ANNEX VII-1. DI-HYDRATE PROCESS PHOSPHORIC ACID PLANT LIST

Source: A Chemical Age Survey, International Contracts (1974 – 1977)

ECN, International Project Review (1978 – 1979)

Country	Process	Capacity	Start-up Date
Brazil	Fisons	210 T/D	1974
	Prayon	300 T/D	1975
	Rhone-Poulenc	2 x 940 T/D	1979
	Gulf design	18,500 T/Y	1979
Egypt	Fisons	200,000 T/Y	1981
France		800 T/D	1974
		600 T/D	1974
	Rhone-Poulenc	428 T/D	1974
Greece	Prayon	200 T/D	1975
Hungary	Cofaz/Prorea	300,000 T/Y	1979
India	Prayon	120,000 T/Y	1977
Iran	Prayon		
Iraq	Prayon	1,260 T/D	1980
Italy		20,000 T/Y	1978
Jordan	Rhone-Poulenc	412,500 T/Y	1980
Korea	Prayon	660 T/D	1977
Mexico	Dorr		1980
Morocco	Phone-Poulenc	500 T/D	1977
Netherland		75,000 T/Y	1976
South Africa	Fisons'	25,000 T/D	1975
	Prayon	575 T/D	1976
	Prayon	1,200 T/D	1977

Country	Process	Capacity	Start-up date
Spain	Prayon	100,000 T/Y	1975
	Prayon	102,000 T/Y	
Tunisia		400 T/D	1974
		2 x 500 T/D	1979
Turkey	Phone-Poulenc	400,000 T/Y	1977
	Rhone-Poulenc	230,000 T/Y	1978
		340 T/D	
U.S.A.	Prayon	1,250 T/D	1975
	Prayon	800 T/D	1975
	Prayon	2 x 912 T/D	1975
	Prayon	1,260 T/D	1976
		1,000 T/D	1977
		500 T/D	1977
	Garrett	120,000 T/Y	1979
	Prayon	230,000 T/Y	1979
	Prayon	525 T/D	
	Prayon	350,000 T/Y	
U.S.S.R.	Prayon	1,000 T/D	1980
	Prayon	2 x 1,000 T/D	1980
	Prayon	1,000 T/D	1980
		500 T/D	1980
Yugoslavia	Rhone-Poulenc	600 T/D	1977
	Fisons	50,000 T/Y	1978
	Fisons	75,000 T/Y	1978
	Fisons	165,000 T/Y	1980

ANNEX VII-2. HEMI-DIHYDRATE PROCESS PHOSPHORIC ACID PLANT LIST

1.	NISSAN CHEMICAL INDUSTRIES, LTD. Toyama, Japan	130 MTPD P_2O_5	July 1955
2.	NIIGATA SULPHURIC ACID CO., LTD. (NIIGATA RYUSAN K.K.) Niigata, Japan	60 MTPD P_2O_5	August 1963
3.	RASA INDUSTRIES CO., LTD. Miyako, Japan	66 MTPD P_2O_5	September 1963
4.	IMPERIAL CHEMICAL INDUSTRIES OF AUSTRALIA AND NEW ZEALAND LIMITED Melbourne, Victoria, Australia	170 LTPD P_2O_5	December 1964
5.	SULPHIDE CORPORATION PTY. LIMITED Newcastle, N. S.A., Australia	200 MTPD P_2O_5	April 1966
6.	ACF & SHIRLEYS FERTILIZERS LIMITED Brisbane, Queensland, Australia	100 LTPD P_2O_5	June 1966
7.	NITRIGIN EIREANN TEORANTA Arklow, Co. Wicklow, Ireland	60 MTPD P_2O_5	November 1966
8.	RASA INDUSTRIES CO., LTD. Miyako, Japan	100 MTPD P_2O_5 (new train)	September 1968
9.	NIPPON RINSAN K.K. (NIPPON PHOSPHORIC ACID CO., LTD.) Chiba, Japan	250 MTPD P_2O_5	May 1969

10.	PRODUITS ET ENGRAIS CHEMIQUES DU RHIN Ottmarsheim (Haut-Rhin), France	150 MTPD P_2O_5	1971
11.	BANGLADESH FERTILIZER CHEMICAL AND PHARMACEUTICAL CORPORATION (BFCPC) Chittagong, Bangladesh	135 MTPD P_2O_5	1974
12.	PRODUITS CHIMIQUES ET METALLURGIQUES DU RUPEL Sauvegarde, Belgium	450 MTPD P_2O_5	1970
13.	SAN CHEMICAL CO., LTD. Niigata, Japan	230 MTPD P_2O_5	July 1970
14.	THE FERTILIZER CORPORATION OF INDIA LTD. Trombay, India	100 MTPD P_2O_5	1974
15.	SOUTHERN PETROCHEMICAL INDUSTRIES CORPORATION LTD. Tuticorin, India	165 MTPD P_2O_5	1975
16.	THE FERTILIZER CORPORATION OF INDIA LTD. Haldia, India	100 MTPD P_2O_5	1976
17.	THE FERTILIZER CORPORATION OF INDIA LTD. Trombay, India	210 MTPD P_2O_5	
18.	COMPANHIA PETROQUIMICA BRASILEIRA (COPEBRAS) Santos, Brasil	300 MTPD P_2O_5	1975

19.	OFFICE CHERIFIEN DES PHOSPHATES (OCP) Safi, Morocco	1,500 MTPD P_2O_5	1976
20.	UNIE VAN KUNSTMESTFABRIEKEN BV (UKF) Pernis, Netherlands	600 MTPD P_2O_5	1976
21.	Unspecified	100 MTPD P_2O_5	1976
22.	CONSOLIDATED FERTILIZERS LIMITED Brisbane, Queensland, Australia	170 LTPD P_2O_5 (Former: ACF & Shirleys Fertilizers Limited expansion)	1976
23.	ISCI ISADAMI KIMYA SANA YII KURULUSLARIAS (ISKUR) Bandirma, Turkey	450 MTPD P_2O_5	1978/1979
24.	MAROC PHOSPHORE Safi, Morocco	1,500 MTPD P_2O_5	1980
25.	SONATRACH Tebessa, Algeria	500 MTPD P_2O_5	1982
26.	SONATRACH Annaba, Algeria	500 MTPD P_2O_5	1982

ANNEX VII-3. MODIFIED HEMI-DIHYDRATE PROCESS PHOSPHORIC ACID PLANT LIST

Country	Process	Capacity	Start-up Date
Japan	Nissan C	40 T/D	1974
Japan	Nissan C	100 T/D	1975
Yugoslavia	Fisons HDH	160 T/D	1976
U.K.	Fisons HDH	160,000 T/Y	1980

ANNEX VIII-1. IMPACT IDENTIFICATION AND EVALUATION CHECKLIST*

	+	-	O	L	M	H	U
A. Existing Physical and Chemical Characteristics							
1. Earth							
a. Mineral Resources			X				
b. Soils			X				
c. Land Forms		X		X			
d. Unique Physical Features			X				
2. Water							
a. Surface (Stream, Drainage, Effluent)			X				
b. Ocean		X					
c. Underground			X				
d. Quality (Domestic Agricutural Industrial, etc.)			X				
e. Temperature		X		X			
f. Recharge			X				
3. Atmosphere							
a. Quality (Gases, Perticulates, etc.)		X		X			
b. Climate			X				
c. Temperature			X				

* Please qualify impacts of projects whether positive or negative.

	+	-	O	L	M	H	U
4. Processes							
a. Floods			X				
b. Erosion			X				
c. Stress-Strain (Earth Quakkes)			X				
d. Deposition (Sedimentation Precipitation)		X		X			
e. Sorption (Ion Exchange)			X				
f. Compaction and Settling			X				
g. Stability (Slides Slumps)			X				
h. Air Movements			X				
B. Existing Biological Conditions							
1. Flora (Trees, Shrubs, etc.)		X		X			
2. Fauna (Birds, Land Animals, etc.)			X				
C. Existing Cultural Factors							
1. Land Use							
a. Agricultural		X		X			
b. Residential		X		X			
c. Industrial			X				
d. Commercial			X				
e. Forestry			X				
f. Grazing			X				
g. Wetlands			X				
h. Mining and Quarrying			X				

	+	-	O	L	M	H	U
2. Man-Made Facilities and Activities							
a. Structures			X				
b. Utility Networks			X				
c. Transportation network	X						
d. Waste Disposal		X		X			
e. Barriers			X				
f. Corridors			X				
3. Aesthetics and Human Interest							
a. Scenic Views and Vistas		X		X			
b. Open Space Qualities			X				
c. Landscapes Design							
d. Unique Physical Features			X				
e. Parks and Reserves			X				
f. Movements			X				
g. Rare and Unique Species			X				
h. Historical and Archeological Sites and Objects			X				
4. Cultural Status							
a. Employment	X					X	
b. Life Style	X					X	
c. Health and Safety			X				
d. Population Density	X					X	

	+	-	O	L	M	H	U
5. Recreation							
a. Resorts	X			X			
b. Swimming, Fishing etc.			X				
D. Ecological Relationships							
1. Food Chains			X				
2. Disease and Insect Vectors			X				
3. Others			X				
E. Others	+	-	O	L	M	H	U

LEGEND:

+	Positive Environmental Impact
-	Negative Environmental Impact
O	No Environmental Impact
L	Minor Environmental impact
M	Moderate Environmental Impact
H	High Environmental Impact
U	Unknown Environmental Impact

ANNEX IX-1. AMBIENT TEMPERATURE (°C)

Item / Month	Maximum Daily Mean	Minimum Daily Mean	Mean Daily Mean
January	29.5	23.0 ~ 23.5	26.5 ~ 26.0
February	29.0 ~ 30.0	22.5 ~ 23.0	26.0
March	30.0 ~ 31.0	23.0 ~ 24.0	26.0 ~ 27.0
April	31.0	24.0 ~ 24.5	28.0
May	32.0	24.5 ~ 25.0	28.5
June	31.0 ~ 32.0	24.5 ~ 25.0	28.5 ~ 28.0
July	32.0	24.5	28.0 ~ 27.5
August	32.0	24.5 ~ 25.0	28.0
September	31.0 ~ 32.0	24.5	28.0
October	31.0 ~ 32.0	24.0 ~ 24.5	28.0
November	31.0	24.0 ~ 24.5	27.5
December	30.0	23.5 ~ 24.0	27.0 ~ 26.5
Annual	31.0	24.0	27.5

ANNEX IX-2. RELATIVE HUMIDITY (RH %)

Item / Month	RH %	Dew Point C	Dry Wet Bulb C
January	82	23	25.5/23.5
February	78	23	25.5/23.0
March	78	22	26.5/23.5
April	76	23	27.0/24.5
May	78	24	28.5/25.0
June	86	24	28.0/25.0
July	80	24	27.5/25.0
August	78	23	27.5/24.5
September	80	23	27.5/24.5
October	82	24	27.0/24.5
November	82	23	26.5/24.5
December	82	23	26.0/24.0
Annual	80	24	27.0/24.5

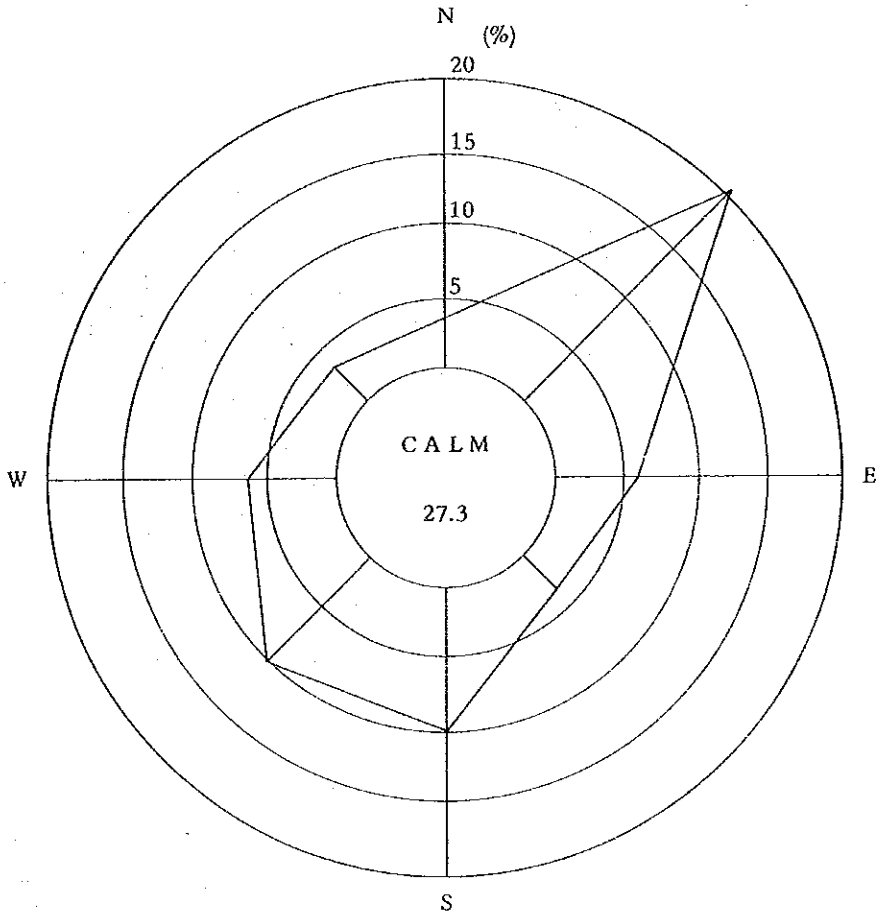
ANNEX IX-3. FREQUENCY OF WIND DIRECTION

Season / Direction	Spring	Summer	Fall	Winter	Annual
N	16.8	2.7	9.2	25.2	13.5
NE	29.6	2.4	14.8	34.1	20.2
NW	1.4	4.4	3.6	4.6	3.5
E	8.4	2.4	5.2	7.0	5.7
SE	2.7	5.4	3.3	1.0	3.2
S	4.0	21.3	12.1	2.6	10.0
SW	5.1	23.0	10.2	2.3	10.1
W	1.7	8.8	12.5	3.0	6.5
Calm	30.3	29.6	29.1	20.2	27.3
Total (%)	100.0	100.0	100.0	100.0	100.0

ANNEX IX-4. WIND FREQUENCY AS TO DIRECTION & FORCE

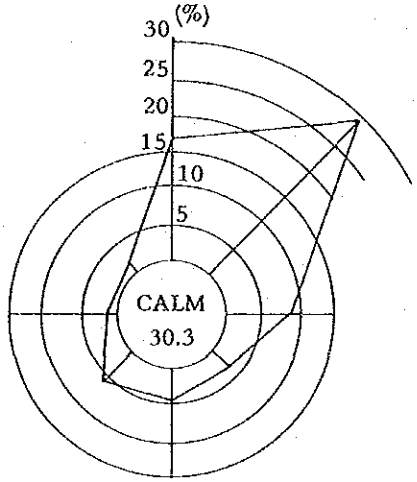
Force / Direction	0 – 1 [0 – 1.6]	2 – 3 [1.6 – 5.5]	4 [5.5 – 8.0]	5 – 6 [8.0 – 13.9]	7 – Over [13.9 – 17.2 ~]	Total (%)
N		10.6	2.5	0.4	0.0	13.5
NE		14.0	4.8	0.8	0.1	19.7
NW		2.7	0.6	0.3	0.0	3.6
E		4.7	0.8	0.4	0.0	5.9
SE		2.9	0.1	0.2	0.0	3.0
S		8.1	1.5	0.4	0.0	10.0
SW		6.9	2.3	1.0	0.0	10.2
W		3.7	1.9	0.8	0.0	6.4
Calm	27.5					27.5
Total (%)	27.5	53.6	14.5	4.3	0.1	100.0

