of long-term loan by 15 years equal installment of the loan principal, annual repayment is as follows:

(Unit: US\$, Million)

Interest Rate	Equity/Debt Ratio	Equity/Debt Ratio
	of 30:70	of 20:80
5%	6.76	7.80
7%	6.96	8.07
9%	7.18	8.37
11%	7.42	8.71

Nevertheless such measures could not contribute to inherent improvement of the financial structure, since the production cost is not decreased by gracing the repayment of loan.

The debt service coverage ratio, as shown in Table IV-6(4), implies that the project would encounter difficulty in debt service during the initial three to four years if higher interest rates are applied. If the interest rate is higher than 7% p.a., the project would not be capable to cover debt service during the initial two to three years even with the application of a longer grace period, because deficits in operation income and interest payments exceed the loan repayment amount.

5. Conclusion

Summing up the discussions as stated above, the sensitivity analysis of interest rates and equity/debt ratio leads to the following conclusion:

- 1) If an applicable interest rate is higher than 5% p.a., the project would encounter difficulties in cash-flow and debt service.
- 2) As far as higher interest rates are applied, the financial structure could not be improved even with the application of longer grace period, since the deficits in operating income and interest payment exceed the loan repayment amount.
- 3) In view of these positions, the application of interest rate not higher than 5% p.a. would be a prerequisite for making the project financially viable.
- 4) If a greater ratio of debt is applied, a similar situation would accrue. In this context an equity/debt ratio of 30:70 can sustain a sound structure. If a 20:80 ratio is applied, it may be necessary to consider the application of lower interest rate or lower electricity price than those assumed for the base estimate.

Table IV-6(1) ESTIMATED PROJECT COST OF UREA FERTILIZER PLANT
BY CHANGES IN EQUITY/DEBT RATIO AND LOAN INTEREST

Capacity: 275 TPD

	(Unit US\$ Million)					
	Interest Rate: 5% p.a.		Interest Rate: 7% p.a.		Interest Rate: 9% p.a.	
	L.C.	F.E.	L.C.	F.E.	L.C.	F.E.
	Portion	Total	Portion	Total	Portion	Total
A. Equity/Debt Ratio: 30/70						
1) Base Project Cost	22.64	110.19	22.64	110.19	22.64	110.19
2) Initial Working Capital	2.28	0.40	2.28	0.40	2.28	0.40
3) Interest During Construction	-	9.28	-	13.59	-	18.31
Total Financing Required	24.92	119.87	24.92	124.18	24.92	134.11
B. Equity/Debt Ratio: 20/80						
1) Base Project Cost	22.64	110.19	22.64	110.19	22.64	110.19
2) Initial Working Capital	2.28	0.40	2.28	0.40	2.28	0.40
3) Interest During Construction	-	10.72	-	15.82	-	21.49
Total Financing Required	24.92	121.31	24.92	126.41	24.92	138.44

Table IV-6(2) SUMMARY OF FINANCIAL PROJECTIONS AND ANALYSIS
(Electric Power Price : 60¢ lower)

Plant Capacity: 275 TPD-Bagged Urea

(In million of current US dollars)

Fiscal Year Ending June 30	1991/92	1992/93	1993/94	1994/95	1996/97	1998/99	2000/01	2002/03	2004/05
Capacity Utilization (%)	60.1	61.0	65.4	68.8	72.4	74.8	76.9	78.4	79.6
Urea Sales (1,000 t.p.a.)	51.5	55.3	59.1	62.3	65.6	67.8	69.7	71.1	72.2
Sales Revenue	25.0	28.8	32.7	36.9	44.2	51.9	60.7	70.2	80.8
Cost of Sales (bef. Admn. Exp. & Interest)	27.1	29.4	30.9	32.4	34.8	37.6	40.8	42.0	43.3
General admn. expenses	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4
Interest on long-term loans	5.1	4.7	4.4	4.1	3.4	2.7	2.0	1.4	0.7
Net profit after tax	-7.3	-5.9	-3.0	0.3	3.5	6.8	10.5	21.9	26.0
Current assets	4.2	4.5	4.9	5.3	6.1	6.9	7.8	8.1	9.2
Net fixed assets	128.7	115.2	101.8	88.3	61.7	35.2	8.8	7.6	6.3
Current liabilities	8.9	8.4	7.2	7.3	7.4	7.5	7.6	7.7	7.9
Long term debt	87.8	81.1	74.3	67.6	54.1	40.5	27.0	13.5	-
Retained earnings (Accumulated)	-7.3	-13.2	-16.2	-15.9	-9.4	2.5	21.6	62.9	112.8
Shareholders equity	36.1	30.2	27.2	27.5	34.0	45.9	65.0	106.4	156.3
Ratio									
Net profit after tax/sales (%)	-29.3	-20.5	-9.1	0.8	7.8	13.1	17.3	31.2	32.2
Net profit after tax/shareholders equity (%)	-20.3	-19.5	-10.9	1.0	10.2	14.8	16.2	20.6	16.7
Net profit after tax/share capital (%)	-16.9	-13.6	-6.8	0.6	8.0	15.6	24.2	50.4	60.0
Current ratio	0.47	0.53	0.68	0.73	0.82	0.91	1.02	1.04	1.17
Quick ratio	0.26	0.30	0.39	0.43	0.49	0.56	0.64	0.72	0.81
Debt service coverage ratio	0.95	1.07	1.33	1.64	1.98	2.40	2.93	2.94	3.68
Long term debt/shareholders equity	71/29	73/27	73/27	71/29	61/39	47/53	29/71	11/39	0/100

Table IV-6(3) ESTIMATED PRODUCTION COST PER TON OF UREA FERTILIZER
(Current Prices)

Electricity Price: 40% of Present Tariff Rate
(Unit: US\$/ton)

