

ANNEX III-2 WORKSHEET FOR CALCULATION FOR MAIN VENTILATOR MOTOR

Required air volume: 5,500 m³/min

Using Atkinson's formula for resistance on airstream

Inclined shaft	46.2 mmW
Drift and mine face	8.0
Vent shaft	23.2
<hr/>	
Total	77.4 mmW, say 100 mmW

Air power required

$$\text{Air power} = \frac{\text{Resistance on airstream} \times \text{air volume}}{75} = 122 \text{ PS}$$

Motor power rating

$$\text{Motor power} = \frac{\text{Air power required}}{\text{Fan efficiency} \times \text{motor efficiency}} = 217 \text{ PS}$$

Therefore, a 220 PS ventilator is needed.

ANNEX IV

ANNEX IV-1 ESTIMATED CAPITAL COSTS REQUIRED FOR ACQUISITION OF HOPPER CARS AND LOCOMOTIVES FOR MARSHALING

Estimates of the capital costs required for acquisition of 138 hopper cars and three locomotives for marshaling are shown for reference in Table AIV-1.

**Table AIV-1 SIDING COST (EXCLUSIVE OF RAILWAY SPUR)
(END-SEPT. 1980 PRICES)**

(Unit : US\$000)

	Foreign	Local	Total
A. Materials			
Locomotive @436 x 3	1,308	0	1,308
Covered Hopper Car @56.6 x 138	7,812	0	7,812
Spare Parts (5% of FOB)	500	0	500
	9,620	0	9,620
B. Construction Labor ¹⁾			
Locomotive	0	5	5
Covered Hopper Car	0	15	15
	0	20	20
C. Ocean Freight, Insurance & Local Handling			
Locomotive (400Ft)	53	20	73
Covered Hopper Car (16,600Ft)	2,367	875	3,242
	2,420	895	3,315
Total	12,040	915	12,955

(Note) 1) Transportation on the railway from the unloading point to the sites.

ANNEX V

ANNEX V-1 SODA ASH PRODUCTION METHOD

The general classification of soda ash production processes presently in commercial use is as follows.

1. Refining of natural soda ash
2. Carbonation of caustic soda
3. By-product from alumina production
4. Synthetic production using salt, carbon dioxide and ammonia as raw materials

The first method is employed in the United States and Kenya for soda ash found in underground deposits or in lakes. The second process produces soda ash through the reaction of caustic soda (which is a byproduct of chlorine production) with carbon dioxide but because of uncertainty regarding the supply of caustic soda this process is not used for large scale production. In the third process, which is employed in the Soviet Union, soda ash is obtained as a byproduct when alumina is produced from bauxite and it is estimated that the Soviets are producing soda ash at the scale of 500,000 t/y by use of this method. The fourth method is what is generally known as the soda ash synthesis process and is the most widely used of the four.

There are three methods of soda ash synthesis, namely

1. Solvay Process
2. Full Ammonium Chloride (AC) Co-production Process
3. Partial Ammonium Chloride (AC) Co-production Process

The Solvay Process is the oldest of the three, and has disadvantages in that the yield of the salt is only 70%, that there is no application for the byproduct calcium chloride which is produced, and that energy consumption is high. The co-production processes (Full or Partial AC) were devised by Japan which is not well endowed with salt resources, as means of overcoming the problems presented by the Solvay Process, and produce soda ash and ammonium chloride in equal quantities in the Full AC Process. The Partial AC Process represents a compromise of the second with realities concerning the market for co-product ammonium chloride.

Almost all soda ash production in Japan is by means of the third AC co-production process. Production has been as shown below.

