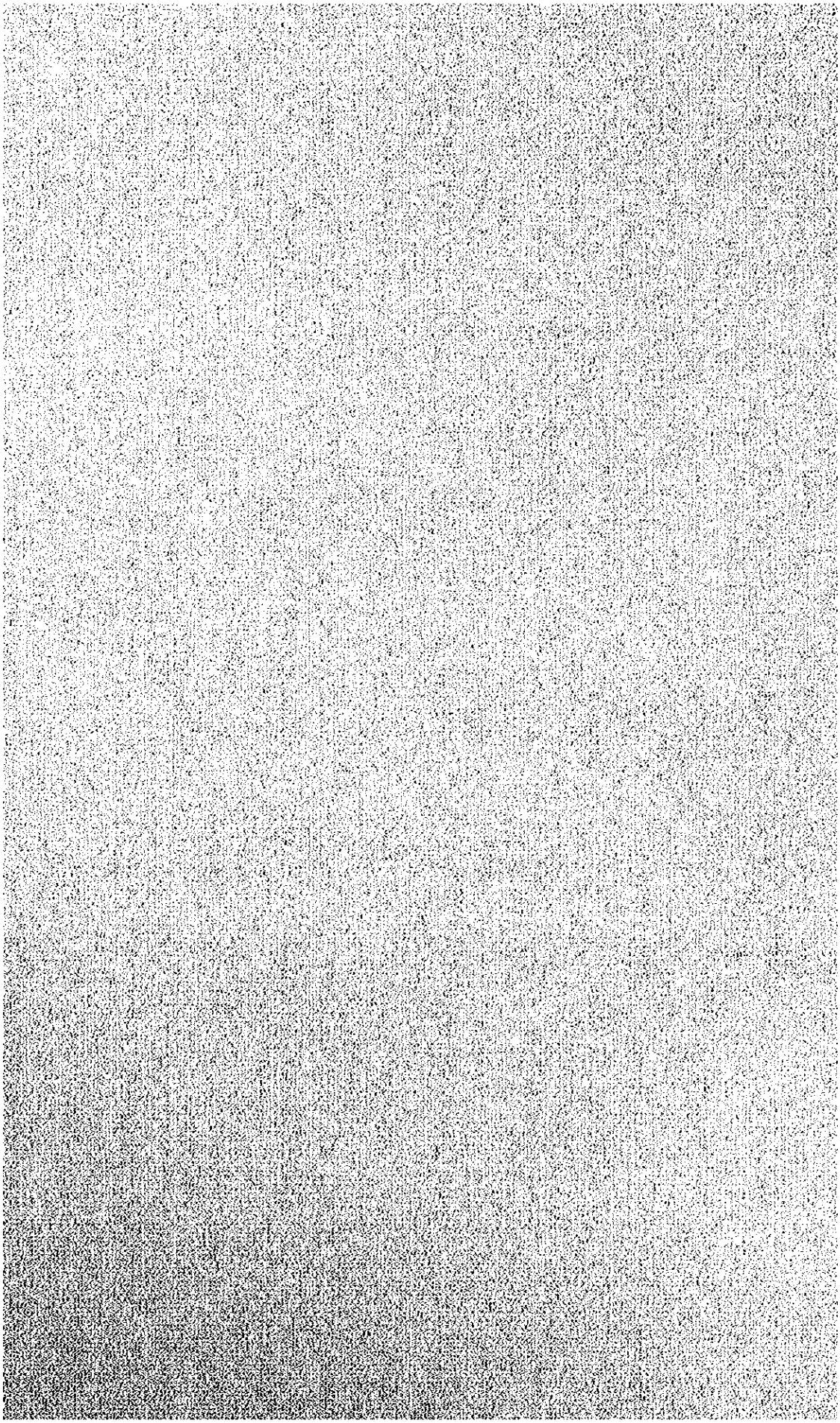
X. ECONOMIC ANALYSIS



X. ECONOMIC ANALYSIS

1. Methods of economic analysis

The economic analysis of the Sri Racha Sea Berth Project must be made from the following two aspects. First of all, it must be studied whether this project is significant for the national economy. Secondly, it must be studied whether the project can be managed healthly. In this chapter, the effects on the national economy are analyzed by quantitatively grasping the costs-benefits ratio and the internal return rate by the current value method. The financial condition is studied by clarifying loss and profit accounts and asset standing of each year.

In this report, the major attention of the economic analysis is directed to 1980 ~ 1985 for the following reasons.

1) The prediction of the import volume of crude oils is relatively stable
2) If the life of facilities is assumed to be 20 years, the analysis period is on the extension of the macro estimate.

This is because analyses based on uncertain assumptions lack reliability.

2. Analysis of national economy

(1) Costs

Construction costs and maintenance costs discussed in Chapter VIII are all the costs that must be considered for this project. Table X-1 shows the costs under various plans. It must be noted that a proposal based on shadow price was introduced for the sake of comparison. Large projects of developing countries often depend heavily on foreign currency. Therefore, the risk for exchange rate fluctuation was considered. This shadow price system is an effective means for preventing the outflow of foreign currency for developing countries with small foreign currency holdings.

Various proposals can be made on the shadow price. We adopted 1.10 in view of the conditions in Thailand, the current international currency situation and NESDB's opinion. Concretely, this shadow price allows to cope with the fluctuation of 1 US$ = 20.0 ~ 22.0 ฿.

As Table X-1 shows, the construction costs for Site C under X plan amount to 931 million ฿ (769 million ฿ of foreign currency and 162 million ฿ of domestic currency. If the shadow price is used, the cost in the foreign currency will rise to 846 million ฿ and the total will rise to 1,008 million ฿.

The life of facilities is an important factor for economic analysis. The life of all the facilities was assumed to be 20 years for the present analysis. Generally speaking, the life of facilities is expected to exceed 20 years if they are maintained and repaired adequately. However, the life of 20 years was assumed in consideration of technological revolutions and for safety.

Table X-1 Construction Cost and Maintenance Cost used for Economic Analysis

(Unit: Million ฿)

Shadow Price 1.00	Plan \ Site (C or M / F or D)		A Site				B Site				C Site			
			Construction			Maintenance	Construction			Maintenance	Construction			Maintenance
			Foreign Currency	Domestic Currency	Total	Domestic Currency	Foreign Currency	Domestic Currency	Total	Domestic Currency	Foreign Currency	Domestic Currency	Total	Domestic Currency
	X	1st Stage	921	232	1,153	47.9	759	187	946	43.7	769	162	931	42.5 (53.8)
		1st year	291	82	373		232	65	297		235	56	291	
		2nd year	630	150	780		527	122	649		534	106	640	
	Y	1st Stage	965	247	1,212	48.6	803	202	1,005	44.4	813	177	990	43.2 (54.5)
		1st year	291	82	373		232	65	297		235	56	291	
		2nd year	674	165	839		571	137	708		578	121	699	
	Z	1st Stage	965	247	1,212	48.3	803	202	1,005	44.1	813	177	990	42.9 (54.2)
		1st year	291	82	373		232	65	297		235	56	291	
		2nd year	674	165	839		571	137	708		578	121	699	
		2nd Stage	361	98	459	64.9	474	137	611	62.1	491	114	605	59.7 (85.4)
		Total	1,326	345	1,671		1,277	339	1,616		1,304	291	1,595	
	W	1st Stage	965	247	1,212	48.4	803	202	1,005	44.3	813	177	990	43.1 (54.4)
		1st year	291	82	373		232	65	297		235	56	291	
		2nd year	674	165	839		571	137	708		578	121	699	
		2nd Stage	361	98	459	65.4	474	137	611	62.6	491	114	605	60.1 (85.9)
		Total	1,326	345	1,671		1,277	339	1,616		1,304	291	1,595	

Shadow Price 1.10	Site / C or M / F or D / Plan	A Site				B Site				C Site			
		Construction			Maintenance	Construction			Maintenance	Construction			Maintenance
		Foreign Currency	Domestic Currency	Total	Domestic Currency	Foreign Currency	Domestic Currency	Total	Domestic Currency	Foreign Currency	Domestic Currency	Total	Domestic Currency
	X 1st Stage	1,013	232	1,245	47.9	835	187	1,022	43.7	846	162	1,008	42.5 (53.8)
	X 1st year	320	82	402		255	65	320		259	56	315	
	X 2nd year	693	150	843		580	122	702		587	106	693	
	Y 1st Stage	1,061	247	1,308	48.6	883	202	1,085	44.4	895	177	1,072	43.2 (54.5)
	Y 1st year	320	82	402		255	65	320		259	56	315	
	Y 2nd year	741	165	906		628	137	765		636	121	757	
	Z 1st Stage	1,061	247	1,308	48.3	883	202	1,085	44.1	895	177	1,072	42.9 (54.2)
	Z 1st year	320	82	402		255	65	320		259	56	315	
	Z 2nd year	741	165	906		628	137	765		636	121	757	
	Z 2nd Stage	397	98	495	64.9	521	137	658	62.1	540	114	654	59.7 (85.4)
	Z Total	1,458	345	1,803		1,404	339	1,743		1,435	291	1,726	
	W 1st Stage	1,061	247	1,308	48.4	883	202	1,085	44.3	895	177	1,072	43.1 (54.4)
	W 1st year	320	82	402		255	65	320		259	56	315	
	W 2nd year	741	165	906		628	137	765		636	121	757	
	W 2nd Stage	397	98	495	65.4	521	137	658	62.6	540	114	654	60.1 (85.9)
	W Total	1,458	345	1,803		1,404	339	1,743		1,435	291	1,726	

Notes:
1. 1974 price is used.
2. 1.10 is used as shadow price.
3. Yearly costs are distributed according to VII 3(3).
4. The figures in the parentheses in the maintenance cost at Site C indicate maintenance cost required at every 5 years.

(2) Benefits

The benefits from this project can be classified into measurable benefits (decrease of transportation costs by the employment of large-tankers and decrease of demurrage loss by decreasing the number of tankers) and unmeasurable benefits (stable supply of Petroleum energy and navigation safety realized by decreasing the number of tankers). The latter was excluded from the economic analysis.

1) Distribution of tanker classes

It is not 200 thousand tankers alone that use 200 thousand DWT sea berths. The tankers which use them show certain class distribution. For example, tankers of 25 thousand DWT ~ 60 thousand DWT currently use TORC Sea Berth (in Sri Racha). The Mission assumed the following distribution of tanker classes for the Sri Racha 200 thousand DWT sea berth on the basis of examples in Japan.

Transportation by	200 thousand DWT tanker	70%
"	90 thousand DWT tanker	20%
"	60 thousand DWT tanker	10%

The following table shows the amount of crude oils that are handled by tankers of various classes in 1980 and 1985.

(Unit: thousand KL)

	1980	1985
200 thousand DWT tanker	8,960	13,230
90 thousand DWT tanker	2,560	3,780
60 thousand DWT tanker	1,280	1,890
Total	12,800	18,900

2) Benefits of large tankers

As discussed in IX, transportation cost can be decreased by increasing berth capacity to 200 thousand DWT class. The benefits of this project include the cut in transportation costs realized by large tankers. It must be pointed out that benefits should not be overestimated.

In IX, we estimated the demurrage loss in 1980 and 1985 by assuming the use of current facilities. We also obtained the tanker class distribution for the minimum demurrage loss.

	1980	1985
90 thousand DWT tanker	2.5 tankers	5.0 tankers
60 thousand DWT tanker	11.0 tankers	14.3 tankers

The following table shows the amount of crude oils to be handled by these tanker classes.

(Unit: thousand KL)

	1980	1985
90 thousand DWT tanker	3,250	6,500
60 thousand DWT tanker	9,550	12,400
Total	12,800	18,900

We can obtain the scale merit by KL by obtaining the weighed average of transportation cost by tanker classes (Table IX-2).

(a) 1980

Total transportation cost for minimum demurrage loss.

57.9₿ × 3,250 thousand KL + 67.9₿ × 9,550 thousand KL
= 837.6 million ₿

Total transportation cost of 200 thousand DWT sea berth.

41.4₿ × 8,960 thousand KL + 57.9₿ × 2,560 thousand KL
+ 67.9₿ × 1,280 thousand KL = 606.1 million ₿

∴ (837.6 - 606.1) million ₿ ÷ 12,800 thousand KL
= 18.1 ₿/KL

(b) 1985

Similarly: (1,218.3 - 894.9) million ₿ ÷ 18,900 thousand KL
= 17.1 ₿/KL

3) Demurrage loss of 200 thousand DWT berth (See IX 2.(2).)

The demurrage loss of 200 thousand DWT sea berth is estimated below by queuing theory.

λ_{200} = 3.1 tankers/month, λ_{90} = 2.0 tankers/month,
λ_{60} = 1.5 tankers/month in 1980

Therefore, 6.6 tankers enter the port monthly and the demurrage loss of 2.48 ₿/KL (one berth system) is estimated. It was obtained by the weighed mean of daily demurrage loss by tanker classes.

In 1985 (two berths are to be constructed by this time), 9.7 tankers enter the port monthly. (λ_{200} = 4.6, λ_{90} = 2.9, λ_{60} = 2.2) Therefore, the demurrage loss is 0.47 ₿/KL.

4) Demurrage loss under current berths alone

As discussed in IX, the demurrage loss will be 1.21 ₿/KL in 1980 and 1.49 ₿/KL in 1985.

5) Determination of benefits

Benefits can be obtained as below from 2), 3) and 4).

(Unit: ¥/KL, thousand KL)

	1980	1985
Model enlargement	18.1	17.1
Decrease of waiting	△ 1.27	1.02
200 thousand DWT berth	△ 2.48	△ 0.47
Current berth	1.21	1.49
Quantity of crude oils	12,800	18,900

The thin line of Fig. X-1 is based on the assumption that benefits are in proportion to the quantity of crude oils. If benefits from decreasing demurrage loss are assumed to increase up to the capacity limit of two 200 thousand DWT berths, unrealistic results will be obtained in remote future. According to the information obtained from Japanese oil enterprices, the construction of a new berth is considered when demurrage loss becomes equal to the benefits of layer tankers. In the case of this project, this will not occur during the period of this economic analysis. Therefore, the merit of large tankers and the merit of the decrease in demurrage loss were added. Fig. X-1 shows this.

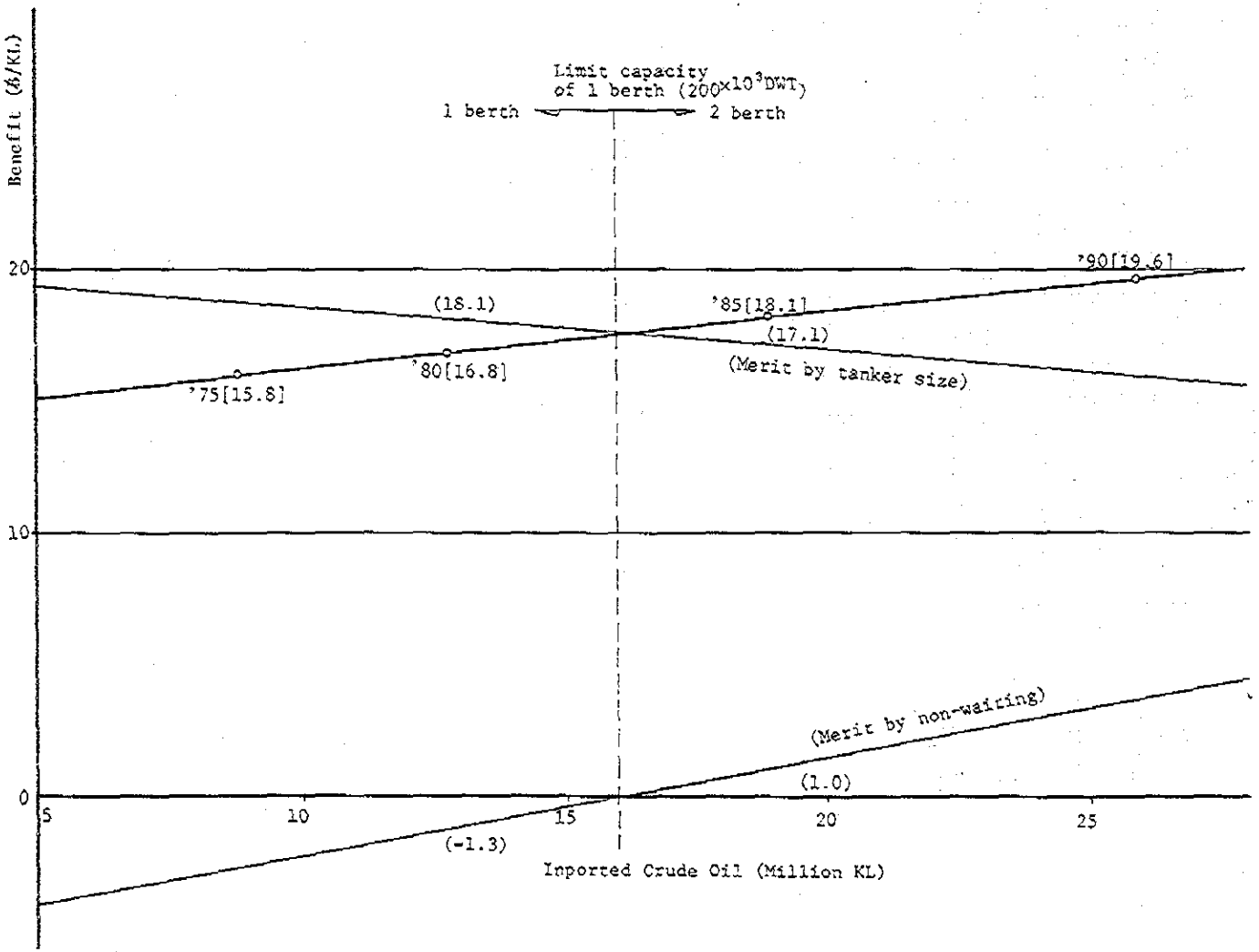


Fig. X-1 Merits and Crude Oil Quantity

The benefit line of Fig. X-1 can be expressed by the following equation if the benefit per KL (฿/KL) and the volume (million KL) of imported crude oils in Sri Racha are given as Y and X, respectively.

$$Y = 0.213X + 14.07$$

X: million KL
Y: ฿/KL

It must be noted that the crude oil quantity here means the total import volume of crude oils in Sri Racha District, regardless of plans (X, Y, Z, W). For example, 3,250 thousand KL of crude oils are to be handled under X Plan in 1978, the import volume of crude oils reaches 8,250 thousand KL in Sri Racha District. Therefore, the benefit is estimated as 15.8 ฿/KL for all the plans (X, Y, Z, W).

Table X-2 shows the total benefits that are obtained on the basis of crude oil quantity under the plans X, Y, Z, W (III).

Table X-2 Benefits of Individual Pland

(Unit: thousand KL, ฿/KL, million ฿)

Year \ Plan	Benefit per KL	X		Y		Z		W	
		Crude oil	Benefit	Crude oil	Benefit	Crude oil	Benefit	Crude oil	Benefit
1978	15.8	3,250	51.4	8,250	130.4	8,250	130.4	8,250	130.4
1980	16.8	6,500	109.2	13,000	218.4	13,000	218.4	13,000	218.4
1985	18.1	11,500	208.2	16,250	294.1	18,750	339.4	18,750	339.4
1990	19.6	15,000	294.0	18,250	357.7	23,250	455,7	25,750	504.7

(3) Internal return rate and cost benefit ratio

These costs and benefits are subjected to a cost effect analysis by the current price method. Twenty-four cases were subjected to this analysis. Three discount rates were used for each case. The assumptions for the analysis are listed again.

1) Costs consist of construction costs and maintenance costs.

2) Benefits consist of the cut of transportation cost and cut of demurrage loss.

3) The life of facilities is 20 years.

4) X and Y Plans require one berth, while Z, W Plans require two berths.

5) The first berth will be constructed in 1976 and 1977, while the second berth will be constructed in 1984. Under the above assumptions, the following equations can be used for the current price method.

$$C^1 = C_1^1 + \frac{1}{1+\alpha} C_2^1 + \frac{1}{(1+\alpha)^2} m_1^1 + \cdots\cdots + \frac{1}{(1+\alpha)^{21}} m_{20}^1$$

$$= \sum_{i=1}^{2} \frac{1}{(1+\alpha)^{i-1}} C_i^1 + \sum_{i=1}^{20} \frac{1}{(1+\alpha)^{i+1}} m_i^1$$

$$C^2 = C_1^1 + \frac{1}{1+\alpha} C_2^1 + \frac{1}{(1+\alpha)^2} m_1^1 + \cdots\cdots + \frac{1}{(1+\alpha)^8} m_7^1 + \frac{1}{(1+\alpha)^8} C_1^2$$

$$+ \frac{1}{(1+\alpha)^9} m_1^2 + \cdots\cdots + \frac{1}{(1+\alpha)^{28}} m_{20}^2$$

$$= \sum_{i=1}^{2} \frac{1}{(1+\alpha)^{i-1}} C_i^1 + \sum_{i=1}^{2} \frac{1}{(1+\alpha)^{i+1}} m_i^1 + \frac{1}{(1+\alpha)^8} C_1^2$$

$$+ \sum_{i=1}^{20} \frac{1}{(1+\alpha)^{i+8}} m_i^2$$

in which

C^i : Total costs of Berth i (i = 1, 2)

C_j^i : Construction cost of Berth i in j year
(i = 1, 2, j = 1, 2)

M_j^i : Maintenance cost of Berth i in j year
(i = 1, 2, j = 1, ... , 20)

α : Discount rate

$$B^1 = \sum_{i=1}^{20} \frac{1}{(1+\alpha)^{i+1}} b_j^1$$

$$B^2 = \sum_{i=1}^{7} \frac{1}{(1+\alpha)^{i+1}} b_i^1 + \sum_{i=1}^{20} \frac{1}{(1+\alpha)^{i+8}} b_i^2$$

in which

B^1 : Total benefits of Berth i (i = 1, 2)

B_j^i : Benefits of Berth i in j year
(i = 1, 2, j = 1, ... , 20)

The internal return rate α and the consts-benefits ratio k can be obtained by the following equations.

$$C^1(\alpha_0) = B^1(\alpha_0) \quad (1 \text{ berth})$$

$$C^2(\alpha_0) = B^2(\alpha_0) \quad (2 \text{ berths})$$

$$k(\alpha) = B^1/C^1 \quad (1 \text{ berth})$$

$$k(\alpha) = B^2/C^2 \quad (2 \text{ berths})$$

For X Plan, 4.0%, 8.0% and 12.0% were used as discount rates. For Y, Z, W Plans, 8.0%, 12.0%, and 16.0% were used for obtaining cost benefit ratio and pure current value. The results are shown in Table X-3 ~ X-26 (in million ₿) and Fig. X-2 ~ X-5. Each case name consists of (site-plan, shadow price.) A - X00 means Site A, X Plan and no Shadow Price.