	Base Estimate	A-1	A-2	A-3	B-1	B-2	B-3	B-4
1991/92	620.7	672.6	725.9	783.4	640.1	698.6	762.0	831.3
1992/93	624.8	680.0	736.7	797.9	648.5	710.8	778.4	852.1
1993/94	601.2	657.0	714.5	776.4	627.8	691.0	759.5	834.3
1994/95	586.4	638.7	698.2	762.3	611.1	676.7	747.7	825.2
1995/96	583.4	623.1	686.1	754.1	596.6	666.1	741.5	823.7
1996/97	586.1	616.1	673.4	746.9	596.7	654.6	736.3	825.5
1997/98	592.0	619.2	658.1	738.0	601.7	641.8	729.5	826.6
1998/99	599.4	623.9	649.7	723.2	608.1	636.4	717.1	823.1
1999/2000	608.7	630.6	653.7	704.7	616.5	641.8	701.7	815.1
2000/01	619.9	639.3	659.7	682.9	626.8	649.2	683.0	801.4
2001/02	456.7	467.7	479.0	491.0	460.8	473.2	486.6	582.2
2002/03	475.9	484.6	493.6	503.2	479.2	489.0	499.6	578.1
2003/04	496.5	503.1	509.7	516.9	499.0	506.4	514.2	570.4
2004/05	518.8	523.4	527.8	532.5	520.7	525.5	530.8	558.5
2005/06	543.1	545.6	547.8	550.1	544.2	546.6	549.2	552.1

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FISCAL YEAR ENDING JUNE 30	1991/92	1992/93	1993/94	1994/95	1996/97	1998/99	2000/01	2002/03	2004/05
1. Cost of Sales									
(bef. Admin. Exp. & Interest)									
Alt. A-1	27.5	29.9	31.3	32.8	35.2	38.0	41.2	32.0	36.3
Alt. A-2	28.0	30.4	31.9	33.3	35.7	38.5	41.7	32.0	36.3
Alt. A-3	28.6	31.0	32.4	33.9	36.3	39.1	42.2	32.0	36.3
Alt. B-1	27.2	29.6	31.0	32.5	34.9	37.8	40.9	32.0	36.3
Alt. B-2	27.8	30.1	31.6	33.1	35.5	38.3	41.5	32.0	36.3
Alt. B-3	28.3	30.8	32.2	33.7	36.1	38.9	42.0	32.0	36.3
Alt. B-4	29.0	31.5	32.9	34.3	36.7	39.5	42.6	32.0	36.3
2. Interest on Long-Term Loans									
Alt. A-1	7.3	6.8	6.3	5.8	4.9	3.9	2.9	1.9	1.0
Alt. A-2	9.7	9.0	8.4	7.8	6.5	5.2	3.9	2.6	1.3
Alt. A-3	12.2	11.4	10.6	9.8	8.2	6.5	4.9	3.3	1.6
Alt. B-1	5.8	5.5	5.1	4.7	3.9	3.1	2.3	1.6	0.8
Alt. B-2	8.5	7.9	7.3	6.8	5.7	4.5	3.4	2.3	1.1
Alt. B-3	11.3	10.6	9.8	9.0	7.5	6.0	4.5	3.0	1.5
Alt. B-4	14.4	13.4	12.5	11.5	9.6	7.7	5.8	3.8	1.9
3. Net Profit after Tax									
Alt. A-1	-10.0	-8.8	-6.2	-2.9	2.3	5.8	9.7	21.5	25.9
Alt. A-2	-12.9	-12.0	-9.6	-6.6	0	4.8	8.9	21.1	25.7
Alt. A-3	-16.0	-15.4	-13.2	-10.6	-4.8	1.8	7.9	20.7	25.5
Alt. B-1	-8.3	-7.1	-4.4	-1.2	3.1	6.5	10.2	21.8	26.0
Alt. B-2	-11.4	-10.5	-8.2	-5.2	0.8	5.3	9.3	21.3	25.8
Alt. B-3	-14.8	-14.3	-12.2	-9.7	-4.1	2.0	7.9	20.9	25.5
Alt. B-4	-18.6	-18.4	-16.7	-14.5	-9.9	-3.8	2.9	17.5	24.3
4. Net Fixed Assets									
Alt. A-1	132.5	118.7	104.8	90.9	63.4	36.1	8.8	7.6	6.3
Alt. A-2	136.8	122.4	108.1	93.8	65.3	37.1	8.8	7.6	6.3
Alt. A-3	141.5	126.6	111.8	96.9	67.4	38.1	8.8	7.6	6.3
Alt. B-1	130.0	116.4	102.8	89.2	62.3	35.5	8.8	7.6	6.3
Alt. B-2	134.6	120.5	106.4	92.3	64.3	36.6	8.8	7.6	6.3
Alt. B-3	139.7	125.0	110.3	95.7	66.6	37.7	8.8	7.6	6.3
Alt. B-4	145.4	130.1	114.8	99.5	69.1	39.0	8.8	7.6	6.3

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FISCAL YEAR ENDING JUNE 30	1991/92	1992/93	1993/94	1994/95	1996/97	1998/99	2000/01	2002/03	2004/05
5. Current Liabilities									
Alt. A-1	11.6	13.8	13.5	9.9	7.6	7.7	7.8	7.9	8.1
Alt. A-2	14.5	19.6	22.4	22.3	12.3	7.9	8.0	8.2	8.3
Alt. A-3	17.6	25.8	32.0	35.6	34.3	20.1	8.3	8.4	8.5
Alt. B-1	12.0	13.6	12.7	8.4	8.4	8.5	8.7	8.8	8.9
Alt. B-2	15.2	20.0	22.6	22.2	12.6	8.8	8.9	9.0	9.2
Alt. B-3	18.7	27.0	33.3	37.1	36.7	24.0	9.2	9.4	9.5
Alt. B-4	22.5	34.6	45.1	53.4	63.5	62.6	47.7	32.4	9.8
6. Long-Term Debt									
Alt. A-1	90.5	83.5	76.5	69.6	55.7	41.7	27.8	13.9	-
Alt. A-2	93.3	86.1	79.0	71.8	57.4	43.1	28.7	14.4	-
Alt. A-3	96.5	89.1	81.6	74.2	59.4	44.5	29.7	14.8	-
Alt. B-1	101.4	93.6	85.8	78.0	62.4	46.8	31.2	15.6	-
Alt. B-2	104.9	96.9	88.8	80.7	64.6	48.4	32.3	16.1	-
Alt. B-3	108.9	100.5	92.1	83.7	67.0	50.2	33.5	16.7	-
Alt. B-4	113.3	104.6	95.8	87.2	69.7	52.3	34.9	17.4	-
7. Retained Earnings (Accumulate)									
Alt. A-1	-10.0	-18.9	-25.0	-27.9	-25.0	-15.2	2.3	42.8	92.2
Alt. A-2	-12.9	-24.9	-34.4	-41.0	-44.5	-37.3	-21.6	18.0	67.0
Alt. A-3	-16.0	-31.4	-44.6	-55.2	-67.9	-67.3	-54.8	-16.0	32.4
Alt. B-1	-8.5	-15.6	-20.0	-21.1	-15.8	-4.6	13.9	55.0	104.8
Alt. B-2	-11.6	-22.1	-30.3	-35.6	-37.0	-28.6	-12.0	28.1	77.3
Alt. B-3	-15.0	-29.3	-41.5	-51.2	-62.3	-61.0	-48.3	-9.3	39.4
Alt. B-4	-18.7	-37.1	-53.7	-68.3	-90.6	-101.6	-98.6	-66.9	-21.9
8. Shareholders Equity									
Alt. A-1	34.7	25.9	19.7	16.8	19.7	29.5	47.0	87.5	137.0
Alt. A-2	33.2	21.3	11.7	5.1	1.6	8.9	24.5	64.2	113.1
Alt. A-3	31.7	16.3	3.1	-7.5	-20.1	-19.6	-7.1	31.7	80.1
Alt. B-1	20.8	13.7	9.3	8.1	13.5	24.6	43.2	84.3	13.4
Alt. B-2	18.7	8.1	0	-5.3	-6.7	1.7	18.3	58.4	107.6
Alt. B-3	16.4	2.1	-10.1	-19.8	-30.9	-29.6	-16.9	22.1	70.8
Alt. B-4	14.0	-4.4	-21.1	-35.6	-57.9	-68.9	-65.9	-34.2	10.8