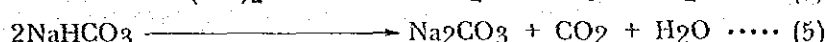
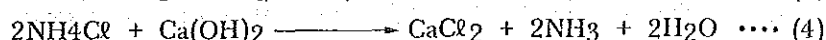
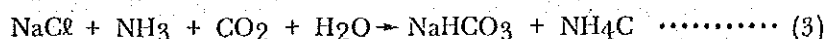
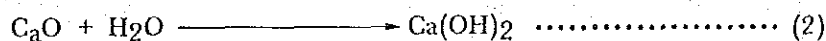
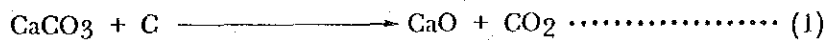
		Soda Ash Production (A) (t)	Ammonium Chloride Production (B) (t)	B/A x 100
F.Y	1970	1,237,180	874,611	70.7
F.Y	1971	1,285,484	860,669	67.0
F.Y	1972	1,307,608	923,521	70.6
F.Y	1973	1,363,321	956,277	70.1
F.Y	1974	1,326,982	957,880	72.2
F.Y	1975	1,123,560	905,942	80.6
F.Y	1976	1,085,463	703,166	64.8
F.Y	1977	1,178,899	707,814	60.0
F.Y	1978	1,161,570	717,815	61.8
F.Y	1979	1,354,442	753,123	55.6

Although there is some fluctuation in the ratio of Soda Ash/AC production in view of trends of demand for nitrogen fertilizer, trends of the price of ammonia, and trend of soda ash production, it may be stated without qualification that the AC Co-production Process, either Full or Partial, has been commercially proven.

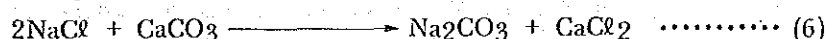
Unit consumption of materials in each process is as shown in Table AV-1. The nature of each production process is described as follows.

1-1 SOLVAY PROCESS

The Solvay Process (see Figure AV-1), also known as the Ammonia Soda Process, is so named for the person who developed it. The major raw materials are salt and limestone, and the reaction is as follows.



which may be simplified to



In the production process the major reaction is (3). Salt, ammonia and carbon dioxide react to form dense ash and intermediate ammonium chloride. The dense ash is separated by settling. In (4) ammonium chloride is decomposed from the mother liquor by use of slaked lime, and recovered ammonia is recycled to (3).