Table X-3

Case A-X00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	4.0%	1,751	2,390	1.365	639
	8.0	1,532	1,500	0.979	△ 32
	12.0	1,389	995	0.716	△394

Table X-4

Case A-X10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	4.0%	1,840	2,390	1.299	550
	8.0	1,619	1,500	0.926	119
	12.0	1,474	995	0.675	479

Table X-5

Case B-X00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	4.0%	1,496	2,390	1.598	894
	8.0	1,298	1,500	1.156	202
	12.0	1,170	995	0.850	△ 175

Table X-6

Case B-X10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	4.0%	1,570	2,390	1.522	820
	8.0	1,370	1,500	1.095	130
	12.0	1,240	995	0.802	△ 245

Table X-7

Case C-X00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	4.0%	1,495	2,390	1.599	895
	8.0	1,292	1,500	1.161	208
	12.0	1,161	995	0.857	△ 166

Table X-8

Case C-X10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	4.0%	1,570	2,390	1.522	820
	8.0	1,365	1,500	1.099	135
	12.0	1,232	995	0.808	△ 237

Table X-9

Case A-Y00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,595	2,296	1.439	701
	12.0	1,449	1,592	1.099	143
	16.0	1,347	1,156	0.858	△ 191

Table X-10

Case A-Y10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,686	2,296	1.362	610
	12.0	1,538	1,592	1.035	54
	16.0	1,434	1,156	0.806	△ 278

Table X-11

Case B-Y00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,353	2,296	1.697	943
	12.0	1,222	1,592	1.303	370
	16.0	1,132	1,156	1.021	24

Table X-12

Case B-Y10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,429	2,296	1.607	867
	12.0	1,296	1,592	1.228	296
	16.0	1,204	1,156	0.960	△ 48

Table X-13

Case C-Y00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,348	2,296	1.703	948
	12.0	1,214	1,592	1.311	378
	16.0	1,122	1,156	1.030	34

Table X-14

Case C-Y10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,426	2,296	1.610	870
	12.0	1,290	1,592	1.234	302
	16.0	1,196	1,156	0.967	△ 40

Table X-15

Case A-Z00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,936	2,838	1.466	902
	12.0	1,682	1,868	1.111	186
	16.0	1,513	1,304	0.862	△ 209

Table X-16

Case A-Z10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	2,046	2,838	1.387	792
	12.0	1,786	1,868	1.046	82
	16.0	1,611	1,304	0.809	△ 307

Table X-17

Case B-Z00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0	1,791	2,838	1.585	1,047
	12.0	1,529	1,868	1.222	339
	16.0	1,353	1,304	0.964	△ 49

Table X-18

Case B-Z10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,892	2,838	1.500	946
	12.0	1,622	1,868	1.152	246
	16.0	1,439	1,304	0.906	△ 135

Table X-19

Case C-Z00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,786	2,838	1.589	1,052
	12.0	1,518	1,868	1.231	350
	16.0	1,341	1,304	0.972	△ 37

Table X-20

Case C-Z10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,890	2,838	1.502	948
	12.0	1,614	1,868	1.157	254
	16.0	1,430	1,304	0.921	△ 126

Table X-21

Case A-W00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,945	2,964	1.524	1,019
	12.0	1,687	1,935	1.147	248
	16.0	1,517	1,339	0.883	△ 178

Table X-22

Case A-W10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	2,055	2,964	1.442	909
	12.0	1,791	1,935	1.080	144
	16.0	1,615	1,339	0.829	△ 276

Table X-23

Case B-W00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,791	2,964	1.655	1,173
	12.0	1,529	1,935	1.266	406
	16.0	1,353	1,339	0.990	△ 14

Table X-24

Case B-W10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,892	2,964	1.567	1,072
	12.0	1,622	1,935	1.193	313
	16.0	1,439	1,339	0.931	△ 100

Table X-25

Case C-W00	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,786	2,964	1.660	1,178
	12.0	1,518	1,935	1.275	417
	16.0	1,341	1,339	0.999	△ 2

Table X-26

Case C-W10	Cost & Benefit / Discount Rate	C	B	B/C	B-C
	8.0%	1,890	2,964	1.568	1,074
	12.0	1,614	1,935	1.199	321
	16.0	1,430	1,339	0.936	△ 91

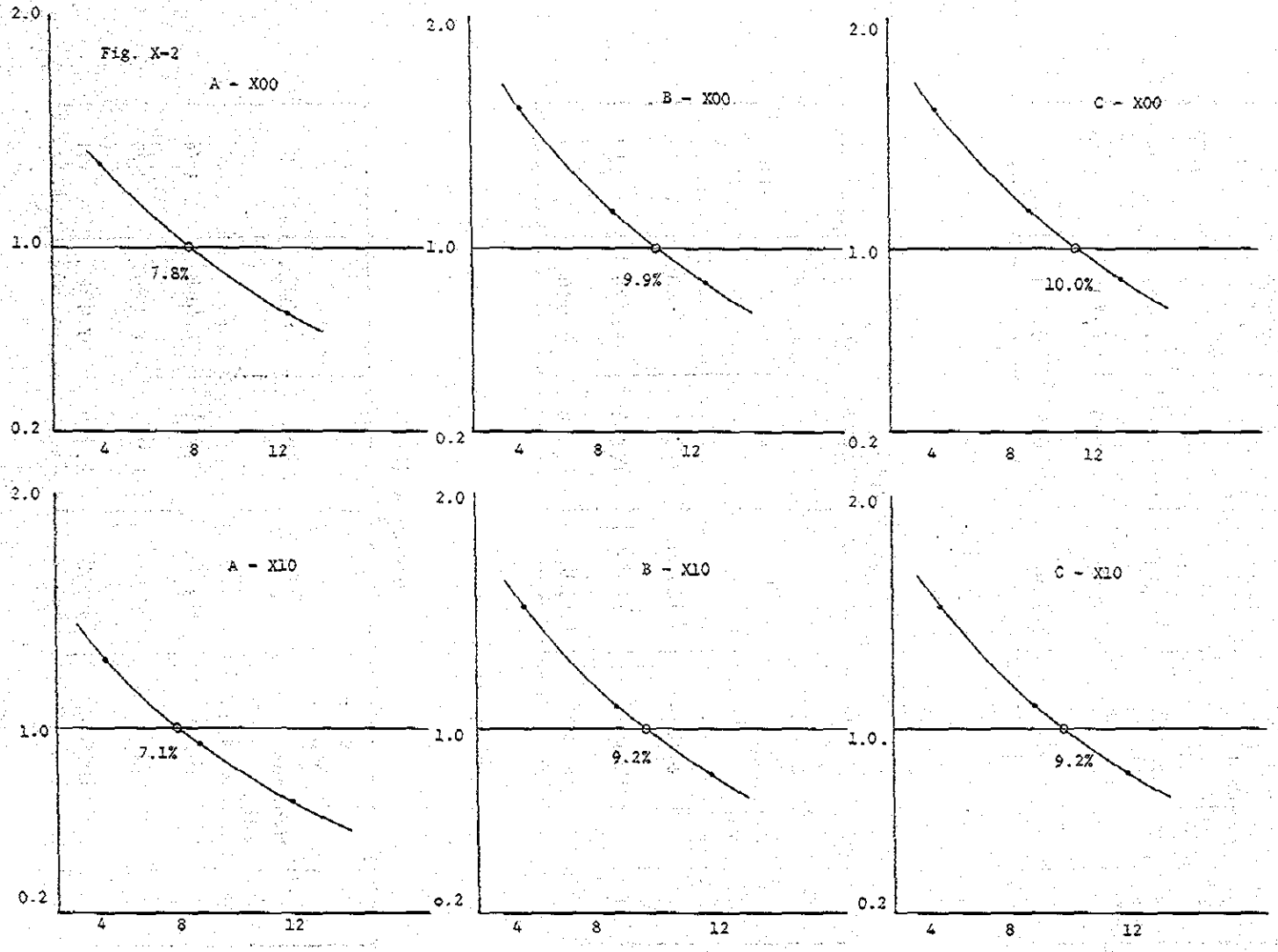


Fig. X-2 Internal Return Ratio (X Plan)

Vertical line: B/C Ratio
Horizontal line: Discount Ratio

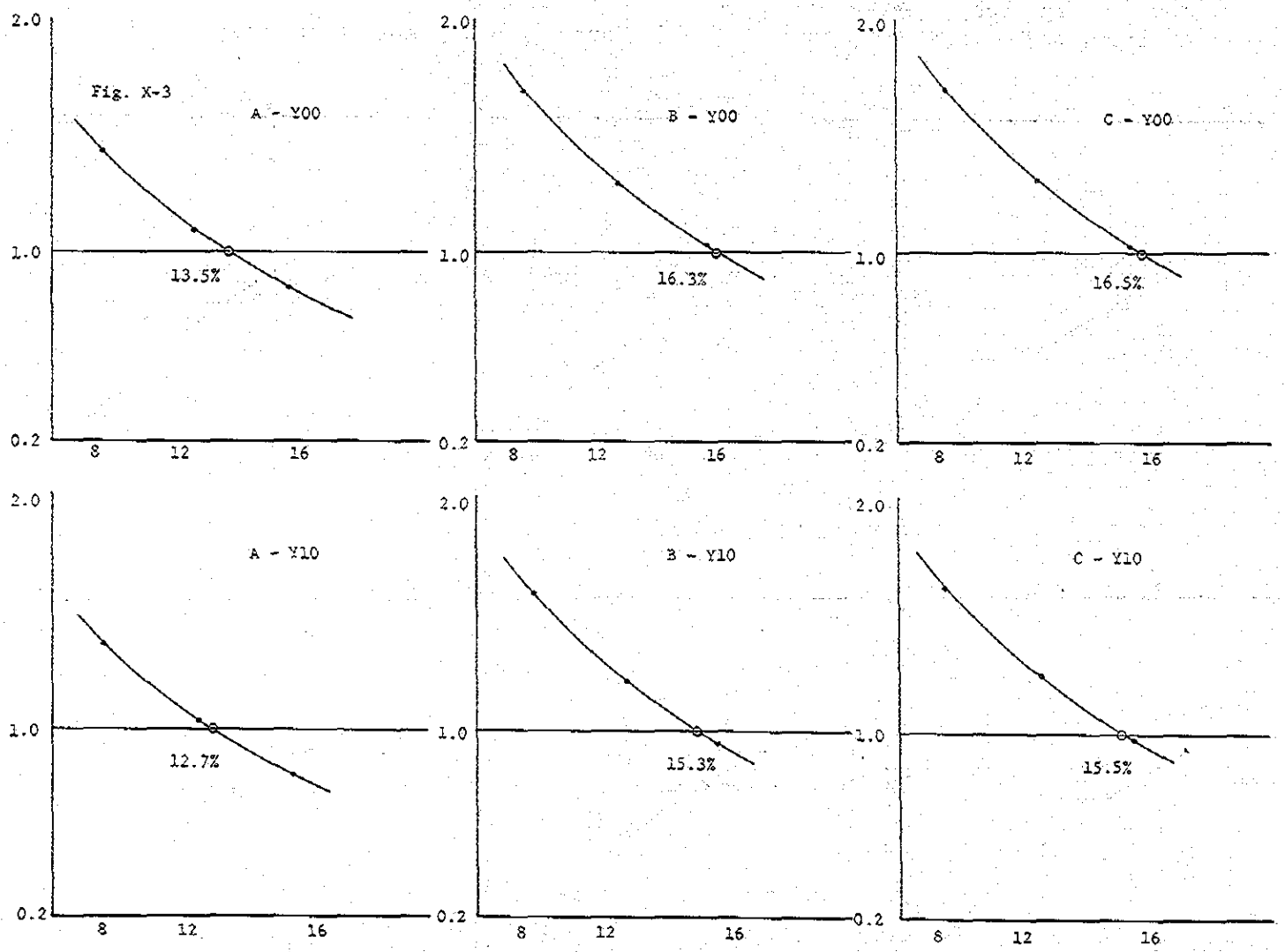


Fig. X-3 Internal Return Ratio (Y Plan)

Vertical Line: B/C Ratio
Horizontal line: Discount Ratio

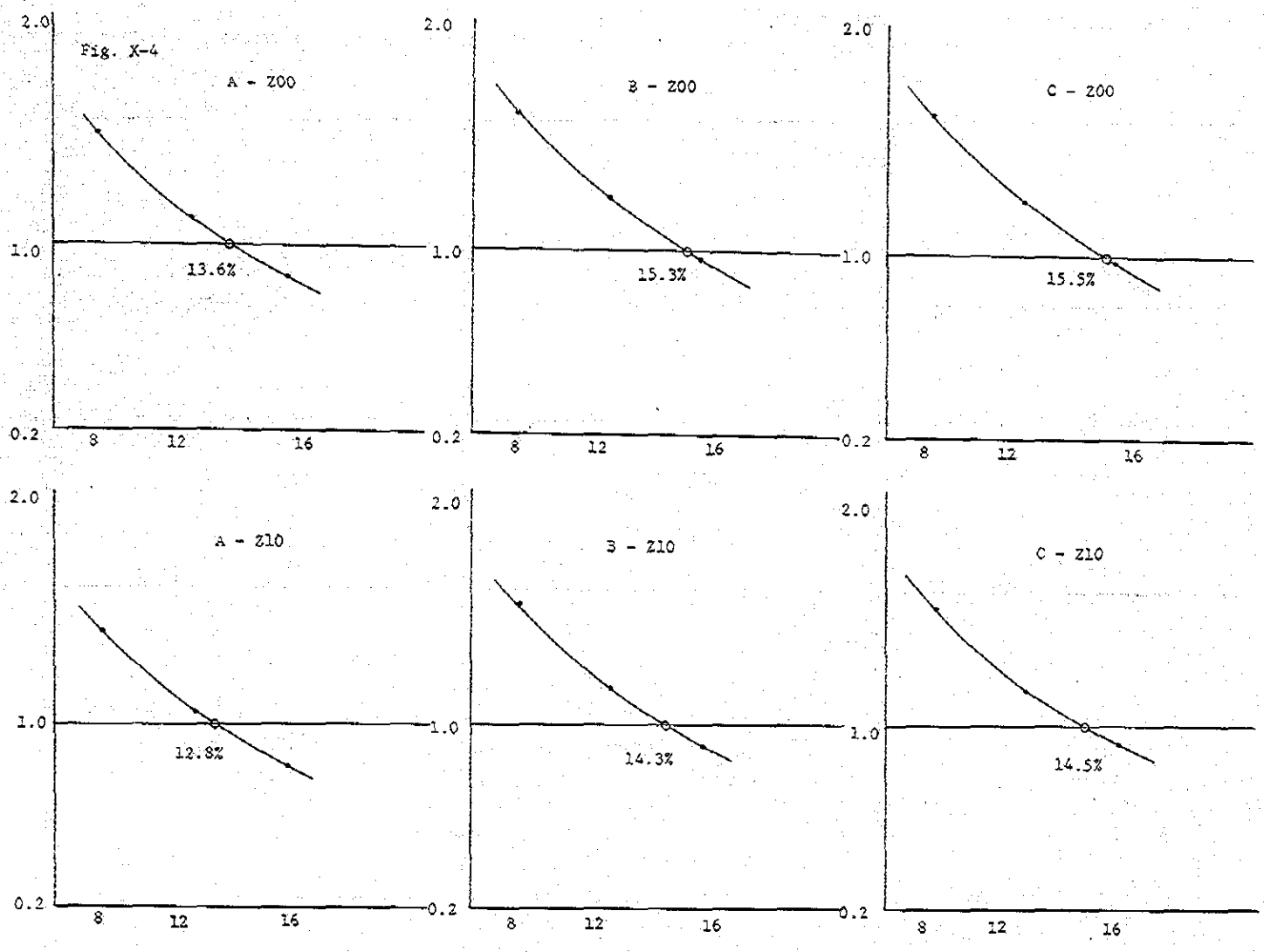


Fig. X-4 Internal Return Ratio (Z Plan)

Vertical line: B/C Ratio
Horizontal line: Discount Ratio

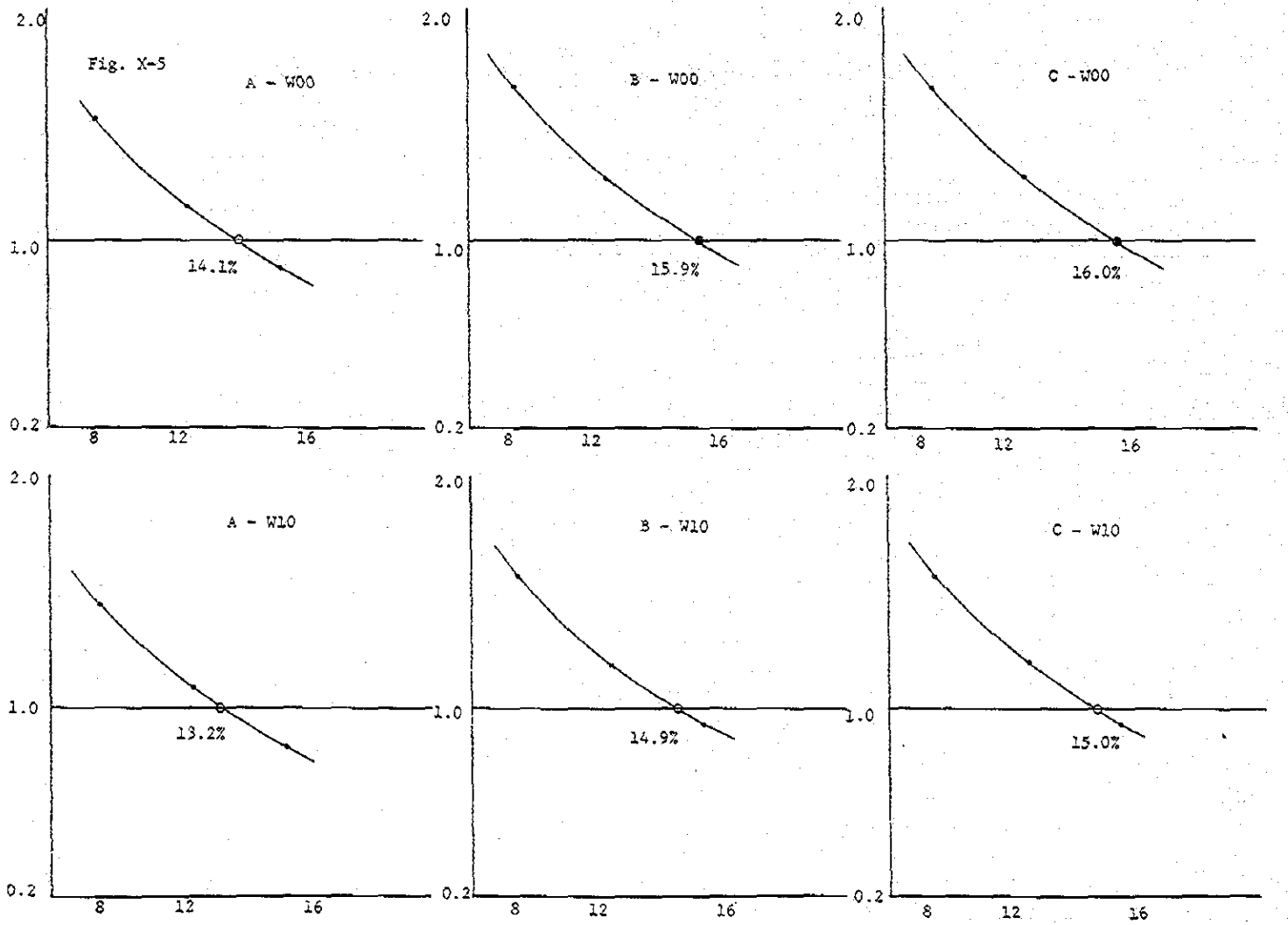


Fig. X-5 Internal Return Ratio (W Plan)

Vertical line: B/C Ratio
Horizontal line: Discount Ratio

The costs (construction cost and maintenance cost) and benefits of each case at the discount ratio of 12% are evaluated in current value in Table X-27 ~ X-30.