ANNEX IX-5. ANNUAL FREQUENCY OF WIND DIRECTION

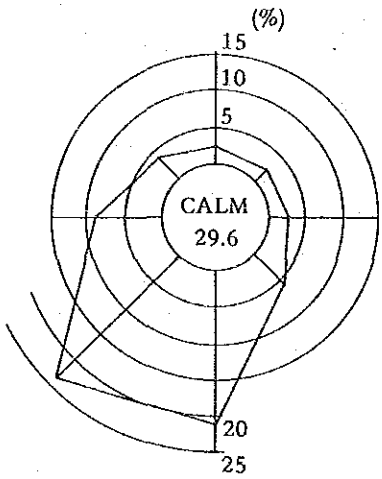


ANNEX IX-6. SEASONAL VARIATIONS OF WIND

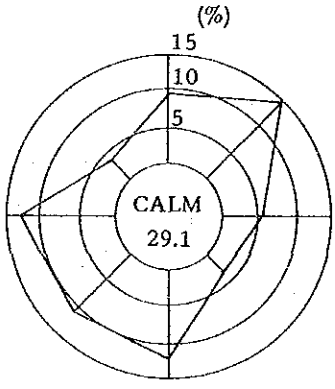
SPRING



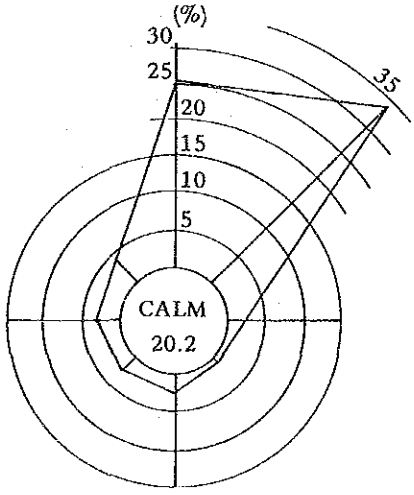
SUMMER



FALL



WINTER



ANNEX IX-7. RAINFALL (mm)

Item / Month	Monthly Total	a	b	c
January	100	8	1	1
February	100	7	0	0
March	100	6	2	2
April	50	6	6	6
May	100	6	12	16
June	150	8	12	14
July	150	9	14	18
August	150	8	12	12
September	150	9	12	18
October	200	7	14	17
November	200	7	8	8
December	100	7	4	5
Annual	2,000	7	97	80 ~ 17

a: Cloudiness (0 10) month mean

b: Thunder Sorm day month

c: Lightning month

ANNEX X-1. WATER ANALYSIS TABLE

Sampling No.	001	002	003	004
Sampling Place	Dupon	St. Posalio	Bantiqui	Matlang
Sampling Date	Oct. 29 '78	Nov. 2 '76	Nov. 4 '78	Nov. 6 '78
Source	River	Spring	Well	Spring
Conductivity (DEG)	36.3	< 1.0	< 1.0	< 1.0
Color (DEG)	< 5.0	< 5.0	< 5.0	< 5.0
PH AT 25°C	7.1	6.9	6.9	7.0
Electric Conductivity $\mu\nu$/cm	573	484	974	568
M-alkalinity as $CaCo_3$	177	326	325	272
Total Hardness as $CaCo_3$	223	233	341	252
$C\ell^-$ Ion	52.6	9.4	109	5.4
Total Iron as Fe	2.29	< 0.1	< 0.1	< 0.1
TDS	356	352	579	353

ANNEX X-2. PORT INSTALLATION DESIGN CONDITIONS

1. Ground Conditions

The study is made with the premises to have a good quality of sand layer, because no physical ground survey around the proposed plant site has at present not been conducted.

In general, a good quality of sand layer has a value of more than 10 in terms of N-value, and more than 30° in terms of internal angle of friction, and in case of evenly homogeneous layer, its N-value may correspondingly increase with an increase of depth.

Standing on the same concept in this study, N-value below 10 m from the sea bed surface is assumed to have more than 30. Summarizing the above is as follows:

i) 0 – 10 m in depth below the sea bed surface:

Good sand: γ = 1.8 t/m^3 γ' = 2.0 t/m^3
(Note: γ' is a value before subtracting bouyancy.)

ϕ = 30°

N = 10

kh = 1.5 kg/cm^3
(Reactional coefficiency in lateral ground direction)

ii) 10 m or more in depth below the sea bed surface:

Good sand: γ = 1.8 t/m^3 γ' = 2.0 t/m^3

ϕ = 35°

N = 20

kh = 3.0 kg/cm^3

2. A Comparison in between Pier Type and Steel Sheet Pile Type

As a water depth is more than - 9.0 m at the front of the site, the rigidity (VL-type in this study) are required for the steel sheet pile type.

Not only the steel sheet pile, but also waling, tie rod and other steel material require a large area of cross section, which make an increased use of steel materials.

On the other hand, in case of pier type, it is well sustained with PC piles, so that this method is more advantageous than the other in general.

3. Comparison in Revetment Construction Methods

Three methods are considered to be applicable for the revetment construction, i.e. rubble-mound, gravity and steel sheet pile type.

The rubble-mound type requires a great number of stones, if the revetment is constructed with stones up to its top end. In gravity type, cast in place concrete is applicable as paving only for a portion above HWL from execution points of view. Therefore pre-cast concrete structure such as L-type block, cellular block, etc. which requires a certain size of big crane vessel and also a certain degree of accuracy in installation might be needed. And, steel sheet pile type may encounter troubles with impossible piling spots and moreover, is relatively higher in cost than all other methods.

With all these above, a multi-method is determined to apply in this planning that a few of riprapping stones are used, upon which a gravity method with use of PC concrete pannels, a simplest revetting method, is overlapped.

Some of embankment work may require to use of some covering stones or wave protection blocks for the purpose of prevention from damage, and this plan is determined to use stones of 500 – 1,000 kg per piece, as the design wave height at the planned points is 2 m.

4. Major Materials Required for the Construction

i) PC pile:

Sizes normally used in the Philippines are:

300 x 300 m/m square
350 x 350 m/m square
400 x 400 m/m square
450 x 450 m/m square

The last one, 450 x 450 m/m square having a maximum area of cross section, is determined in this study to be used, by taking account of handling and hardness requirements at the time of piling, because it is assumed that external resisting force may relatively be strong and piling length may be long.

Use of steel pipe piling requires at least 500 mmϕ, in view of lateral support force, which cost you more in material cost, so that use of PC piles is the best among such.

ii) Steel pipe pile:

A size of steel pipe is determined based on the requirements estimated for bending moment, stress in axial force and supporting force of pile.

Steel pipe piles are applied in all places of big scale installations where PC pile are possibly deemed to be insufficient with PC piles, as the external force is quite big.

5. **Settlement of Marine Conditions**

i) Tidal level:

The values shown in "Tide and current tables of Philippines for the year 1979," p. 35, "List of primary tide stations and datum planes Cebu," are:

H.W.L.	+ 1.530 M
L.W.L.	+ 0.183 M

ii) Maximum wind speed:

A typhoon routine is shown in the next page.

Maximum wind speed	40 m/sec.
Design wind speed	20 m/sec.

Wind speed and direction around the planned site is likely to be as shown in Annex IX-3 through 5, and NE direction is prominent.

iii) Design wave height

Assuming that blowing distance is 30 km and wind speed is 25 m, the wave height at the offing is 3 m and the wave height at site is

$$H\ 1/3 = 2.0\ m$$

6. Design Seismic Intensity

Following Building Code in the Philippines, the horizontal force at earthquake is calculated in the following formula

$$H = Z \cdot K \cdot C \cdot W$$

H: Total horizontal force
Z: Seismic coefficient due to locality and ground condition
K: Coefficient in terms of importance degree of structure
C: Seismic coefficient (0.1)
W: Vertical gravity (ton)

With these above, a design scale of seismic intensity, kh, can be obtained from the following formula:

$$kh = Z \times K \times C$$

Seismic coefficient Z due to locality and ground condition is resulted in 1.2 from Table-1, as ground N-value is assumed to be in a range of 10 – 20.

Coefficient K due to importance degree of structure, is assumed to be 1.0.

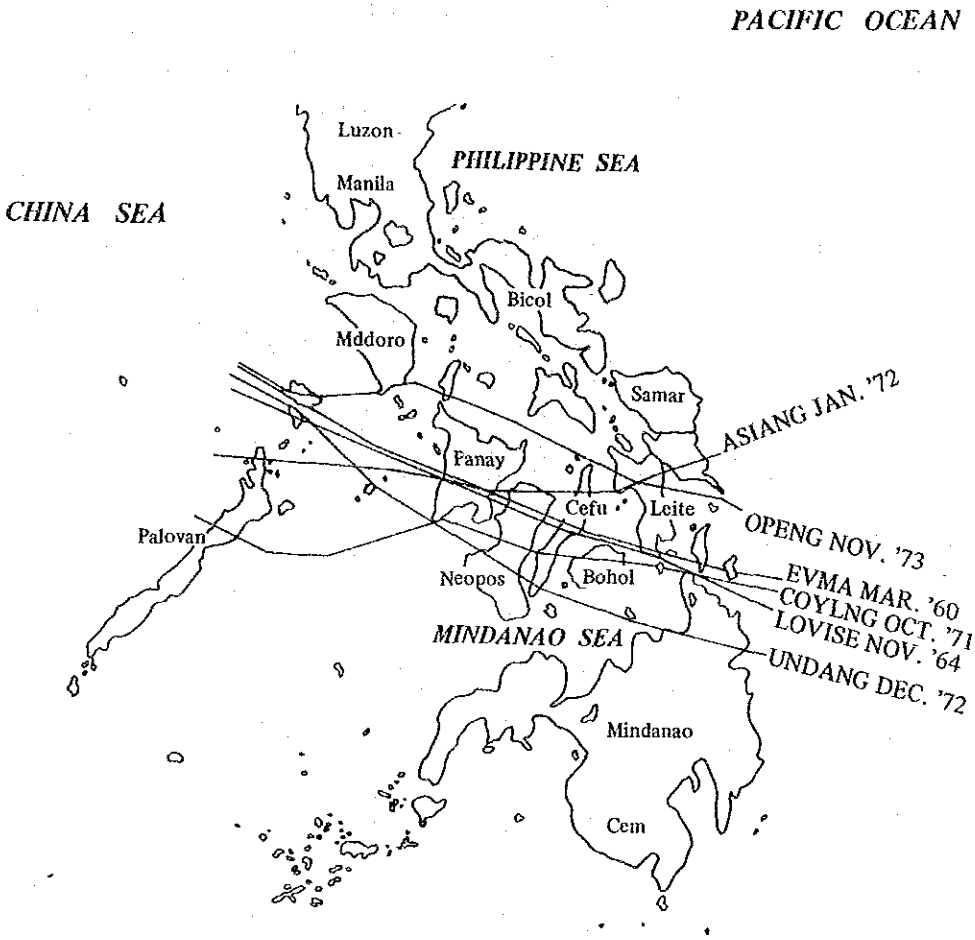
With these above assumptions, the result of kh is:

$$kh = Z \cdot K \cdot C = 1.2 \times 1.0 \times 0.1 = 0.12$$

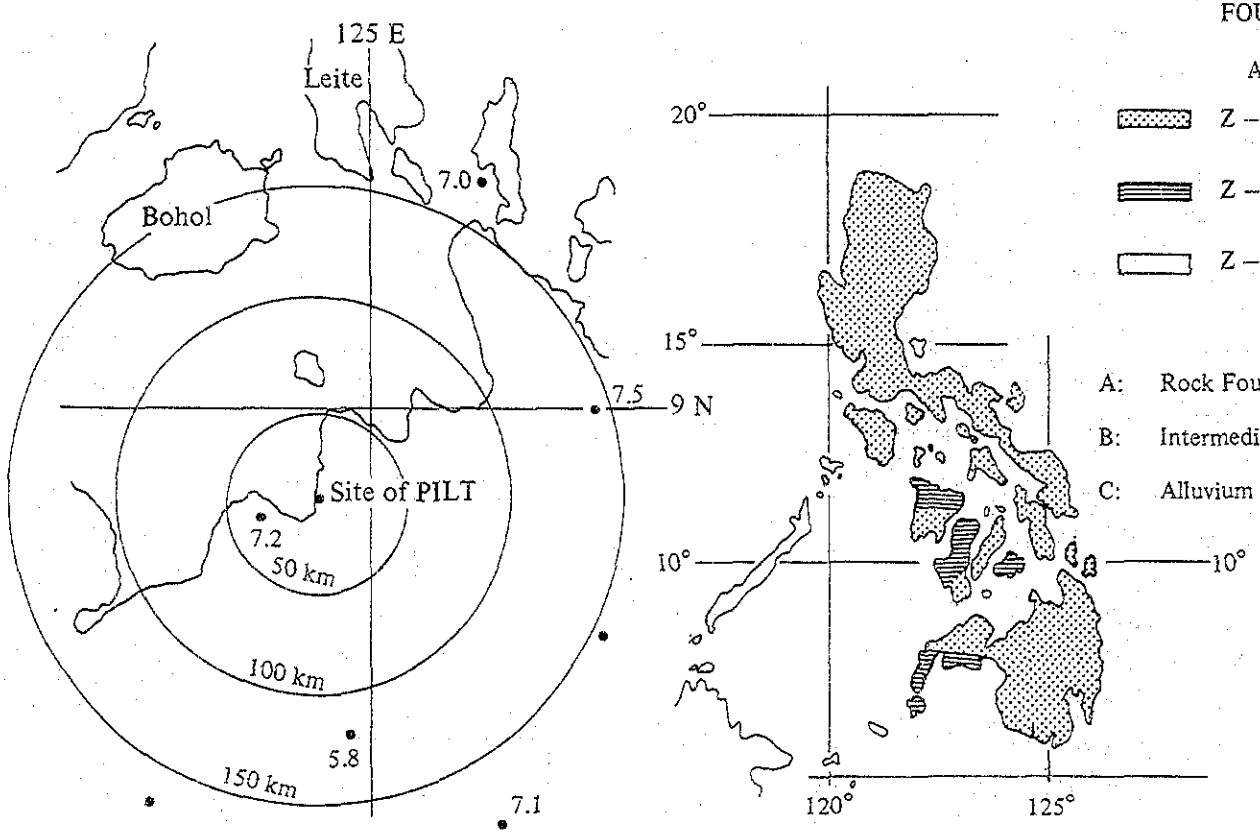
Calculating down to two places of decimals, round it off to two decimal places,

to get "0" or "5", by applying either rule to count 3 and 4 into 5 and to cut away the rest, or to count 8 and 9 into 10, and 6 and 7 into 5, namely:

$$kh = 0.1$$


PACIFIC OCEAN
CHINA SEA
Luzon
Manila
PHILIPPINE SEA
Bicol
Mddoro
Samar
ASIANG JAN. '72
Fanay
Cefu
Leite
OPENG NOV. '73
Palovan
Neopos
Bohol
EVMA MAR. '60
COYLNG OCT. '71
LOVISE NOV. '64
MINDANAO SEA
UNDANG DEC. '72
Mindanao
Cem