Table AV-1 COMPARISON OF UNIT CONSUMPTION OF MATERIAL IN EACH PROCESS

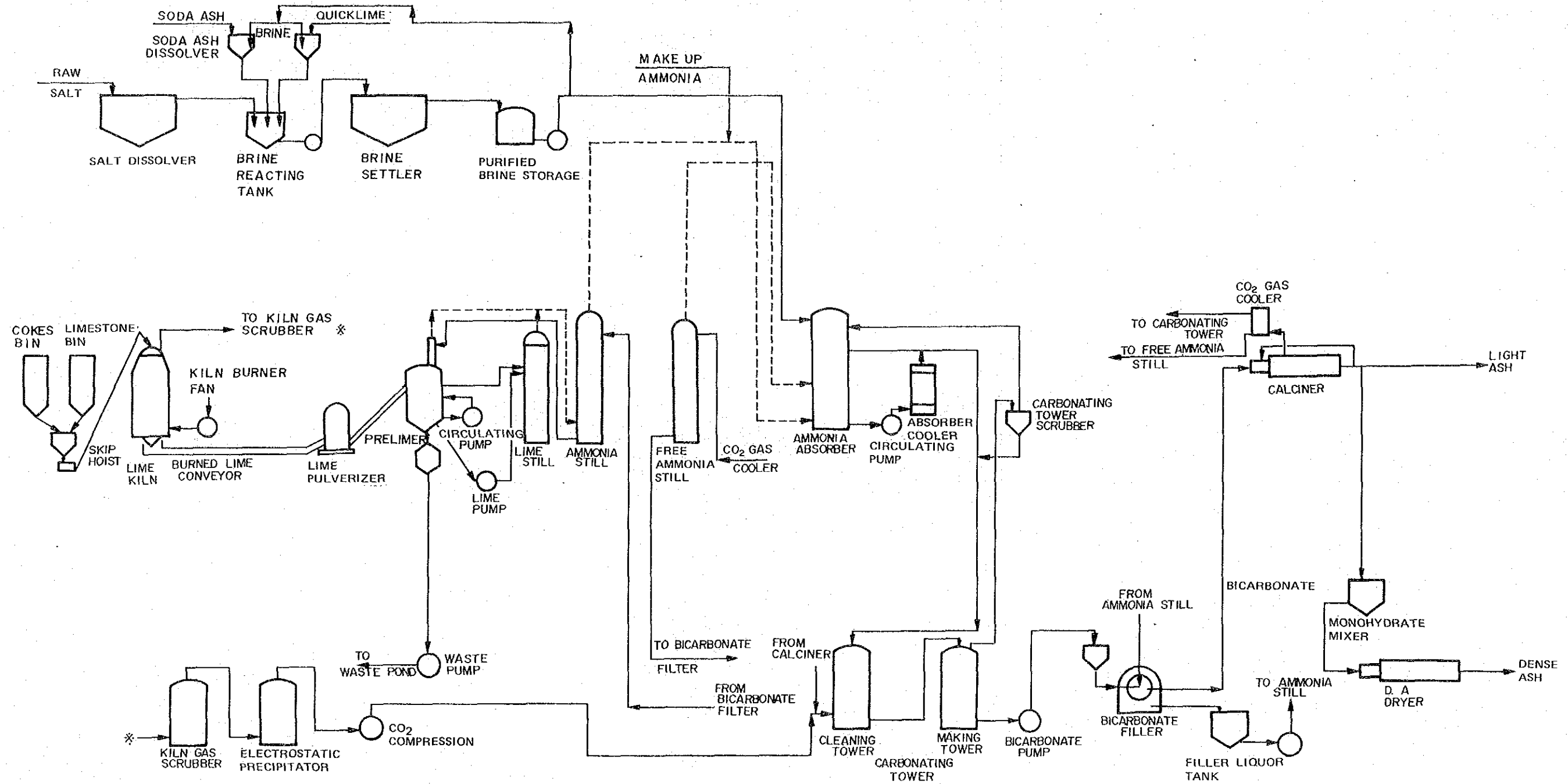
	Solvay Process (Per ton soda ash)	Full AC Process (per ton soda ash and ammonium chloride)	Partial AC Process (per ton soda ash and ammonium chloride)
Rock salt	1,620 kg	1,413 kg	1,413 kg
Limestone (CaCO ₃ 98%)	1,280 kg	-	1,280 kg *1)
Cokes (Fixed carbon, 83%)	120 kg	-	120 kg *1)
Ammonia	4.3 kg	320 kg	320 kg *2)
Carbon dioxide gas	-	332 NM ³	332 NM ³
Sodium sulfide	0.76 kg	-	-
Quicklime	-	46 kg	46 kg
Caustic soda	-	42 kg	42 kg

Electricity	Soda ash 150 KWH	331 KWH	331 KWH
	Ammonium chloride drying	60 KWH	60 KWH
	Ammonia recovery	-	115 KWH *1
Steam	Soda ash 1,750 kg	1,800 kg	1,800 kg
	Ammonia recovery 1,210 kg	1,000 kg	1,000 kg *1
Heavy oil			

(Notes) *1) Per ton ammonium chloride

*2) Not required if ammonia is recovered from ammonium chloride.

PROCESS FLOW DIAGRAM
(SOLVAY)



THE ASEAN ROCK SALT · SODA ASH
PROJECT IN THAILAND

PROCESS FLOW DIAGRAM
(SOLVAY)

JICA

FIG. AV - 1

The decomposed mother liquor contains calcium chloride, unreacted salt, slaked lime and calcium carbonate. When there is demand for calcium chloride, the following procedure will be employed for the production of purified calcium chloride. The mother liquor is reacted with carbon dioxide to remove the slaked lime as calcium carbonate, which is settled in the thickener and removed from the system. Top liquor of the thickener is put into the evaporator, where the crystal ammonia is separated as a product; in due course of this evaporation operation salt is also recovered.