Table X-27 Current value at discount ratio of 12% (X Plan)

A-X00		Current Value of C & B				Present Value of C & B				Remarks
S.Q. No.	Year	Cost		Benefit		Cost		Benefit		
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	
1	1976	373				373				Discount Ratio 12.0%
2	1977	780				697				
3	1978	48		51		38		41		Results
4	1979	48		51		34		36		
5	1980	48		109		31		69		a. 1st Berth
6	1981	48		109		27		62		Cost 1,389
7	1982	48		109		24		55		Benefit 995
8	1983	48		109		22		49		B/C 0,716
9	1984	48		109		19		44		
10	1985	48		208		17		75		b. 2nd Berth
11	1986	48		208		15		67		Cost
12	1987	48		208		14		60		Benefit
13	1988	48		208		12		53		B/C
14	1989	48		208		11		48		
15	1990	48		294		10		60		c. Total System
16	1991	48		294		9		54		Cost 1,389
17	1992	48		294		8		48		Benefit 995
18	1993	48		294		7		43		B/C 0,716
19	1994	48		294		6		38		
20	1995	48		294		6		34		
21	1996	48		294		5		31		
22	1997	48		294		4		27		
23	1998									
24	1999									
25	2000									
26	2001									
27	2002									
28	2003									
29	2004									
Total						1,389		995		

B-X00		Current Value of C & B				Present Value of C & B				Remarks
S.Q. No.	Year	Cost		Benefit		Cost		Benefit		
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	
1	1976	297				297				Discount Ratio 12.0%
2	1977	649				580				
3	1978	44		51		35		41		Results
4	1979	44		51		31		36		
5	1980	44		109		28		69		a. 1st Berth
6	1981	44		109		25		62		Cost 1,170
7	1982	44		109		22		55		Benefit 995
8	1983	44		109		20		49		B/C 0.850
9	1984	44		109		18		44		
10	1985	44		208		16		75		b. 2nd Berth
11	1986	44		208		14		67		Cost
12	1987	44		208		13		60		Benefit
13	1988	44		208		11		53		B/C
14	1989	44		208		10		48		
15	1990	44		294		9		60		c. Total System
16	1991	44		294		8		54		Cost 1,170
17	1992	44		294		7		48		Benefit 995
18	1993	44		294		6		43		B/C 0.850
19	1994	44		294		6		38		
20	1995	44		294		5		34		
21	1996	44		294		5		31		
22	1997	44		294		4		27		
23	1998									
24	1999									
25	2000									
26	2001									
27	2002									
28	2003									
29	2004									
Total						1,170		995		

C-X00		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	291				291				Discount Ratio	12.0%
2	1977	640				572					
3	1978	43		51		34		41		Results	
4	1979	43		51		31		36			
5	1980	43		109		27		69		a. 1st Berth	
6	1981	43		109		24		62		Cost	1,161
7	1982	54		109		27		55		Benefit	995
8	1983	43		109		19		49		B/C	0.857
9	1984	43		109		17		44			
10	1985	43		208		16		75		b. 2nd Berth	
11	1986	43		208		14		67		Cost	
12	1987	54		208		15		60		Benefit	
13	1988	43		208		11		53		B/C	
14	1989	43		208		10		48			
15	1990	43		294		9		60		c. Total System	
16	1991	43		294		8		54		Cost	1,161
17	1992	54		294		9		48		Benefit	995
18	1993	43		294		6		43		B/C	0.857
19	1994	43		294		6		38			
20	1995	43		294		5		34			
21	1996	43		294		4		31			
22	1997	54		294		5		27			
23	1998										
24	1999										
25	2000										
26	2001										
27	2002										
28	2003										
29	2004										
Total						1,161		995			

A-X10		Current Value of C & B				Present Value of C & B				Remarks
S.Q. No.	Year	Cost		Benefit		Cost		Benefit		
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	
1	1976	402				402				Discount Ratio 12.0%
2	1977	843				753				
3	1978	48		51		38		41		Results
4	1979	48		51		34		36		
5	1980	48		109		31		69		a. 1st Berth
6	1981	48		109		27		62		Cost 1,474
7	1982	48		109		24		55		Benefit 995
8	1983	48		109		22		49		B/C 0.675
9	1984	48		109		19		44		
10	1985	48		208		17		75		b. 2nd Berth
11	1986	48		208		15		67		Cost
12	1987	48		208		14		60		Benefit
13	1988	48		208		12		53		B/C
14	1989	48		208		11		48		
15	1990	48		294		10		60		c. Total System
16	1991	48		294		9		54		Cost 1,474
17	1992	48		294		8		48		Benefit 995
18	1993	48		294		7		43		B/C 0.675
19	1994	48		294		6		38		
20	1995	48		294		6		34		
21	1996	48		294		5		31		
22	1997	48		294		4		27		
23	1998									
24	1999									
25	2000									
26	2001									
27	2002									
28	2003									
29	2004									
Total						1,474		995		

B-X10		Current Value of C & B				Present Value of C & B				Remarks
S.Q. No.	Year	Cost		Benefit		Cost		Benefit		
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	
1	1976	320				320				Discount Ratio 12.0%
2	1977	702				627				
3	1978	44		51		35		41		Results
4	1979	44		51		31		36		
5	1980	44		109		28		69		a. 1st Berth
6	1981	44		109		25		62		Cost 1,240
7	1982	44		109		22		55		Benefit 995
8	1983	44		109		20		49		B/C 0.802
9	1984	44		109		18		44		
10	1985	44		208		16		75		b. 2nd Berth
11	1986	44		208		14		67		Cost
12	1987	44		208		13		60		Benefit
13	1988	44		208		11		53		B/C
14	1989	44		208		10		48		
15	1990	44		294		9		60		c. Total System
16	1991	44		294		8		54		Cost 1,240
17	1992	44		294		7		48		Benefit 995
18	1993	44		294		6		43		B/C 0.802
19	1994	44		294		6		38		
20	1995	44		294		5		34		
21	1996	44		294		5		31		
22	1997	44		294		4		27		
23	1998									
24	1999									
25	2000									
26	2001									
27	2002									
28	2003									
29	2004									
Total						1,240		995		

C-X10		Current Value of C & B				Present Value of C & B				Remarks
S.Q. No.	Year	Cost		Benefit		Cost		Benefit		
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	
1	1976	315				315				Discount Ratio 12.0%
2	1977	693				619				
3	1978	43		51		34		41		Results
4	1979	43		51		31		36		
5	1980	43		109		27		69		a. 1st Berth
6	1981	43		109		24		62		Cost 1,232
7	1982	54		109		27		55		Benefit 995
8	1983	43		109		19		49		B/C 0.808
9	1984	43		109		17		44		
10	1985	43		208		16		75		b. 2nd Berth
11	1986	43		208		14		67		Cost
12	1987	54		208		15		60		Benefit
13	1988	43		208		11		53		B/C
14	1989	43		208		10		48		
15	1990	43		294		9		60		c. Total System
16	1991	43		294		8		54		Cost 1,232
17	1992	54		294		9		48		Benefit 995
18	1993	43		294		6		43		B/C 0.808
19	1994	43		294		6		38		
20	1995	43		294		5		34		
21	1996	43		294		4		31		
22	1997	54		294		5		27		
23	1998									
24	1999									
25	2000									
26	2001									
27	2002									
28	2003									
29	2004									
Total						1,232		995		

Table X-28 Current value at discount ratio of 12% (Y Plan)

A-Y00		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	373				373				Discount Ratio	12.0%
2	1977	839				749					
3	1978	49		130		39		104		Results	
4	1979	49		130		35		93			
5	1980	49		218		31		139		a. 1st Berth	
6	1981	49		218		28		124		Cost	1,449
7	1982	49		218		25		111		Benefit	1,592
8	1983	49		218		22		99		B/C	1,099
9	1984	49		218		20		88			
10	1985	49		294		18		106		b. 2nd Berth	
11	1986	49		294		16		95		Cost	
12	1987	49		294		14		84		Benefit	
13	1988	49		294		13		76		B/C	
14	1989	49		294		11		67			
15	1990	49		358		10		73		c. Total System	
16	1991	49		358		9		66		Cost	1,449
17	1992	49		358		8		58		Benefit	1,592
18	1993	49		358		7		52		B/C	1,099
19	1994	49		358		6		47			
20	1995	49		358		6		42			
21	1996	49		358		5		37			
22	1997	49		358		5		33			
23	1998										
24	1999										
25	2000										
26	2001										
27	2002										
28	2003										
29	2004										
Total						1,449		1,592			

B-Y00		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	297				297				Discount Ratio	12.0%
2	1977	708				632					
3	1978	44		130		35		104		Results	
4	1979	44		130		31		93			
5	1980	44		218		28		139		a. 1st Berth	
6	1981	44		218		25		124		Cost	1,222
7	1982	44		218		22		111		Benefit	1,592
8	1983	44		218		20		99		B/C	1.303
9	1984	44		218		18		88			
10	1985	44		294		16		106		b. 2nd Berth	
11	1986	44		294		14		95		Cost	
12	1987	44		294		13		84		Benefit	
13	1988	44		294		11		76		B/C	
14	1989	44		294		10		67			
15	1990	44		358		9		73		c. Total System	
16	1991	44		358		8		66		Cost	1,222
17	1992	44		358		7		58		Benefit	1,592
18	1993	44		358		6		52		B/C	1.303
19	1994	44		358		6		47			
20	1995	44		358		5		42			
21	1996	44		358		5		37			
22	1997	44		358		4		33			
23	1998										
24	1999										
25	2000										
26	2001										
27	2002										
28	2003										
29	2004										
Total						1,222		1,592			

C-Y00		Current Value of C & B				Present Value of C & B				Remarks
S.Q. No.	Year	Cost		Benefit		Cost		Benefit		
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	
1	1976	291				291				Discount Ratio 12.0%
2	1977	699				624				
3	1978	43		130		34		104		Results
4	1979	43		130		31		93		
5	1990	43		218		27		139		a. 1st Berth
6	1981	43		218		24		124		Cost 1,214
7	1982	55		218		28		111		Benefit 1,592
8	1983	43		218		19		99		B/C 1.311
9	1984	43		218		17		88		
10	1985	43		294		16		106		b. 2nd Berth
11	1986	43		294		14		95		Cost
12	1987	55		294		16		84		Benefit
13	1988	43		294		11		76		
14	1989	43		294		10		67		
15	1990	43		358		9		73		c. Total System
16	1991	43		358		8		66		Cost 1,214
17	1992	55		358		9		58		Benefit 1,592
18	1993	43		358		6		52		B/C 1.311
19	1994	43		358		6		47		
20	1995	43		358		5		42		
21	1996	43		358		4		37		
22	1997	55		358		5		33		
23	1998									
24	1999									
25	2000									
26	2001									
27	2002									
28	2003									
29	2004									
Total						1,214		1,592		

A-Y10		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	402				402				Discount Ratio	12.0%
2	1977	906				809					
3	1978	49		130		39		104		Results	
4	1979	49		130		35		93			
5	1980	49		218		31		139		a. 1st Berth	
6	1981	49		218		28		124		Cost	1,538
7	1982	49		218		25		111		Benefit	1,592
8	1983	49		218		22		99		B/C	1.035
9	1984	49		218		20		88			
10	1985	49		294		18		106		b. 2nd Berth	
11	1986	49		294		16		95		Cost	
12	1987	49		294		14		84		Benefit	
13	1988	49		294		13		76		B/C	
14	1989	49		294		11		67			
15	1990	49		358		10		73		c. Total System	
16	1991	49		358		9		66		Cost	1,538
17	1992	49		358		8		58		Benefit	1,592
18	1993	49		358		7		52		B/C	1.035
19	1994	49		358		6		47			
20	1995	49		358		6		42			
21	1996	49		358		5		37			
22	1997	49		358		5		33			
23	1998										
24	1999										
25	2000										
26	2001										
27	2002										
28	2003										
29	2004										
Total						1,538		1,592			

B-Y10		Current Value of C & B				Present Value of C & B				Remarks
S.Q. No.	Year	Cost		Benefit		Cost		Benefit		
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	
1	1976	320				320				Discount Ratio 12.0%
2	1977	765				683				
3	1978	44		130		35		104		Results
4	1979	44		130		31		93		
5	1980	44		218		28		139		a. 1st Berth
6	1981	44		218		25		124		Cost 1,296
7	1982	44		218		22		111		Benefit 1,592
8	1983	44		218		20		99		B/C 1.228
9	1984	44		218		18		88		
10	1985	44		294		16		106		b. 2nd Berth
11	1986	44		294		14		95		Cost
12	1987	44		294		13		84		Benefit
13	1988	44		294		11		76		B/C
14	1989	44		294		10		67		
15	1990	44		358		9		73		c. Total System
16	1991	44		358		8		66		Cost 1,296
17	1992	44		358		7		58		Benefit 1,592
18	1993	44		358		6		52		B/C 1.228
19	1994	44		358		6		47		
20	1995	44		358		5		42		
21	1996	44		358		5		37		
22	1997	44		358		4		33		
23	1998									
24	1999									
25	2000									
26	2001									
27	2002									
28	2003									
29	2004									
Total						1,296		1,592		

C-Y10		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	315				315				Discount Ratio	12.0%
2	1977	757				676					
3	1978	43		130		34		104		Results	
4	1979	43		130		31		93			
5	1980	43		218		27		139		a. 1st Berth	
6	1981	43		218		24		124		Cost	1,290
7	1982	55		218		28		111		Benefit	1,592
8	1983	43		218		19		99		B/C	1.234
9	1984	43		218		17		88			
10	1985	43		294		16		106		b. 2nd Berth	
11	1986	43		294		14		95		Cost	
12	1987	55		294		16		84		Benefit	
13	1988	43		294		11		76		B/C	
14	1989	43		294		10		67			
15	1990	43		358		9		73		c. Total System	
16	1991	43		358		8		66		Cost	1,290
17	1992	55		358		9		58		Benefit	1,592
18	1993	43		358		6		52		B/C	1.234
19	1994	43		358		6		47			
20	1995	43		358		5		42			
21	1996	43		358		4		37			
22	1997	55		358		5		33			
23	1998										
24	1999										
25	2000										
26	2001										
27	2002										
28	2003										
29	2004										
Total						1,290		1,592			

Table X-29 Current value at discount ratio of 12% (Z Plan)

A-Z00		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	373				373				Discount Ratio	12.0%
2	1977	839				749					
3	1978	48		130		38		104		Results	
4	1979	48		130		34		93			
5	1980	48		218		31		139		a. 1st Berth	
6	1981	48		218		27		124		Cost	1,400
7	1982	48		218		24		111		Benefit	1,262
8	1983	48		218		22		99		B/C	0.901
9	1984	48	459	218		19	185	88			
10	1985	32	32	170	170	12	12	61	61	b. 2nd Berth	
11	1986	32	32	170	170	10	10	55	55	Cost	282
12	1987	32	32	170	170	9	9	49	49	Benefit	604
13	1988	32	32	170	170	8	8	44	44	B/C	2,142
14	1989	32	32	170	170	7	7	39	39		
15	1990	32	32	228	228	7	7	47	47	c. Total System	
16	1991	32	32	228	228	6	6	42	42	Cost	1,682
17	1992	32	32	228	228	5	5	37	37	Benefit	1,868
18	1993	32	32	228	228	5	5	33	33	B/C	1,111
19	1994	32	32	228	228	4	4	30	30		
20	1995	32	32	228	228	4	4	26	26		
21	1996	32	32	228	228	3	3	24	24		
22	1997	32	32	228	228	3	3	21	21		
23	1998		32		228		3		19		
24	1999		32		228		2		17		
25	2000		32		228		2		15		
26	2001		32		228		2		13		
27	2002		32		228		2		12		
28	2003		32		228		2		11		
29	2004		32		228		1		10		
Total						1,400	282	1,264	604		

B-Z00		Current Value of C & B				Present Value of C & B				Remark	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	297				297				Discount Ratio	12.0%
2	1977	708				632					
3	1978	44		130		35		104		Results	
4	1979	44		130		31		93			
5	1980	44		218		28		139		a. 1st Berth	
6	1981	44		218		25		124		Cost	1,189
7	1982	44		218		22		111		Benefit	1,264
8	1983	44		218		20		99		B/C	1.063
9	1984	44	611	218		18	247	88			
10	1985	31	31	170	170	11	11	61	61	b. 2nd Berth	
11	1986	31	31	170	170	10	10	55	55	Cost	340
12	1987	31	31	170	170	9	9	49	49	Benefit	604
13	1988	31	31	170	170	8	8	44	44	B/C	1.776
14	1989	31	31	170	170	7	7	39	39		
15	1990	31	31	228	228	6	6	47	47	c. Total System	
16	1991	31	31	228	228	6	6	42	42	Cost	1,529
17	1992	31	31	228	228	5	5	37	37	Benefit	1,868
18	1993	31	31	228	228	5	5	33	33	B/C	1.222
19	1994	31	31	228	228	4	4	30	30		
20	1995	31	31	228	228	4	4	26	26		
21	1996	31	31	228	228	3	3	24	24		
22	1997	31	31	228	228	3	3	21	21		
23	1998		31		228		3		19		
24	1999		31		228		2		17		
25	2000		31		228		2		15		
26	2001		31		228		2		13		
27	2002		31		228		2		12		
28	2003		31		228		1		11		
29	2004		31		228		1		10		
Total						1,189	340	1,264	604		

C-Z00		Current Value of C & B				Present Value of C & B				Remarks
S.Q. No.	Year	Cost		Benefit		Cost		Benefit		
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	
1	1976	291				291				Discount Ratio 12.0%
2	1977	699				624				
3	1978	43		130		34		104		Results
4	1979	43		130		31		93		
5	1980	43		218		27		139		a. 1st Berth
6	1981	43		218		24		124		Cost 1,177
7	1982	54		218		27		111		Benefit 1,264
8	1983	43		218		19		99		B/C 1.074
9	1984	43	605	218		17	244	88		
10	1985	30	30	170	170	11	11	61	61	b. 2nd Berth
11	1986	30	30	170	170	10	10	55	55	Cost 341
12	1987	30	30	170	170	9	9	49	49	Benefit 604
13	1988	30	30	170	170	8	8	44	44	B/C 1.771
14	1989	43	43	170	170	10	10	39	39	
15	1990	30	30	228	228	6	6	47	47	c. Total System
16	1991	30	30	228	228	5	5	42	42	Cost 1,518
17	1992	30	30	228	228	5	5	37	37	Benefit 1,868
18	1993	30	30	228	228	4	4	33	33	B/C 1.231
19	1994	43	43	228	228	6	6	30	30	
20	1995	30	30	228	228	3	3	26	26	
21	1996	30	30	228	228	3	3	24	24	
22	1997	30	30	228	228	3	3	21	21	
23	1998		30		228		2		19	
24	1999		43		228		3		17	
25	2000		30		228		2		15	
26	2001		30		228		2		13	
27	2002		30		228		2		12	
28	2003		30		228		1		11	
29	2004		43		228		2		10	
Total						1,177	341	1,264	604	

A-Z10		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	402				402				Discount Ratio	12.0%
2	1977	906				809					
3	1978	48		130		38		104		Results	
4	1979	48		130		34		93			
5	1980	48		218		31		139		a. 1st Berth	
6	1981	48		218		27		124		Cost	1,489
7	1982	48		218		24		111		Benefit	1,264
8	1983	48		218		22		99		B/C	0.849
9	1984	48	495	218		19	200	88			
10	1985	32	32	170	170	12	12	61	61	b. 2nd Berth	
11	1986	32	32	170	170	10	10	55	55	Cost	297
12	1987	32	32	170	170	9	9	49	49	Benefit	604
13	1988	32	32	170	170	8	8	44	44	B/C	2.034
14	1989	32	32	170	170	7	7	39	39		
15	1990	32	32	228	228	7	7	47	47	c. Total System	
16	1991	32	32	228	228	6	6	42	42	Cost	1,786
17	1992	32	32	228	228	5	5	37	37	Benefit	1,868
18	1993	32	32	228	228	5	5	33	33	B/C	1.046
19	1994	32	32	228	228	4	4	30	30		
20	1995	32	32	228	228	4	4	26	26		
21	1996	32	32	228	228	3	3	24	24		
22	1997	32	32	228	228	3	3	21	21		
23	1998		32		228		3		19		
24	1999		32		228		2		17		
25	2000		32		228		2		15		
26	2001		32		228		2		13		
27	2002		32		228		2		12		
28	2003		32		228		2		11		
29	2004		32		228		1		10		
Total						1,489	297	1,264	604		