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FISCAL YEAR ENDING JUNE 30	1991/92	1992/93	1993/94	1994/95	1996/97	1998/99	2000/01	2002/03	2004/05
9. Net Profit after Tax/Sales (%)									
Alt. A-1	-40.1	-30.7	-18.8	-7.8	5.2	11.2	16.0	30.6	32.0
Alt. A-2	-51.6	-41.6	-29.2	-17.9	0.1	9.2	14.6	30.1	31.8
Alt. A-3	-63.9	-53.4	-40.4	-28.7	-10.8	3.4	13.0	29.5	31.5
Alt. B-1	-33.0	-24.7	-13.5	-3.1	6.9	12.4	16.9	31.0	32.2
Alt. B-2	-45.7	-36.7	-24.9	-14.2	1.7	10.2	15.3	30.4	31.9
Alt. B-3	-59.3	-49.7	-37.4	-26.2	-9.2	3.9	13.0	29.7	31.6
Alt. B-4	-74.3	-63.9	-50.9	-39.3	-22.5	-7.4	4.8	25.0	30.1
10. Net Profit after Tax/Share									
Capital									
Alt. A-1	-22.4	-19.7	-13.8	-6.4	5.1	13.0	21.7	48.1	57.8
Alt. A-2	-28.0	-25.9	-20.7	-14.3	0.1	10.3	19.2	45.8	55.6
Alt. A-3	-33.5	-32.2	-27.7	-22.2	-10.0	3.7	16.6	43.5	53.4
Alt. B-1	-28.3	-24.2	-15.1	-3.9	10.4	22.1	35.0	74.4	88.8
Alt. B-2	-37.8	-34.8	-27.0	-17.3	2.6	17.5	30.8	70.5	85.2
Alt. B-3	-47.3	-45.5	-39.0	-30.9	-13.0	6.4	25.1	66.5	81.4
Alt. B-4	-56.9	-56.2	-51.0	-44.5	-30.4	-11.8	9.0	53.7	74.5
11. Current Ratio									
Alt. A-1	0.36	0.33	0.37	0.54	0.80	0.89	1.00	1.02	1.14
Alt. A-2	0.29	0.23	0.22	0.24	0.50	0.87	0.97	0.99	1.11
Alt. A-3	0.24	0.18	0.16	0.15	0.18	0.34	0.95	0.96	1.08
Alt. B-1	0.35	0.33	0.39	0.63	0.72	0.80	0.90	0.92	1.03
Alt. B-2	0.28	0.23	0.22	0.24	0.49	0.78	0.87	0.89	1.00
Alt. B-3	0.23	0.17	0.15	0.15	0.17	0.29	0.85	0.86	0.97
Alt. B-4	0.19	0.13	0.11	0.10	0.10	0.11	0.16	0.25	0.94
12. Quick Ratio									
Alt. A-1	0.20	0.18	0.21	0.32	0.48	0.55	0.62	0.70	0.79
Alt. A-2	0.16	0.13	0.13	0.14	0.30	0.53	0.60	0.68	0.77
Alt. A-3	0.13	0.10	0.09	0.09	0.11	0.21	0.58	0.66	0.74
Alt. B-1	0.19	0.19	0.22	0.37	0.43	0.49	0.56	0.63	0.71
Alt. B-2	0.15	0.13	0.13	0.14	0.29	0.48	0.54	0.61	0.69
Alt. B-3	0.12	0.09	0.08	0.08	0.10	0.18	0.52	0.59	0.67
Alt. B-4	0.10	0.07	0.06	0.06	0.06	0.07	0.10	0.17	0.65
13. Debt Service Coverage Ratio									
Alt. A-1	0.78	0.86	1.06	1.32	1.76	2.15	2.66	2.71	3.46
Alt. A-2	0.66	0.70	0.85	1.04	1.51	1.95	2.43	2.50	3.26
Alt. A-3	0.56	0.58	0.68	0.82	1.16	1.64	2.23	2.30	3.06
Alt. B-1	0.82	0.90	1.11	1.37	1.74	2.10	2.56	2.56	3.19
Alt. B-2	0.67	0.72	0.86	1.05	1.48	1.88	2.32	2.35	2.99
Alt. B-3	0.57	0.58	0.67	0.80	1.13	1.56	2.08	2.15	2.80
Alt. B-4	0.48	0.47	0.52	0.61	0.80	1.15	1.64	1.75	2.53

Annex IV-7

ECONOMIC POWER COST

Annex IV-7

ECONOMIC POWER COST

(Marginal Cost Calculated on
the Basis of Sapta Gandaki Project
-225MW, at Mid. 1984 Cost)

1. Capital Cost for Hydropower Plant

1.1 Financial Cost at Market Price

	<u>Cost at Mid. 1983</u> (US\$ million)	<u>Revised Cost at Mid. 1984</u> (US\$ million)
Foreign	289.6	299.7
Local	59.6	63.2
In-Service Cost:	<u>349.21/</u>	<u>362.9</u>