Generally, and especially in Thailand, there is no sizable amount of demand for calcium chloride, and therefore the above-mentioned procedure will not be taken. Instead, the mother liquor is disposed in a waste pond, where the insoluble materials are settled and top liquor is abandoned.

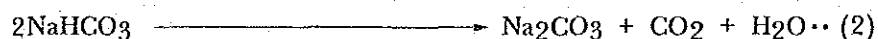
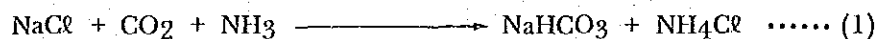
Ammonia is recycled and supply is needed only to make up for loss. Dense ash is heated in a calciner and, as shown in (5), soda ash is produced with carbon dioxide which is recycled.

The Solvay Process has deficiencies in that energy is required to produce heat for (4), that the yield of salt is less than 73%, and that there is no suitable use for byproduct calcium chloride.

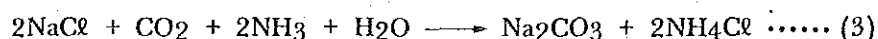
1-2 FULL AC CO-PRODUCTION PROCESS

The Full Ammonium Chloride Co-Production Process (see Figure AV-2) has been developed in Japan where salt resources are substantially limited, and has been commercially used in that country. It has advantages in that the utilization of salt is high and its energy requirement is low because heat for recovery of ammonia is not necessary, and when there is demand for ammonium chloride, the production cost of soda ash is reduced.

The reactions in the Full AC Process are as follows.