RECOMMENDED SEISMIC COEFFICIENTS
FOR THE PHILIPPINES



FOUNDATION TYPE	A	B	C
Z – 1.0	1.2	1.1
Z – 0.8	1.0	1.2
Z – 0.6	0.8	1.0

A: Rock Foundation

B: Intermediate between A and C

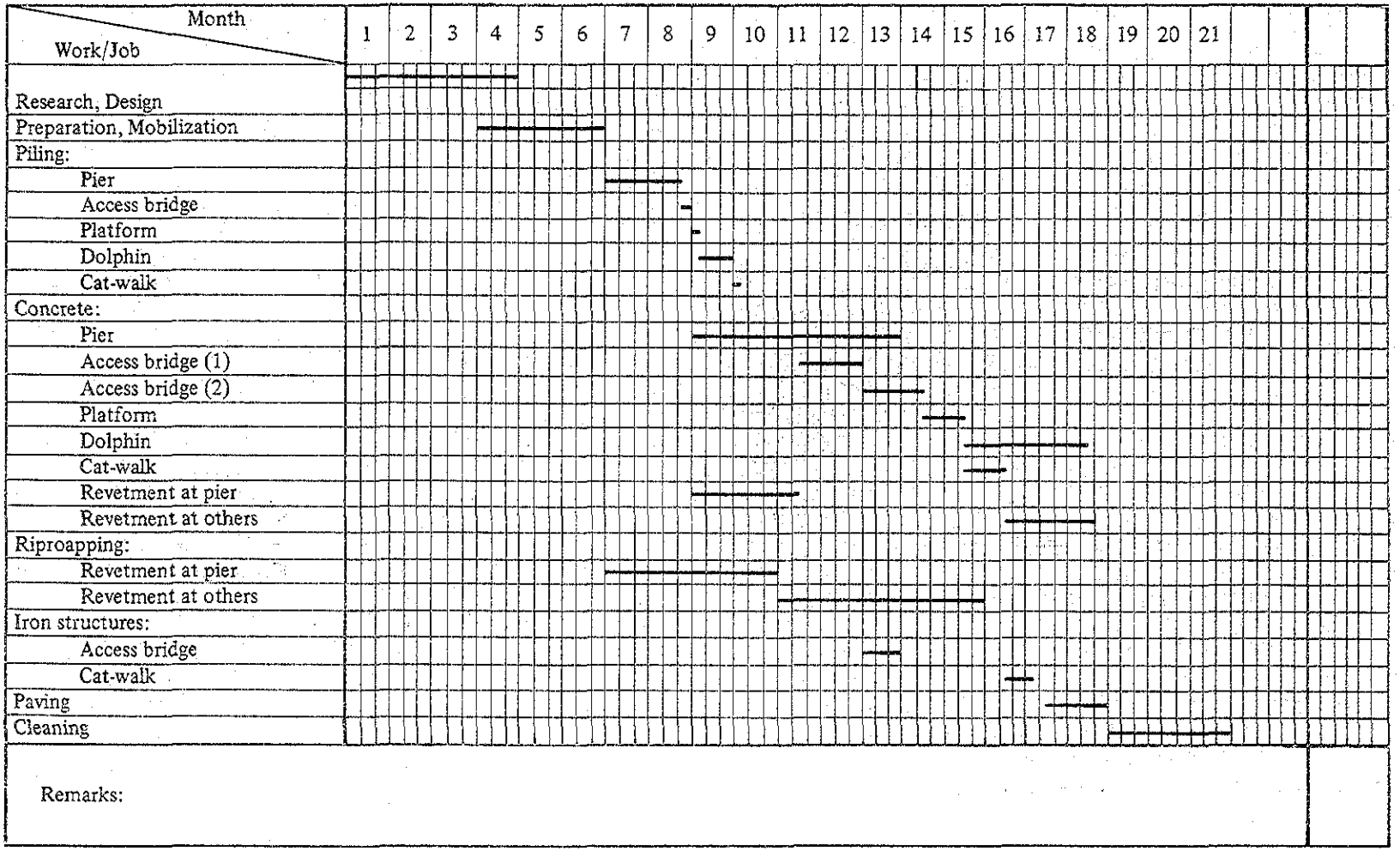
C: Alluvium or Poor Foundation

WORK SCHEDULE

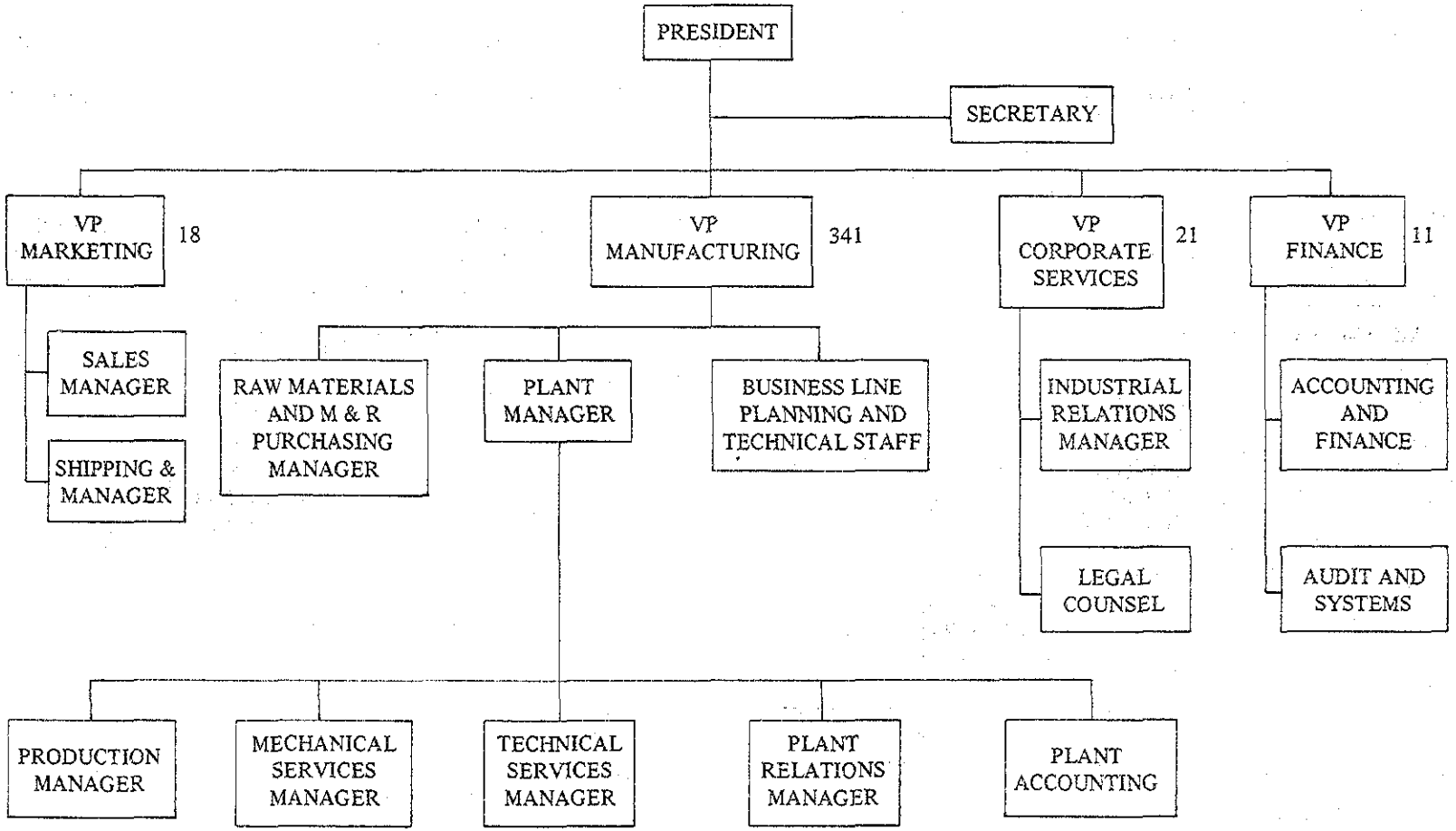
Name of Work:

Contract (Date)

Conclusion	Completion
Commencement	Duration

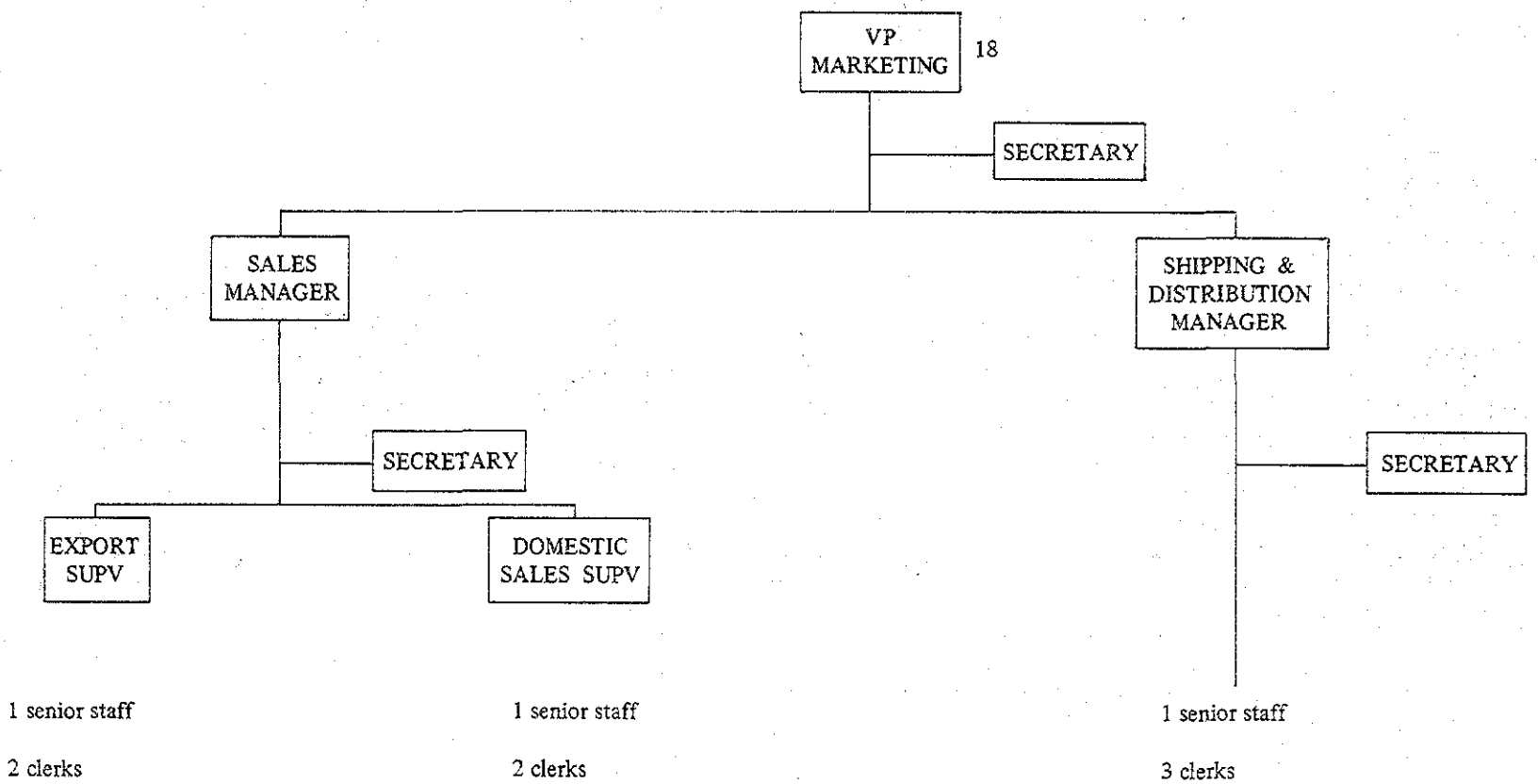


ANNEX XI-1-(1) PROPOSED ORGANIZATION CHART FOR ASEAN PHOSPHATE FERTILIZER PROJECT



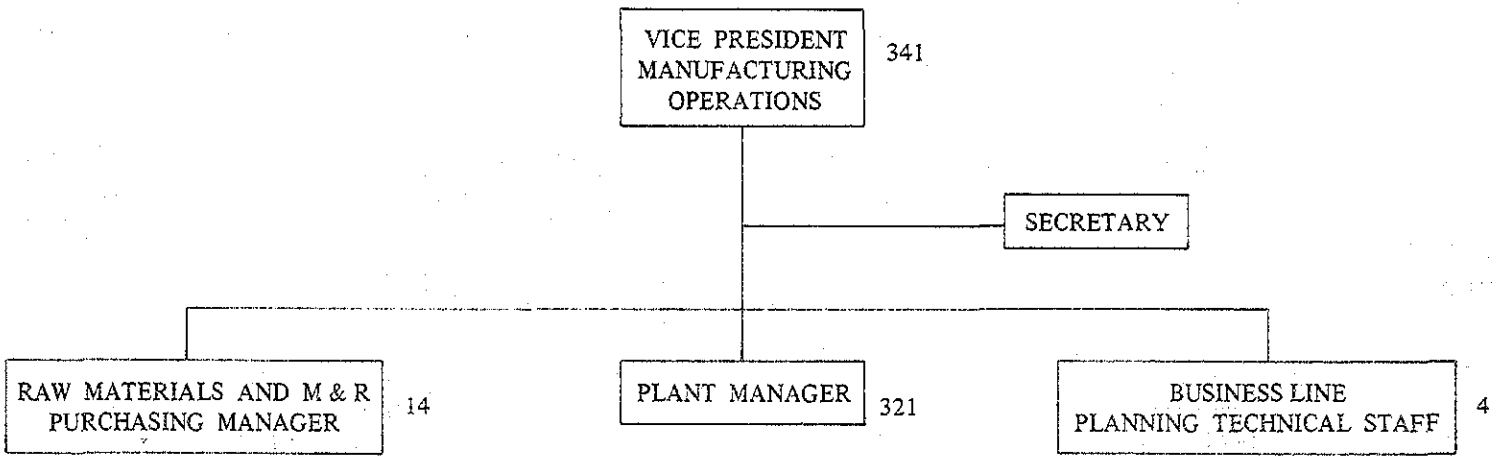
ANNEX XI-1-(2) PROPOSED ORGANIZATION CHART FOR ASEAN PHOSPHATE FERTILIZER PROJECT

– MARKETING DIV. (MANILA) –



ANNEX XI-1-(3) PROPOSED ORGANIZATION CHART FOR ASEAN PHOSPHATE FERTILIZER PROJECT

MANUFACTURING DIV. (LEYTE)

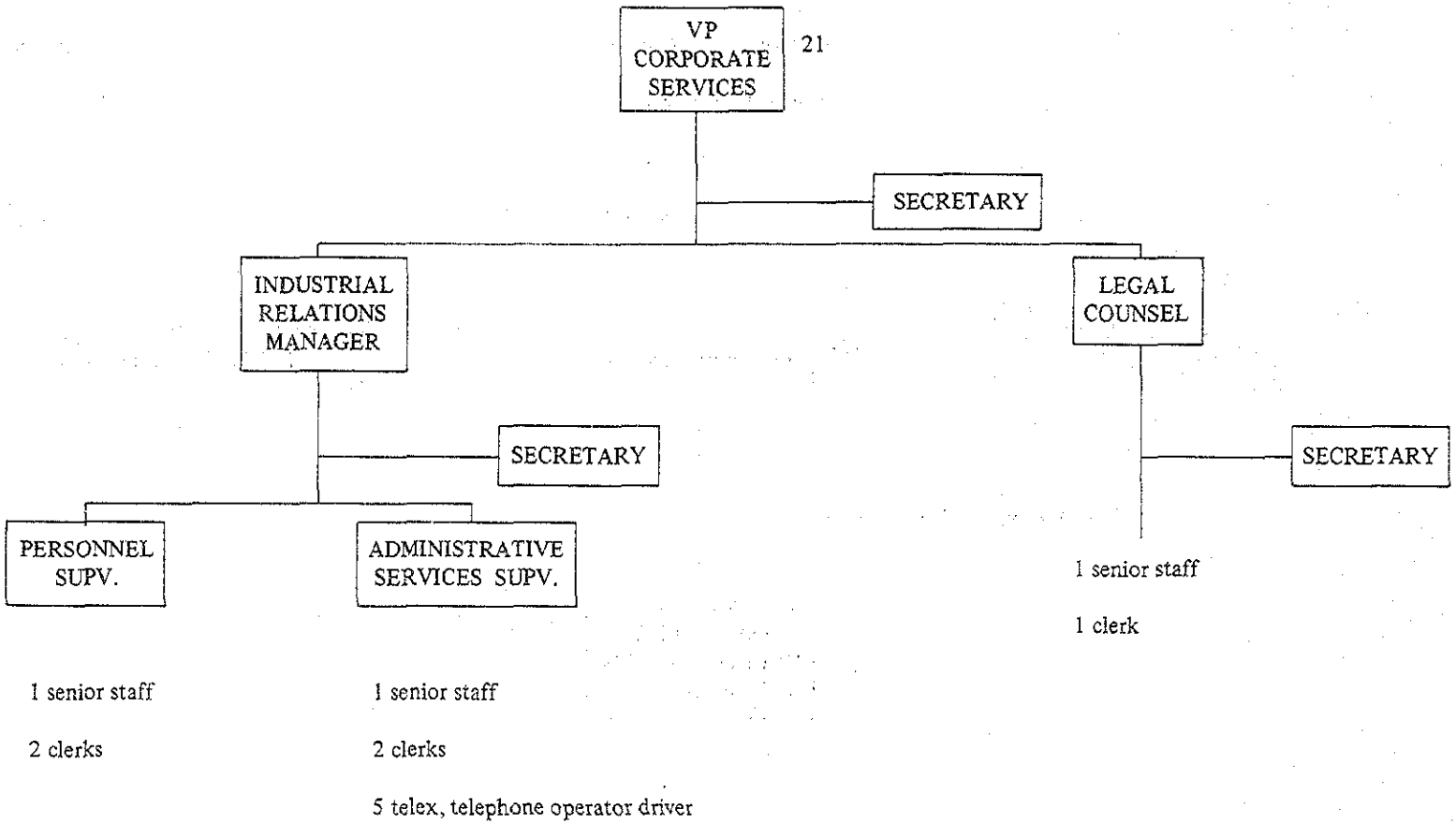


2 supervisors	5 managers	2 engineers
5 buyers	16 superintendents	1 economist
1 cost analyst	47 supervisors, engineers	1 clerk
4 clerks	246 operators, clerks	
1 secretary	6 secretaries	

[For detail, refer to Annex XI-1-(6) ~ (10).]