1.2 Disbursement Profile and Financial Cost (with Interest) of
Capital Cost (US\$ million)

<u>Years</u>	<u>%</u>	<u>Financial Cost</u>	<u>(A) With 6% Interest</u>	<u>(B) With 12% Interest</u>
4	10	36.3	45.8	57.1
3	20	72.5	86.3	101.9
2	30	108.9	122.4	136.6
1	30	108.9	115.4	122.0
0	10	36.3	36.3	36.3
	<u>100</u>	<u>362.9</u>	<u>406.2</u>	<u>453.9</u>

1.3 Economic Cost at Mid. 1984 Price

$$(A) 406.2 \times 0.9732/ = \text{US\$}395.2 \text{ million}$$

$$(B) 453.9 \times 0.973 = \text{US\$}441.6 \text{ million}$$

2. Capital Cost (Based on Economic Cost and Mid-1984 Price)

2.1 Annual Capital Cost

	<u>6% Interest</u>	<u>12% Interest</u>
Civil Work (60% - 50yrs)	4.74	5.30
Electro-mechanical Work (40% - 30yrs)	5.27	5.89
Ann. Capital Cost (US\$million/yr)	10.01	11.19

2.2 Capacity Cost-Capital Related Cost (93.5% of Ann. Capital Cost)

(US\$ million/yr)

at 6% Interest: 9.36

at 12% Interest: 10.46

2.3 Operation and Maintenance Cost

@1.4% to 93.5% of
Financial Capital
Cost:

$$362.9 \times 0.935 \times 0.014 = \text{US\$4.75 million/yr}$$

$$\text{Economic Cost: } 4.75 \times 0.973 = \text{US\$4.62 million/yr}$$

2.4 Total Capacity Cost

$$\begin{aligned} \text{(A) at 6% Interest: } & 9.36 + 4.62 = \text{US\$13.98 million/yr} \\ & (13.98 \times 10^6) / 225\text{MW} \\ & = \underline{\text{US\$62.13/yr/KW}} \end{aligned}$$

$$\begin{aligned} \text{(B) at 12% Discount: } & 10.46 + 4.62 = \text{US\$15.08 million/yr} \\ & (15.08 \times 10^6) / 225\text{MW} \\ & = \underline{\text{US\$67.02/yr/KW}} \end{aligned}$$

3. Energy Cost (Based on Economic Cost at Mid-1984 Price)

3.1 Capital Related Cost (6.5% of Economic Capital Cost)

$$\text{at 6% Interest: } 395.2 \times 0.065 = \text{US\$25.69 million}$$

$$\text{at 12% Interest: } 441.6 \times 0.065 = \text{US\$28.70 million}$$

3.2 Operation and Maintenance Cost

@0.5% for 50 years to 20%
of Financial Capital Cost: $362.9 \times 0.065 \times 0.005 \times 50$
 $= \underline{\text{US\$5.90 million}}$

Economic Cost: $5.90 \times 0.973 = \underline{\text{US\$5.74 million}}$

3.3 PW of Energy for 50 years:

(1) Firm energy

at 6% Discount: $768 \text{ GWh/yr}^{3/} \times 16,764^{5/} = 12,875 \text{ GWh}$

at 12% Discount: $768 \text{ GWh/yr} \times 12,621^{6/} = 9,693 \text{ GWh}$

(2) Total available energy (including secondary energy)

at 6% Discount: $1,609 \text{ GWh/yr}^{4/} \times 16,764 = 26,973 \text{ GWh}$

at 12% Discount: $1,609 \text{ GWh/yr} \times 12,621 = 20,307 \text{ GWh}$

3.4 Energy Cost (Based on Economic Cost)

(A) at 6% Discount Factor:

a. Capital Related Cost 25.69

b. Operation and
Maintenance Cost 5.94

Total 31.63

$\text{US\$31.63 million} / 26,973 \text{ GWh} = \text{US\$1.17/kWh}$

(B) at 12% Discount Factor

a. Capital Related Cost 28.70

b. Operation and
Maintenance Cost 5.74

Total 34.44

$\text{US\$34.44 million} / 20,307 \text{ GWh} = \text{US\$1.70/kWh}$

4. Transmission Cost

4.1 Capital Related Cost

	(US\$ million)
(1) Financial Cost at Mid. 1984 Market Price:	11.00
(2) Economic Cost: (11.00 x 0.973)	10.70
(3) At 6% Interest:	11.98
(4) At 12% Interest:	13.39

4.2 Operation and Maintenance Cost

(3% of Financial

Capital Cost): $11.00 \times 0.03 \times 50 \text{ yrs} = \text{US\$}16.5 \text{ million}$

4.3 Total Transmission Cost

(A) at 6% Discount Factor:	$11.98 + 16.50 = 28.45$
	$\text{US\$}28.48 \text{ million} / 12,875 \text{ GWh} = \text{US}\phi 0.22/\text{kWh}$
(B) at 12% Discount Factor:	$13.39 + 16.50 = 29.89$
	$\text{US\$}29.89 \text{ million} / 9,693 \text{ GWh} = \text{US}\phi 0.31/\text{kWh}$

5. Economic Power Cost

(A) at 6% Discount Factor:

Firm Energy:

-Capacity Cost

($\text{US\$}62.13/\text{yr}/\text{KW} \times 225 \text{ MW}$
 $\times 50 \text{ yrs} / 12,875 \text{ GWh}$)

$\text{US}\phi 5.43/\text{kWh}$

-Energy Cost

1.17

-Transmission Cost

0.22

6.82

Secondary Energy: Energy Cost

$\text{US}\phi 1.17$

(B) at 12% Discount Factor:

Firm Energy:

-Capital Cost
(US\$67.02/yr/KW x 225 MW
x 50 yrs / 9,693 GWh) US\$7.78/kWh

-Energy Cost 1.70

-Transmission Cost 0.31

9.79

Secondary Energy: US\$1.70/kWh

(NOTES)

1/ Figures used in UNDP/World Bank Report No. 4474-NEP
"Nepal: Issues and Options in the Energy Sector",
Aug. 1983 (Energy Study).

2/ Standard Correction Factor used to estimate economic
costs based on financial costs, NEC Tariff Study -
Report No. 4/2/310882/1/1, Aug. 1983.