B-Z10		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	320				320				Discount Ratio	12.0%
2	1977	765				683					
3	1978	44		130		35		104		Results	
4	1979	44		130		31		93			
5	1980	44		218		28		139		a. 1st Berth	
6	1981	44		218		25		124		Cost	1,263
7	1982	44		218		22		111		Benefit	1,264
8	1983	44		218		20		99		B/C	1.001
9	1984	44	658	218		18	266	88			
10	1985	31	31	170	170	11	11	61	61	b. 2nd Berth	
11	1986	31	31	170	170	10	10	55	55	Cost	359
12	1987	31	31	170	170	9	9	49	49	Benefit	604
13	1988	31	31	170	170	8	8	44	44	B/C	1.682
14	1989	31	31	170	170	7	7	39	39		
15	1990	31	31	228	228	6	6	47	47	c. Total System	
16	1991	31	31	228	228	6	6	42	42	Cost	1,622
17	1992	31	31	228	228	5	5	37	37	Benefit	1,868
18	1993	31	31	228	228	5	5	33	33	B/C	1.152
19	1994	31	31	228	228	4	4	30	30		
20	1995	31	31	228	228	4	4	26	26		
21	1996	31	31	228	228	3	3	24	24		
22	1997	31	31	228	228	3	3	21	21		
23	1998		31		228		3		19		
24	1999		31		228		2		17		
25	2000		31		228		2		15		
26	2001		31		228		2		13		
27	2002		31		228		2		12		
28	2003		31		228		1		11		
29	2004		31		228		1		10		
Total						1,263	359	1,264	604		

C-Z10		Current Value of C & B				Present Value of C & B				Remarks
S.Q. No.	Year	Cost		Benefit		Cost		Benefit		
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	
1	1976	315				315				Discount Ratio 12.0%
2	1977	757				676				
3	1978	43		130		34		104		Results
4	1979	43		130		31		93		
5	1980	43		218		27		139		a. 1st Berth
6	1981	43		218		24		124		Cost 1,253
7	1982	54		218		27		111		Benefit 1,264
8	1983	43		218		19		99		B/C 1.009
9	1984	43	654	218		17	264	88		
10	1985	30	30	170	170	11	11	61	61	b. 2nd Berth
11	1986	30	30	170	170	10	10	55	55	Cost 361
12	1987	30	30	170	170	9	9	49	49	Benefit 604
13	1988	30	30	170	170	8	8	44	44	B/C 1.673
14	1989	43	43	170	170	10	10	39	39	
15	1990	30	30	228	228	6	6	47	47	c. Total System
16	1991	30	30	228	228	5	5	42	42	Cost 1,614
17	1992	30	30	228	228	5	5	37	37	Benefit 1,868
18	1993	30	30	228	228	4	4	33	33	B/C 1.157
19	1994	43	43	228	228	6	6	30	30	
20	1995	30	30	228	228	3	3	26	26	
21	1996	30	30	228	228	3	3	24	24	
22	1997	30	30	228	228	3	3	21	21	
23	1998		30		228		2		19	
24	1999		43		228		3		17	
25	2000		30		228		2		15	
26	2001		30		228		2		13	
27	2002		30		228		2		12	
28	2003		30		228		1		11	
29	2004		43		228		8		10	
Total						1,253	361	1,264	604	

Table X-30 Current value at discount ratio of 12% (W Plan)

A-W00 S.Q. No.	Year	Current Value of C & B				Present Value of C & B				Remarks	
		Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	373				373				Discount Ratio	12.0%
2	1977	839				749					
3	1978	48		130		38		104		Results	
4	1979	48		130		34		93			
5	1980	48		218		31		139		a. 1st Berth	
6	1981	48		218		27		124		Cost	1,402
7	1982	48		218		24		111		Benefit	1,293
8	1983	48		218		22		99		B/C	0.922
9	1984	48	459	218		19	185	88			
10	1985	33	33	170	170	12	12	61	61	b. 2nd Berth	
11	1986	33	33	170	170	11	11	55	55	Cost	285
12	1987	33	33	170	170	9	9	49	49	Benefit	642
13	1988	33	33	170	170	8	8	44	44	B/C	2,253
14	1989	33	33	170	170	8	8	39	39		
15	1990	33	33	252	252	7	7	52	52	c. Total System	
16	1991	33	33	252	252	6	6	46	46	Cost	1,687
17	1992	33	33	252	252	5	5	41	41	Benefit	1,935
18	1993	33	33	252	252	5	5	37	37	B/C	1,147
19	1994	33	33	252	252	4	4	33	33		
20	1995	33	33	252	252	4	4	29	29		
21	1996	33	33	252	252	3	3	26	26		
22	1997	33	33	252	252	3	3	23	23		
23	1998		33		252		3		21		
24	1999		33		252		2		19		
25	2000		33		252		2		17		
26	2001		33		252		2		15		
27	2002		33		252		2		13		
28	2003		33		252		2		12		
29	2004		33		252		1		11		
Total						1,402	285	1,293	642		

B-W00		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	297				297				Discount Ratio	12.0%
2	1977	708				632					
3	1978	44		130		35		104		Results	
4	1979	44		130		31		93			
5	1980	44		218		28		139		a. 1st Berth	
6	1981	44		218		25		124		Cost	1,189
7	1982	44		218		22		111		Benefit	1,293
8	1983	44		218		20		99		B/C	1.087
9	1984	44	611	218		18	247	88			
10	1985	31	31	170	170	11	11	61	61	b. 2nd Berth	
11	1986	31	31	170	170	10	10	55	55	Cost	340
12	1987	31	31	170	170	9	9	49	49	Benefit	642
13	1988	31	31	170	170	8	8	44	44	B/C	1.888
14	1989	31	31	170	170	7	7	39	39		
15	1990	31	31	252	252	6	6	52	52	c. Total System	
16	1991	31	31	252	252	6	6	46	46	Cost	1,529
17	1992	31	31	252	252	5	5	41	41	Benefit	1,935
18	1993	31	31	252	252	5	5	37	37	B/C	1.266
19	1994	31	31	252	252	4	4	29	29		
20	1995	31	31	252	252	4	4	29	29		
21	1996	31	31	252	252	3	3	26	26		
22	1997	31	31	252	252	3	3	23	23		
23	1998		31		252		3		21		
24	1999		31		252		2		19		
25	2000		31		252		2		17		
26	2001		31		252		2		15		
27	2002		31		252		2		13		
28	2003		31		252		1		12		
29	2004		31		252		1		11		
Total						1,189	340	1,293	642		

C-W00		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	291				291				Discount Ratio	12.0%
2	1977	699				624					
3	1978	43		130		34		104		Results	
4	1979	43		130		31		93			
5	1980	43		218		27		139		a. 1st Berth	
6	1981	43		218		24		124		Cost	1,177
7	1982	54		218		27		111		Benefit	1,293
8	1983	43		218		19		99		B/C	1.099
9	1984	43	605	218		17	244	88			
10	1985	30	30	170	170	11	11	61	61	b. 2nd Berth	
11	1986	30	30	170	170	10	10	55	55	Cost	341
12	1987	30	30	170	170	9	9	49	49	Benefit	642
13	1988	30	30	170	170	8	8	44	44	B/C	1.883
14	1989	43	43	170	170	10	10	39	39		
15	1990	30	30	252	252	6	6	52	52	c. Total System	
16	1991	30	30	252	252	5	5	46	46	Cost	1,518
17	1992	30	30	252	252	5	5	46	46	Benefit	1,935
18	1993	30	30	252	252	4	4	37	37	B/C	1.275
19	1994	43	43	252	252	6	6	33	33		
20	1995	30	30	252	252	3	3	29	29		
21	1996	30	30	252	252	3	3	26	26		
22	1997	30	30	252	252	3	3	23	23		
23	1998		30		252		2		21		
24	1999		43		252		3		19		
25	2000		30		252		2		17		
26	2001		30		252		2		15		
27	2002		30		252		2		13		
28	2003		30		252		1		12		
29	2004		43		252		2		11		
Total						1,177	341	1,293	642		

A-W10		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	402				402				Discount Ratio	12.0%
2	1977	906				809					
3	1978	48		130		38		104		Results	
4	1979	48		130		34		93			
5	1980	48		218		31		139		a. 1st Berth	
6	1981	48		218		27		124		Cost	1,491
7	1982	48		218		24		111		Benefit	1,293
8	1983	48		218		22		99		B/C	0.867
9	1984	48	495	218		19	200	88			
10	1985	33	33	170	170	12	12	61	61	b. 2nd Berth	
11	1986	33	33	170	170	11	11	55	55	Cost	300
12	1987	33	33	170	170	9	9	49	49	Benefit	642
13	1988	33	33	170	170	8	8	44	44	B/C	2.140
14	1989	33	33	170	170	8	8	39	39		
15	1990	33	33	252	252	7	7	52	52	c. Total System	
16	1991	33	33	252	252	6	6	46	46	Cost	1,791
17	1992	33	33	252	252	5	5	41	41	Benefit	1,935
18	1993	33	33	252	252	5	5	37	37	B/C	1.080
19	1994	33	33	252	252	4	4	29	29		
20	1995	33	33	252	252	4	4	29	29		
21	1996	33	33	252	252	3	3	26	26		
22	1997	33	33	252	252	3	3	23	23		
23	1998		33		252		3		21		
24	1999		33		252		2		19		
25	2000		33		252		2		17		
26	2001		33		252		2		15		
27	2002		33		252		2		13		
28	2003		33		252		2		12		
29	2004		33		252		1		11		
Total						1,491	300	1,293	642		

B-W10		Current Value of C & B				Present Value of C & B				Remarks	
S.Q. No.	Year	Cost		Benefit		Cost		Benefit			
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth		
1	1976	320				320				Discount Ratio	12.0%
2	1977	765				683					
3	1978	44		130		35		104		Results	
4	1979	44		130		31		93			
5	1980	44		218		28		139		a. 1st Berth	
6	1981	44		218		25		124		Cost	1,263
7	1982	44		218		22		111		Benefit	1,293
8	1983	44		218		20		99		B/C	1.024
9	1984	44	658	218		18	266	88			
10	1985	31	31	170	170	11	11	61	61	b. 2nd Berth	
11	1986	31	31	170	170	10	10	55	55	Cost	359
12	1987	31	31	170	170	9	9	49	49	Benefit	642
13	1988	31	31	170	170	8	8	44	44	B/C	1.788
14	1989	31	31	170	170	7	7	39	39		
15	1990	31	31	252	252	6	6	52	52	c. Total System	
16	1991	31	31	252	252	6	6	46	46	Cost	1,622
17	1992	31	31	252	252	5	5	41	41	Benefit	1,935
18	1993	31	31	252	252	5	5	37	37	B/C	1.193
19	1994	31	31	252	252	4	4	29	29		
20	1995	31	31	252	252	4	4	29	29		
21	1996	31	31	252	252	3	3	26	26		
22	1997	31	31	252	252	3	3	23	23		
23	1998		31		252		3		21		
24	1999		31		252		2		19		
25	2000		31		252		2		17		
26	2001		31		252		2		15		
27	2002		31		252		2		13		
28	2003		31		252		1		12		
29	2004		31		252		1		11		
Total						1,263	359	1,293	642		

C-W10		Current Value of C & B				Present Value of C & B				Remarks
S.Q. No.	Year	Cost		Benefit		Cost		Benefit		
		1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	1st Berth	2nd Berth	
1	1976	315				315				Discount Ratio 12.0%
2	1977	757				676				
3	1978	43		130		34		104		Results
4	1979	43		130		31		93		
5	1980	43		218		27		139		a. 1st Berth
6	1981	43		218		24		124		Cost 1,253
7	1982	54		218		27		111		Benefit 1,293
8	1983	43		218		19		99		B/C 1.032
9	1984	43	654	218		17	264	88		
10	1985	30	30	170	170	11	11	61	61	b. 2nd Berth
11	1986	30	30	170	170	10	10	55	55	Cost 361
12	1987	30	30	170	170	9	9	49	49	Benefit 642
13	1988	30	30	170	170	8	8	44	44	B/C 1.778
14	1989	43	43	170	170	10	10	39	39	
15	1990	30	30	252	252	6	6	52	52	c. Total System
16	1991	30	30	252	252	5	5	46	46	Cost 1,614
17	1992	30	30	252	252	5	5	41	41	Benefit 1,935
18	1993	30	30	252	252	4	4	37	37	B/C 1.199
19	1994	43	43	252	252	6	6	29	29	
20	1995	30	30	252	252	3	3	29	29	
21	1996	30	30	252	252	3	3	26	26	
22	1997	30	30	252	252	3	3	23	23	
23	1998		30		252		2		21	
24	1999		43		252		3		19	
25	2000		30		252		2		17	
26	2001		30		252		2		15	
27	2002		30		252		2		13	
28	2003		30		252		1		12	
29	2004		43		252		2		11	
Total						1,253	361	1,293	642	

These results are summarized in Table X-31 and Table X-32.

Table X-31 Internal Earning Rate

(%)

Site \ Plan S.P.		X	Y	Z	W
A	1.00	7.8	13.5	13.6	14.1
	1.10	7.1	12.7	12.8	13.2
B	1.00	9.9	16.3	15.3	15.9
	1.10	9.2	15.3	14.3	14.9
C	1.00	10.0	16.5	15.5	16.0
	1.10	9.2	15.5	14.5	15.0

Table X-32 Cost-benefit (Discount rate 12%)

Site \ Plan S.P.		X	Y	Z	W
A	1.00	0.716	1.099	1.111	1.147
	1.10	0.675	1.035	1.046	1.080
B	1.00	0.850	1.303	1.222	1.266
	1.10	0.802	1.228	1.152	1.193
C	1.00	0.857	1.311	1.231	1.275
	1.10	0.808	1.234	1.157	1.199

(Note)

X Plan: SUMMIT, TIPCO, TPC
Y Plan: ESSO, TORC, SUMMIT, TIPCO
Z Plan: ESSO, TORC, SUMMIT, TIPCO, TPC
W Plan: ESSO, TORC, SUMMIT, TIPCO, TPC, Others

The internal earning rate at sites A, B, C is small because the shadow price of 1.10 was considered. The difference from the internal earning rate estimated without the shadow price is about 0.7 ~ 1.0%. The internal earning rate of X Plan is below 10%. This plan is far less profitable than Y, Z, W Plans since the number of sea berth using enterprises is small. Among the three sites, Site C is most profitable under any of the plans. It is followed by Site B and Site A in this order. Profitability increases as the number of participating enterprises increases. It is worth noting that Z Plan and W Plan are less profitable than Y

Plan at Sites B and C. This is because another oil storage tank must be constructed at the 2nd stage when Site B and Site C are selected. (In the case of Site A, two tanks are constructed at the 1st stage.) Especially, Site B requires long submarine pipes.

The tendency of the cost-benefit ratio is similar to that of internal yield rate. The ratio exceeds 1.0 in every case at the discount rate of 12% except X Plan. It should be noted that the cost-benefit ratio of X Plan is quite small. Therefore, it seems advantageous to construct one sea berth at the initial stage and to construct the second sea berth in consideration of the import volume of crude oils.

The three sites and the four plans were compared in terms of internal earning rate and cost-benefit ratio from Table X-31 and Table X-32. The case C-Y seems to be most advantageous among all the cases.

The Mission concludes that this project is advantageous for the national economy and that C has the largest economic advantages among A, B, C.

3. Financial analysis

(1) Basic standpoint

Financial analysis should be approached from two aspects. First of all, yearly income - expenditure balance must studied. Secondly, financial standing at certain time must be studied. The former is based on the concept of flow, while the latter is based on the concept of stock. Financial evaluation is sometimes made simply by obtaining the financial rate of return. This is based on the concept of stock and is applicable to the end of the life of facilities. Therefore, it may allow general grasping (or estimating) of management standing, but does not allow thorough analyses. In this report, income and expenditure balance in each year will be obtained and assets and liability standing of each year will be clarified.

(2) Loss and profit calculation

Loss and profit calculation consists of income part and expenditure part. The difference (namely, the surplus fund) is added up to the expenditure part to obtain a balance.

The following items will be studied as the loss and profit calculation of this project.

1) Expenditure part

The expenditure part consists of management cost (personnel expense, maintenance and repairing cost, facility and equipment management cost, health and welfare cost), interests and depreciation expense. Navigation route maintenance cost is not included in depreciation expense. This is because the life of a dredged navigation route is infinite. Maintenance and dredging cost is included in management cost.

(a) Management cost

The following table shows the maintenance cost at A, B, C under X, Y, Z, W, discussed in VIII.

(Unit: 100 million ₿)

Plan / Site	X	Y	Z	W
A	48 -	49 -	48 65	48 65
B	44 -	44 -	44 62	44 63
C	(54) 43 -	(55) 43 -	(54) 43 (85) 60	(54) 43 (86) 60

(Note) 1. The upper figures apply to a one-berth system, while the lower figures apply to a two-berth system.

2. The figures in the parentheses of C site indicate the management cost required at every five years.

(b) Interest

The current conditions of international loans are given below.

Yen Credit	Interest rate	Term 25 years	Term of deferment 7 years
Asian Bank	7.5 % p.a.	12 ~ 20 year	(unknown)
World Bank	7.25 % p.a.	15 ~ 25 year	(")

For the present financial analysis, the assumption of 8.0 % p.a. (interest rate), 20 years (term of loan) and 5 years (term of deferment) is made in view of these conditions and the recent international credit situation.

For the domestic loan, 10.0 % p.a. (interest rate), 20 years (term of loan) and 5 years (term of deferment) were assumed on the basis of the 1973 Thai official rate. The following returning method is assumed. In other words, the interest for the principal alone is returned during the five years of deferment and the principal and interest are returned during the remaining fifteen years.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

x_1 x_1 x_1 x_1 x_1 x_2 x_2 x_2 x_2 x_2 x_2 x_2 x_2 x_2 x_2 x_2 x_2 x_2 x_2

i) $X_1 = A(1+\alpha) - A = A\alpha$

ii) $$\frac{X_1(1+\alpha)^{15}[(1+\alpha)^5 - 1]}{(1+\alpha) - 1} + \frac{X_2[(1+\alpha)^{15} - 1]}{(1+\alpha) - 1} = A(1+\alpha)^{20}$$

iii) Foreign capital $\alpha = 0.08$

$X_1 = 0.08A$

$X_2 = 0.1168A$

Domestic capital $\alpha = 0.10$

$X_1 = 0.10A$

$X_2 = 0.1315A$

For the foreign capital, in sum, 8% of the loan is to be returned during the first five years and 11.68% of the loan is to be returned during the remaining fifteen years. For the domestic capital, 10% and 13.15% of the loan are to be returned during two terms.

(c) Depreciation expense

The amortization of 10% (residual price) and 20 years (amortization length) is assumed. Therefore, yearly depreciation is 4.5% of the investment. The service life of the current facilities is less than 20 years (after compensation.) However, compensation cost is included in depreciation cost.

These expenditures in current value are given in Table X-33 ~ X-36 for each case.

2) Income part

The income part consists of charges for using facilities and charges for services. The charges for facilities are to be collected when crude oils pass the facilities, while the charges for services are to be collected when tankers dock and undock.

(a) Charges for using facilities

For X Plan, it is assumed that 25 ฿/KL is collected in 1978 ~ 1984 and 30 ฿/KL is collected in 1985 ~ 1997.

For Y Plan, it is assumed that 20 ฿/KL is collected in 1978 ~ 1997. For Z and W Plans, it is assumed that 20 ฿/KL is collected in 1978 ~ 2004.

(b) Charges for services

Charges for services include manpower required for loading and unloading and tug boats. The manpower cost was assumed to be 0.134 ฿/KL and the tug boat costs was assumed to be

1.105 ฿/KL (X Plan), 0.924 ฿/KL (Y Plan), 0.743 ฿/KL (Z Plan) and 0.677 ฿/KL (W Plan) on the basis of the prime cost estimated in VIII. The charges for using tug boats drop in the order of X, Y, Z, W since the quantity of crude oils to be handled increases in this order.

The charges for services are given below. The service charge for each tanker class is also given for reference.

		thousand DWT (200)	thousand DWT (90)	thousand DWT (60)
		thousand ฿/ tanker	thousand ฿/ tanker	thousand ฿/ tanker
X	1.239฿/KL	299	134	90
Y	1.058	255	115	76
Z	0.877	211	95	63
W	0.811	195	88	59

These figures are given in Table X-33 ~ Table X-36 as income in current value.

Table X-33 Expenditure and Income of X Plan

(Unit: Million ¥)

Item / Year	Expenditure												Income		
	A Site				B Site				C Site				Y Plan		
	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Facilities	Service	Total
1976		* **		* **		* **		* **		* **		* **			
1977		23 8		23 8		19 7		19 7		19 6 19 6		19 6			
1978	48	23 8 50 15	52	73 123	44	19 7 42 12	43	61 106	43	43 11	37	62 97	(25¥/KL) 81	4	85
1979	48	23 8 50 15	52	73 123	44	19 7 42 12	43	61 106	43	19 6 43 11	37	62 97	81	4	85
1980	48	23 8 50 15	52	73 123	44	19 7 42 12	43	61 106	43	19 6 43 11	37	62 97	163	8	171
1981	48	23 8 50 15	52	73 123	44	19 7 42 12	43	61 106	43	19 6 43 11	37	62 97	163	8	171
1982	48	34 11 50 15	52	84 126	44	27 9 42 12	43	69 108	54	27 7 43 11	37	70 109	163	8	171
1983	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	163	8	171
1984	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	163	8	171
1985	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	(30¥/KL) 345	14	359
1986	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	345	14	359
1987	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	54	27 7 62 14	37	89 112	345	14	359
1988	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	345	14	359
1989	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	345	14	359
1990	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	450	19	469
1991	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	450	19	469
1992	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	54	27 7 62 14	37	89 112	450	19	469
1993	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	450	19	469
1994	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	450	19	469
1995	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	450	19	469
1996	48	34 11 74 20	52	108 131	44	27 9 62 16	43	89 112	43	27 7 62 14	37	89 101	450	19	469
1997	48	0 0 74 20	52	74 120	44	0 0 62 16	43	62 103	54	0 0 62 14	37	62 105	450	19	469

Note: The figures in the upper column apply to the 1st year of the 1st stage. (Note) * Foreign ** Domestic (The dredging costs are excuded)
The figures in the middle column apply to the 2nd year of the 1st stage.