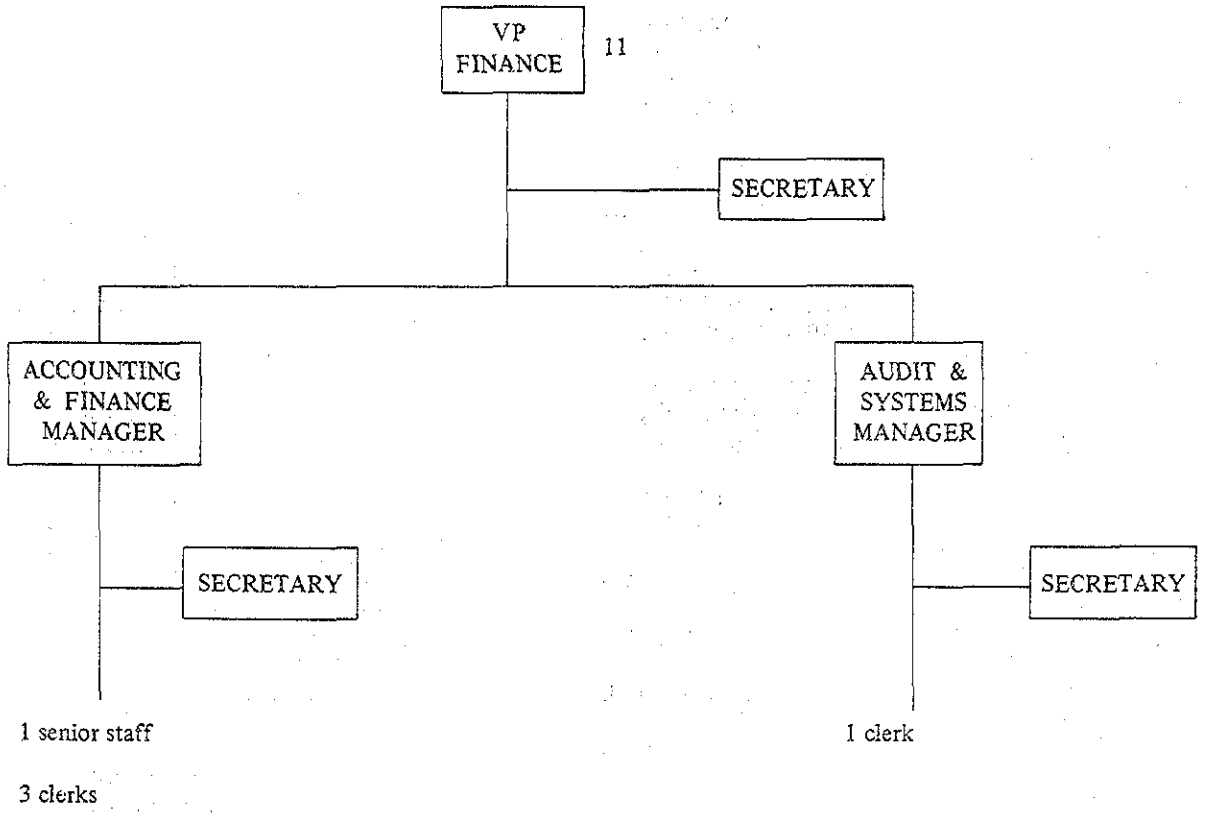
ANNEX XI-1-(4) PROPOSED ORGANIZATION CHART FOR ASEAN PHOSPHATE FERTILIZER PROJECT

CORPORATE SERVICES DIV. (MANILA)



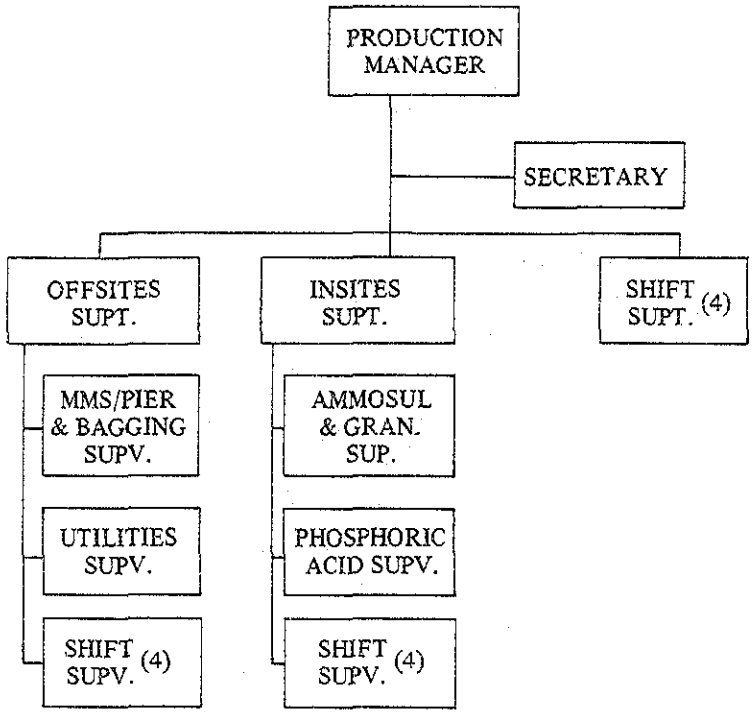
ANNEX XI-1-(5) PROPOSED ORGANIZATION CHART FOR ASEAN PHOSPHATE FERTILIZER PROJECT

FINANCE DIV. (MANILA)



ANNEX XI-1-(6) PROPOSED ORGANIZATION CHART FOR ASEAN PHOSPHATE FERTILIZER PROJECT

PRODUCTION DEPARTMENT (LEYTE)

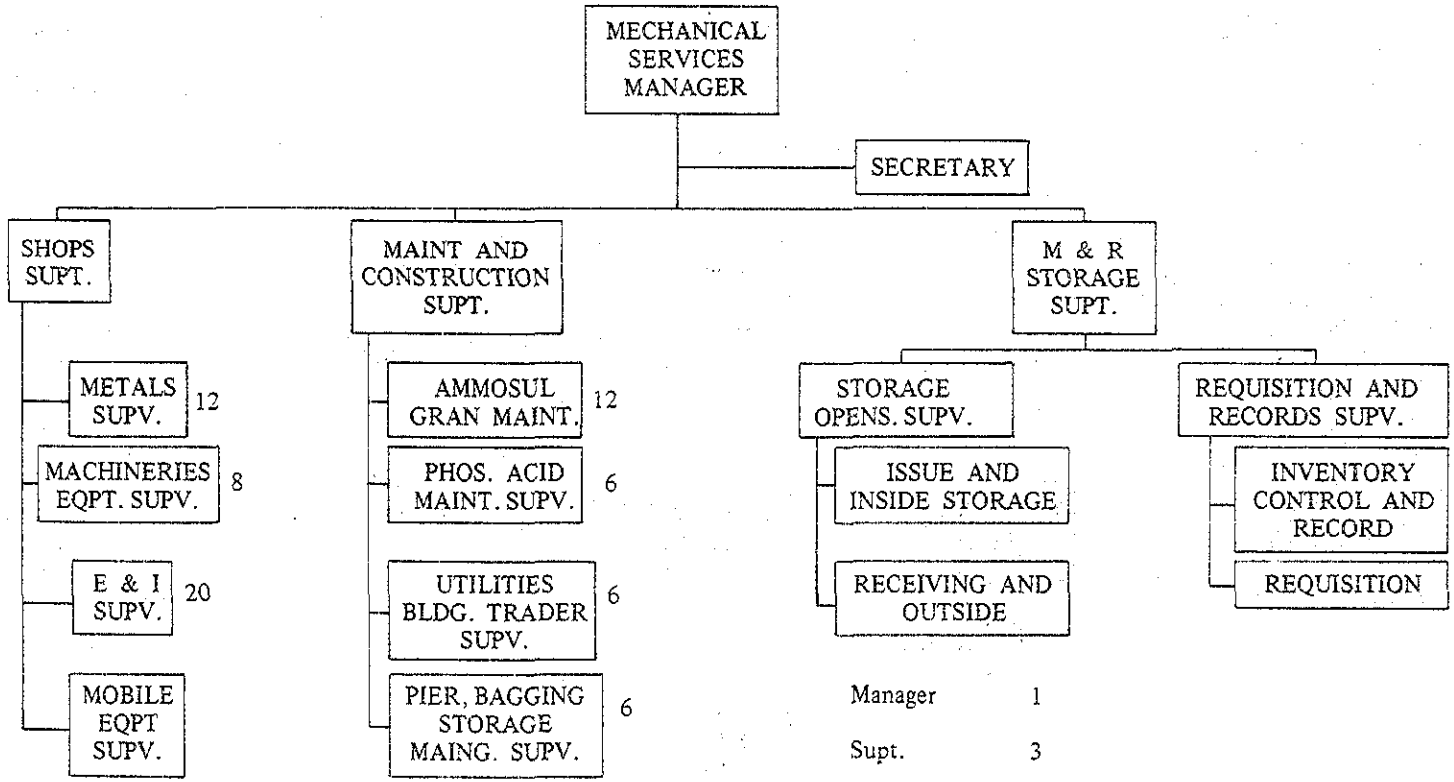


Manager	1
Supt	6
Supv	12
Operator	124
Secretary	1
	144

	Per Shift	Total Shift
Ammosul	3	12
Phosphoric Acid	4	16
Granulation	8	32
MMS		
– Bagging, 4 Trains 2 Men/Train	8	32
– Pier 1 Unloader Oper, Conveyor Operators 2 Men	3 3	12
– Raw Material/Product Storage and Reclaim 2 Men	2	8
Utilities		
– Boiler, BFW	2	8
– Well Leater Sea Water Compressed Air System	1	4
		124

ANNEX XI-1-(7) PROPOSED ORGANIZATION CHART FOR ASEAN PHOSPHATE FERTILIZER PROJECT

MECHANICAL SERVICES DEPARTMENT (LEYTE)

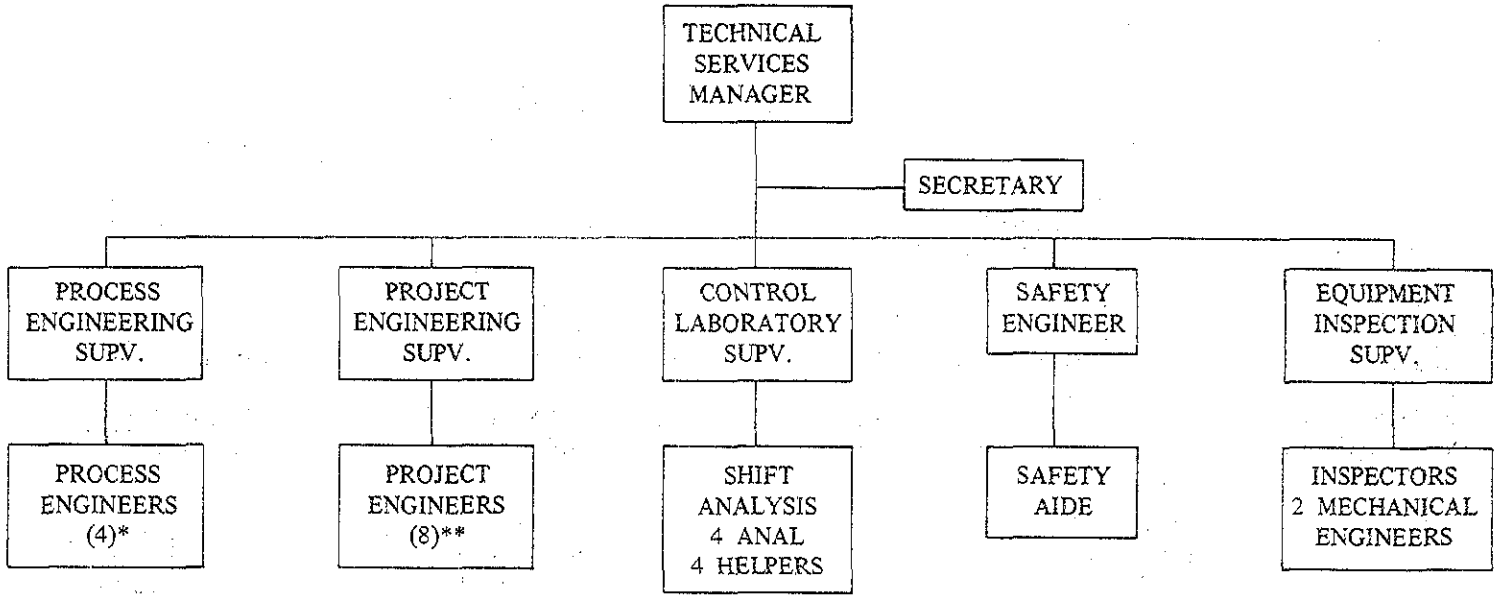


Master mech	1
Auto mech	6
Eqpt oper	12
	19

Manager	1
Supt.	3
Supv.	10
Operator	93
Secretary	1
	108

ANNEX XI-1-(8) PROPOSED ORGANIZATION CHART FOR ASEAN PHOSPHATE FERTILIZER PROJECT

TECHNICAL SERVICES DEPARTMENT (LEYTE)



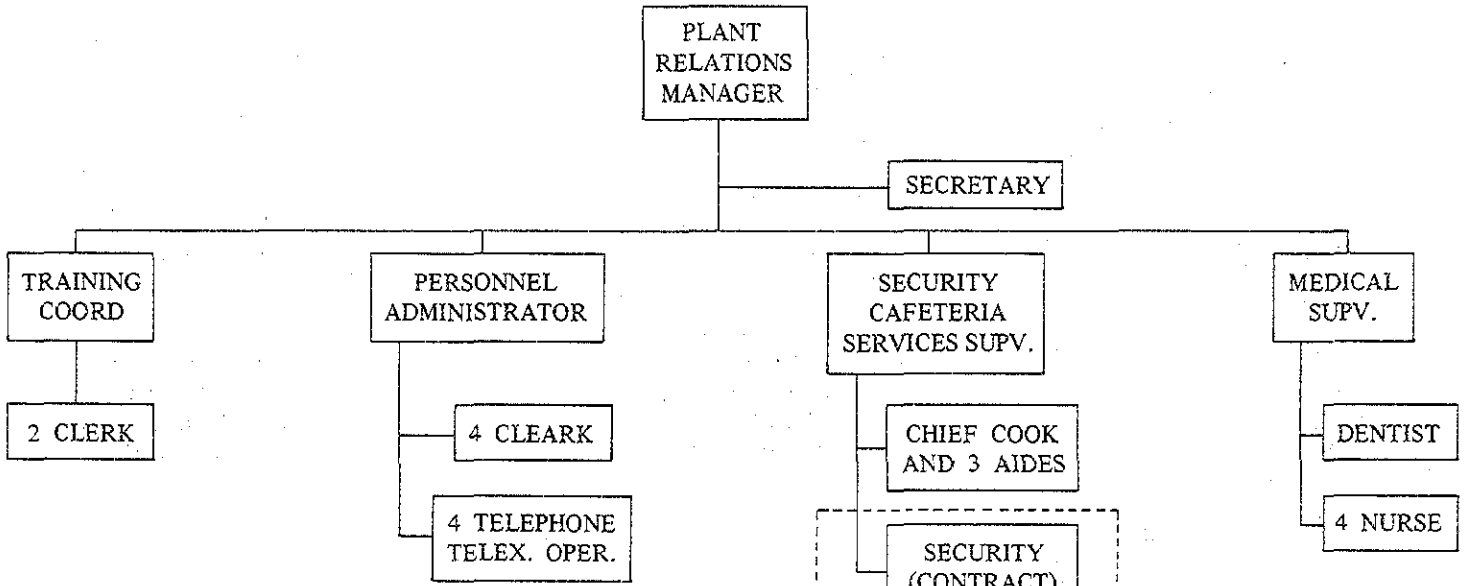
* 1 Chem Engr. Ammosul/Gran
1 Chem. Engr., P.A.
1 Chem. Engr. or Mechanical Engr., Util.
1 Chem. Engr. or Mech. Engr. Bagging, Pier MMS