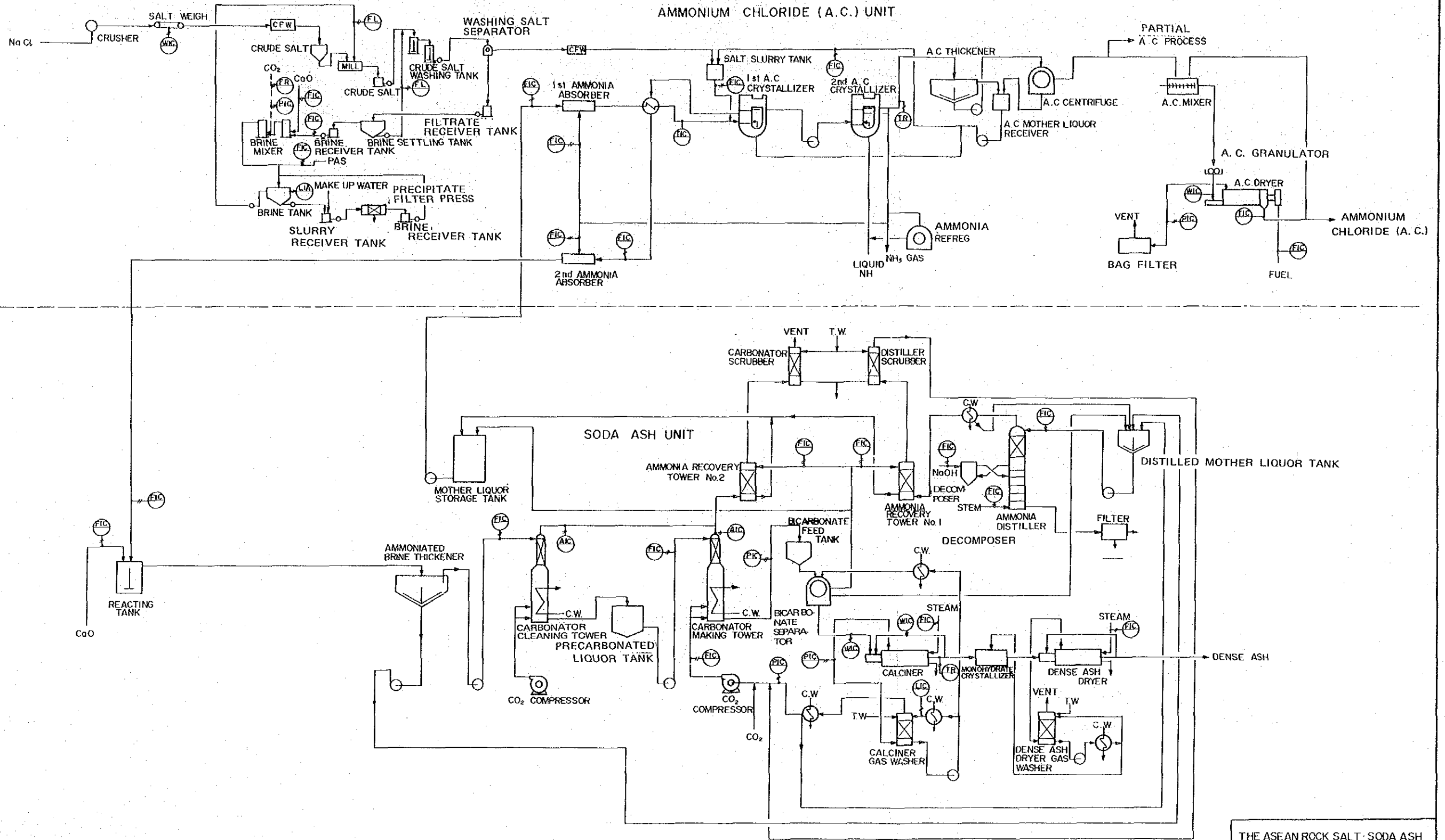
which may be simplified to



In this process, the reaction shown as (1) is carried out in two stages: carbonation and crystallization of ammonium chloride.

After the mother liquor from the sodium bicarbonate separator is reacted with ammonia, it is mixed with crushed salt to form ammonium chloride. The formed ammonium

SODA ASH PROJECT IN THAILAND
PROCESS FLOW DIAGRAM



THE ASEAN ROCK SALT - SODA ASH
PROJECT IN THAILAND
PROCESS FLOW DIAGRAM
JICA Fig. AV-2

chloride is separated by cooling crystallization followed by the thickener. Top liquor of the thickener is recycled back to the ammonia absorption section. The crystal AC is then prilled and dried to be as final product.

Sodium bicarbonate is heated in the calciner to be decomposed to carbon dioxide and sodium carbonate (Soda Ash) as in equation (2). Carbon dioxide is recycled to the carbonation section.

In this process, due to the presence of moisture and impurities in the crude salt, the recycle solution is increased, and the impurities in the recycle solution are accumulated; therefore it is required to blow down a certain amount of recycle solution in order to dispose of the impurities in the system.

It is also a characteristic of the process that the process consumes a substantial amount of ammonia and carbon dioxide, therefore the process plant is beneficially located adjacent to an ammonia plant. This process has advantages such that yield of salt is high and energy consumption is low due to the fact that the ammonia recovery and distillation section are eliminated.

1-3 PARTIAL AC CO-PRODUCTION PROCESS

This process is almost same as the Full AC Co-production Process except that, when the demand for AC is limited, the ammonia recovery section is added to Full AC Process in order to recover ammonia by putting quicklime to dispose chlorine as calcium chloride and recycle ammonia back to the process, as these are conducted in the Solvay Process.

In comparison with the Solvay Process, this process has advantages of higher salt yield and lower energy consumption.

ANNEX V-2 EFFLUENTS FROM EACH SODA ASH MANUFACTURING PROCESS

In V-1, outlines of all three process are described, and in this Annex effluents from each process are discussed. First, effluents from each process are defined, and then the effluents standards of Thailand, Japan and other countries are studied. In view of these standards, actual practices in Japan are discussed in relation to the use of each process.