3/, 4/ See ATTACHMENT (Ann. Energy Value)

5/ $\sum_{n=1}^{51} 1.06n$

6/ $\sum_{n=1}^{51} 1.12n$

ATTACHMENT

Annual Energy Value

(Unit: GWh)

	<u>Energy Potential</u>	<u>Demand</u>	<u>Surplus</u>
JUL/AUG	167.40		103.4
AUG/SEP	167.40		103.4
SEP/OCT	162.00		98.0
OCT/NOV	167.40		103.4
NOV/DEC	162.00		98.0
DEC/JAN	128.79		64.79
JAN/FEB	98.73		34.73
FEB/MAR	66.52		2.52
MAR/APR	70.31		6.31
APR/MAY	89.14		25.14
MAY/JUN	167.40		103.40
JUN/JUL	162.00		98.00
Ann. Total	<u>1,609.09^{1/}</u>	<u>64 x 12 = 768^{2/}</u>	<u>841.09</u>

(NOTES)

1/ Estimated by JICA Study Team

2/ UNDP/World Bank Energy Study

Annex IV-8

ECONOMIC RATE OF RETURN

Annex IV-8(1)

ECONOMIC RATE OF RETURN

(Benefit: -10%)

NEPAL UREA PROJECT (275 TPD)

(UNIT: US\$ '000)

YEAR	GROSS		ANNUAL COSTS	NET DISCOUNT FACTOR	(COST/BENEFIT) PRESENT VALUE		DISCOUNT FACTOR (8 %)	(COST/BENEFIT) PRESENT VALUE	
	COSTS	BENEFIT			COSTS	BENEFIT		COSTS	BENEFIT
1984	0.00	0.00	0.00	1.0000	0.00	0.00	1.0000	0.00	0.00
1985	0.00	0.00	0.00	0.9443	0.00	0.00	0.9259	0.00	0.00
1986	0.00	0.00	0.00	0.8916	0.00	0.00	0.8573	0.00	0.00
1987	2910.00	0.00	0.00	0.8419	2450.07	0.00	0.7938	2310.05	0.00
1988	37826.00	0.00	0.00	0.7950	30072.60	0.00	0.7350	27803.30	0.00
1989	44615.00	0.00	0.00	0.7507	33493.20	0.00	0.6806	30364.20	0.00
1990	9809.00	0.00	0.00	0.7089	6953.37	0.00	0.6302	6181.34	0.00
1991	0.00	15371.10	8732.00	0.6694	0.00	4444.01	0.5835	0.00	3873.85
1992	0.00	16556.30	9166.00	0.6321	0.00	4734.35	0.5403	0.00	4046.78
1993	0.00	17912.70	9396.00	0.5968	0.00	5083.09	0.5003	0.00	4260.47
1994	0.00	19056.60	9594.00	0.5636	0.00	5332.88	0.4632	0.00	4383.02
1995	0.00	19844.10	9702.00	0.5322	0.00	5397.28	0.4289	0.00	4349.78
1996	0.00	20307.60	9717.00	0.5025	0.00	5321.85	0.3971	0.00	4205.68
1997	0.00	20770.20	9738.00	0.4745	0.00	5234.79	0.3677	0.00	4056.52
1998	0.00	21238.20	9766.00	0.4481	0.00	5140.19	0.3405	0.00	3905.85
1999	0.00	21680.10	9794.00	0.4231	0.00	5028.83	0.3152	0.00	3747.00
2000	0.00	22090.50	9818.00	0.3995	0.00	4902.93	0.2919	0.00	3582.23
2001	0.00	22409.10	9892.00	0.3772	0.00	4721.95	0.2703	0.00	3382.99
2002	0.00	22731.30	9949.00	0.3562	0.00	4553.26	0.2503	0.00	3198.77
2003	0.00	22986.70	10005.00	0.3364	0.00	4367.23	0.2317	0.00	3008.49
2004	0.00	23283.90	10051.00	0.3176	0.00	4202.99	0.2145	0.00	2839.10
2005	-1624.00	23478.30	10086.00	0.2999	-487.06	4016.55	0.1987	-322.62	2660.47
TOTAL	93536.00	*****	*****	*****	72482.20	72482.10	*****	66336.30	55501.00

** ERR = 5.90%

** NPV = *****

Annex IV-8(2)

ECONOMIC RATE OF RETURN

(Benefit: -5%)

NEPAL UREA PROJECT (275 TPD)

(UNIT: US\$ '000)

YEAR	GROSS		NET	(COST/BENEFIT)		DISCOUNT	(COST/BENEFIT)	
	COSTS	BENEFIT		PRESENT VALUE	DISCOUNT		PRESENT VALUE	FACTOR
1984	0.00	0.00	0.00	0.00	0.00	1.0000	0.00	0.00
1985	0.00	0.00	0.00	0.00	0.00	0.9339	0.00	0.00
1986	0.00	0.00	0.00	0.00	0.00	0.8721	0.00	0.00
1987	2910.00	0.00	0.00	2369.93	0.00	0.8144	2310.05	0.00
1988	37824.00	0.00	0.00	28768.20	0.00	0.7605	27803.30	0.00
1989	44615.00	0.00	0.00	31687.20	0.00	0.7102	30364.20	0.00
1990	9809.00	0.00	0.00	6505.91	0.00	0.6633	6181.34	0.00
1991	0.00	16225.10	7493.05	0.00	4641.11	0.6194	0.00	4372.13
1992	0.00	17581.70	8415.65	0.00	4867.79	0.5784	0.00	4546.72
1993	0.00	18907.90	9511.85	0.00	5137.95	0.5403	0.00	4758.30
1994	0.00	20115.30	10521.30	0.00	5307.31	0.5044	0.00	4873.40
1995	0.00	20946.60	11244.60	0.00	5296.97	0.4711	0.00	4822.60
1996	0.00	21435.80	11718.80	0.00	5155.25	0.4399	0.00	4653.70
1997	0.00	21924.10	12186.10	0.00	5006.24	0.4108	0.00	4480.81
1998	0.00	22418.10	12652.10	0.00	4853.89	0.3836	0.00	4307.56
1999	0.00	22884.60	13090.60	0.00	4689.92	0.3583	0.00	4126.70
2000	0.00	23317.80	13499.80	0.00	4516.63	0.3346	0.00	3940.46
2001	0.00	23654.10	13762.10	0.00	4299.84	0.3124	0.00	3719.46
2002	0.00	23994.20	14045.20	0.00	4098.04	0.2918	0.00	3514.80
2003	0.00	24265.90	14260.90	0.00	3885.76	0.2725	0.00	3304.42
2004	0.00	24577.50	14526.50	0.00	3696.32	0.2545	0.00	3116.63
2005	-1624.00	24782.70	14696.70	-385.90	3492.28	0.2376	-322.62	2919.58
TOTAL	93536.00	*****	*****	68945.30	68945.30		66336.30	61457.30