** 3 Mechanical Engrs
2 Civil Engrs.
1 Elec Engrs.
2 Draftsmen

Manager	1
Supt.	4
Supv. Engrs.	13
Operator	11
Secretary	1
	30

ANNEX XI-1-(9) PROPOSED ORGANIZATION CHART FOR ASEAN PHOSPHATE FERTILIZER PROJECT

PLANT RELATIONS DEPARTMENT



Manager	1
Supv, etc.	9
Clerk, Oper.	14
Secretary	1
	23

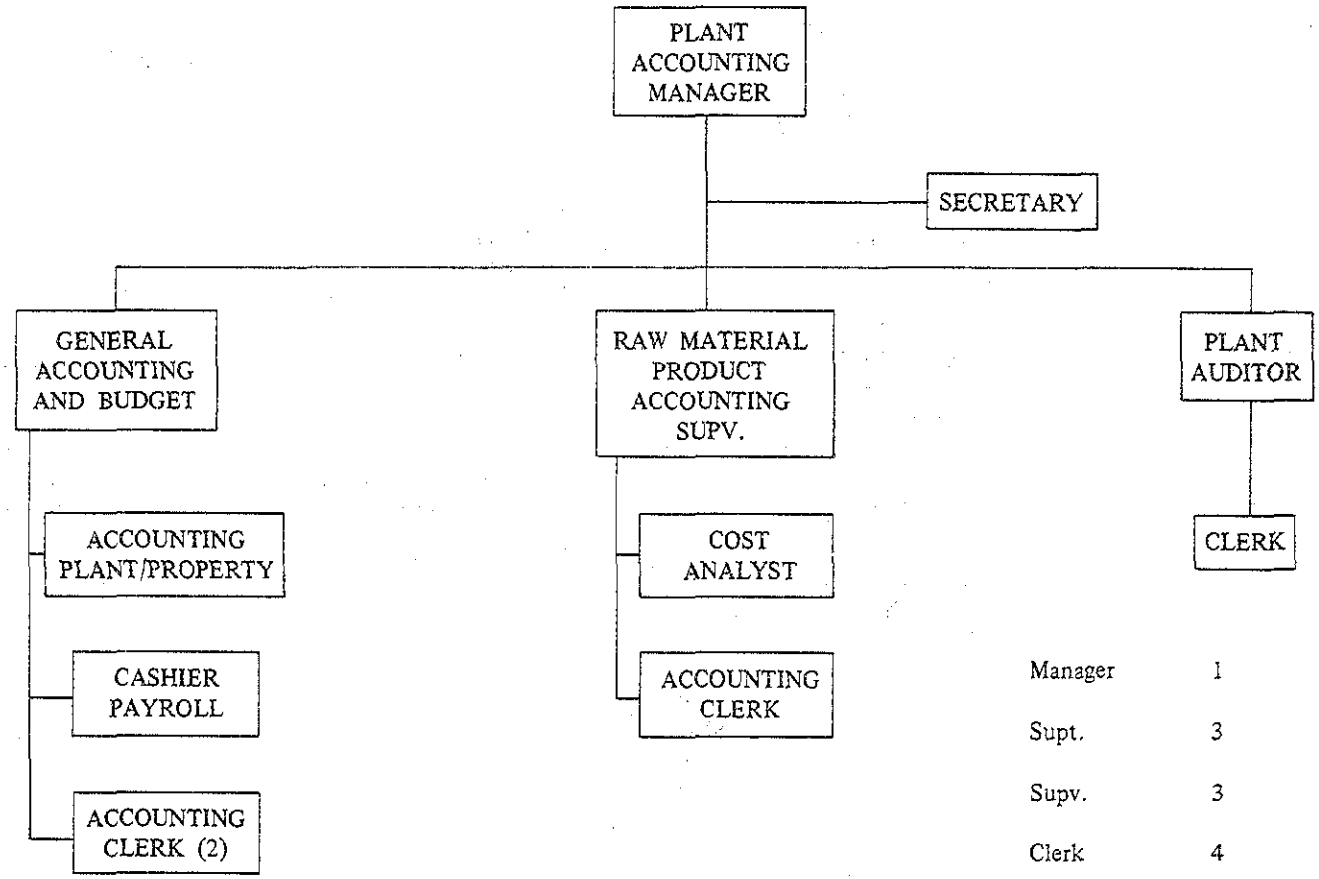
NO. OF POSTS

Plant	10
HSG	2
Per Shift	12
Total Shift	48
Officers	3
Total Contract	51

Note: Functions within dotted lines are contracted services.

ANNEX XI-1-(10) PROPOSED ORGANIZATION CHART FOR ASEAN PHOSPHATE FERTILIZER PROJECT

PLANT ACCOUNTING DEPARTMENT (LEYTE)



Manager	1
Supt.	3
Supv.	3
Clerk	4
Secretary	1
	12

ANNEX XII-1. BREAKDOWN OF INVESTMENT (1,000 US$)

1. Phosphoric Acid Plant

	Foreign	Local	Total
License & Engineering Fee	1,600	0	1,600
Equipment & Material	7,454	960	8,404
Erection	800	2,300	3,100
Civil Work & Building	150	3,173	3,323
Spare Parts	535	0	535
Ocean Freight	1,033	0	1,033
Insurance	34	0	34
Total	11,606	6,423	18,029

2. NPK Granulation Plant

	Foreign	Local	Total
License & Engineering Fee	1,500	0	1,500
Equipment & Material	9,246	1,100	10,346
Erection	700	2,889	3,589
Civil Work & Building	400	3,850	4,520
Spare Parts	710	0	710
Ocean Freight	1,221	0	1,221
Insurance	44	0	44
Total	13,821	7,839	21,660

3. Ammonium Sulfate Plant

	Foreign	Local	Total
License & Engineering Fee	500	0	500
Equipment & Material	4,261	200	4,461
Erection	150	802	952
Civil Work & Building	50	535	585
Spare Parts	250	0	250
Ocean Freight	512	0	512
Insurance	18	0	18
Total	5,741	1,537	7,278

4. Storage & Warehouses

	Foreign	Local	Total
Unloader, Conveyor	2,544	1,000	3,544
Phosphate Rock, KCl Storage	5,700	4,050	9,750
Ammonia Storage	4,780	3,200	7,980
Sulfuric Acid Tank	1,100	1,000	2,100
Product Silo	3,700	3,116	6,816
Packing Machine	380	120	500
Product Warehouse	1,900	1,200	3,100
Spare Parts	390	0	390
Ocean Freight	2,070	0	2,070
Insurance	75	0	75
Total	22,639	13,686	36,325

5. Utility Facilities

	Foreign	Local	Total
Boiler	465	200	665
Watertreatment	1,080	480	1,560
Substation	1,170	537	1,707
Emergency Power Generator	270	110	380
Sea Water Intake	290	150	440
Heavy Oil System	80	35	115
Air Supply System	50	25	75
Spare Parts	205	0	205
Ocean Freight	350	0	350
Insurance	13	0	13
Total	3,973	1,537	5,510

6. Offsite Facilities

	Foreign	Local	Total
Office	200	633	833
Repair & Maintenance Shop	2,400	300	2,700
Test & Laboratory Room	200	250	450
Garage	100	100	200
Clinic	150	220	370
Fire Station	425	400	825
Central Air-conditioner	750	100	850
Canteen	250	300	550
Warehouse	100	700	800
Resting Room	150	170	320
Communication System	300	200	500
Lighting, Fence, etc.	323	350	673
Spare Parts	54	0	54
Ocean Freight	550	0	550
Insurance	20	0	20
Total	5,972	3,723	9,695

ANNEX XII-2. CONTINGENCY SCHEDULE (PHYSICAL & PRICE) (%)

	Physical Contingency			Price		Combined	
	Foreign	Local	Months	Foreign	Local	Foreign	Local
A. Land Acquisition	0	0	0	0	0	0	0
B. Site Preparation	0	10	15	0	9.0	0	20.0
C. Plant Cost							
Plant Equipment & Materials	10	10	18	10.7	10.7	21.8	21.8
– Phosphoric Acid Plant	10	10	18	10.7	10.7	21.8	21.8
– Phosphoric Acid Concentration Plant	10	10	18	10.7	10.7	21.8	21.8
– Fertilizer Plant	10	10	18	10.7	10.7	21.8	21.8
– Ammonium Sulfate Plant	10	10	18	10.7	10.7	21.8	21.8
– Storage & Warehouses	10	10		10.7	10.7	21.8	31.8
– Utility Facilities	10	10	18	10.7	10.7	21.8	21.8
– Offsite Facilities	10	10	18	10.7	10.7	21.8	21.8
Spare Parts	10	10	18	10.7	–	21.8	–
Erection, Civil Work & Building	10	10	23	13.8	13.8	25.2	25.2
D. Pier Facilities and Water Intake	10	10	21	12.6	12.6	23.9	23.9
E. Housing Colony	–	10	25	–	14.5	–	26.0
F. Ocean Freight, Insurance	10	–	24	14.5	–	25.9	–
G. Pre-operational Expenses	10	10	33	20.4	20.4	32.4	32.4

ANNEX XII-3. ESCALATED CAPITAL COST ESTIMATE (CASE 10)

	July, 1979 (1,000 US$)			Combined contingency		Early 1983 (1,000 US$)		
	Foreign	Local	Total	Foreign	Local	Foreign	Local	Total
A. Land Acquisition		176	176	– (%)	– (%)	–	176	176
B. Site Preparation		1,906	1,906	–	20.0	–	2,287	2,287
C. Plant Cost								
Plant Equipment & Materials								
– Phosphoric Acid Plant	7,433	80	8,213	21.8	21.8	9,054	950	10,004
– Phosphoric Acid Concentration Plant	–	–	–	–	–	–	–	–
– Fertilizer Plant	8,823	903	9,726	21.8	21.8	10,746	1,100	11,846
– Ammonium Sulfate Plant	3,338	164	3,502	21.8	21.8	4,761	220	4,961
– Storage & Warehouses	15,308	1,190	16,498	21.8	21.8	18,645	1,450	20,104
– Utility Facilities	2,590	205	2,795	21.8	21.8	3,155	250	3,405
– Offsite Faciliteis	3,947	443	4,390	21.8	21.8	4,808	540	5,348
Spare Parts	1,760	–	1,760	21.8	21.8	2,144	–	2,144
Erection, Civil Wrok & Building	3,624	24,419	28,043	25.2	25.2	4,490	30,255	34,745
D. Pier Facilities & Water Intake	5,204	1,684	6,888	23.9	23.9	6,448	2,087	8,535
E. Housing Colony	–	1,417	1,417	–	26.0	–	1,785	1,785
F. Ocean Freight, Insurance	4,718	–	4,718	25.9	–	5,940	–	5,940
G. Pre-Operation Expenses	76	1,012	1,088	32.4	32.4	100	1,340	1,440
Total Plant Cost	56,821	34,299	91,120			70,300	42,420	112,720
H. Initial Working Capital						4,100	7,460	11,560
Total Plant Cost						74,700	49,880	124,280

ANNEX XII-4. PRE-OPERATION EXPENSE

1. Subject to the following condition

   1) Term of construction: 2.5 years

   2) On May, 1980, president and one vice president are appointed.

   3) On January, 1981, vice presidents, managers and some numbers of employees are appointed.

   4) Supervisors, engineers and foremen are recruited on March, 1982.

   5) The remaining production people and the other proposed people will be recruited on July, 1982.

   6) Regarding the expense of the commissioning, the fertilizer produced during its commissioning terms shall pay the raw material and utilities cost in concern.

2. Cost estimation

Labour cost	890 (1,000 US$)
Basic salary	
Overtime	
Fringe benefit	
Training expense	50
Establishment cost	500
Total	1,440 (1,000 US$)

Note: The above-noted expense shall be amortized for 5 years after starting the production

ANNEX XII-5. INITIAL WORKING CAPITAL CALCULATION (IN EARLY 1983 PRICES)

			(US$ 1,000)
A.	Material Inventories		
	a)	About two months supply of phosphate rock	2,400
	b)	Fifteen days supply of ammonia	900
	c)	Two months supply of potassium chloride	800
	d)	Ten days supply of sulfuric acid	240
	e)	Bags for one month operation	550
	f)	Heavy fuel oil for twenty days operation	200
B.	Finished Goods Inventory		
	About half month cash operating cost		2,500
C.	Accounts Receivable		
	About one month cash operating cost		5,000
D.	Cash Balance		670
	Gross Working Capital		15,760
E.	Account Payable		
	Sulfuric acid and bags for 1.5 months consumption		- 1,700
	Net Working Capital		11,560

Notes: 1. Cash operating cost = Total production cost – Depreciation

2. Bags cost for packing 100 % of ammonium sulphate and NP/NPK fertilizer

All "cost" and "month(s)" are based on the figures of initial year's operation (1983).

ANNEX XII-6. INTEREST DURING CONSTRUCTION (1,000 US$)

		1st year	At the end of 2nd year	3rd year
a.	Already drawn	0	26,099	60,897
b.	Interest on opening debt	0	1,044	2,436
c.	Drawn during year	26,099	34,798	26,099
d.	Interest on current drawn	261	696	522
e.	Total interest for year	261	1,740	2,958

Interest during construction 261 + 1,740 + 2,958 = 4,959

Calculation method:

Long-term loan is 70% to total financing required.

0.7 x 124,280 = 86,996 (1,000 US$)

Loan schedule is 30 % 1st year, 40 % 2nd year and 30 % 3rd year.

For the first year, capital is drawn only druing the second half of the year and interest is paid for a quarter of the year as average.

For the second year, the interest for the capital drawn during the first year is paid for full year and for the capital drawn during the second year is paid for half year as average.

Similar calculation to the second year is made for the third year.

ANNEX XII-7. TOTAL FINANCING REQUIRED AND DISBURSEMENT

Total Financing required

Debt	(70 %)	86,996
Equity	(30 %)	37,284
Total	(100 %)	124,280

Disbursement (assumed)

1980	(30 %)	37,284
1981	(40 %)	49,712
1982	(30 %)	37,284
Total		124,280

ANNEX XII-8. TENTATIVE LOAN REPAYMENT SCHEDULE

Total debt	US$ 86,996
Interest rate	4 % per annum
Grace period	4 years
Repayment	11 year-equal-instalment-repayment after the grace period

	Principal	Interest	Total	Loan balance after repayment
1980		261	261	26,099
1981		1,740	1,740	60,893
1982		2,958	2,958	86,992
1983		3,480	3,480	86,992
1984	7,908	3,480	11,388	79,084
1985	7,908	3,163	11,071	71,176
1986	7,908	2,847	10,755	63,268
1987	7,908	2,531	10,439	55,360
1988	7,908	2,214	10,122	47,452
1989	7,908	1,898	9,806	39,544
1990	7,908	1,582	9,490	31,636
1991	7,908	1,265	9,173	23,728
1992	7,908	949	8,857	15,820
1993	7,908	633	8,541	7,912
1994	7,908	316	8,224	0
Total	86,992	29,317	116,305	

ANNEX XIII-1. OCEAN FREIGHT COST ESTIMATE FOR THE PRODUCTS

C & F, each of the ASEAN countries is estimated to add an estimated ocean freight cost from the Philippines to each of the ASEAN countries on top of FOB, Ex-factory, Philippines.

An ocean freight cost in July, 1979, is estimated to be 15 US$/T in bag and 12 US$/T in bulk between Philippines and each of the ASEAN countries.

The basis for it are shown bleow:

1. Estimate based on charterage:

i) Tanker specifications:

DWT		11,000 MT
Bale		505,000 cft.
Loading capacity		10,500 (at 45 cft/LT of stowage factor)
Bunker	IFO (180 US$/T)	21 tons/day
	MDO (330 US$/T)	1.5 tons/day

ii) Tax: 4.5 %

Charterage	2,750 US$/day

iii) Distance

Leyte/Bangkok	1,836 miles
Leyte/Jakarta	1,635 miles
Leyte/Port Klang	1,635 miles

iv) Loading/unloading rate

	loading	unloading
Bag	2,000 T/D	1,000 T/D
Bulk	3,000 T/D	2,000 T/D

v) Ocean freight

(a) Bag

Destination	Sea days	Port days	Freight rate
Bangkok	12	18	15.1 US$/T
Jakarta	11	18	14.4 US$/T
Port Klang	11	18	14.4 US$/T

(b) Bulk

Destination	Sea days	Port days	Freight rate
Bangkok	12	10	12.3 US$/T
Jakarta	11	10	11.7 US$/T
Port Klang	11	10	11.7 US$/T

This estimation is made in terms of chartering a vessel, and assumed to have no load on returning voyage. In such a case, it is quite easy to find out any vessel at any time, and if any load on returning voyage is taken into account, such rate may probably be lowered down.

But as 11,000 DWT vessel is a slightly large in capacity and a freight rate becomes proportionally higher as the vessel becomes smaller, 15 US$/T of bag freight rate and 12 US$/T of bulk freight rate for July 1979 estimated here are considered to be reasonable.

Variance by destination is within a range of tolerance.