However, since it is beyond the scope of this study, evaluation is not made here of impact on the Thai environment by these effluents.

2-1 EFFLUENTS FROM EACH PROCESS

Generally industrial waste is classified as gaseous effluents, liquid effluents, and solid wastes. In the soda ash manufacturing processes, no pollutant gas will be produced, therefore discussion is given only for liquid effluents and solid waste.

In the soda ash manufacturing process, the main process is to carbonate the salt (NaCl) by carbon dioxide (CO_2), to form soda ash (Na_2CO_3); how to fix the remaining chlorine in the raw material salt differentiates each production process, i.e., to fix chlorine with quicklime to form calcium chloride in the Solvay Process, with ammonia to form ammonium chloride in Full AC Process, and with both quicklime and ammonia in the Partial AC Process.

Regarding these chlorine salts, i.e., calcium chloride and ammonium chloride, no substantial demand for calcium chloride is anticipated in the other ASEAN countries or in Thailand, whereas ammonium chloride has been used as nitrogen fertilizer in Thailand and its demand is increasing as discussed in Part II. Therefore, in the Solvay Process and Partial AC Process, it is necessary for calcium chloride to be disposed of without harming the environment. Hereinafter, discussion will be made for the liquid and solid wastes of each process. In Table AV-2-1, amounts of liquid and solid wastes from each process are shown.

2-1-1 Liquid Wastes in each Process

In the Solvay and Partial AC Processes, in which chlorine in the raw material salt is fixed fully or partially with quicklime, liquid wastes containing various calcium salts must be disposed of. These calcium salts are calcium chloride, (CaCl_2), calcium carbonate (CaCO_3), and slaked lime ($\text{Ca}(\text{OH})_2$). Among these calcium salts, calcium carbonate has low water solubi-

Table AV-2-1 WASTES FROM EACH SODA ASH MANUFACTURING PROCESS

Process	Solvay (per ton of soda ash)	Full AC (per ton of soda ash)	Partial AC (per ton of recovered AC)
<u>Liquid Waste</u>			
Volume	10.5m ³	1.0m ³ *	4.5m ³
CaCl ₂	10%	—	23%
CaCO ₃	1%	—	—
Ca(OH) ₂	1%	—	—
Gypsum	0.2%	—	—
NaCl	4.5%	6%	—
Insoluble Materials	0.1%	—	5%
<u>Solid Waste</u>			
Rock salt purification section			
Volume	—	260Kg	260Kg
Water	—	100Kg	100Kg
Solid	—	160Kg	160Kg
Main contents	—	Gypsum CaCO ₃ , NaCl	Gypsum CaCO ₃ , NaCl
Distillation section			
Volume	1,000 – 1,300Kg	100Kg	1,000 – 1,300Kg
Liquid	700 – 900Kg	40Kg	700 – 900Kg
Solid (Dry base)	300 – 400Kg	60Kg	300 – 400Kg
Main contents	Unreacted CaCO ₃	CaCO ₃	Unreacted CaCO ₃

* To be recycled to rock salt purification section.