** ERR = 7.08%

** NPV = -4879.00

Annex IV-8(3)

ECONOMIC RATE OF RETURN
NEPAL UREA PROJECT (275 TPD)

(Benefit: +5%)

(UNIT: US\$ '000)

YEAR	GROSS		NET DISCOUNT	(COST/BENEFIT)		DISCOUNT	(COST/BENEFIT)	
	COSTS	BENEFIT		PRESENT VALUE	BENEFIT		FACTOR	PRESENT VALUE
1984	0.00	0.00	1.0000	0.00	0.00	1.0000	0.00	0.00
1985	0.00	0.00	0.9153	0.00	0.00	0.9259	0.00	0.00
1986	0.00	0.00	0.8378	0.00	0.00	0.8573	0.00	0.00
1987	2910.00	0.00	0.7668	2231.38	0.00	0.7938	2310.05	0.00
1988	37826.00	0.00	0.7018	26548.00	0.00	0.7350	27803.30	0.00
1989	44615.00	0.00	0.6424	28660.40	0.00	0.6806	30364.20	0.00
1990	9809.00	0.00	0.5880	5767.48	0.00	0.6302	6181.34	0.00
1991	0.00	17933.00	0.5382	0.00	4951.70	0.5835	5368.67	0.00
1992	0.00	19432.40	0.4926	0.00	5057.05	0.5403	5546.60	0.00
1993	0.00	20898.20	0.4509	0.00	5185.86	0.5003	5753.95	0.00
1994	0.00	2232.70	0.4127	0.00	5215.60	0.4632	5854.17	0.00
1995	0.00	23151.50	0.3777	0.00	5080.03	0.4289	5768.25	0.00
1996	0.00	23692.20	0.3457	0.00	4831.48	0.3971	5549.75	0.00
1997	0.00	24231.90	0.3164	0.00	4586.36	0.3677	5329.39	0.00
1998	0.00	24777.90	0.2896	0.00	4347.89	0.3405	5110.98	0.00
1999	0.00	25293.50	0.2651	0.00	4108.84	0.3152	4886.08	0.00
2000	0.00	25772.50	0.2426	0.00	3871.15	0.2919	4656.91	0.00
2001	0.00	26144.00	0.2221	0.00	3607.35	0.2703	4392.41	0.00
2002	0.00	26519.90	0.2033	0.00	3368.44	0.2503	4146.85	0.00
2003	0.00	26820.20	0.1861	0.00	3128.56	0.2317	3896.28	0.00
2004	0.00	27164.60	0.1703	0.00	2914.37	0.2145	3671.69	0.00
2005	-1624.00	27391.40	0.1559	-253.13	2697.40	0.1987	-322.62	3437.82
TOTAL	93536.00	*****	*****	62954.10	62954.00	*****	66336.30	73369.80

** ERR = 9.25%

** NPV = 7033.50

Annex IV-8(4)

ECONOMIC RATE OF RETURN

(Benefit: +10%)

NEPAL UREA PROJECT (275 TPD)

(UNIT: US\$ '000)

YEAR	GROSS		ANNUAL COSTS	NET DISCOUNT FACTOR	(COST/BENEFIT) PRESENT VALUE		DISCOUNT FACTOR (%)	(COST/BENEFIT) PRESENT VALUE	
	COSTS	BENEFIT			COSTS	BENEFIT		COSTS	BENEFIT
1984	0.00	0.00	0.00	1.0000	0.00	0.00	1.0000	0.00	0.00
1985	0.00	0.00	0.00	0.9069	0.00	0.00	0.9259	0.00	0.00
1986	0.00	0.00	0.00	0.8225	0.00	0.00	0.8573	0.00	0.00
1987	2910.00	0.00	0.00	0.7460	2170.73	0.00	0.7938	2310.05	0.00
1988	37826.00	0.00	0.00	0.6765	25590.20	0.00	0.7350	27803.30	0.00
1989	44615.00	0.00	0.00	0.6136	27373.80	0.00	0.6806	30364.20	0.00
1990	9809.00	0.00	0.00	0.5564	5458.20	0.00	0.6302	6181.34	0.00
1991	0.00	18786.90	8732.00	0.5047	10054.90	5074.26	0.5835	0.00	5866.94
1992	0.00	20357.70	9166.00	0.4577	11191.70	5122.26	0.5403	0.00	6046.53
1993	0.00	21893.30	9396.00	0.4151	12497.30	5187.43	0.5003	0.00	6251.77
1994	0.00	23291.40	9594.00	0.3765	13697.40	5156.38	0.4632	0.00	6344.55
1995	0.00	24253.90	9702.00	0.3414	14551.90	4968.18	0.4289	0.00	6241.07
1996	0.00	24620.40	9717.00	0.3096	15103.40	4676.53	0.3971	0.00	5997.78
1997	0.00	25385.80	9738.00	0.2808	15647.80	4394.13	0.3677	0.00	5753.67
1998	0.00	25957.80	9766.00	0.2547	16191.80	4123.68	0.3405	0.00	5512.69
1999	0.00	26497.90	9794.00	0.2310	16703.90	3858.15	0.3152	0.00	5265.78
2000	0.00	26999.50	9818.00	0.2095	17181.50	3599.09	0.2919	0.00	5015.13
2001	0.00	27388.90	9892.00	0.1900	17496.90	3324.02	0.2703	0.00	4728.88
2002	0.00	27782.70	9949.00	0.1723	17833.70	3072.66	0.2503	0.00	4462.88
2003	0.00	28097.30	10005.00	0.1563	18092.30	2827.08	0.2317	0.00	4192.22
2004	0.00	28458.10	10051.00	0.1417	18407.10	2608.55	0.2145	0.00	3949.22
2005	-1624.00	28695.70	10086.00	0.1285	18609.70	-208.72	0.1987	-322.62	3696.94
TOTAL	93536.00	*****	*****	*****	60384.10	60384.20	*****	66336.30	79326.00

** ERR = 10.26%

** NPV = 12989.80

Annex IV-8 (5)

ECONOMIC RATE OF RETURN

(Capital Cost: -10%)

NEPAL UREA PROJECT (275 TPD)