Table X-34 Expenditure and Income of Y Plan

(Unit: Million ¥)

Item / Year	Expenditure												Income		
	A Site				B Site				C Site				Y Plan		
	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Facilities	Service	Total
1976		* **		* **		* **		* **		* **		* **			
		23 8				19 7				19 6					
1977				23 8				19 7				19 6			
		23 8				19 7				19 6			(20¥/KL)		
1978	49	54 17	55	77 129	44	46 14	45	65 110	43	46 12	40	65 101	165	9	174
		23 8				19 7				19 6					
1979	49	54 17	55	77 129	44	46 14	45	65 110	43	46 12	40	65 101	165	9	174
		23 8				19 7				19 6					
1980	49	54 17	55	77 129	44	46 14	45	65 110	43	46 12	40	65 101	260	14	274
		23 8				19 7				19 6					
1981	49	54 17	55	77 129	44	46 14	45	65 110	43	46 12	40	65 101	260	14	274
		34 11				27 9				27 7					
1982	49	54 17	55	88 132	44	46 14	45	73 112	55	46 12	40	73 114	260	14	274
		34 11				27 9				27 7					
1983	49	79 22	55	113 127	44	67 18	45	94 116	43	68 16	40	95 106	260	14	274
		34 11				27 9				27 7					
1984	49	79 22	55	113 137	44	67 18	45	94 116	43	68 16	40	95 106	260	14	274
		34 11				27 9				27 7					
1985	49	79 22	55	113 137	44	67 18	45	94 116	43	68 16	40	95 106	325	17	342
		34 11				27 9				27 7					
1986	49	79 22	55	113 137	44	67 18	45	94 116	43	68 16	40	95 106	325	17	342
		34 11				27 9				27 7					
1987	49	79 22	55	113 137	44	67 18	45	94 116	55	68 16	40	95 118	325	17	342
		34 11				27 9				27 7					
1988	49	79 22	55	113 137	44	67 18	45	94 116	43	68 16	40	95 106	325	17	342
		34 11				27 9				27 7					
1989	49	79 22	55	113 137	44	67 18	45	94 116	43	68 18	40	95 106	325	17	342
		34 11				27 9				27 7					
1990	49	79 22	55	113 137	44	67 18	45	94 116	43	68 16	40	95 106	365	19	384
		34 11				27 9				27 7					
1991	49	79 22	55	113 137	44	67 18	45	94 116	43	68 16	40	95 106	365	19	384
		34 11				27 9				27 7					
1992	49	79 22	55	113 137	44	67 18	45	94 116	55	68 16	40	95 118	365	19	384
		34 11				27 9				27 7					
1993	49	79 22	55	113 137	44	67 18	45	94 116	43	68 16	40	95 106	365	19	384
		34 11				27 9				27 7					
1994	49	79 22	55	113 137	44	67 18	45	94 116	43	68 16	40	95 106	365	19	384
		34 11				27 9				27 7					
1995	49	79 22	55	113 137	44	67 18	45	94 116	43	68 16	40	95 106	365	19	384
		34 11				27 9				27 7					
1996	49	79 22	55	113 137	44	67 18	45	94 116	43	68 16	40	95 106	365	19	384
		0 0				0 0				0 0					
1997	49	79 22	55	79 126	44	67 18	45	67 107	55	68 16	40	68 111	365	19	384

NOTE: The figures in the upper column apply to the 1st year of the 1st stage. * Foreign ** Domestic (The dredging costs are excuded)
The figures in the middle column apply to the 2nd year of the 1st stage.

Table X-35 Expenditure and Income of Z Plan

(Unit: Million $)

Item / Year	Expenditure												Income		
	A Site				B Site				C Site				Z Plan		
	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Facilities	Service	Total
		* **		* **		* **		* **		* **		* **			
1976		23 8				19 7				19 6					
1977				23 8				19 7				19 6			
1978	48	23 8 54 17	55	77 128	44	19 7 46 14	45	65 110	43	19 6 46 12	40	65 101	(20$/KL) 165	7	172
1979	48	23 8 54 17	55	77 128	44	19 7 46 14	45	65 110	43	19 6 46 12	40	65 101	165	7	172
1980	48	23 8 54 17	55	77 128	44	19 7 46 14	45	65 110	43	19 6 46 12	40	65 101	260	11	271
1981	48	23 8 54 17	55	77 128	44	19 7 46 14	45	65 110	43	19 6 46 12	40	65 101	260	11	271
1982	48	34 11 54 17	55	88 131	44	27 9 46 14	45	73 112	54	27 7 46 12	40	73 113	260	11	271
1983	48	34 11 79 22	55	113 136	44	27 9 67 18	45	94 116	43	27 7 68 16	40	95 106	260	11	271
1984	48	34 11 79 22	55	113 136	44	27 9 67 18		94 116	43	27 7 68 16	40	95 106	260	11	271
1985	65	34 11 79 22 29 10	55 21	142 184	62	27 9 67 18 38 14	45 27	132 175	60	27 7 68 16 39 11	40 21	134 155	375	16	391
1986	65	34 11 79 22 29 10	55 21	142 184	62	27 9 67 18 38 14	45 27	132 175	60	27 7 68 16 39 11	40 21	134 155	375	16	391
1987	65	34 11 79 22 29 10	55 21	142 184	62	27 9 67 18 38 14	45 27	132 175	60	27 7 68 16 39 11	40 21	134 155	375	16	391
1988	65	34 11 79 22 29 10	55 21	142 184	62	27 9 67 18 38 14	45 27	132 175	60	27 7 68 16 39 11	40 21	134 155	375	16	391
1989	65	34 11 79 22 29 10	55 21	142 184	62	27 9 67 18 38 14	45 27	132 175	85	27 7 68 16 39 11	40 21	134 180	375	16	391
1990	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	465	20	485
1991	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	465	20	485
1992	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	465	20	485
1993	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	465	20	485
1994	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	85	27 7 68 16 57 15	40 21	134 180	465	20	485

* Foreign ** Domestic

Table X-35 (Continued from the previous page)

Item / Year	Expenditure												Income		
	A Site				B Site				C Site				Y Plan		
	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Facilities	Service	Total
1995	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	465	20	485
1996	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	465	20	485
1997	65	0 0 79 22 42 13	55 21	121 176	62	0 0 67 18 55 18	45 27	122 170	60	0 0 68 16 57 15	40 21	125 152	465	20	485
1998	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	30	0 0 0 0 57 15	0 21	57 66	233	10	243
1999	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	43	0 0 0 0 57 15	0 21	57 79	233	10	243
2000	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	30	0 0 0 0 57 15	0 21	57 66	233	10	243
2001	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	30	0 0 0 0 57 15	0 21	57 66	233	10	243
2002	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	30	0 0 0 0 57 15	0 21	57 66	233	10	243
2003	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	30	0 0 0 0 57 15	0 21	57 66	233	10	243
2004	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	43	0 0 0 0 57 15	0 21	57 79	233	10	243

Note: The figures in the upper column apply to the 1st year of the 1st stage.
The figures in the middle column apply to the 2nd year of the 1st stage.
The figures in the lower column apply to the 2nd stage.

* Foreign ** Domestic (The dredging costs are excuded)

Table X-36 Expenditure and Income of W Plan

(Unit: Million ¥)

Item / Year	Expenditure												Income		
	A Site				B Site				C Site				W Plan		
	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Facilities	Service	Total
1976		* 23 ** 8		* 23 ** 8		* 19 ** 7		* 19 ** 7		* 19 ** 6		* 19 ** 6			
1977															
1978	48	23 8 54 17	55	77 128	44	19 7 46 14		65 110	43	19 6 46 12	40	65 101	(20¥/KL) 165	7	172
1979	48	23 8 54 17	55	77 128	44	19 7 46 14	45	65 110	43	19 6 46 12	40	65 101	165	7	172
1980	48	23 8 54 17	55	77 128	44	19 7 46 14	45	65 110	43	19 6 46 12	40	65 101	260	11	271
1981	48	23 8 54 17	55	77 128	44	19 7 46 14	45	65 110	43	19 6 46 12	40	65 101	260	11	271
1982	48	34 11 54 17	55	88 131	44	27 9 46 14	45	73 112	54	27 7 46 12	40	73 113	260	11	271
1983	48	34 11 79 22	55	113 136	44	27 9 67 18	45	94 116	43	27 7 68 16	40	95 106	260	11	271
1984	48	34 11 79 22	55	113 136	44	27 9 67 18	45	94 116	43	27 7 68 16	40	95 106	260	11	271
1985	65	34 11 79 22 29 10	55 21	142 184	62	27 9 67 18 38 14	45 27	132 175	60	27 7 68 16 39 11	40 21	134 155	375	15	390
1986	65	34 11 79 22 29 10	55 21	142 184	62	27 9 67 18 38 14	45 27	132 175	60	27 7 68 16 39 11	40 21	134 155	375	15	390
1987	65	34 11 79 22 29 10	55 21	142 184	62	27 9 67 18 38 14	45 27	132 175	60	27 7 68 16 39 11	40 21	134 155	375	15	390
1988	65	34 11 79 22 29 10	55 21	142 184	62	27 9 67 18 38 14	45 27	132 175	60	27 7 68 16 39 11	40 21	134 155	375	15	390
1989	65	34 11 79 22 29 10	55 21	142 184	62	27 9 67 18 38 14	45 27	132 175	85	27 7 68 16 39 11	40 21	134 180	375	15	390
1990	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	515	21	536
1991	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	515	21	536
1992	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	515	21	536
1993	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	515	21	536
1994	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	85	27 7 68 16 57 15	40 21	134 180	515	21	536

Table X-36 (Continued from the previous page)

Item / Year	Expenditure												Income		
	A Site				B Site				C Site				W Plan		
	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Management cost	Interest	Depreciation cost	Total	Facilities	Service	Total
1995	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	515	21	536
1996	65	34 11 79 22 42 13	55 21	155 187	62	27 9 67 18 55 18	45 27	149 179	60	27 7 68 16 57 15	40 21	152 159	515	21	536
1997	65	0 0 79 22 42 13	55 21	121 176	62	0 0 67 18 55 18	45 27	122 170	60	0 0 68 16 57 15	40 21	125 152	515	21	536
1998	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	30	0 0 0 0 57 15	0 21	57 66	258	11	269
1999	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	43	0 0 0 0 57 15	0 21	57 79	258	11	269
2000	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	30	0 0 0 0 57 15	0 21	57 66	258	11	269
2001	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	30	0 0 0 0 57 15	0 21	57 66	258	11	269
2002	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	30	0 0 0 0 57 15	0 21	57 66	258	11	269
2003	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	30	0 0 0 0 57 15	0 21	57 66	258	11	269
2004	32	0 0 0 0 42 13	0 21	42 66	31	0 0 0 0 55 18	0 27	55 76	43	0 0 0 0 57 15	0 21	57 79	258	11	269

Note: The figures in the upper column apply to the 1st year of the 1st stage.
The figures in the middle column apply to the 2nd year of the 1st stage.
The figures in the lower column apply to the 2nd stage.

* Foreign ** Domestic (The dredging costs are excuded)

3) Profit and loss statement

We prepared a balance sheet on the basis of Table X-33 ~ X-36.

A balance sheet must give actual values, instead of the values of economic analysis (current value). The Mission decided to prepare balance sheets by assuming the yearly rise of 5.0% in commodity price for management cost. Therefore, slight corrections must be made if the rapid rise in the price of commodities during the recent years continues.

(a) X Plan

Table X-37 shows the balance sheet under X Plan.

Under X Plan, deficit finance continues until 1984 if A is selected for sea berth construction. Even if B or C is selected, deficit must be declared until 1984, though the deficits are small. When A, B, C are compared, site C is relatively more advantageous than A and B.

In any event, poor financial standing is inevitable at the beginning under X Plan in spite of the high charges for using facilities, namely, 25 ฿/KL (1975 ~ 1984) and 30 ฿/KL (1985 ~ 1997). It requires government assistances in some form.

(b) Y Plan

Table X-38 shows the balance sheet under Y Plan.

If A is selected for sea berth construction, a deficit will be declared in 1977 ~ 1979, 1983 and 1984. If B or C is selected, a deficit will be declared in 1977 ~ 1979. When A, B, C are compared, the financial standing at Site C is for better. The case C-Y is financially most desirable among all the cases.

(c) Z Plan

Table X-39 shows the balance sheet.

The income and expenditure is the best at Site C. However, small deficit must be declared in 1977 ~ 1979. Since dredging cost is large, deficit must be declared in 1989 and 2004 partly due to the rise in the price of commodities. Like under X and Y Plans, the management situation is the worst at Site A. It was assumed that the income after 1998 was 1/2 of that of 1997 (since only one berth will be in operation.)

(d) W Plan

Table X-40 shows the balance sheet. The income and expenditure situation under W Plan is similar to that under Z Plan.

Table X-37 Balance Sheet (X Plan)

(Unit: Million ฿)

No.	Year	Income X Plan (1)	Expenditure & Surplus						Remarks
			A site		B site		C site		
			(2)	(1) - (2)	(3)	(1) - (3)	(4)	(1) - (4)	
1	1976								1 The annual rise of 5% in the price of commodities is assumed for the management expence of 1974.
2	1977		31	△ 31	26	△ 26	25	△ 25	
3	1978	85	206	△ 121	177	△ 92	168	△ 83	
4	1979	85	209	△ 124	179	△ 94	171	△ 86	2 1978 ~ 1984 Transit fee 25 ฿/KL 1985 ~ 1997 Transit fee 30 ฿/KL
5	1980	171	212	△ 41	182	△ 11	174	△ 3	
6	1981	171	216	△ 45	185	△ 14	177	△ 6	
7	1982	171	233	△ 62	198	△ 27	205	△ 34	
8	1983	171	265	△ 94	225	△ 54	214	△ 43	
9	1984	171	269	△ 98	229	△ 58	217	△ 46	
10	1985	359	273	86	232	127	221	138	
11	1986	359	277	82	236	123	224	135	
12	1987	359	282	77	240	119	249	110	
13	1988	359	286	73	244	115	232	127	
14	1989	359	291	68	248	111	236	123	
15	1990	469	296	173	253	216	241	228	
16	1991	469	301	168	258	211	246	223	
17	1992	469	307	162	263	206	277	192	
18	1993	469	312	157	268	201	256	213	
19	1994	469	318	151	274	195	261	208	
20	1995	469	325	144	280	189	267	202	
21	1996	469	331	138	286	183	273	196	
22	1997	469	293	176	256	213	279	190	
23	1998								
24	1999								
25	2000								
26	2001								
27	2002								
28	2003								
29	2004								

Table X-38 Balance Sheet (Y Plan)

(Unit: Million ¥)

No.	Year	Income Y Plan (1)	Expenditure & Surplus						Remarks
			A site		B site		C site		
			(2)	(1) - (2)	(3)	(1) - (3)	(4)	(1) - (4)	
1	1976								1 The annual rise of 5% in the price of commodities is assumed for the management expence of 1974.
2	1977		31	△ 31	26	△ 26	25	△ 25	
3	1978	174	217	△ 43	185	△ 11	175	△ 1	2 The transit fee in 1978 ~ 1997 is assumed as 20.0¥/KL.
4	1979	174	220	△ 46	187	△ 13	178	△ 4	
5	1980	274	223	51	190	84	181	93	
6	1981	274	226	48	193	81	184	90	
7	1982	274	243	31	206	68	213	61	
8	1983	274	277	△ 3	234	40	225	49	
9	1984	274	281	△ 7	238	36	228	46	
10	1985	342	285	57	241	101	232	110	
11	1986	342	289	53	245	97	235	107	
12	1987	342	293	49	249	93	262	80	
13	1988	342	298	44	253	89	243	99	
14	1989	342	303	39	257	85	247	95	
15	1990	384	308	76	262	122	252	132	
16	1991	384	313	71	267	117	257	127	
17	1992	384	319	65	272	112	290	94	
18	1993	384	325	59	277	107	267	117	
19	1994	384	331	53	283	101	272	112	
20	1995	384	338	46	289	95	278	106	
21	1996	384	344	40	295	89	284	100	
22	1997	384	307	77	265	119	293	91	
23	1998								
24	1999								
25	2000								
26	2001								
27	2002								
28	2003								
29	2004								

Table X-39 Balance Sheet (Z Plan)

(Unit: Million ¥)

No.	Year	Income Z Plan (1)	Expenditure & Surplus						Remarks
			A site		B site		C site		
			(2)	(1) - (2)	(3)	(1) - (3)	(4)	(1) - (4)	
1	1976								1 The annual rise of 5% in the price of commodities is assumed for the management expence of 1974.
2	1977		31	△ 31	26	△ 26	25	△ 25	
3	1978	172	215	△ 43	185	△ 13	175	△ 3	
4	1979	172	218	△ 46	187	△ 15	178	△ 6	2 The transit fee in 1978 ~ 2004 is assumed as 20.0 ¥/KL.
5	1980	271	221	50	190	81	181	90	
6	1981	271	225	46	193	78	184	87	
7	1982	271	242	29	206	65	212	59	
8	1983	271	275	△ 4	234	37	225	46	
9	1984	271	279	△ 8	238	33	228	43	
10	1985	391	372	19	351	40	332	59	
11	1986	391	378	13	356	35	337	54	
12	1987	391	384	7	362	29	342	49	
13	1988	391	390	1	368	23	348	43	
14	1989	391	396	△ 5	376	15	406	15	
15	1990	485	419	66	401	84	382	103	
16	1991	485	426	59	408	77	389	96	
17	1992	485	433	52	415	70	395	90	
18	1993	485	441	44	423	62	403	82	
19	1994	485	449	36	430	55	455	30	
20	1995	485	458	27	439	46	418	67	
21	1996	485	467	18	447	38	427	58	
22	1997	485	432	53	420	65	401	84	
23	1998	243	179	64	200	43	190	53	
24	1999	243	184	59	205	38	239	4	
25	2000	243	190	53	210	33	200	43	
26	2001	243	195	48	216	27	205	38	
27	2002	243	201	42	222	21	211	32	
28	2003	243	208	35	228	15	216	27	
29	2004	243	214	29	234	9	279	△ 36	

Table X-40 Blanace Sheet (W Plan)

(Unit: Million ¥)

No.	Year	Income W Plan (1)	Expenditure & Surplus						Remarks
			A site		B site		C site		
			(2)	(1) - (2)	(3)	(1) - (3)	(4)	(1) - (4)	
1	1976								1 The annual rise of 5% in the price of commodities is assumed for the management expence of 1974.
2	1977		31	△ 31	26	△ 26	25	△ 25	
3	1978	172	215	△ 43	185	△ 13	175	△ 3	
4	1979	172	218	△ 46	187	△ 15	178	△ 6	2 The transit fee in 1978 ~ 2004 is assumed as 20.0¥/KL.
5	1980	271	221	50	190	81	181	90	
6	1981	271	225	46	193	78	184	87	
7	1982	271	242	29	206	65	212	59	
8	1983	271	275	△ 4	234	37	225	46	
9	1984	271	279	△ 8	238	33	228	43	
10	1985	390	372	18	351	39	332	58	
11	1986	390	378	12	356	34	337	53	
12	1987	390	384	6	362	28	342	48	
13	1988	390	390	0	368	22	348	42	
14	1989	390	396	6	376	14	406	△ 16	
15	1990	536	419	117	401	135	382	154	
16	1991	536	426	110	408	128	389	147	
17	1992	536	433	103	415	121	395	141	
18	1993	536	441	95	423	113	403	133	
19	1994	536	449	87	430	106	455	81	
20	1995	536	458	78	439	97	418	118	
21	1996	536	467	69	447	89	427	109	
22	1997	536	432	104	420	116	401	135	
23	1998	269	179	90	200	69	190	79	
24	1999	269	184	85	205	64	239	30	
25	2000	269	190	79	210	59	200	69	
26	2001	269	195	74	216	53	205	64	
27	2002	269	201	68	222	47	211	58	
28	2003	269	208	61	228	41	216	53	
29	2004	269	214	55	234	35	279	10	

(3) Asset statement

Asset statement consists of assets, liabilities and capital. The following items will be studied for the asset statement of this project.

1) Assets

Assets consist of depreciable assets, nondepreciable assets and internal reserve. Depreciable assets include sea berths, pipe lines , tanks and other facilities and equipment, excluding navigation channel Amortization, 10% residual price, 20 years of depreciation length are assumed. Nondepreciable assets include navigation channel. Internal reserve is obtained as the accumulation of earnings (difference between income and expenditure.)

These assets are estimated in Table X-41 ~ X-52 for each case in the assets column.

2) Liabilities

Floating liabilities alone are included in the liabilities column. This is the total of loan (interest included) and returned interest. Liabilities are estimated in Table X-41 ~ X-52 under the liabilities column for each case.

3) Capital

Capital consists of owned capital and revaluation benefits. Capital is assumed to be zero for the present project. Therefore, revaluation benefits (difference between assets and liabilities) are included. Capital is estimated in Table X-41 ~ X-52 under the capital column for each case.