2. Examples with similar freight (all in bag)

Destination			
Thailand/Port Klang	Rock salt	9,000 tons	10.00 US$/T
Thailand/Jakarta	Rock salt	3,000 tons	10.00 US$/T
Thailand/Port Klang	Soda ash	9,000 tons	11.00 US$/T
Thailand/Jakarta	Soda ash	3,000 tons	9.00 US$/T

3. Regrading ocean freight cost for phosphoric acid, chartering an exclusive small tanker can possibly be taken into account, and the similar conditions as in case of liquid ammonia transport is foreseen.

Therefore, 25 US$/T at present and 32 US$/T in 1983 are determined to be used.

Please refer to Annex V-1 for further details.

ANNEX XIII-2. DEPRECIATION SCHEDULE IN 1983 PRICE (US$ 1,000)

A. Non-depreciable Assets

a)	Land acquisition	176
b)	Site preparation	2,463
	Sub-total	2,463

B. Depreciable Assets

1) 5-year amortization asset

Pre-operational expenses	1,440

2) 12-year depreciation assets

Plant	98,497
Interest during consturction	4,959
Sub-total	103,456

3) 30-year depreciation assets

Housing colony	1,785

4) 50-year depreciation assets

Jetty and water intake and water pipeline	8,535

C. Annual Depreciation Charge
(Straight line with 10 % salvage value method)

For the first five years

$$\frac{1,440}{5} + \frac{103,456 \times 0.9}{12} + \frac{1,785 \times 0.9}{30} + \frac{8,535 \times 0.9}{50} = 8,254$$

D. Breakdown of salvage value after 12 years

Plant cost	$103,456 \times 0.1$	=	10,345
Housing colony	$1,785 \times 0.1 + \frac{1,606 \times 18}{30}$	=	1,143
Pier	$8,535 \times 0.1 + \frac{7,681 \times 38}{50}$	=	6
Initial working capital			11
Land acquisition & preparation			2,463
Interest during construction*			-4,959
Total			27,244

Total coincides with the salvage value shown in Annex XIII-9 last line of column "Total Investment."

* Interest during construction is not included in the capital investment, but it is depreciated in cost calculation. So, it is necessary to be deducted.

ANNEX XIII-3. PRODUCTION COST STATEMENT (CASE 10)

Long-term Interest Rate = 4 %

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Variable cost	37,047	39,396	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571
Depreciation (Plant)	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387
Depreciation (Harbor, Wat.)	154	154	154	154	154	154	154	154	154	154	154	154
Depreciation (Housing)	54	54	54	54	54	54	54	54	54	54	54	54
Depreciation (Int. Const.)	372	372	372	372	372	372	372	372	372	372	372	372
Depreciation	7,966	7966	7,966	7,966	7,966	7,966	7,966	7,966	7,966	7,966	7,966	7,966
Amortization (Pre-Ope.)	288	288	288	288	288	0	0	0	0	0	0	0
Amortization	288	288	288	288	288	0	0	0	0	0	0	0
Depreciation & Amortization	8,254	8,254	8,254	8,254	8,254	7,966	7,966	7,966	7,966	7,966	7,966	7,966
Maintenance cost (Plant	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972
Maintenance cost (Harb, W.)	256	256	256	256	256	256	256	256	256	256	256	256
Maintenace (Housing)	18	18	18	18	18	18	18	18	18	18	18	18
Maintenace cost	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246
Labour cost	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100
Overhead	2,264	2,767	3,013	3,002	2,990	2,967	2,956	2,944	2,933	2,921	2,910	2,899
Tax & insurance	3,693	3,420	3,146	2,873	2,600	2,326	2,053	1,779	1,506	1,233	959	686
Other fixed cost	11,303	11,533	11,505	11,220	10,936	10,639	10,354	10,069	9,784	9,500	9,215	8,930
Ex-factory production cost	56,604	65,183	75,330	75,045	74,761	74,176	73,891	73,606	73,321	73,037	72,752	72,467
Interest on long term debt	3,480	3,480	3,163	2,847	2,531	2,214	1,898	1,582	1,265	949	633	316
Interest on short term debt	0	0	0	0	0	0	0	0	0	0	0	0
Total production cost	60,084	72,663	78,494	77,893	77,291	76,390	75,789	75,188	74,587	73,986	73,385	72,783

ANNEX XIII-4. PRODUCTION COST STATEMENTS (CASE 10-1-2)

Long-term Interest Rate = 5 %

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Variable cost	37,047	39,396	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571
Depreciation (Plant)	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387
Depreciation (Harbor, Wat.)	154	154	154	154	154	154	154	154	154	154	154	154
Depreciation (Housing)	54	54	54	54	54	54	54	54	54	54	54	54
Depreciation (Int. Const.)	465	465	465	465	465	465	465	465	465	465	465	465
Depreciation	8,059	8,059	8,059	8,059	8,059	8,059	8,059	8,059	8,059	8,059	8,059	8,059
Amortization (Pre-Ope.)	288	288	288	288	288	0	0	0	0	0	0	0
Amortization	288	288	288	288	288	0	0	0	0	0	0	0
Depreciation & amortization	8,347	8,347	8,347	8,347	8,347	8,059	8,059	8,059	8,059	8,059	8,059	8,059
Maintenance cost (Plant)	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972
Maintenance cost (Harb. W.)	256	256	256	256	256	256	256	256	256	256	256	256
Maintenance (Housing)	18	18	18	18	18	18	18	18	18	18	18	18
Maintenance cost	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246
Labour cost	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100
Overhaed	2,268	2,771	3,017	3,006	2,994	2,971	2,960	2,948	2,937	2,925	2,914	2,903
Tax & insurance	3,693	3,420	3,146	2,873	2,600	2,326	2,053	1,779	1,506	1,233	959	686
Other fixed cost	11,307	11,537	11,509	11,224	10,940	10,643	10,358	10,073	9,788	9,504	9,219	8,934
Ex-factory production cost	56,701	69,280	75,427	75,142	74,857	74,273	73,988	73,703	73,418	73,134	72,849	72,564
Interest on long term debt	3,450	4,350	3,954	3,559	3,163	2,768	2,373	1,977	1,582	1,186	791	395
Interest on short term debt	0	0	0	0	0	0	0	0	0	0	0	0
Total production cost	61,051	73,630	79,381	78,701	78,021	77,041	76,360	75,680	75,000	74,320	73,640	72,959

ANNEX XIII-5. PRODUCTION COST STATEMENTS (CASE 10-1-3)

Long-term Interest Rate = 6 %

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Variable cost	37,047	45,356	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571
Depreciation (Plant)	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387	7,387
Depreciation (Harbor, Wat.)	154	154	154	154	154	154	154	154	154	154	154	154
Depreciation (Housing)	54	54	54	54	54	54	54	54	54	54	54	54
Depreciation (Int. Const.)	558	558	558	558	558	558	558	558	558	558	558	558
Depreciation	8,152	8,152	8,152	8,152	8,152	8,152	8,152	8,152	8,152	8,152	8,152	8,152
Amortization (Pre-Ope.)	288	288	288	288	288	0	0	0	0	0	0	0
Amortization	288	288	288	288	288	0	0	0	0	0	0	0
Depreciation & amortization	8,440	8,440	8,440	8,440	8,440	8,152	8,152	8,152	8,152	8,152	8,152	8,152
Maintenance cost (Plant)	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972	2,972
Maintenance cost (Harb, W.)	256	256	256	256	256	256	256	256	256	256	256	256
Maintenance (Housing)	18	18	18	18	18	18	18	18	18	18	18	18
Maintenance cost	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246	3,246
Labour cost	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100	2,100
Overhead	2,272	2,775	3,021	3,010	2,998	2,975	2,963	2,952	2,941	2,929	2,918	2,906
Tax & insurance	3,693	3,420	3,146	2,873	2,600	2,326	2,053	1,779	1,506	1,233	959	686
Other fixed cost	11,311	11,540	11,513	11,228	10,943	10,647	10,362	10,077	9,792	9,507	9,223	8,938
Ex-factory production cost	56,798	69,377	75,524	75,239	74,954	74,370	74,085	73,800	73,515	73,230	72,946	72,661
Interest on long term debt	5,220	5,220	4,745	4,271	3,796	3,322	2,847	2,373	1,898	1,424	945	475
Interest on short term debt	0	0	0	0	0	0	0	0	0	0	0	0
Total production cost	62,018	74,597	80,269	79,510	78,750	77,691	76,932	76,172	75,413	74,654	73,895	73,135

ANNEX XIII-6. INCOME STATEMENTS (CASE 10)

Long-term Interest Rate = 4%

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Sales revenue	59,966	82,562	93,426	93,860	93,860	93,860	93,860	93,860	93,860	93,860	93,860	93,860
Cost of sales	54,246	68,659	75,074	75,057	74,772	74,200	73,903	73,618	73,333	73,049	72,764	72,479
Variable cost	37,047	49,396	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571
Depreciation & amortization	8,254	8,254	8,254	8,254	8,254	7,966	7,966	7,966	7,966	7,966	7,966	7,966
Other fixed Cost	11,303	11,533	11,505	11,220	10,936	10,639	10,354	10,069	9,784	9,500	9,215	8,930
(Inc.) in product inventories	-2,359	-524	-256	12	12	24	12	12	12	12	12	12
Operating profit or (Loss)	5,720	13,903	18,351	18,803	19,088	19,660	19,957	20,242	20,527	20,812	21,096	21,381
Less interest												
On long term debt	3,480	3,480	3,163	2,847	2,531	2,214	1,898	1,582	1,265	949	633	316
On short term debt	0	0	0	0	0	0	0	0	0	0	0	0
Net profit or (Loss) before tax	2,240	10,422	15,188	15,956	16,557	17,445	18,059	18,660	19,261	19,863	20,464	21,065
Less income tax	896	4,169	6,075	6,382	6,623	6,978	7,224	7,464	7,705	7,945	8,185	8,426
Net profit or (Loss) after tax	1,344	6,254	5,113	9,573	9,934	10,467	10,835	11,196	11,557	11,918	12,278	12,639

ANNEX XIII-7. INCOME STATEMENTS (CASE 10-1-2)

Long-term Interest Rate = 5 %

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Sales revenue	59,966	82,562	93,426	93,860	93,860	93,860	93,860	93,860	93,860	93,860	93,860	93,860
Cost of sales	54,239	68,756	75,171	75,154	74,869	74,297	74,000	73,715	73,430	73,145	72,861	72,576
Variable cost	37,047	49,396	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571
Depreciation & amortization	8,347	8,347	8,347	8,347	8,059	8,059	8,059	8,059	8,059	8,059	8,059	8,059
Other fixed cost	11,307	11,537	11,509	11,224	10,940	10,643	10,358	10,073	9,788	9,504	9,219	8,934
(Inc.) in product inventories	- 2,363	- 524	- 256	12	12	24	12	12	12	12	12	12
Dperating profit or (Loss)	5,627	13,806	18,255	18,706	18,991	19,563	19,860	20,145	20,430	20,715	21,000	21,284
Less interest												
On long term debt	4,350	4,350	3,954	3,559	3,163	2,768	2,373	1,977	1,582	1,186	791	395
On short term debt	0	0	0	0	0	0	0	0	0	0	0	0
Net profit or (Loss) before tax	1,278	9,456	14,300	15,147	15,827	16,795	17,488	18,168	18,848	19,528	20,209	20,889
Less income tax	511	2,783	5,720	6,059	6,331	6,718	6,995	7,267	7,539	7,811	8,083	8,356
Net profit or (Loss) after tax	767	5,674	8,580	9,088	9,496	10,077	10,493	10,901	11,309	11,717	12,125	12,533

ANNEX XIII-8. INCOME STATEMENTS (CASE 10-1-3)

Long-term Interest Rate = 6 %

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Sales revenue	59,966	82,562	93,426	93,860	93,860	93,860	93,860	93,860	93,860	93,860	93,860	93,860
Cost of sales	54,432	68,853	75,268	75,251	74,966	74,394	74,097	73,812	73,527	73,242	72,957	72,673
Variable cost	37,047	49,396	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571	55,571
Depreciation & amortization	8,440	8,440	8,440	8,440	8,440	8,152	8,152	8,152	8,152	8,152	8,152	8,152
Other fixed cost	11,311	11,540	11,513	11,228	10,943	10,647	10,362	10,077	9,792	9,507	9,223	8,938
(Inc.) in product inventories	- 2,367	- 524	- 256	12	12	24	12	12	12	12	12	12
Operating profit or (Loss)	5,535	13,709	18,158	18,609	18,894	19,466	19,764	20,048	20,333	20,618	20,903	21,187
Less interest												
On long term debt	5,220	5,220	4,745	4,271	3,796	3,322	2,847	2,373	1,898	1,424	949	475
On short term debt	0	0	0	0	0	0	0	0	0	0	0	0
Net profit or (Loss) before tax	315	8,490	13,412	14,338	15,098	16,145	16,916	17,676	18,435	19,194	19,954	20,713
Less income tax	126	3,396	5,365	5,735	6,039	6,458	6,767	7,070	7,374	7,678	7,981	8,285
Net profit or (Loss) after tax	189	5,094	8,047	8,603	9,059	9,687	10,150	10,605	11,061	11,517	11,972	12,428

ANNEX XIII-9. IRR CALCULATION ON TOTAL INVESTMENT (CASE 10, after tax)

Long-term Interest Rate = 4 %

Year	Total investment	Profit before tax	(Less) income tax	Profit after tax	Depreciation	Interest on L-T debt	Total return	Discount factor	Discounted cash Out-flow	Discounted cash In-flow	DCF
1980	37,284	0	0	0	0	0	0	1.0000	37,284	0	-37,284
1981	45,712	0	0	0	0	0	0	0.9057	45,025	0	-45,025
1982	37,284	0	0	0	0	0	0	0.8203	30,585	0	-30,585
1983	0	2,240	896	1,344	8,254	3,480	13,078	0.7430	0	9,717	9,717
1984	0	10,423	4,169	6,254	8,254	3,480	17,988	0.6729	0	12,105	12,105
1985	0	15,188	6,075	9,113	8,254	3,163	20,531	0.6095	0	12,513	12,513
1986	0	15,956	6,382	9,573	8,254	2,847	20,675	0.5520	0	11,413	11,413
1987	0	16,557	6,623	9,934	8,254	2,531	20,719	0.5000	0	10,359	10,359
1988	0	17,445	6,978	10,467	7,966	2,214	20,648	0.4529	0	9,351	9,351
1989	0	18,059	7,224	10,835	7,966	1,898	20,700	0.4102	0	8,490	8,490
1990	0	18,660	7,464	11,196	7,966	1,582	20,744	0.3715	0	7,706	7,706
1991	0	19,261	7,705	11,557	7,966	1,265	20,789	0.3365	0	6,995	6,995
1992	0	19,863	7,945	11,918	7,966	949	20,833	0.3047	0	6,349	6,349
1993	0	20,464	8,185	12,278	7,966	633	20,877	0.2760	0	5,762	5,762
1994	-27,244	21,065	8,426	12,639	7,966	316	20,922	0.2500	-6,811	5,230	12,041
										Total DCF	-92

Internal rate of return (after tax) 10.41 per cent

Pay out period 6.51 years

ANNEX XIII-10. IRR CALCULATION ON TOTAL INVESTMENT (CASE 10, before tax)

Long-term Interest Rate = 4 %

Year	Total investment	Profit before tax	(Less) income tax	Profit after tax	Depreciation	Interest on L–T debt	Total return	Discount factor	Discounted cash Out-flow	Discounted cash In-flow	DCF
1980	37,284	0	0	0	0	0	0	1.0000	37,284	0	-37,284
1981	49,712	0	0	0	0	0	0	0.8737	43,432	0	-43,432
1982	37,284	0	0	0	0	0	0	0.7633	28,458	0	-28,458
1983	0	2,240	896	1,344	8,254	3,480	13,975	0.6669	0	9,319	9,319
1984	0	10,423	4,169	6,254	8,254	3,480	22,157	0.5826	0	12,909	12,909
1985	0	15,188	6,075	9,113	8,254	3,163	26,606	0.5090	0	13,542	13,542
1986	0	15,956	6,382	9,573	8,254	2,847	27,057	0.4447	0	12,032	12,032
1987	0	16,557	6,623	9,934	8,254	2,531	27,342	0.3885	0	10,623	10,623
1988	0	17,445	6,978	10,467	7,966	2,214	27,626	0.3394	0	9,377	9,377
1989	0	18,059	7,224	10,835	7,966	1,898	27,924	0.2965	0	8,281	8,281
1990	0	18,660	7,464	11,196	7,966	1,582	28,208	0.2591	0	7,308	7,308
1991	0	19,261	7,705	11,557	7,966	1,265	28,493	0.2264	0	6,450	6,450
1992	0	19,863	7,945	11,918	7,966	949	28,778	0.1978	0	5,691	5,691
1993	0	20,464	8,185	12,278	7,966	633	29,063	0.1728	0	5,021	5,021
1994	-27,244	21,065	8,426	12,639	7,966	316	29,347	0.1509	-4,112	4,430	8,542
										Total DCF	-78