(UNIT: US\$ '000)

YEAR	GROSS		ANNUAL COSTS	NET DISCOUNT		(COST/BENEFIT) PRESENT VALUE		DISCOUNT FACTOR (%)	(COST/BENEFIT) PRESENT VALUE	
	COSTS	BENEFIT		BENEFIT	FACTOR	COSTS	BENEFIT		COSTS	BENEFIT
1984	0.00	0.00	0.00	1.0000	0.00	0.00	1.0000	0.00	0.00	0.00
1985	0.00	0.00	0.00	0.9131	0.00	0.00	0.9259	0.00	0.00	0.00
1986	0.00	0.00	0.00	0.8338	0.00	0.00	0.8573	0.00	0.00	0.00
1987	2619.00	0.00	0.00	0.7614	1994.02	0.00	0.7938	2079.05	0.00	0.00
1988	34043.40	0.00	0.00	0.6952	23667.80	0.00	0.7350	25022.90	0.00	0.00
1989	40153.50	0.00	0.00	0.6346	25490.50	0.00	0.6806	27327.80	0.00	0.00
1990	8828.10	0.00	0.00	0.5797	5117.45	0.00	0.6302	5563.20	0.00	0.00
1991	0.00	17079.00	8732.00	0.5293	8347.00	0.00	0.5835	0.00	4870.40	0.00
1992	0.00	18507.00	9166.00	0.4833	9341.00	0.00	0.5403	0.00	5046.66	0.00
1993	0.00	19503.00	9396.00	0.4413	10207.00	0.00	0.5003	0.00	5256.12	0.00
1994	0.00	21174.00	9594.00	0.4030	11580.00	0.00	0.4632	0.00	5363.79	0.00
1995	0.00	22049.00	9702.00	0.3680	12347.00	0.00	0.4289	0.00	5295.43	0.00
1996	0.00	22564.00	9717.00	0.3360	12847.00	0.00	0.3971	0.00	5101.73	0.00
1997	0.00	23078.00	9738.00	0.3068	13340.00	0.00	0.3677	0.00	4905.10	0.00
1998	0.00	23598.00	9766.00	0.2802	13832.00	0.00	0.3405	0.00	4709.27	0.00
1999	0.00	24089.00	9794.00	0.2558	14295.00	0.00	0.3152	0.00	4506.39	0.00
2000	0.00	24545.00	9818.00	0.2336	14727.00	0.00	0.2919	0.00	4298.68	0.00
2001	0.00	24899.00	9892.00	0.2133	15007.00	0.00	0.2703	0.00	4055.94	0.00
2002	0.00	25257.00	9949.00	0.1948	15308.00	0.00	0.2503	0.00	3830.82	0.00
2003	0.00	25543.00	10005.00	0.1779	15538.00	0.00	0.2317	0.00	3600.35	0.00
2004	0.00	25871.00	10051.00	0.1624	15830.00	0.00	0.2145	0.00	3394.16	0.00
2005	-1461.60	26087.00	10086.00	0.1483	16001.00	-216.76	0.1987	-290.36	3178.70	0.00
TOTAL	84182.40	*****	*****	*****	*****	56053.00	*****	59702.60	67413.50	*****

** ERR = 9.51%

** NPV = 7710.88

Annex IV-8(6)

ECONOMIC RATE OF RETURN

(Capital Cost: -5%)

NEPAL UREA PROJECT (275 TPD)

(UNIT: US\$ '000)

YEAR	GROSS		ANNUAL COSTS	NET DISCOUNT FACTOR	(COST/BENEFIT) PRESENT VALUE		DISCOUNT FACTOR (%)	(COST/BENEFIT) PRESENT VALUE	
	COSTS	BENEFIT			COSTS	BENEFIT		COSTS	BENEFIT
1984	0.00	0.00	0.00	1.0000	0.00	0.00	1.0000	0.00	0.00
1985	0.00	0.00	0.00	0.9188	0.00	0.00	0.9259	0.00	0.00
1986	0.00	0.00	0.00	0.8443	0.00	0.00	0.8573	0.00	0.00
1987	2764.50	0.00	0.00	0.7758	2144.60	0.00	0.7938	2194.55	0.00
1988	35934.70	0.00	0.00	0.7128	25614.60	0.00	0.7350	26413.10	0.00
1989	42384.20	0.00	0.00	0.6550	27760.10	0.00	0.6806	28846.00	0.00
1990	9318.55	0.00	0.00	0.6018	5608.00	0.00	0.6302	5872.27	0.00
1991	0.00	17079.00	8732.00	0.5530	0.00	4615.66	0.5835	0.00	4870.40
1992	0.00	16507.00	9166.00	0.5081	0.00	4746.13	0.5403	0.00	5046.66
1993	0.00	19903.00	9396.00	0.4669	0.00	4905.33	0.5003	0.00	5256.12
1994	0.00	21174.00	9594.00	0.4290	0.00	4967.54	0.4632	0.00	5363.79
1995	0.00	22049.00	9702.00	0.3942	0.00	4866.74	0.4289	0.00	5295.43
1996	0.00	22564.00	9717.00	0.3622	0.00	4652.88	0.3971	0.00	5101.73
1997	0.00	23078.00	9738.00	0.3328	0.00	4439.35	0.3677	0.00	4905.10
1998	0.00	23598.00	9766.00	0.3058	0.00	4229.52	0.3405	0.00	4709.27
1999	0.00	24089.00	9794.00	0.2810	0.00	4016.37	0.3152	0.00	4506.39
2000	0.00	24545.00	9818.00	0.2582	0.00	3801.96	0.2919	0.00	4298.68
2001	0.00	24899.00	9892.00	0.2372	0.00	3559.84	0.2703	0.00	4055.94
2002	0.00	25257.00	9949.00	0.2180	0.00	3336.55	0.2503	0.00	3830.82
2003	0.00	25543.00	10005.00	0.2003	0.00	3111.85	0.2317	0.00	3600.35
2004	0.00	25871.00	10051.00	0.1840	0.00	2911.21	0.2145	0.00	3394.16
2005	-1542.80	26087.00	10086.00	0.1691	-260.87	2705.56	0.1987	-306.49	3178.70
TOTAL	8859.20	*****	*****	*****	60866.40	60866.50	*****	63019.40	67413.50

** ERR = 8.83%

** NPV = 4394.08

Annex IV-8(7)

ECONOMIC RATE OF RETURN

(Capital Cost: +5%)