Table X-41 Assets and Liabilities (X Plan)

(Unit: Million ¥)

Case A-X00

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
1	1976	373		373	291	82	373		0	0	1978 ~ 1984 Transit fee 25¥/KL
2	1977	780	△ 31	749	921	232	1,153		△ 404	△ 404	
3	1978	1,101	△ 152	949	921	232	1,153		△ 204	△ 204	1985 ~ 1997 Transit fee 30¥/KL
4	1979	1,049	△ 276	773	921	232	1,153		△ 380	△ 380	
5	1980	997	△ 317	684	921	232	1,153		△ 469	△ 469	
6	1981	945	△ 362	583	921	232	1,153		△ 570	△ 570	
7	1982	893	△ 424	469	911	229	1,140		△ 671	△ 671	
8	1983	841	△ 518	323	876	221	1,097		△ 774	△ 774	
9	1984	789	△ 616	173	838	212	1,050		△ 877	△ 877	
10	1985	737	△ 530	207	797	202	999		△ 792	△ 792	
11	1986	685	△ 448	237	752	192	944		△ 707	△ 707	
12	1987	633	△ 371	262	704	180	884		△ 622	△ 622	
13	1988	581	△ 298	283	653	167	820		△ 537	△ 537	
14	1989	529	△ 230	299	597	153	750		△ 451	△ 451	
15	1990	477	△ 57	420	537	137	674		△ 254	△ 254	
16	1991	425	111	536	472	119	591		△ 55	△ 55	
17	1992	373	273	646	402	100	502		144	144	
18	1993	321	430	751	326	79	405		346	346	
19	1994	269	581	850	244	56	300		550	550	
20	1995	217	725	942	155	31	186		756	756	
21	1996	165	863	1,028	60	3	63		965	965	
22	1997	113	1,039	1,152	0	0	0		1,152	1,152	

Table X-42 Assets and Liabilities

(Unit: Million ¥)

Case B-X00

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
1	1976	297		297	232	65	297		0	0	1978 ~ 1984 Transit fee 25¥/KL
2	1977	649	△ 26	623	759	187	946		△ 323	△ 323	1985 ~ 1997 Transit fee 30¥/KL
3	1978	903	△ 118	785	759	187	946		△ 161	△ 161	
4	1979	860	△ 212	648	759	187	946		△ 298	△ 298	
5	1980	817	△ 223	594	759	187	946		△ 352	△ 352	
6	1981	774	△ 237	537	751	185	936		△ 409	△ 409	
7	1982	731	△ 264	467	722	178	900		△ 469	△ 469	
8	1983	688	△ 318	370	691	171	862		△ 530	△ 530	
9	1984	645	△ 376	269	657	163	820		△ 593	△ 593	
10	1985	602	△ 249	353	620	154	774		△ 467	△ 467	
11	1986	559	△ 126	433	581	145	726		△ 341	△ 341	
12	1987	516	△ 7	509	538	134	672		△ 217	△ 217	
13	1988	473	108	581	492	123	615		△ 91	△ 91	
14	1989	430	219	649	443	110	553		34	34	
15	1990	387	435	822	389	96	485		269	269	
16	1991	344	646	990	331	81	412		505	505	
17	1992	301	852	1,153	269	64	333		741	741	
18	1993	258	1,053	1,311	201	45	246		978	978	
19	1994	215	1,248	1,463	129	25	154		1,217	1,217	
20	1995	172	1,437	1,609	50	2	52		1,455	1,455	
21	1996	129	1,620	1,749	0	0	0		1,697	1,697	
22	1997	86	1,833	1,919					1,919	1,919	

Table X-43 Assets and Liabilities

Case C-X00

(Unit: Million ¥)

No.	Item / Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
1	1976	291		291	235	56	291		0	0	1. Dredging cost is excluded from depreciation cost.
2	1977	640	△ 25	615	769	162	931		△ 316	△ 316	2. 1978 ~ 1984 Transit fee 25¥/KL
3	1978	894	△ 108	786	769	162	931		△ 145	△ 145	1985 ~ 1997 Transit fee 30¥/KL
4	1979	857	△ 194	663	769	162	931		△ 268	△ 268	
5	1980	820	△ 197	623	769	162	931		△ 308	△ 308	
6	1981	783	△ 203	580	761	160	921		△ 351	△ 351	
7	1982	746	△ 237	509	732	155	887		△ 412	△ 412	
8	1983	709	△ 280	429	702	150	852		△ 458	△ 458	
9	1984	672	△ 326	346	669	144	813		△ 506	△ 506	
10	1985	635	△ 188	447	634	137	771		△ 366	△ 366	
11	1986	598	△ 53	545	595	130	725		△ 226	△ 226	
12	1987	561	57	618	554	122	676		△ 107	△ 107	
13	1988	524	184	708	509	113	622		32	32	
14	1989	487	307	784	461	103	564		162	162	
15	1990	450	535	985	409	93	502		421	421	
16	1991	413	758	1,171	353	81	434		669	669	
17	1992	376	950	1,326	292	68	360		892	892	
18	1993	339	1,163	1,502	226	54	280		1,142	1,142	
19	1994	302	1,371	1,673	155	38	193		1,393	1,393	
20	1995	265	1,573	1,838	79	21	100		1,645	1,645	
21	1996	228	1,769	1,997	0	0			1,897	1,897	
22	1997	191	1,959	2,150					2,150	2,150	

Table X-44 Assets and Liabilities (Y Plan)

Case A-Y00

(Unit: Million ¥)

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
1	1976	373		373	291	82	373		0	0	1978 ~ 1997
2	1977	839	△ 31	808	965	247	1,212		△ 404	404	Transit fee 20¥/KL
3	1978	1,157	△ 74	1,083	965	247	1,212		△ 129	129	
4	1979	1,102	△ 120	982	965	247	1,212		△ 230	230	
5	1980	1,047	△ 69	978	965	247	1,212		△ 234	234	
6	1981	992	△ 21	971	965	247	1,212		△ 241	241	
7	1982	937	10	947	954	244	1,198		△ 251	251	
8	1983	882	7	889	918	235	1,153		△ 264	264	
9	1984	827	0	827	878	226	1,104		△ 277	277	
10	1985	772	57	829	835	215	1,050		△ 221	221	
11	1986	717	110	827	789	204	993		△ 166	166	
12	1987	662	159	821	739	191	930		△ 109	109	
13	1988	607	203	810	685	177	862		△ 52	52	
14	1989	552	242	794	627	162	789		5	5	
15	1990	497	318	815	564	145	709		106	106	
16	1991	442	389	831	496	127	623		208	208	
17	1992	387	454	841	423	106	529		312	312	
18	1993	332	513	845	344	84	428		417	417	
19	1994	277	566	843	258	59	317		526	526	
20	1995	222	612	834	166	32	198		636	636	
21	1996	167	652	819	66	2	68		751	751	
22	1997	112	729	841	0	0	0		841	841	

Table X-45 Assets and Liabilities

Case B-Y00 (Unit: Million ฿)

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
1	1976	297		297	232	65	297		0	0	1978 ~ 1997
2	1977	708	△ 26	682	803	202	1,005		△ 323	△ 323	Transit fee 20฿/KL
3	1978	960	△ 37	923	803	202	1,005		△ 82	△ 82	
4	1979	915	△ 50	865	803	202	1,005		△ 140	△ 140	
5	1980	870	34	904	803	202	1,005		△ 101	△ 101	
6	1981	825	115	940	803	202	1,005		△ 65	△ 65	
7	1982	780	183	963	794	199	993		△ 30	△ 30	
8	1983	735	223	958	764	192	956		2	2	
9	1984	690	259	949	731	184	915		34	34	
10	1985	645	360	1,005	695	176	871		134	134	
11	1986	600	457	1,057	657	166	823		234	234	
12	1987	555	550	1,105	616	156	772		333	333	
13	1988	510	639	1,149	571	145	716		433	433	
14	1989	465	724	1,189	522	132	654		535	535	
15	1990	420	846	1,266	470	118	588		678	678	
16	1991	375	963	1,338	414	103	517		821	821	
17	1992	330	1,075	1,405	353	86	439		966	966	
18	1993	285	1,182	1,467	287	68	355		1,112	1,112	
19	1994	240	1,283	1,523	216	48	264		1,259	1,259	
20	1995	195	1,378	1,573	139	26	165		1,408	1,408	
21	1996	150	1,467	1,617	57	1	58		1,559	1,559	
22	1997	105	1,586	1,691	0	0	0		1,691	1,691	

Table X-46 Assets and Liabilities

Case C-Y00 (Unit: Million ฿)

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
1	1976	291		291	235	56	291		0	0	1. Dredging cost is excluded from depreciation cost.
2	1977	699	△ 25	674	813	177	990		△ 316	△ 316	2. 1978 ~ 1997 Transit fee 20฿/KL
3	1978	950	△ 26	924	813	177	990		△ 66	△ 66	
4	1979	910	△ 30	880	813	177	990		△ 110	△ 110	
5	1980	870	63	933	813	177	990		△ 57	△ 57	
6	1981	830	153	983	813	177	990		△ 7	△ 7	
7	1982	790	214	1,004	805	176	981		23	23	
8	1983	750	263	1,013	774	170	944		69	69	
9	1984	710	309	1,019	741	164	905		114	114	
10	1985	670	419	1,089	706	158	864		225	225	
11	1986	630	526	1,156	667	150	817		339	339	
12	1987	590	606	1,196	626	143	769		427	427	
13	1988	550	705	1,255	581	134	715		540	540	
14	1989	510	800	1,310	532	124	656		654	654	
15	1990	470	932	1,402	480	114	594		808	808	
16	1991	430	1,059	1,489	423	102	525		964	964	
17	1992	390	1,153	1,543	362	89	451		1,092	1,092	
18	1993	350	1,270	1,620	296	75	371		1,249	1,249	
19	1994	310	1,382	1,692	224	60	284		1,408	1,408	
20	1995	270	1,488	1,758	147	43	190		1,568	1,568	
21	1996	230	1,588	1,818	64	24	88		1,730	1,730	
22	1997	190	1,679	1,869	0	0	0		1,869	1,869	

Table X-47 Assets and Liabilities (Z Plan)

Case A-Z00

(Unit: Million ¥)

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
1	1976	373		373	291	82	373		0	0	1. 1978 ~ 2004 Transit fee 20¥/KL
2	1977	839	△ 31	808	965	247	1,212		△ 404	△ 404	2. Upper: 1st stage Lower: 2nd stage
3	1978	1,157	△ 74	1,083	965	247	1,212		△ 129	△ 129	
4	1979	1,102	△ 120	982	965	247	1,212		△ 230	△ 230	
5	1980	1,047	△ 70	977	965	247	1,212		△ 235	△ 235	
6	1981	992	△ 24	968	954	244	1,198		△ 244	△ 244	
7	1982	937	5	942	918	235	1,153		△ 256	△ 256	
8	1983	882	1	883	878	226	1,104		△ 270	△ 270	
9	1984	1,286	△ 7	1,279	361 835	98 215	459 1,050		△ 284	△ 284	
10	1985	1,210	12	1,222	361 789	98 204	459 993		△ 287	△ 287	
11	1986	1,134	25	1,159	361 739	98 191	459 930		△ 293	△ 293	
12	1987	1,058	32	1,090	361 685	98 177	459 862		△ 299	△ 299	
13	1988	982	33	1,015	361 627	98 162	459 789		△ 306	△ 306	
14	1989	906	28	934	361 564	98 145	459 709		△ 314	△ 314	
15	1990	830	94	924	348 496	95 127	443 623		△ 228	△ 228	
16	1991	754	153	907	334 423	91 106	425 529		△ 141	△ 141	
17	1992	678	205	883	318 344	87 84	405 428		△ 51	△ 51	
18	1993	602	249	851	302 258	83 59	385 317		38	38	
19	1994	526	285	811	284 166	78 32	362 198		132	132	
20	1995	450	312	762	265 66	73 2	338 68		226	226	
21	1996	374	330	704	244 0	68 0	312 0		324	326	
22	1997	298	383	681	221	61	282		399	399	

Table X-47 (Continued from the previous page)

Case A-Z00

No.	Year	Assets			Liabilities			Capital			Remarks
		Depreciation	Reserve	Total	Foreign fund	Domestic fund	Total	Capital	Surplus fund	Total	
23	1998	165	447	612	197	55	252		360	360	
24	1999	144	506	650	171	47	218		432	432	
25	2000	123	559	682	143	39	182		500	500	
26	2001	102	607	709	112	30	142		567	567	
27	2002	81	649	730	79	20	99		631	631	
28	2003	60	684	744	43	8	51		693	693	
29	2004	39	713	752	0	0	0		752	752	

Table X-48 Assets and Liabilities

Case B-Z00

(Unit: Million ฿)

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
					232	65	297				1. 1978 ~ 2004 Transit fee 20฿/KL
1	1976	297		297					0	0	
					803	202	1,005				
2	1977	708	△ 26	682					△ 323	△ 323	2. Upper: 1st stage
					803	202	1,005				Lower: 2nd stage
3	1978	960	△ 39	921					△ 84	△ 84	
					803	202	1,005				
4	1979	915	△ 54	861					△ 144	△ 144	
					803	202	1,005				
5	1980	870	27	897					△ 108	△ 108	
					803	202	1,005				
6	1981	825	105	930					△ 75	△ 75	
					794	199	993				
7	1982	780	170	950					△ 43	△ 43	
					764	192	956				
8	1983	735	207	942					△ 14	△ 14	
					731	184	915				
9	1984	1,301	240	1,541	474	137	611		15	15	
					695	176	871				
10	1985	1,229	280	1,509	474	137	611		27	27	
					657	166	823				
11	1986	1,157	315	1,474	474	137	611		40	40	
					616	156	772				
12	1987	1,085	344	1,429	474	137	611		46	46	
					571	145	716				
13	1988	1,013	367	1,380	474	137	611		53	53	
					522	132	654				
14	1989	941	382	1,323	474	137	611		58	58	
					470	118	588				
15	1990	869	466	1,335	457	133	590		157	157	
					414	103	517				
16	1991	797	543	1,340	438	128	566		257	257	
					353	86	439				
17	1992	725	613	1,338	419	123	542		357	357	
					287	68	355				
18	1993	653	675	1,328	397	117	514		459	459	
					216	48	264				
19	1994	581	730	1,311	374	111	485		562	562	
					139	26	165				
20	1995	509	776	1,285	349	104	453		667	667	
					57	1	58				
21	1996	437	814	1,251	322	96	418		775	775	
					0	0	0				
22	1997	365	879	1,244	292	88	380		864	864	

Table X-48 (Continued from the previous page)

Case B-200

No.	Year	Assets			Liabilities			Capital			Remarks
		Depreciation	Reserve	Total	Foreign fund	Domestic fund	Total	Capital	Surplus fund	Total	
23	1998	233	922	1,155	261	79	340		815	815	
24	1999	206	960	1,166	227	68	295		871	871	
25	2000	179	993	1,172	190	57	247		925	925	
26	2001	152	1,020	1,172	150	45	195		977	977	
27	2002	125	1,041	1,166	107	32	139		1,027	1,027	
28	2003	98	1,056	1,154	60	17	77		1,077	1,077	
29	2004	71	1,065	1,136	0	0	0		1,136	1,136	

Table X-49 Assets and Liabilities

Case C-200 (Unit: Million ¥)

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
1	1976	291		291	235 813	56 177	291 990		0	0	1. Dredging cost is excluded from depreciation cost.
2	1977	699	△ 25	674	813	177	990		△ 316	△ 316	2. 1978 ~ 2004 Transit fee 20¥/KL
3	1978	950	△ 28	922	813	177	990		△ 68	△ 68	
4	1979	910	△ 34	876	813	177	990		△ 114	△ 114	3. Upper: 1st stage Lower: 2nd stage
5	1980	870	56	926	813	177	990		△ 64	△ 64	
6	1981	830	143	973	805	176	981		△ 17	△ 17	
7	1982	790	202	992	774	170	944		11	11	
8	1983	750	248	998	741 491	164 114	905 605		54	54	
9	1984	1,315	291	1,606	706 491	158 114	864 605		96	96	
10	1985	1,254	350	1,604	667 491	150 114	817 605		135	135	
11	1986	1,193	404	1,597	626 491	143 114	769 605		175	175	
12	1987	1,132	453	1,585	581 491	134 114	715 605		211	211	
13	1988	1,071	496	1,567	532 491	124 114	656 605		247	247	
14	1989	1,010	481	1,491	480 473	114 110	594 583		230	230	
15	1990	949	584	1,533	423 454	102 106	525 560		356	356	
16	1991	888	680	1,568	362 433	89 102	451 535		483	483	
17	1992	827	770	1,597	296 411	75 97	371 508		611	611	
18	1993	766	852	1,618	224 387	60 92	284 479		739	739	
19	1994	705	882	1,587	147 361	43 86	190 447		824	824	
20	1995	644	949	1,593	64 333	24 80	88 413		956	956	
21	1996	583	1,007	1,590	0 303	0 73	0 376		1,089	1,089	
22	1997	522	1,091	1,613					1,237	1,237	

Table X-49 (Continued from the previous page)

Case C-Z00

No.	Year	Assets			Liabilities			Capital			Remarks
		Depreciation	Reserve	Total	Foreign fund	Domestic fund	Total	Capital	Surplus fund	Total	
23	1998	413	1,144	1,557	270	65	335		1,222	1,222	
24	1999	392	1,148	1,540	234	57	291		1,249	1,249	
25	2000	371	1,191	1,562	196	47	243		1,319	1,319	
26	2001	350	1,229	1,579	155	37	192		1,387	1,387	
27	2002	329	1,261	1,590	110	26	136		1,454	1,454	
28	2003	308	1,288	1,596	62	13	75		1,521	1,521	
29	2004	287	1,252	1,539	0	0	0		1,539	1,539	

Table X-50 Assets and Liabilities (W Plan)

Case A-W00 (Unit: Million ¥)

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
					291	82	373				1. 1978 ~ 2004
1	1976	373		373					0	0	Transit fee 20¢/KL
					965	247	1,212				
2	1977	839	△ 31	808					△ 404	△ 404	2. Upper: 1st stage
					965	247	1,212				Lower: 2nd stage
3	1978	1,157	△ 74	1,083					△ 129	△ 129	
					965	247	1,212				
4	1979	1,102	△ 120	982					△ 230	△ 230	
					965	247	1,212				
5	1980	1,047	△ 70	977					△ 235	△ 235	
					965	247	1,212				
6	1981	992	△ 24	968					△ 244	△ 244	
					954	244	1,198				
7	1982	937	5	942					△ 256	△ 256	
					918	235	1,153				
8	1983	882	1	883					△ 270	△ 270	
					878	226	1,104				
9	1984	1,286	△ 7	1,279	361	98	459		△ 284	△ 284	
					835	215	1,050				
10	1985	1,210	11	1,321	361	98	459		△ 188	△ 188	
					789	204	993				
11	1986	1,134	23	1,157	361	98	459		△ 295	△ 295	
					739	191	930				
12	1987	1,058	29	1,087	361	98	459		△ 302	△ 302	
					685	177	862				
13	1988	982	29	1,011	361	98	459		△ 310	△ 310	
					627	162	789				
14	1989	906	23	929	361	98	459		△ 319	△ 319	
					564	145	709				
15	1990	830	140	970	348	95	443		△ 182	△ 182	
					496	127	623				
16	1991	754	250	1,004	334	91	425		△ 44	△ 44	
					423	106	529				
17	1992	678	353	1,031	318	87	405		97	97	
					344	84	428				
18	1993	602	448	1,050	302	83	385		237	237	
					258	59	317				
19	1994	526	535	1,061	284	78	362		382	382	
					166	32	198				
20	1995	450	613	1,063	265	73	338		527	527	
					66	2	68				
21	1996	374	682	1,056	244	68	312		676	676	
					0	0	0				
22	1997	298	786	1,084	221	61	282		802	802	

Table X-50 (Continued from the previous page)

Case A-W00

No.	Year	Assets			Liabilities			Capital			Remarks
		Depreciation	Reserve	Total	Foreign fund	Domestic fund	Total	Capital	Surplus fund	Total	
23	1998	165	876	1,041	197	55	252		789	789	
24	1999	144	961	1,105	171	47	218		887	887	
25	2000	123	1,040	1,163	143	39	182		981	981	
26	2001	102	1,114	1,216	112	30	142		1,074	1,074	
27	2002	81	1,182	1,263	79	20	99		1,164	1,164	
28	2003	60	1,243	1,303	43	8	51		1,252	1,252	
29	2004	39	1,298	1,337	0	0	0		1,337	1,337	

Table X-51 Assets and Liabilities

Case B-W00

(Unit: Million ฿)