Internal rate of return (before tax) 14.46 per cent

Pay out period 5.26 years

ANNEX XIII-11. IRR CALCULATION ON TOTAL INVESTMENT (CASE 10-1-2, after tax)

Long-term Interest Rate = 5 %

Year	Total investment	Profit before tax	(Less) income tax	Profit after tax	Depreciation	Interest on L-T debt	Total return	Discount factor	Discounted cash Out-flow	Discounted cash In-flow	DCF
1980	37,284	0	0	0	0	0	0	1.0000	37,284	0	-37,284
1981	49,712	0	0	0	0	0	0	0.9043	44,957	0	-44,957
1982	37,284	0	0	0	0	0	0	0.8178	30,492	0	-30,492
1983	0	1,278	511	767	8,347	4,350	13,464	0.7396	0	9,958	9,958
1984	0	9,456	3,783	5,674	8,347	4,350	18,371	0.6689	0	12,287	12,287
1985	0	14,300	5,720	8,580	8,347	3,954	20,882	0.6049	0	12,631	12,631
1986	0	15,147	6,059	9,088	8,347	3,559	20,994	0.5470	0	11,484	11,484
1987	0	15,827	6,331	9,496	8,347	3,163	21,007	0.4947	0	10,392	10,392
1988	0	16,795	6,718	10,077	8,059	2,768	20,904	0.4474	0	9,352	9,352
1989	0	17,488	6,995	10,493	8,059	2,373	20,925	0.4046	0	8,466	8,466
1990	0	18,168	7,267	10,901	8,059	1,977	20,937	0.3659	0	7,660	7,660
1991	0	18,848	7,539	11,309	8,059	1,582	20,950	0.3309	0	6,932	6,932
1992	0	19,528	7,811	11,717	8,059	1,186	20,963	0.2992	0	6,273	6,273
1993	0	20,209	8,083	12,125	8,059	791	20,975	0.2706	0	5,676	5,676
1994	-26,128	20,889	8,356	12,533	8,059	395	20,988	0.2447	-6,394	5,136	11,530
										Total DCF	-92

Internal rate of return (after tax) 10.58 per cent

Pay out period 6.41 years

ANNEX XIII-12. IRR CALCULATION ON TOTAL INVESTMENT (CASE 10-1-2, before tax)

Long-term Interest Rate = 5 %

Year	Total investment	Profit before tax	(Less) income tax	Profit after tax	Depreciation	Interest on L-T debt	Total return	Discount factor	Discounted cash Out-flow	Discounted cash In-flow	DCF
1980	37,284	0	0	0	0	0	0	1.0000	37,284	0	-37,284
1981	49,712	0	0	0	0	0	0	0.8739	43,442	0	-43,442
1982	37,284	0	0	0	0	0	0	0.7637	28,473	0	-28,473
1983	0	1,278	511	767	8,347	4,350	13,975	0.6674	0	9,326	9,326
1984	0	9,456	3,783	5,674	8,347	4,350	22,153	0.5832	0	12,920	12,920
1985	0	14,300	5,720	8,580	8,347	3,954	26,602	0.5096	0	13,557	13,557
1986	0	15,147	6,059	9,088	8,347	3,559	27,053	0.4454	0	12,048	12,048
1987	0	15,827	6,331	9,496	8,347	3,163	27,338	0.3892	0	10,640	10,640
1988	0	16,795	6,718	10,077	8,059	2,768	27,622	0.3401	0	9,395	9,395
1989	0	17,488	6,995	10,493	8,059	2,373	27,920	0.2972	0	8,298	8,298
1990	0	18,168	7,267	10,901	8,059	1,977	28,204	0.2597	0	7,325	7,325
1991	0	18,848	7,539	11,309	8,059	1,582	28,489	0.2270	0	6,466	6,466
1992	0	19,528	7,811	11,717	8,059	1,186	28,774	0.1983	0	5,707	5,707
1993	0	20,209	8,083	12,125	8,059	791	29,059	0.1733	0	5,037	5,037
1994	-26,128	20,889	8,356	12,533	8,059	395	29,344	0.1515	-3,958	4,445	8,402
										Total DCF	-77

Internal rate of return (before tax) 14.43 per cent

Pay out period 5.26 years

ANNEX XIII-13. IRR CALCULATION ON TOTAL INVESTMENT (CASE 10-1-3, after tax)

Long-term Interest Rate = 6 %

Year	Total investment	Profit before tax	(Less) income tax	Profit after tax	Depreciation	Interest on L–T debt	Total return	Discount factor	Discounted cash Out-flow	Discounted cash In-flow	DCF
1980	37,284	0	0	0	0	0	0	1.0000	37,284	0	- 37,284
1981	45,712	0	0	0	0	0	0	0.9030	44,889	0	- 44,889
1982	37,284	0	0	0	0	0	0	0.8154	30,401	0	- 30,401
1983	0	315	126	189	8,440	5,220	13,849	0.7363	0	10,197	10,197
1984	0	8,490	3,396	5,094	8,440	5,220	18,754	0.6649	0	12,468	12,468
1985	0	13,412	5,365	8,047	8,440	4,745	21,233	0.6004	0	12,747	12,747
1986	0	14,338	5,735	8,603	8,440	4,271	21,314	0.5421	0	11,555	11,555
1987	0	15,098	6,039	9,059	8,440	3,796	21,295	0.4895	0	10,424	10,424
1988	0	16,145	6,458	9,687	8,152	3,322	21,161	0.4420	0	9,354	9,354
1989	0	16,916	6,767	10,150	8,152	2,847	21,149	0,3991	0	8,442	8,442
1990	0	17,676	7,070	10,605	8,152	2,373	21,130	0,3604	0	7,616	7,616
1991	0	18,435	7,374	11,061	8,152	1,898	21,111	0,3255	0	6,871	6,871
1992	0	19,194	7,678	11,517	8,152	1,424	21,092	0.2939	0	6,199	6,199
1993	0	19,954	7,981	11,972	8,152	949	21,073	0.2654	0	5,592	5,592
1994	- 25,013	20,713	8,285	12,428	8,152	475	21,055	0.2396	- 5,994	5,045	11,039
										Total DCF	- 71

Internal rate of return (after tax) 10.74 per cent

Pay out period 6.32 years

ANNEX XIII-14. IRR CALCULATION ON TOTAL INVESTMENT (CASE 10-1-3, before tax)

Long-term Interest Rate = 6 %

Year	Total investment	Profit before tax	(less) income tax	Profit after tax	Depreciation	Interest on L-T debt	Total return	Discount factor	Discounted cash Out-flow	Discounted cash In-flow	DCF
1980	37,284	0	0	0	0	0	0	1.0000	37,284	0	-37,284
1981	49,712	0	0	0	0	0	0	0.8741	43,453	0	-43,453
1982	37,284	0	0	0	0	0	0	0.7640	28,487	0	-28,487
1983	0	315	126	189	8,440	5,220	13,975	0.6679	0	5,333	9,333
1984	0	8,490	3,396	5,094	8,440	5,220	22,150	0.5838	0	12,530	12,930
1985	0	13,412	5,365	8,047	8,440	4,745	26,598	0.5103	0	13,572	13,572
1986	0	14,338	5,735	8,603	8,440	4,271	27,049	0.4460	0	12,065	12,065
1987	0	15,098	6,039	9,059	8,440	3,796	27,334	0.3899	0	10,657	10,657
1988	0	16,145	6,458	9,687	8,152	3,322	27,618	0.3408	0	9,412	9,412
1989	0	16,916	6,767	10,150	8,152	2,847	27,916	0.2979	0	8,316	8,316
1990	0	17,676	7,070	10,605	8,152	2,373	28,201	0.2604	0	7,343	7,343
1991	0	18,435	7,374	11,061	8,152	1,898	28,485	0.2276	0	6,483	6,483
1992	0	19,194	7,678	11,517	8,152	1,424	28,770	0.1989	0	5,724	5,724
1993	0	19,954	7,981	11,972	8,152	949	29,055	0.1739	0	5,052	5,052
1994	-25,013	20,713	8,285	12,428	8,152	475	29,340	0.1520	-3,802	4,460	8,262
										Total DCF	-76

Internal rate of return (before tax) 14.40 percent

Pay out period 5.26 years

ANNEX XIII-15. RESULTS OF FINANCIAL ANALYSIS (CASE 10, INTEREST RATE 4 %)

Average return on paid-up capital — Before tax 43.62 — After tax 26.17

Return on paid-up capital (discounted base) — Before tax 25.13 — After tax 15.98

Year	Profit ratio (before tax) (%)	Profit ratio (after tax) (%)	Debt service coverage ratio	Profit break even operation (%)	Profit break even price (%)	Cash break even operation (%)	Cash break even price (%)
1983	3.74	2.24	3.76	60.28	3.74	42.98	12.07
1984	12.62	7.57	1.58	56.73	12.62	65.72	7.36
1985	16.26	9.75	1.85	54.90	16.26	68.37	9.85
1986	17.00	10.20	1.92	52.47	17.00	66.66	10.58
1987	17.64	10.58	1.98	51.06	17.64	65.81	10.96
1988	18.59	11.15	2.04	48.94	18.59	65.20	11.24
1989	19.24	11.54	2.11	47.52	19.24	64.37	11.62
1990	19.88	11.93	2.19	46.11	19.88	63.52	12.00
1991	20.52	12.31	2.27	44.70	20.52	62.67	12.39
1992	21.16	12.70	2.35	43.29	21.16	61.82	12.77
1993	21.80	13.08	2.44	41.87	21.80	60.98	13.16
1994	22.44	13.47	2.54	40.46	22.44	60.13	13.54
Average	17.57	10.54	2.25	(12 years)			
			2.12	(11 years)			

Profit ratio = (Profit/sales revenue) x 100

ANNEX XIII-16. RESULTS OF FINANCIAL ANALYSIS (CASE 10-1-2, LONG-TERM INTEREST RATE 5%)

Average return on paid-up capital - Before tax 42.00 After tax 25.20

Return on paid-up capital (discounted base) Before tax 23.93 After tax 15.12

Year	Profit ratio (before tax) (%)	Profit ratio (after tax) (%)	Debt service coverage ratio	Profit break even operation (%)	Profit break even price (%)	Cash break even operation (%)	Cash break even price (%)
1983	2.13	1.28	3.10	62.55	2.13	44.13	11.26
1984	11.45	6.87	1.50	59.00	11.45	66.86	6.77
1985	15.31	9.18	1.76	56.99	15.31	69.40	9.38
1986	16.14	9.68	1.83	54.37	16.14	67.58	10.16
1987	16.86	10.12	1.90	52.77	16.86	66.62	10.60
1988	17.89	10.74	1.96	50.47	17.89	65.90	10.92
1989	18.63	11.18	2.04	48.87	18.63	64.96	11.35
1990	19.36	11.61	2.12	47.27	19.36	64.00	11.79
1991	20.08	12.05	2.21	45.67	20.08	63.04	12.22
1992	20.81	12.48	2.30	44.07	20.81	62.08	12.66
1993	21.53	12.92	2.41	42.47	21.53	61.12	13.09
1994	22.26	13.35	2.53	40.87	22.26	60.16	13.53
Average	16.87	10.12	2.14	(12 years)			
			2.05	(11 years)			

Profit ratio = (Profit/sales revenue) x 100

ANNEX XIII-17. RESULTS OF FINANCIAL ANALYSIS (CASE 10-1-3, INTEREST RATE 6 %)

Average return paid-up capital — Before tax 40.38 — After tax 24.23

Return on paid-up capital (discounted base) — Before tax 22.74 — After tax 14.26

Year	Profit ratio (before tax) (%)	Profit ratio (after tax) (%)	Debt service coverage ratio	Profit break even operation (%)	Profit break even price (%)	Cash break even operation (%)	Cash break even price (%)
1983	0.53	0.32	2.65	64.82	0.53	45.28	10.44
1984	10.28	6.17	1.43	61.28	10.28	68.01	6.18
1985	14.36	8.61	1.68	59.08	14.36	70.44	8.51
1986	15.28	9.17	1.75	56.27	15.28	68.50	9.74
1987	16.09	9.65	1.82	54.48	16.09	67.43	10.23
1988	17.20	10.32	1.88	51.99	17.20	66.60	10.61
1989	18.02	10.81	1.97	50.21	18.02	65.54	11.09
1990	18.82	11.30	2.06	48.43	18.83	64.47	11.57
1991	19.64	11.78	2.15	46.64	19.64	63.40	12.06
1992	20.45	12.27	2.26	44.86	20.45	62.33	12.54
1993	21.26	12.76	2.38	43.07	21.26	61.26	13.03
1994	22.07	13.24	2.51	41.29	22.07	60.19	13.51
Average	16.17	9.70	2.04	(12 years)			
			1.55	(11 years)			

Profit ratio = (Profit/sales revenue) x 100

ANNEX XIII-18. CASH FLOW STATEMENTS (CASE 10)

Long-term Interest Rate = 4 %

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Sources of cash	37,284	49,712	38,584	14,575	22,457	26,606	27,057	27,342	27,626	27,924	28,208	28,493	28,778	29,063	29,347
Cash generated from operation	0	0	0	13,975	22,157	26,606	27,057	27,342	27,626	27,924	28,208	28,493	28,778	29,063	29,347
Profit before tax & interest	0	0	0	5,720	13,903	18,351	18,803	19,088	19,660	19,957	20,242	20,527	20,812	21,096	21,381
Depreciation & amortization	0	0	0	8,254	8,254	8,254	8,254	8,254	7,966	7,966	7,966	7,966	7,966	7,966	7,966
Financial resources	37,284	49,712	37,284	0	0	0	0	0	0	0	0	0	0	0	0
Share capital	11,185	14,914	11,185	0	0	0	0	0	0	0	0	0	0	0	0
Long term debt	26,099	34,798	26,099	0	0	0	0	0	0	0	0	0	0	0	0
Short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Increase in account payable	0	0	1,700	600	300	0	0	0	0	0	0	0	0	0	0
Use of cash	37,545	51,452	21,765	11,865	15,206	16,403	16,855	16,810	16,722	16,773	16,702	16,626	16,550	16,475	11,768
Investment in fixed asset	37,545	51,452	28,682	0	0	0	0	0	0	0	0	0	0	0	0
Land and site improvement	2,463	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Constructed facilities	34,821	49,712	24,284	0	0	0	0	0	0	0	0	0	0	0	0
Pre-invest. & start-up exp.	0	0	1,440	0	0	0	0	0	0	0	0	0	0	0	0
Interest during construction	261	1,740	2,958	0	0	0	0	0	0	0	0	0	0	0	0
Increase in current asset other than cash	0	0	3,087	8,385	2,922	1,161	24	-12	-24	-12	-12	-12	-12	-12	-4,643
Incr (Decr) in acct receivable	0	0	0	4,997	1,883	905	36	0	0	0	0	0	0	0	0
Incr (Decr) in inventories															
Products	0	0	0	2,359	524	256	-12	-12	-24	-12	-12	-12	-12	-12	-12
Materials	0	0	3,087	1,029	515	0	0	0	0	0	0	0	0	0	-4,631
Debt services	0	0	0	3,480	11,389	11,072	10,756	10,440	10,123	9,807	9,490	9,174	8,858	8,541	8,225
Repayment of long term debt	0	0	0	0	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909
Repayment of short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest on long term debt	0	0	0	3,480	3,480	3,163	2,847	2,531	2,214	1,898	1,582	1,265	949	633	316
Interest on short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Income tax payment	0	0	0	0	896	4,165	6,075	6,382	6,623	6,978	7,224	7,464	7,705	7,945	8,185
Dividends payment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash increase or (decrease)	-261	-1,740	7,215	2,710	7,251	10,203	10,202	10,532	10,905	11,150	11,506	11,867	12,227	12,588	17,580
Beginning cash balance	0	-261	-2,001	5,214	7,924	15,175	25,378	35,580	46,112	57,016	68,167	79,673	91,540	103,767	116,355
Ending cash balance	-261	-2,001	5,214	7,924	15,175	25,378	35,580	46,112	57,016	68,167	79,673	91,540	103,767	116,355	133,935

ANNEX XIII-19. CASH FLOW STATEMENTS (CASE 10-1-2)