NEPAL UREA PROJECT (275 TPO)

(UNIT: US\$ '000)

YEAR	GROSS		ANNUAL COSTS	NET BENEFIT	NET DISCOUNT FACTOR	(COST/BENEFIT) PRESENT VALUE		DISCOUNT FACTOR (%)	(COST/BENEFIT) PRESENT VALUE	
	COSTS	BENEFIT				COSTS	BENEFIT		COSTS	BENEFIT
1984	0.00	0.00	0.00	0.00	1.0000	0.00	0.00	1.0000	0.00	0.00
1985	0.00	0.00	0.00	0.00	0.9293	0.00	0.00	0.9259	0.00	0.00
1986	0.00	0.00	0.00	0.00	0.8637	0.00	0.00	0.8573	0.00	0.00
1987	3055.50	0.00	0.00	0.00	0.8026	2452.47	0.00	0.7938	2425.56	0.00
1988	39717.30	0.00	0.00	0.00	0.7459	29626.10	0.00	0.7350	29193.40	0.00
1989	46845.70	0.00	0.00	0.00	0.6932	32474.20	0.00	0.6806	31882.40	0.00
1990	10299.50	0.00	0.00	0.00	0.6442	6635.23	0.00	0.6302	6490.40	0.00
1991	0.00	17079.00	8732.00	8347.00	0.5987	0.00	4997.42	0.5835	0.00	4870.40
1992	0.00	18507.00	9166.00	9341.00	0.5564	0.00	5197.35	0.5403	0.00	5046.66
1993	0.00	19903.00	9396.00	10507.00	0.5171	0.00	5433.02	0.5003	0.00	5256.12
1994	0.00	21174.00	9594.00	11580.00	0.4805	0.00	5564.74	0.4632	0.00	5363.79
1995	0.00	22049.00	9702.00	12347.00	0.4466	0.00	5514.06	0.4289	0.00	5295.43
1996	0.00	22564.00	9717.00	12847.00	0.4150	0.00	5331.94	0.3971	0.00	5101.73
1997	0.00	23078.00	9738.00	13340.00	0.3857	0.00	5145.33	0.3677	0.00	4905.10
1998	0.00	23598.00	9766.00	13832.00	0.3585	0.00	4958.11	0.3405	0.00	4709.27
1999	0.00	24089.00	9794.00	14295.00	0.3331	0.00	4761.99	0.3152	0.00	4506.39
2000	0.00	24545.00	9818.00	14727.00	0.3096	0.00	4559.24	0.2919	0.00	4298.68
2001	0.00	24899.00	9892.00	15007.00	0.2877	0.00	4317.63	0.2703	0.00	4055.94
2002	0.00	25257.00	9949.00	15308.00	0.2674	0.00	4093.02	0.2503	0.00	3830.82
2003	0.00	25543.00	10005.00	15538.00	0.2485	0.00	3860.95	0.2317	0.00	3600.35
2004	0.00	25871.00	10051.00	15820.00	0.2309	0.00	3653.25	0.2145	0.00	3394.16
2005	-1705.20	26087.00	10086.00	16001.00	0.2146	-365.95	3433.95	0.1987	-338.75	3178.70
TOTAL	98212.80	*****	*****	*****	*****	70822.00	70622.00	*****	69653.10	67413.50

** ERR = 7.60%

** NPV = -2239.56

Annex IV-8(8)

ECONOMIC RATE OF RETURN

NEPAL UREA PROJECT (275 TPD)

(Capital Cost: +10%)

(UNIT: US\$ '000)

YEAR	GROSS		ANNUAL COSTS	NET		(COST/BENEFIT)		(COST/BENEFIT)	
	COSTS	BENEFIT		BENEFIT	COSTS	PRESENT VALUE	DISCOUNT FACTOR	PRESENT VALUE	DISCOUNT FACTOR
1984	0.00	0.00	0.00	0.00	0.00	1.0000	0.00	0.00	1.0000
1985	0.00	0.00	0.00	0.00	0.00	0.9342	0.00	0.00	0.9259
1986	0.00	0.00	0.00	0.00	0.00	0.8727	0.00	0.00	0.8573
1987	3201.00	0.00	0.00	0.00	2609.55	0.8152	0.00	2541.06	0.7938
1988	41608.60	0.00	0.00	0.00	31687.70	0.7615	0.00	39583.60	0.7350
1989	42076.50	0.00	0.00	0.00	34914.60	0.7114	0.00	33400.70	0.6806
1990	10789.90	0.00	0.00	0.00	7170.97	0.6646	0.00	6799.47	0.6302
1991	0.00	17079.00	8732.00	8347.00	0.00	0.6209	5182.24	0.00	0.5835
1992	0.00	18507.00	9166.00	9341.00	0.00	0.5800	5417.60	0.00	0.5403
1993	0.00	19903.00	9396.00	10507.00	0.00	0.5418	5692.71	0.00	0.5003
1994	0.00	21174.00	9594.00	11580.00	0.00	0.5061	5861.06	0.00	0.4632
1995	0.00	22049.00	9702.00	12347.00	0.00	0.4728	5837.89	0.00	0.4289
1996	0.00	22564.00	9717.00	12847.00	0.00	0.4417	5674.44	0.00	0.3971
1997	0.00	23078.00	9738.00	13340.00	0.00	0.4126	5504.32	0.00	0.3677
1998	0.00	23598.00	9766.00	13832.00	0.00	0.3855	5331.62	0.00	0.3405
1999	0.00	24089.00	9794.00	14295.00	0.00	0.3601	5147.37	0.00	0.3152
2000	0.00	24545.00	9818.00	14727.00	0.00	0.3364	4953.84	0.00	0.2919
2001	0.00	24899.00	9892.00	15007.00	0.00	0.3142	4715.73	0.00	0.2703
2002	0.00	25257.00	9949.00	15308.00	0.00	0.2936	4493.66	0.00	0.2503
2003	0.00	25543.00	10005.00	15538.00	0.00	0.2742	4260.92	0.00	0.2317
2004	0.00	25871.00	10051.00	15820.00	0.00	0.2562	4052.67	0.00	0.2145
2005	-1786.40	26087.00	10086.00	16001.00	0.00	0.2393	-427.50	3829.21	0.1987
TOTAL	*****	*****	*****	*****	*****	*****	75955.30	75955.20	*****
									72969.90
									67413.50

** ERR = 7.05%

** NPV = -5556.36

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