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
					291	82	373				1. 1978 ~ 2004
1	1976	373		297					0	0	Transit fee 20฿/KL
					965	247	1,212				
2	1977	839	△ 26	682					△ 323	△ 323	2. Upper: 1st stage
					965	247	1,212				Lower: 2nd stage
3	1978	1,157	△ 39	921					△ 84	△ 84	
					965	247	1,212				
4	1979	1,102	△ 54	861					△ 144	△ 144	
					965	247	1,212				
5	1980	1,047	27	897					△ 108	△ 108	
					965	247	1,212				
6	1981	992	105	930					△ 75	△ 75	
					954	244	1,198				
7	1982	937	170	950					△ 43	△ 43	
					918	235	1,153				
8	1983	882	207	942					△ 14	△ 14	
					878	226	1,104				
9	1984	1,286	240	1,541	361	98	459		15	15	
					835	215	1,050				
10	1985	1,210	279	1,508	361	98	459		26	26	
					789	204	993				
11	1986	1,134	313	1,470	361	98	459		36	36	
					739	191	930				
12	1987	1,058	341	1,426	361	98	459		43	43	
					685	177	862				
13	1988	982	363	1,376	361	98	459		49	49	
					627	162	789				
14	1989	906	377	1,318	361	98	459		53	53	
					564	145	709				
15	1990	830	512	1,381	348	95	443		203	203	
					496	127	623				
16	1991	754	640	1,437	334	91	425		354	354	
					423	106	529				
17	1992	678	761	1,486	318	87	405		505	505	
					344	84	428				
18	1993	602	874	1,527	302	83	385		658	658	
					258	59	317				
19	1994	526	980	1,561	284	78	362		812	812	
					166	32	198				
20	1995	450	1,077	1,586	265	73	338		968	968	
					66	2	68				
21	1996	374	1,166	1,603	244	68	312		1,127	1,127	
					0	0	0				
22	1997	298	1,282	1,647	221	61	282		1,267	1,267	

Table X-51 (Continued from the previous page)

Case B-W00

No.	Year	Assets			Liabilities			Capital			Remarks
		Depreciation	Reserve	Total	Foreign fund	Domestic fund	Total	Capital	Surplus fund	Total	
23	1998	165	1,351	1,584	197	55	252		1,244	1,244	
24	1999	144	1,415	1,621	171	47	218		1,326	1,326	
25	2000	123	1,474	1,653	143	39	182		1,406	1,406	
26	2001	102	1,527	1,679	112	30	142		1,484	1,484	
27	2002	81	1,474	1,699	79	20	99		1,560	1,560	
28	2003	60	1,615	1,713	43	8	51		1,636	1,636	
29	2004	39	1,650	1,721	0	0	0		1,721	1,721	

Table X-52 Assets and Liabilities

Case C-W00

(Unit: Million ฿)

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
					291	82	373				1. Dredging cost is excluded from depreciation cost.
1	1976	373		291					0	0	
					965	247	1,212				
2	1977	839	△ 25	674					△ 316	△ 316	2. 1978 ~ 2004
					965	247	1,212				Transit fee 20฿/KL
3	1978	1,157	△ 28	922					△ 68	△ 68	
					965	247	1,212				3. Upper: 1st stage
4	1979	1,102	△ 34	876					△ 114	△ 114	Lower: 2nd stage
					965	247	1,212				
5	1980	1,047	56	926					△ 64	△ 64	
					965	247	1,212				
6	1981	992	143	973					△ 17	△ 17	
					954	244	1,198				
7	1982	937	202	992					11	11	
					918	235	1,153				
8	1983	882	248	998					54	54	
					878	226	1,104				
9	1984	1,286	291	1,606	361	98	459		96	96	
					835	215	1,050				
10	1985	1,210	349	1,603	361	98	459		134	134	
					789	204	993				
11	1986	1,134	402	1,595	361	98	459		173	173	
					739	191	930				
12	1987	1,058	450	1,582	361	98	459		208	208	
					685	177	862				
13	1988	982	492	1,563	361	98	459		243	243	
					627	162	789				
14	1989	906	476	1,486	361	98	459		225	225	
					564	145	709				
15	1990	830	630	1,579	348	95	443		402	402	
					496	127	623				
16	1991	754	777	1,665	334	91	425		580	580	
					423	106	529				
17	1992	678	918	1,745	318	87	405		759	759	
					344	84	428				
18	1993	602	1,051	1,817	302	83	385		938	938	
					258	59	317				
19	1994	526	1,132	1,837	284	78	362		1,074	1,074	
					166	32	198				
20	1995	450	1,250	1,894	265	73	338		1,257	1,257	
					66	2	68				
21	1996	374	1,359	1,942	244	68	312		1,441	1,441	
					0	0	0				
22	1997	298	1,494	2,016	221	61	282		1,640	1,640	

Table X-52 (Continued from the previous page)

Case C-W00

No.	Year	Assets: Depreciation	Assets: Reserve	Assets: Total	Liabilities: Foreign fund	Liabilities: Domestic fund	Liabilities: Total	Capital: Capital	Capital: Surplus fund	Capital: Total	Remarks
23	1998	165	1,573	1,986	197	55	252		1,651	1,651	
24	1999	144	1,603	1,995	171	47	218		1,704	1,704	
25	2000	123	1,672	2,043	143	39	182		1,800	1,800	
26	2001	102	1,736	2,086	112	30	142		1,894	1,894	
27	2002	81	1,794	2,123	79	20	99		1,987	1,987	
28	2003	60	1,847	2,155	43	8	51		2,080	2,080	
29	2004	39	1,837	2,124	0	0	0		2,124	2,124	

4) Balance sheets were prepared on the basis of Table X-41 ~ X-52.

(a) X Plan

The balance sheet for X Plan is shown in Table X-53.

If Site A is selected for sea berth construction, liabilities exceed assets until 1990 if 20 ¥/KL and 30¥/KL are charged for using facilities in 1978 ~ 1984 and 1985 ~ 1997, respectively. If Site B and Site C are selected, liabilities exceed assets until 1985. When the three sites are compared, asset standing deteriorates in the order of C, B, A.

(b) Y Plan

The balance sheet for Y Plan is shown in Table X-54. At Site A and Site B, assets begin to exceed liabilities five years earlier than X Plan. When the three sites are compared, asset standing is far better at C and poor at A and B.

(c) Z Plan

The balance sheet for Z Plan is shown in Table X-55. At Site A, asset standing is worse under Plan Z than under Plan Y. They are almost equal at Sites B and C. When the three sites are compared, asset standing is the best at C. It is especially poor at A.

(d) W Plan

The balance sheet for W Plan is shown in Table X-56. Asset standing under W Plan is almost equal to that under Y Plan. When the three sites are compared, asset standing is good at C, but poor at A.

Table X-53 Financial Standing (X Plan)

(Unit: Million ฿)

Site / Item / Year	A			B			C			Note
	Assets	Debts	Funds	Assets	Debts	Funds	Assets	Debts	Funds	
1978	949	1,153	△ 204	785	946	△ 161	786	931	△ 145	Transit fee
1980	684	1,153	△ 469	594	946	△ 352	623	931	△ 308	1978 ~ 1984 25฿/KL
1985	207	999	△ 792	353	820	△ 467	447	813	△ 366	1985 ~ 1997 30฿/KL
1990	420	674	△ 254	822	553	269	985	564	421	
1995	942	186	756	1,609	154	1,455	1,838	193	1,645	

Table X-54 Financial Standing (Y Plan)

(Unit: Million ฿)

Site / Item / Year	A			B			C			Note
	Assets	Debts	Funds	Assets	Debts	Funds	Assets	Debts	Funds	
1978	1,083	1,212	△ 129	923	1,005	△ 82	924	990	△ 66	Transit fee
1980	978	1,212	△ 234	904	1,005	△ 101	933	990	△ 57	1978 ~ 1997 20฿/KL
1985	829	1,050	△ 221	1,005	871	134	1,089	864	225	
1990	815	709	106	1,266	588	678	1,402	594	808	
1995	834	198	636	1,573	165	1,408	1,758	190	1,568	

Table X-55 Financial Standing (Z Plan)

(Unit: Million ¥)

Site / Item / Year	A			B			C			Note
	Assets	Debts	Funds	Assets	Debts	Funds	Assets	Debts	Funds	
1978	1,083	1,212	△ 129	921	1,005	△ 84	922	990	△ 68	Transit fee
1980	977	1,212	△ 235	897	1,005	△ 108	926	990	△ 64	1978 ~ 2004 20¥/KL
1985	1,222	1,509	△ 287	1,509	1,482	27	1,604	1,469	135	
1990	924	1,152	△ 228	1,335	1,178	157	1,533	1,177	356	
1995	762	536	226	1,285	618	667	1,593	637	956	
2000	682	182	500	1,172	247	925	1,562	243	1,319	

Table X-56 Financial Standing (W Plan)

(Unit: Million ฿)

Site / Item / Year	A			B			C			Note
	Assets	Debts	Funds	Assets	Debts	Funds	Assets	Debts	Funds	
1978	1,083	1,212	△ 129	921	1,005	△ 84	922	990	△ 68	Transit fee
1980	977	1,212	△ 235	897	1,005	△ 108	926	990	△ 64	1978 ~ 2004 20฿/KL
1985	1,321	1,509	△ 188	1,508	1,482	26	1,603	1,469	134	
1990	970	1,152	△ 182	1,381	1,178	203	1,579	1,177	402	
1995	1,063	536	527	1,586	618	968	1,894	637	1,257	
2000	1,163	182	981	1,653	247	1,406	2,043	243	1,800	

(4) Comparison of sites

Overall comparison of various choises based on these financial analys as (profit and loss calculation, asset calculation) reveals and Site C is the most advantageous under any plan (X, Y, Z, W). Especially, Case C-Y is financially for better than all the other cases. Therefore, the Mission concludes that Site C is financially most suitable for sea berth construction.

4. Managing organization

As the financial analyses reveal, current transactions will remain deficit for a considerable period even in Case C-Y. If Site C is selected for sea berth construction, the deficit will be 25 million ฿ in 1977 and 1 million ฿' in 1978 under X Plans.

It is impossible to charge prospective users in 1977 since the facilities are not ready for services yet. Therefore, measures must be studied to cover the deficit. The following two methods are conceivable.

(1) Raising funds

1) Sea berth using enterprises

2) Country and sea berth using enterprises

3) Ordinary private funds

(2) Financial assistance from country's general account

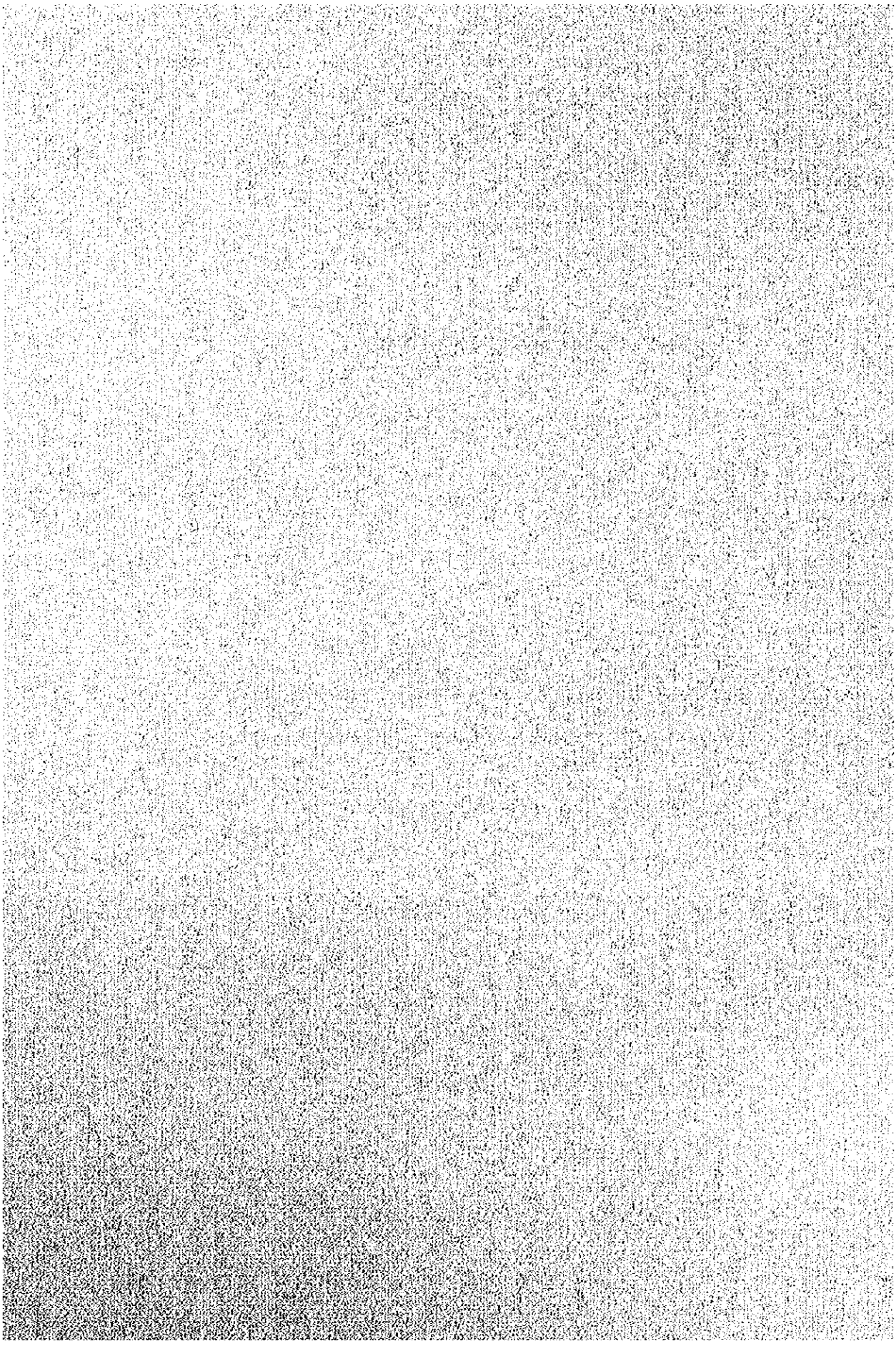
In view of the fact that the primary purpose of this project consists of securing stable supply of energy, sole dependence on private funds must be avoided for sake of the future energy policy. On the other hand, sole dependence on assistances from Thailand's general account will inevitably have influence on its policies for education, agriculture etc. An effective method is to establish such a public enterprise that is participated by sea berth using enterprises and can be controlled by the Government. It is desirable to cover the initial deficits by the joint investments by the enterprices and the country. The economic analyses have revealed that this project has sufficient long range profitability. Both the enterprises and the country will profit sufficiently from this project even if they give some burden during the initial period.

Even if this management system is adopted, the irrationality of charging more than benefits can be solved. Under this system, those who receive benefits are identical with those who pay charges. (Formerly, the managing organization receives benefits and users pay charges.)

Another important merit of this managing organization is that the benefits of this projects are undoubtedly returned to people's life. According to the results of the profit and loss calculation, the ordinary black figure will be 808 million ฿ in 1990 in the case of C-Y. If a half of this is used for lowering the price of products, the benefits of 22 ฿/KL will be given to the people since 18,250 thousand KL of crude oils are handled in this year.

The Mission believes that this project will bring about enormous benefits to Thai people. It recommend the establishment of a public enterprise as the managing organization.

XI. ATTACHED MATERIALS



XI. ATTACHED MATERIALS

1. Summary of investigations by First Investigation Mission

(1) Scope of investigations

The investigations were carried out in preparation for the project of constructing 200 thousand dead weight ton class sea berths and pipe lines in Sri Racha District in Thailand. Of various necessary studies including sea bottom topography, geology, the physical and mechanical properties of soil, tidal current, tidal level, water depth, the Mission carried out sounding by a sounding machine and a submarine geological investigation by sonic prospecting method.

The field investigations were carried out for 13 days between Oct. 8, 1972 and Oct. 20. The details are given below.

Investigated district: Sri Racha Sea Area (Fig. XI-1)

Investigation items: Submarine geological investigations by sonic prospecting method

Measured tracks; 15

Measured length; 97.2 km

Measured depth; At least 20m below sea bottom.

Sounding by sounding machine

Measured tracks; 18

Total track length; 127.2 km

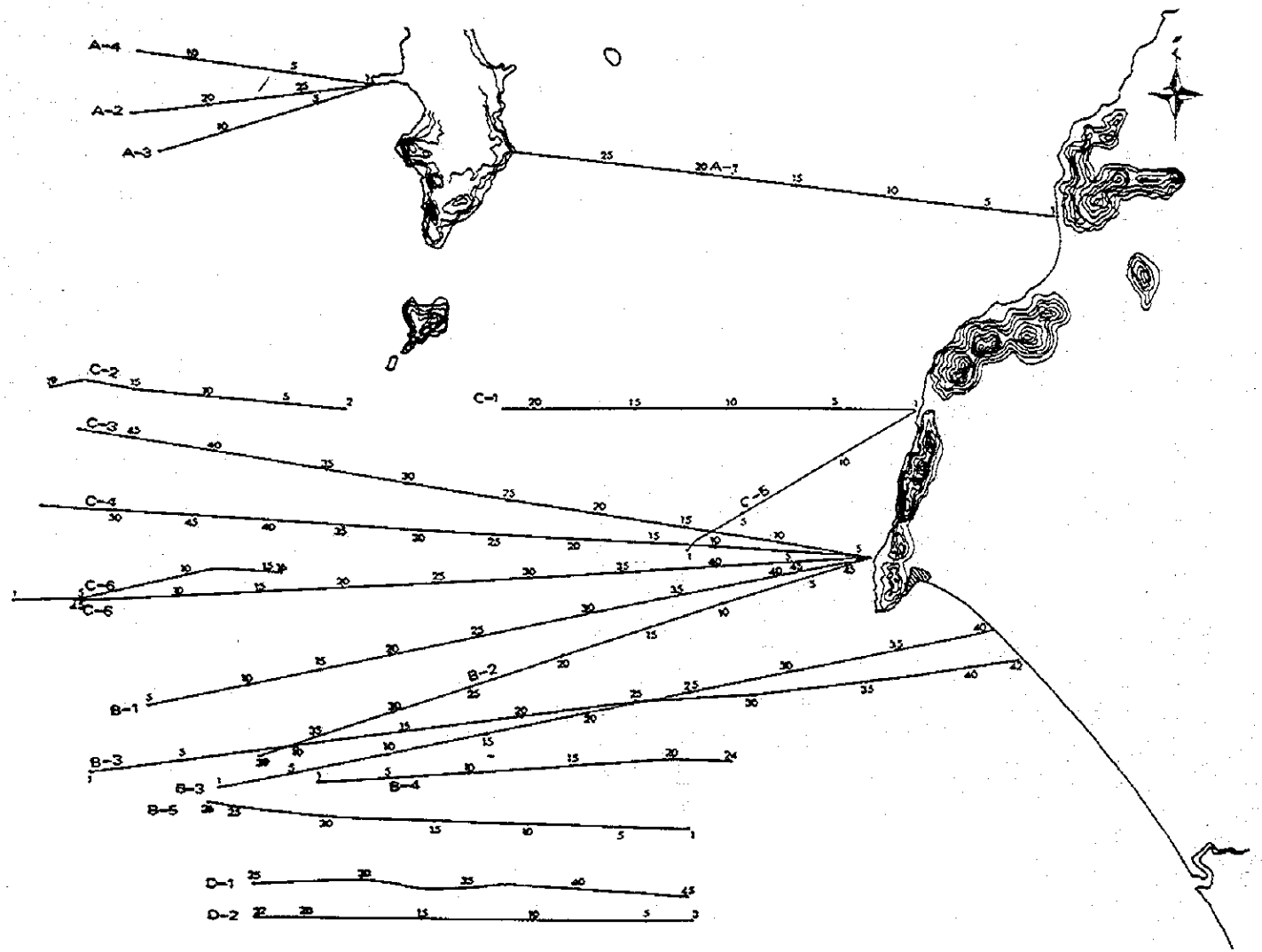


Fig. XI-1 District Investigated by First Investigatin Mission

(2) Results of investigations

1) Strata

The records measured were analyzed and studied. The results revealed that the geology of this district can be divided into six strata. (Stratum A, Stratum B_1, Stratum B_2, Stratum B_3, Stratum C and Stratum D.) Table XI-1 shows the suspected stratum categories.

Table XI-1 Assumed Stratum Type and Maximum Stratum Thickness

Period		Division	Assumed stratum type	Maximum stratum thickness (m)
Quartermary	Alluvium	Stratum A	Sandy silt, silty sand (soft stratum)	16
	Dilluvium	" B_1	Sand, silty sand	15
		" B_2	Sand, silt, clay (alternating)	13
		" B_3	Sand, gravel, gravel sand	
		" C	Clay, sand, gravel etc. (Slightly solidified sedimentary stratum)	
Pre-tertiary		" D	Basement surface and its weathered stratum (granite etc.)	

Stratum A is distributed almost throughout this district. It is suspected to be an alluvium consisting mainly of soft sandy silt or silty sand. Stratum B is also distributed throughout the district. It is suspected to be diluvium of generally sandy materials which deposited since Max Würm glacial age. Stratum C is distributed over the district except the sea area of Ao Udom and Laem Chabang. It is alluvium before Max Würm glacial age. It is suspected to consist of clay, sand and gravel, alternatively. Large horizontal changes are also suspected.

The depth of Stratum B and Stratum C is shown in Fig. IV-7 ~ IV-8 in IV.

2) Water depth

Fig. XI-2 shows the isobathic map that was drawn on the basis of the sounding work by a echosounder.