Long-term Interest Rate = 5 %

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Sources of cash	37,284	45,712	38,984	14,575	22,453	26,602	27,053	27,338	27,622	27,920	28,204	28,489	28,774	29,059	29,344
Cash generated from operation	0	0	0	13,975	22,153	26,602	27,053	27,338	27,622	27,920	28,204	28,489	28,774	29,059	29,344
Profit before tax & interest	0	0	0	5,627	13,806	18,255	18,706	18,991	19,563	19,860	20,145	20,430	20,715	21,000	21,284
Depreciation & amortization	0	0	0	8,347	8,347	8,347	8,347	8,347	8,059	8,059	8,059	8,059	8,059	8,059	8,059
Financial resources	37,284	49,712	37,284	0	0	0	0	0	0	0	0	0	0	0	0
Spare capital	11,185	14,914	11,185	0	0	0	0	0	0	0	0	0	0	0	0
Long term debt	26,099	34,798	26,099	0	0	0	0	0	0	0	0	0	0	0	0
Short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Increase in account payable	0	0	1,700	600	300	0	0	0	0	0	0	0	0	0	0
Use of cash	37,610	51,887	32,509	12,739	15,691	16,807	17,212	17,119	16,983	16,987	16,869	16,746	16,622	16,499	11,745
Investment in fixed asset	37,610	51,887	29,421	0	0	0	0	0	0	0	0	0	0	0	0
Land and site improvement	2,463	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Constructed facilities	34,821	49,712	24,284	0	0	0	0	0	0	0	0	0	0	0	0
Pre-invest. & start-up exp.	0	0	1,440	0	0	0	0	0	0	0	0	0	0	0	0
Interest during construction	326	2,175	3,697	0	0	0	0	0	0	0	0	0	0	0	0
Increase in current asset other than cash	0	0	3,087	8,389	2,922	1,161	24	-12	-24	-12	-12	-12	-12	-12	-4,643
Incr (Decr) in acct receivable	0	0	0	4,997	1,883	905	36	0	0	0	0	0	0	0	0
Incr (Decr) in inventories															
Products	0	0	0	2,363	524	256	-12	-12	-24	-12	-12	-12	-12	-12	-12
Materials	0	0	3,087	1,029	515	0	0	0	0	0	0	0	0	0	-4,631
Debt services	0	0	0	4,350	12,259	11,863	11,468	11,072	10,677	10,281	9,886	9,490	9,095	8,700	8,304
Repayment of long term debt	0	0	0	0	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909
Repayment of short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest on long term debt	0	0	0	4,350	4,350	3,954	3,559	3,163	2,768	2,373	1,977	1,582	1,186	791	395
Interest on short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Income tax payment	0	0	0	0	511	3,783	5,720	6,059	6,331	6,718	6,995	7,267	7,539	7,811	8,083
Dividends payment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash increase or (Decrease)	-326	-2,175	6,375	1,836	6,762	9,795	9,841	10,219	10,639	10,932	11,335	11,744	12,152	12,560	17,599
Beginning cash balance	0	-326	-2,501	3,974	5,810	12,573	22,367	32,209	42,428	53,067	63,999	75,334	87,078	99,229	111,789
Ending cash balance	-326	-2,501	3,974	5,810	12,573	22,367	32,209	42,428	53,067	63,999	75,334	87,078	99,229	111,789	129,388

ANNEX XIII-20. CASH FLOW STATEMENTS (CASE 10-1-3)

Long-term Interest Rate = 6 %

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Sources of cash	37,284	49,712	38,984	14,575	22,450	26,598	27,049	27,334	27,618	27,916	28,201	28,485	28,770	29,055	29,340
Cash generated from operation	0	0	0	13,975	22,150	26,598	27,049	27,334	27,618	27,916	28,201	28,485	28,770	29,055	29,340
Profit before tax & interest	0	0	0	5,535	13,709	18,158	18,609	18,894	19,466	19,764	20,048	20,333	20,618	20,903	21,187
Financial resources	37,284	49,712	37,284	0	0	0	0	0	0	0	0	0	0	0	0
Share capital	11,185	14,914	11,185	0	0	0	0	0	0	0	0	0	0	0	0
Long term debt	26,099	34,798	26,099	0	0	0	0	0	0	0	0	0	0	0	0
Short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Increase in account payable	0	0	1,700	600	300	0	0	0	0	0	0	0	0	0	0
Use of cash	37,675	52,322	33,248	13,613	16,176	17,211	17,569	17,428	17,245	17,202	17,036	16,865	166,694	16,524	11,722
Investment in fixed asset	37,675	52,322	30,161	0	0	0	0	0	0	0	0	0	0	0	0
Land and site improvement	2,463	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Constructed facilities	34,821	49,712	24,284	0	0	0	0	0	0	0	0	0	0	0	0
Pre-invest. & start-up exp.	0	0	1,440	0	0	0	0	0	0	0	0	0	0	0	0
Interest during construction	391	2,610	4,437	0	0	0	0	0	0	0	0	0	0	0	0
Increase in current asset other than cash	0	0	3,087	8,393	2,922	1,161	24	-12	-24	-12	-12	-12	-12	-12	-4,643
Incr (Decr) in acct receivable	0	0	0	4,997	1,883	905	36	0	0	0	0	0	0	0	0
Incr (Decr) in inventories															
Products	0	0	0	2,367	524	256	-12	-12	-12	-12	-12	-12	-12	-12	-12
Materials	0	0	3,087	1,029	515	0	0	0	0	0	0	0	0	0	-4,631
Debt services	0	0	0	5,220	13,128	12,654	12,179	11,705	11,230	10,756	10,281	9,807	9,332	8,858	8,383
Repayment of long term debt	0	0	0	0	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909
Repayment of short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest on long term debt	0	0	0	5,220	5,220	4,745	4,271	3,796	3,322	2,847	2,373	1,898	1,424	949	475
Interest on short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Income tax payment	0	0	0	0	126	3,396	5,365	5,735	6,039	6,458	6,767	7,070	7,374	7,678	7,981
Dividends payment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cash increase or (Decrease)	-352	-2,610	5,736	962	6,274	9,387	9,481	9,906	10,373	10,714	11,165	11,620	12,076	12,531	17,618
Beginning cash balance	0	-392	-3,001	2,735	3,697	9,970	19,357	28,838	38,744	49,117	59,831	70,996	82,616	94,691	107,223
Ending cash balance	-392	-3,001	2,735	3,697	9,970	19,357	28,838	38,744	49,117	59,831	70,996	82,616	94,691	107,223	124,841

ANNEX XIII-21. BALANCE SHEET (CASE 10)

Long-term Interest Rate = 4 %

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Assets	37,284	86,996	125,980	128,820	130,738	133,848	135,820	138,086	141,000	144,172	147,700	151,589	155,838	160,448	165,418
Current assets	- 261	- 2,001	8,301	19,396	29,569	40,933	51,159	61,679	72,559	83,698	95,192	107,047	119,263	131,839	144,776
Accounts receivable	0	0	0	4,997	6,880	7,785	7,822	7,822	7,822	7,822	7,822	7,822	7,822	7,822	7,822
Inventories															
Products	0	0	0	2,359	2,883	3,139	3,127	3,115	3,091	9,079	3,067	3,055	3,043	3,031	3,019
Materials	0	0	3,087	4,116	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	0
Net fixed assets	37,545	88,997	117,679	109,424	101,170	92,916	84,661	76,407	68,441	60,474	52,508	44,542	36,575	28,609	20,643
Investment	37,545	88,997	117,679	117,679	117,679	117,679	117,679	117,679	117,679	117,679	117,679	117,679	117,679	117,679	117,679
Land & site improvement	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463
Constructed facilities	34,821	84,533	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817
Pre-invest. & start-up exp.	0	0	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440
Less. depre. & amortization	0	0	0	8,254	16,509	24,763	33,017	41,272	49,238	57,204	65,171	73,137	81,103	89,070	97,036
Liabilities	26,099	60,897	88,696	90,192	85,856	79,854	72,252	64,584	57,030	45,367	41,699	34,031	26,362	18,694	11,026
Current liabilities	0	0	1,700	11,105	14,678	16,584	16,891	17,131	17,487	17,732	17,973	18,213	18,454	18,694	11,026
Accounts payable	0	0	1,700	2,300	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600
Income tax payable	0	0	0	896	4,169	8,075	6,382	6,623	6,978	7,224	7,464	7,705	7,945	8,185	8,426
Dividends payable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Current portion of debt															
Long term debt	0	0	0	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	0
Short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed liabilities	26,099	60,897	86,996	79,087	71,178	63,270	55,361	47,452	39,544	31,635	23,726	15,817	7,909	0	0
Long term debt balance	26,099	60,897	86,996	79,087	71,178	63,270	55,361	47,452	39,544	31,635	23,726	15,817	7,909	0	0
Stock holders equity	11,185	26,099	37,284	38,628	44,882	53,995	63,568	73,502	83,970	94,805	106,001	117,558	129,475	141,754	154,392
Share capital	11,185	26,099	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284
Retained earnings	0	0	0	1,344	7,598	16,711	26,284	36,218	46,686	57,521	68,717	80,274	92,192	104,470	117,108

ANNEX XIII-22. BALANCE SHEET (CASE 10-1-2)

Long-term Interest Rate - 5 %)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Assets	37,284	86,996	125,980	127,857	129,194	131,803	133,321	135,181	137,736	140,597	143,861	147,534	151,614	156,103	160,999
Current assets	- 326	- 2,501	7,061	17,286	26,970	37,927	47,792	57,999	68,614	79,534	90,858	102,589	114,725	127,277	140,233
Cash	- 326	- 2,501	3,974	5,810	12,573	22,367	32,209	42,428	53,067	63,999	75,334	87,078	99,229	111,789	129,388
Accounts receivable	0	0	0	4,997	6,880	7,785	7,822	7,822	7,822	7,822	7,822	7,822	7,822	7,822	7,822
Inventories															
Products	0	0	0	2,363	2,887	3,143	3,131	3,119	3,095	3,083	3,071	3,059	3,047	3,035	3,023
Materials	0	0	3,087	4,116	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	0
Net fixed assets	37,610	89,497	118,918	110,571	102,224	93,876	85,529	77,182	69,122	61,063	53,004	44,944	36,885	28,826	20,767
Investment	37,610	89,497	118,918	118,918	118,918	118,918	118,918	118,918	118,918	118,918	118,918	118,918	118,918	118,918	118,918
Land & site improvement	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463
Constructed facilities	34,821	84,533	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817
Pre-invest. & start-up exp.	0	0	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440
Interest during construction	326	2,501	6,198	6,198	6,198	6,198	6,198	6,198	6,198	6,198	6,198	6,198	6,198	6,198	6,198
Less. depre. & amortization	0	0	0	8,347	16,695	25,042	33,389	41,737	49,796	57,855	65,915	73,974	82,033	90,093	98,152
Liabilities	26,099	60,897	88,696	89,807	85,470	79,498	71,928	64,292	56,770	49,139	41,502	33,865	26,229	18,592	10,955
Current liabilities	0	0	1,700	10,720	14,291	16,229	16,568	16,840	17,227	17,504	17,776	18,048	18,320	18,592	10,956
Accounts payable	0	0	1,700	2,300	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600
Income tax payable	0	0	0	511	3,783	5,720	6,059	6,331	6,718	6,995	7,267	7,539	7,811	8,083	8,356
Dividends payable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Current portion of debt															
Long term debt	0	0	0	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	0
Short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed liabilities	26,099	60,897	86,996	79,087	71,178	63,270	55,361	47,452	39,544	31,635	23,726	15,817	7,909	0	0
Long term debt balance	26,099	60,897	86,996	79,087	71,178	63,270	55,361	47,452	39,544	31,635	23,726	15,817	7,909	0	0
Stock holders equity	11,185	26,099	37,284	38,051	43,724	52,304	61,393	70,889	80,966	91,459	102,359	113,668	125,385	137,510	150,044
Share capital	11,185	26,099	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284
Retained earnings	0	0	0	767	6,440	15,020	24,109	33,605	43,682	54,175	65,075	76,384	88,101	100,227	112,760

ANNEX XIII-23. BALANCE SHEET (CASE 10-1-3)

Long-term Interest Rate = 6 %

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Assets	37,284	86,996	125,980	126,895	127,650	129,757	130,822	132,276	134,473	137,022	140,023	143,479	147,390	151,758	156,580
Current assets	-392	-3,001	5,822	15,177	24,372	34,920	44,425	54,315	64,668	75,370	86,523	98,131	110,195	122,715	135,690
Cash	-392	-3,001	2,735	3,697	9,970	19,357	28,838	38,744	49,117	59,831	70,996	82,616	94,691	107,223	124,841
Accounts receivable	0	0	0	4,997	6,880	7,785	7,822	7,822	7,822	7,822	7,822	7,822	7,822	7,822	7,822
Inventories															
Products	0	0	0	2,367	2,891	3,147	3,135	3,123	3,099	3,087	3,075	3,063	3,051	3,039	3,028
Materials	0	0	3,087	4,116	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	4,631	0
Net fixed assets	37,675	89,997	120,158	111,718	103,277	94,837	86,397	77,957	69,804	61,652	53,500	45,347	37,195	29,043	20,891
Investment	37,675	89,997	120,158	120,158	120,158	120,158	120,158	120,158	120,158	120,158	120,158	120,158	120,158	120,158	120,158
Land & site improvement	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463	2,463
Constructed facilitites	34,821	84,533	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817	108,817
Pre-invest. & start-up exp.	0	0	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440	1,440
Interest during construction	391	3,001	7,438	7,438	7,438	7,438	7,438	7,438	7,438	7,438	7,438	7,438	7,438	7,438	7,483
Less. depre. & amortization	0	0	0	8,440	16,881	25,321	33,761	42,202	50,354	58,506	66,658	74,811	82,963	91,115	99,267
Liabilities	26,099	60,897	88,696	89,422	85,083	79,143	71,605	64,000	56,510	48,910	41,305	33,700	26,095	18,490	10,885
Current liabilities	0	0	1,700	10,335	13,905	15,874	16,244	16,548	16,967	17,275	17,579	17,883	18,186	18,490	10,885
Accounts payable	0	0	1,700	2,300	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600	2,600
Income tax payable	0	0	0	126	3,396	5,365	5,735	6,039	6,458	6,767	7,070	7,374	7,678	7,981	8,285
Dividends payable	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Current portion of debt															
Long term debt	0	0	0	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	7,909	0
Short term debt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fixed liabilities	26,099	60,897	86,996	79,087	71,178	63,270	55,361	47,452	39,544	31,635	23,726	15,817	7,909	0	0
Long term debt balance	26,099	60,897	86,996	79,087	71,178	63,270	55,361	47,452	39,544	31,635	23,726	15,817	7,909	0	0
Stock holders equity	11,185	26,099	37,284	37,473	42,567	50,614	59,217	68,276	77,962	88,112	98,718	109,779	121,295	133,267	145,695
Share capital	11,185	26,099	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284	37,284
Retained earnings	0	0	0	189	5,283	13,330	21,933	30,992	40,678	50,828	61,434	72,495	84,011	95,983	108,411

[Supplemental Explanation on Cash Flow Statement and Balance Sheet]

1. Fianncing schedule is 30 % first year, 40 % second year and 30 % third year. This corresponds to column "Financial resources" of Annex XIII-18.

   1980: 37,284 1981: 49,712 1982: 37,284

2. Use of cash for each year in Annex XIII-18 is as follows:

	1980	1981	1982
Land acquisition and preparation	2,463	0	0
Plants, Pier, Housing	34,821	49,712	24,284
Pre-operation expenses			1,440
Initial working capital			11,560

   Naturally initial working capital is not shown in the table.

3. Account payable is assumed as follows: (1,000$)

		increase
1982	1,700	1,700
1983	2,300	600
1984	2,600	300

   These figures roughly correspond to cost of sulfuric acid and bags for 1.5 months consumption.

4. Account receivable corresponds to sales revenue of one month for that year. After arriving at constant operation, there is no change in account receivable and incrase in account receivable becomes zero.

5. Product inventory corresponds to production cost of half month for that year. As the production cost decreases year by year, there remains decrease after constant operation is achieved.

6. There are differences between the figures in Annex XII-5 and the Annex XIII-18. Annex XII-5 shows only basis of initial working capital assumption and difference is adjusted by cash flow balance.

7. Interest during construction is not counted in capital requirement and this causes the red of cash balance for 1980 and 1981 in Annex XIII-18. But if we consider from 1980 to 1982 as a whole, cash balance can be plus. Naturally interest during construction is depreciated in cost calculation.