2. Terms of Reference for the Second Stage Mission Sri Racha Sea Berth Project

(1) Introduction

Petroleum products account for about 84% of the total energy consumed in Thailand. At present, there are 3 local refineries, which produce about 80% of the country's demand for petroleum product. New refineries and petrochemical plants are currently being developed. Due to the convenience of petroleum product transportation to consumers and the availability of deep sea area for unloading purpose, the refineries are located in the Sri Racha area of Chonburi Province. For these refineries, crude oils are transported mainly from the Middle East by relatively small-sized tankers of up to 90,000 ton class. They are unloaded at Sri Racha in the eastern coast of Thailand. It is anticipated that if crude oils could be shipped by larger tankers, say 200,000 ∿ 300,000 ton class, enormous savings in the cost of ocean transportation can be realized. As the existing sea berths of belonging to the refineries cannot accept tankers above 90,000 DWT, the National Energy Authority consulted with the refineries and proposed a project to construct a new sea berth. It should be capable of accommodating largersized tankers (up to approximately 200,000 tons) and used commonly by all the refineries.

(2) Description of the project

The sea berth project is briefly summarized below.

1) Sea berth for double mooring of approximately 200,000 ton tankers.

2) Submarine pipeline of suitable size from the sea berth to the bank yard area. It facilitates the delivery of the crude oil to meet the growing demand of the refineries and related industries.

3) Tank yard and tank terminal for the storage of crude oil reserve to meet the refineries' production plan and related industries and reserve regulation of the government.

(3) Scope of works

Japan with the best cooperation from the Thai side would furnish staff and supplies to perform the works as herein described.

1) Scope and format of the feasibility report

The feasibility report shall be comprehensive in scope, giving due regards to all the aspects of the most up-to-date concept related to the development of the crude oil sea berth. The format of the feasibility report shall comply with the requirements prescribed by the International Bank for Reconstruction and Development and/or other agencies or institutions engaged in the international financing of development

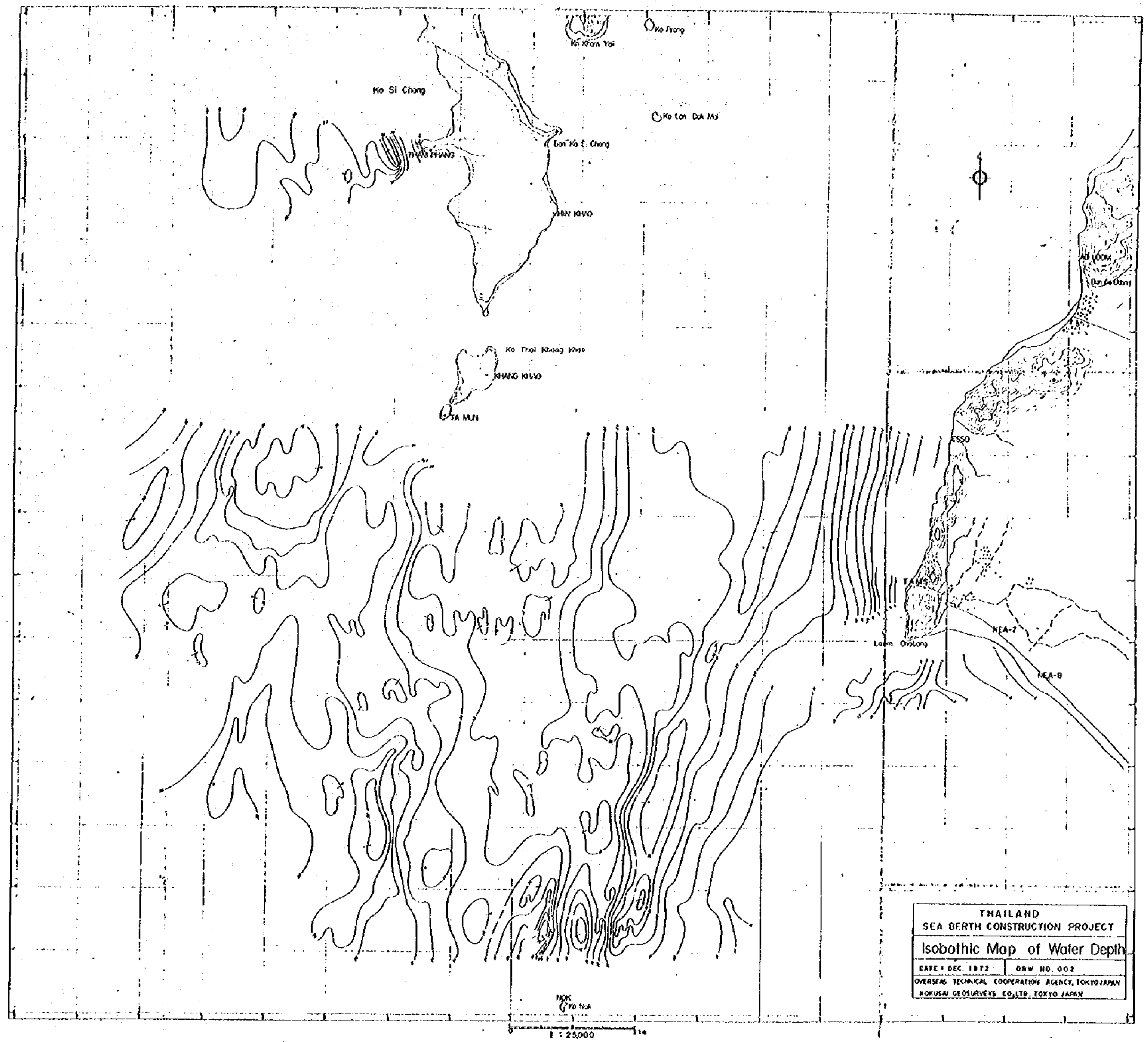

Ko Si Chang
Ko Khram Yai
Ko Thai Khang Khao
KHANG KHAO
TA MUN
ESSO
Laem Chabang
NEA-2
NEA-8
THAILAND
SEA BERTH CONSTRUCTION PROJECT
Isobathic Map of Water Depth
DATE : DEC. 1972
DRW NO. 002
OVERSEAS TECHNICAL COOPERATION AGENCY, TOKYO JAPAN
KOKUSAI GEOSURVEYS CO.,LTD. TOKYO JAPAN
1 : 25,000

Fig. XI-2

projects. An outline indicates, the coverage of the feasibility report in general terms. Its includes, but is not limited to, the attached Appendix A.

2) Basic data and information studies

The team shall perform the reconnaissance, collect, analyse and evaluate the following information and data.

(a) Physical conditions of project area

a. Wind
b. Tidal current and its direction
c. Wave height
d. Rainfall
e. Temperature
f. Geology
g. Sea bottom
h. Sedimentation
i. Other meteorological conditions.

(b) Land uses in Laem Chabang area and vicinity

a. Presnet land ownership and uses of various oil refineries as well as petrochemical industries taking into account the future expension.

b. Available land for the Project.

c. Possibility of offshore land reclaimation for the Project.

d. Available land on Si Chang Island.

e. Possibility of obtaining the land from the existing oil refineries.

(c) Statistical date of import, production, and consumption of petroleum in Thailand.

a. Demand, origin and type of crude oils.

b. The present status and future trend of crude oil reserve in Thailand in relation to the crude oil types and refinery capabilities.

c. Present refining capacity and future expension plan of existing oil refineries and petrochemical plants.

d. Pattern of petroleum products consumption for which the suitable crude oil type and origin can be determined on the basis of economic point of view.

3) Technical studies

Based upon data and information obtained by the first and second missions, the team shall conduct the following studies.

(a) Forecast of the crude oil volume to be unloaded at the new sea berth on the basis of these condition.

a. ESSO and TORC will not use the new facilities. (only TPC, TIPCO and SUMMIT will use the new sea berth)

b. All oil refineries will use the new sea berth.

c. All oil refineries and petrochemical plants will use the new sea berth.

(b) Justification for project selection

a. Site selection from various alternatives.

b. Type and size of the sea berth.

c. Site and storage capacity of the tank farm.

(c) Based upon the forecast in 3. 3) (a) and project selection in 3.3)b, the team shall conduct the studies to draw a definite plan and a layout of a most economical product. These studies shall include, but not limited to, the following items.

a. Comparison among 3 alternatives of the sea berth locations, and other locations which the term and NEA may consider.

b. Cost estimates and comparison among these alternatives on their merits and demerits. Recommendation of the most suitable and economical one.

4) Transport system studies

Study of the transport system techniques and economy will be carried out by considering the following factors:

(a) Ocean transportation studies

a. Past record of transport systems and costs.

b. Crude oil transportation cost by 90,000 DWT tanker (annual cost - depreciation, interest, and operation costs)

c. Crude oil transportation cost by 200,000 DWT tanker and over (annual cost - depreciation, interest, and operation costs.)

d. Crude oil transportation distance from producing countries to the Project, tanker size and performance record of trips per month or year.

e. Sea berth size at the crude oil producing countries, present and future.

f. Time required by various tanker types for loading and transporting different crude oil types in the same tanker from petroleum field to the Project.

g. The required number of tankers, present and future.

h. Simulation study on various tanker sizes in relation to different crude oil types from various parts. It should allow meet the oil refineries demand with minimum oil storage capacity.

i. World tanker fleets available for rent or chartering and their costs.

j. Oil companies' obligation to tanker operator companies such as existing contracts, policy etc.

(b) Requirement of crude oil storage capacity at Laem Chabang taking into consideration of

a. Separate crude oil storage or possibility of common crude oil, storage by different refineries.

b. Suitable tank volume and size for various tanker sizes and crude types.

c. Size, number and capacity of existing tankers at Laem Chabang area and future expension.

d. Optimum usage of existing tank capacity of the oil refineries as a part of the Project's storage capacity.

(c) Study of the needs of navigation channel improvement on the basis of the existing chart.

a. Improvement of navigation channel leading from the Gulf of Thailand to the sea berth location.

b. Sediment drift into channel due to sea current.

c. Improvement of navigation area surrounding sea berth.

d. Improvement of light houses and beacons including the objects of radar.

(d) Study of the present unloading facilities at Laem Chabang area.

a. ESSO sea berth

b. TORC sea berth

c. SUMMIT sea berth

d. Possibilities of expanding existing sea berths to accommodate 200,000 DWT tankers.

e. Possibilities of using existing crude oil sea berths as export piers for petroleum products.

5) Preliminary design and cost estimates

Engineering design and related drawing shall be considered as preliminary type but shall be sufficiently comprehensive to enable the team to make reliable estimate in quantity and cost of the project.

The engineering design and drawing shall cover all component of the unloading facilities, the major ones are listed below.

(a) Sea berth of fixed type and/or single bouy mooring, multiple buoy mooring types for tankers of 200,000 DWT or larger.

(b) Submarine pipeline from the sea berth to tank yard.

(c) Tank farm and tarminal with office building, housing facility, communication and control equipment necessary for the Project operation.

(d) Equipments and facilities required for protection against fire, accident, pollution, corrosion etc.

(e) Auxiliary equipments & facilities required for the operation, power supply, fresh water, maintenance and repair shops etc.

(f) Navigational aids, lighthouses etc.

(g) Other auxiliary facilities required for the operation of the Project.

6) Economic justification based on various conditions in 3. 3) (a) the report shall justify.

(a) B/C at various interest rates.

(b) Rates of return.

7) Financial studies

The team shall identify the economic factors affecting the Project and make the financial studies of the Project.

(a) Import duties on materials and equipments.

(b) The methods for financing pipeline construction.

(c) The desired rate of return or investment.

(d) The required form of depreciation.

(e) Rate of applicable taxes.

(f) The possibilities of ownership and operation of the pipeline by government, oil companies or other.

(g) Study of cash flow of the system for a period of 20 years.

8) Report

The report compilation, computer studies, printing shall be done in Japan.

The complete feasibility report of 75 copies shall be distributed to the National Energy Authority.

(4) Facilities and services to be given by the Government

The Thai Government shall furnish the following personnel, services and data.

1) One vehicle with a driver for transportation of the staff engaged in the performance or the work under this terms of reference.

2) Two air-conditioned rooms (space 20 sq.m. each) for the 2nd mission members.

3) The use of available office equipments, copying machine and draft boards.

4) Documents, data and/or informations, in connection with the Project, which are already in hand.

5) To assist the survey party in their effects to obtain necessary informations from the third party. These third parties shall be, but not limited to, the government's offices, the refineries, and major oil companies.

(5) Period of works

The work to be performed by the team under this terms of reference shall be commenced on June, 1973 and shall be completed in approximately 6 months.

(6) Ownership of documents

All computations, computer records, notes, designs, drawings, specifications, and other technical data related to the Project shall become the property of the Thai Government represented by the National Energy Authority upon the completion of the Project. The maps and marine charts shall be returned to the National Energy Authority. In addition to the maps, marine charts and data, the documents shall be delivered to the National Energy Authority as requested. However, the Japanese team shall have the right to retain in its permanent files and record two (2) copies of all such documents and data.

The Report shall not be released without prior written authorization from the Thai Government.

(7) Expert

The Japanese Experts shall be sent to Thailand in connection with the Project. The total quantity of works shall involve about 27 expert-months, dividing into.

Work in Thailand (7 expert-months)
Work in Japan (20 expert-months)

1) Expert title and qualification

(a) Planning Engineer, team leader, shall be a civil engineer with the minimum of ten years of experience in the sea berth planning and construction.

(b) Design Engineer shall also be a civil engineer with the minimum of eight year experience in design steel structures such as sea berth, submarine pipeline and tank form foundation.

(c) Maritime Transportation Expert shall be a qualified engineer with the experience in tanker operation and petroleum transportation problems for at least eight years.

(d) Economist shall be a college graduate in the field of economics with some background in statistics and especially be familiar with sea berth project evaluation for at least 5 years.

(e) Foundation Engineer shall be civil engineer or on engineering geologist with at least 8 year experience in soil and rock mechanics.

(f) Refinery Expert shall be a chemical engineer or scientist with knowledge of refinery processes regarding to the different crude oil types input and board knowledge of the refinery design for at least 8 years.

(g) Hydro-grapher shall be an oceanographer with the board knowledge of oceanography for at least 8 years.

(8) Fellowship

The Japanese Government shall grant two fellowship with travel expenses to NEA so that they may also participate in the preparation and drafting of the report before final printing.

Appendix A

Outline of the feasibility study

1. Forecast of demand for petroleum & crude oils in Thailand.
2. Forecast of crude oil to be unloaded in Laem Chabang area.
3. Study of transport system & costs.
4. Study of storage requirement at Laem Chabang.
5. Study of improvement of navigation channel.
6. Physical and geographical conditions of project area.
7. Land uses in Laem Chabang.
8. Navigation in Gulf of Thailand & Laem Chabang area.
9. Present unloading facilities at Laem Chabang.
10. Site Investigation.
11. Structures and facilities to be provided at sea berth.
12. Acquisition of land and compensation of land facilities.
13. Justification for project selection for various alternatives.
14. Project description.
15. Preliminary design.
16. Cost estimate.
17. Economic justification, B/C, internal rate of return.
18. Financial analysis.
19. Construction plan & schedule.
20. Studies of the effect of other related projects which bear influent on this project.

3. List of data collected by the Second Investigation Mission

The following data were collected by the Second Investigation Mission in Thailand. The total number of such data exceeds 100. Since they are numbered and arranged orderly, they are listed for later uses.

No.	Contents
001	NAVIGATION MAP No. 1
002	" No. 42
003	" No. 37
004	" No. 14 (Ko Sichang Harbour)
005	LAND MAP (NEA) 1/3 3 sheets
006	" 2/3 2 "
007	" 3/3 3 "
008	LAND MAP (D.S. ARMY) (Contour lines are entered.)
009	" (Ground conditions are entered.)
010	" (Berth positions are entered.)
011	NAVIGATION MAP
012	LAND MAP (NEA) (Land utilization plan)
013	SEA MAP (Basement depth is entered.)
014	MAP OF THAILAND (MINERAL RESOURCES)
015	TECTONIC MAP OF INDOCHINA
016	OIL-GAS BASINS OF INDOCHINA (MAP)
017	SAKON NAKON AND SEDIMENTARY BASINS
018	GEOLOGY AND MINERAL DEPOSITS OF SOUTHERN PHOKET ISLAND SOUTH THAILAND (1)
019	GEOLOGY AND MINERAL DEPOSITS OF SOUTHERN PHOKET ISLAND SOUTH THAILAND (2)
020	GEOLOGICAL MAP (DEP'T OF MINERAL RESOURCES)
021	GEOLOGICAL MAP OF THAILAND (1)
022	" (2)
023	
024	
025	
026	STATISTICAL YEAR BOOK THAILAND (1970 ~ 71)
027	MONTHLY BULLETIN BANK OF THAILAND (DEC. 1973)
028	OUTLINE OF THAI ECONOMY 1974 (Chamber of Commerce)
029	" 1972 (")

No.	Contents
030	SOME IMPORTANT STATISTICS OF THAILAND
031	QUARTERLY BULLETIN OF STATISTICS
032	FOREIGN TRADE STATISTICS OF THAILAND (DEC. 1972) DEP'T OF CUSTOMS
033	FOREIGN TRADE STATISTICS OF THAILAND (JUN. 1973) DEP'T OF CUSTOMS
034	POPULATION & HOUSING CENSUS 1970 CHANGWAT CHON BURI
035	ROAD TRANSPORT STATISTICS LAND TRANSPORT DEP'T 1972
036	PETROLEUM ACT VOL 7 No. 8
037	PETROLEUM INCOME TAX ACT VOL 7 No. 9
038	PETROLEUM INCOME TAX ACT 1971
039	PETROLEUM ACT 1971
040	PRELIMINARY REPORT OF THE 1970 POPULATION AND HOUSING CENSUS
041	THE THIRD STAGE NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT PLAN (Oct. 1971 ~ Sep. 1976) (Chamber of Commerce)
042	MAJOR ECONOMIC STATISTICS OF THAILAND, 1973 (Chamber of Commerce)
043	1973 ECONOMIC AND SOCIAL PROSPECT OF THAILAND (Chamber of Commerce)
044	BUSINESS IN THAILAND CASH & CARRY SEP. 1973
045	1972 REPORT OF INVESTIGATION ON ECONOMIC TREND IN THAILAND, OCT. 1971 (Chamber of Commerce)
046	1972 REPORT OF INVESTIGATION OF ECONOMIC AND BUSINESS TREND IN THAILAND, MAY, 1972 (Chamber of Commerce)
047	KRUNG THEP 1974
048	ANNUAL REPORT EGAT 1972
049	ANNUAL ECONOMIC REPORT 1972 BANK OF THAILAND
050	BULLETIN OF CHAMBER OF COMMERCE JULY 1972
051	INFRA STRUCTURE OF THAILAND MAY, 1973 (Chamber of Commerce)
052	THE ENERGY SITUATION IN THAILAND NEA
053	ELECTRIC POWER IN THAILAND 1971-72 NEA
054	INDUSTRIAL SECTOR IN THAILAND
055	AN OFFICIAL HANDBOOK MINISTRY OF NATIONAL DEVELOPMENT 1970
056	SOUTHEAST ASIAN REGIONAL TRANSPORTATION STUDY
057	THAILAND TRANSPORTATION COORDINATION STUDY
058	TRANSPORT IN THAILAND
059	THE INVESTOR

No.	Contents
060	JAPAN CHEMICAL WEEK
061	ODYSSEY FOR OIL THE INVESTOR JULY, 1969
062	BUSINESS REVIEW OCT, 1913
063	PETROLEUM AND NATURAL GAS SITUATION INDIA AND THAILAND, SEKIYUGAKKAI-SHI, Vol. 9, No. 10 OCTOBER, 1968
064	PORT & HARBOR STATISTICAL MATERIALS
065	ENERGY INDUSTRIALIZATION MATERIAL
066	TORC'S ANSWER
067	THE OVERSEAS INVESTMENT GUIDEBOOK BANK OF TOKYO
068	BULLETIN OF CHAMBER OF COMMERCE JAN, 1974
069	PETROLEUM MATERIALS
070	TIDE TABLES VOL. 1
071	" VOL. 2
072	GEOLOGICAL INVESTIGATION REPORT NEA JAN, 1974
073	CLIMATOLOGICAL DATA
074	CLIMATOLOGICAL DATA OF THAILAND (1951 ~ 1970)
075	RECONNAISSANCE OF THE GEOLOGY AND GROUND WATER OF THE KHORAT PLATEAU, THAILAND
076	ANNUAL REPORT OF SRI RACHA AMPHUR
077	NAVIGATION CHANNEL IMPROVEMENT OF SOUTHERN PORTS, MINISTRY OF COMM.
078	MATERIALS OF NATURAL CONDITIONS
079	MATERIALS ON LAEM CHABANG
080	ESSO'S PAMPHLETS 4 copies
081	TORC'S " 5 "
082	SUMMIT'S " 2 "
083	SPEC. OF SUMMIT'S PRODUCTS
084	K-LINE'S PAMPHLETS
085	KEC'S " 3 copies
086	PRELIMINARY REPORT OF THE LABOR FORCE SURVEY
087	CONSTRUCTION COST FOR SRI RACHA SEA BERTH PROJECT
088	MATERIALS ON CONSTRUCTION WORKS
089	
090	DEEP-SEAPORT OF LAEM CHABANG (1)
091	" (2)
092	STUDY MATERIALS ON SATTAHIP

No.	Contents
093	COASTAL WATER POLLUTION SURVEY OF CHONBURI PROVINCE, ALT
094	THE NATION (ENGLISH PAPER IN THAILAND) JAN, 20, 1974
095	AERIAL PHOTOGRAPH OF LAEM CHABANG
096	
097	
098	
099	
100	ORGANIZATIONAL DIRECTORY OF THE GOVERNMENT OF THAILAND 1971-72
101	LAW LIST OF THE INTERNATIONAL TRANSLATIONS