lity that makes it easy to separate it from the system, by settling operation, in order to minimize the calcium carbonate contents in the effluent solution. On the other hand, slaked lime forms a white muddy emulsion in aqueous solution so that if the solution is disposed of without treatment, slaked lime will cause the transparency of the water of the disposal area to be reduced. Therefore, it is general practice to neutralize the aqueous solution containing slaked lime with carbon dioxide in order to convert slaked lime to calcium carbonate which can be settled out as discussed above. As for calcium chloride, its solubility in water is so high that it is a highly-energy-consuming operation to separate it as a solid substance. In addition to this fact, there are no effluent standards which limit the disposal of calcium chloride solution, therefore the solution is usually disposed after the dilution with water. Liquid effluents from both the Solvay and Partial AC Processes contain such calcium salts as discussed above, and therefore it is general practice in Japanese soda ash plants which employ either the Solvay or Partial AC Process to dispose of the liquid effluent in a huge waste pond which is generally close to the open sea in order to permit it to flow out after diluting the solution, by tidal difference of the sea water level. Before disposal, the solution is neutralized by carbon dioxide to convert slaked lime to calcium carbonate and then the solution is sent to the waste pond, where solid calcium carbonate is settled. Since this settlement operation necessitates quite a long time and the amount of liquid effluent is so large the waste pond requires use of a huge area of land. On the other hand, liquid effluent from the Full AC Process is an aqueous salt solution, with approximately 6% of salt concentration, and is obtained from the ammonia recovery section as a filtrate. However, the solution can be recycled to the rock salt purification section of the process. Therefore, it can be judged that no pollutant liquid effluent will be disposed from a Full AC Process plant.

2-1-2 Solid Effluents from each Process

In this project, it is a basic condition to utilize rock salt, which contains more sulfate salts, especially gypsum, than the crude salt normally used for the production of soda ash. Therefore, in this Project, it is necessary to install an additional process section of the rock salt purification section in order to remove sulfates from the system, for either the Partial or Full AC Process. In the Solvay Process, sulfates are put into the process without purifying the rock salt and are separated with calcium salts as liquid effluent which is discussed in the above section.

In the Full and Partial AC Process, sulfate salts are separated as a filter cake in the rock salt purification section. The filter cake is a mixture of sulfate salts, salt, and calcium carbonate and the mixture is easy to solidify to form solid earth after disposal in a waste pond. And as mixture is insoluble in water these substances in the mixture will not be dissolved. In all processes, there are other solid effluents from the ammonia distillation section; these are solids with high calcium carbonate content.

Both of the solid effluents discussed above are generally disposed of in a pit, which is later covered by earth. A site where this disposal practice has been used can be used later for housing and as industrial land, although it is not suitable for agricultural use.

2-2 LIQUID EFFLUENT STANDARDS IN VARIOUS COUNTRIES

As discussed in the foregoing, industrial pollution from a soda ash production process, if any, is only a liquid effluent, from the Solvay or Partial AC Process. Therefore, in this section, discussion will be made on how the liquid effluent is treated, according to standards in various countries.

2-2-1 Liquid Effluent Standards in Japan

The liquid effluent standard in Japan is shown in Table AV-2-2. As is clear from the table there are no items which directly limit the disposal of calcium chloride and other calcium salts. Regarding the chemical oxygen demand (C.O.D.), calcium chloride is such a stable substance that it will not affect the C.O.D. Therefore, in Japan, soda ash plants using the Solvay or Partial AC Process are disposing of the liquid effluent without special treatment other than neutralization and settling of suspended and solid materials. Even the concentration of calcium carbonate is not usually controlled, but it usually depends upon the tidal difference for dilution and discharge of the solution.

2-2-2 Liquid Effluent Standards in Other Industrialized Countries

(1) United States

Generally, in the USA, the effluent standards differ among the states and according to the place of disposal. There are no standards, which limit the disposal of calcium salts into the open sea as may be used by this project in Laem Chabang, Thailand. However in the inland waters in Oklahoma State, there is a regulation limiting the disposal of calcium salts to 40 p.p.m. maximum, when the effluent is discharged into agricultural water resources.

Table AV-2-2 LIQUID EFFLUENT STANDARD IN JAPAN

pH	i. Disposal to open sea	5.0-9.0
	ii. Disposal to public water other than sea	5.8-8.6
B. O. D.	160 mg/l	
C. O. D.	160 mg/l	
Floating Substances	200 mg/l	
Phenols	5 mg/l	
Copper	3 mg/l	
Mineral Oils	5 mg/l	
Animal and Vegetable Oils	30 mg/l	
Zinc	5 mg/l	
Soluble Iron	10 mg/l	
Soluble Manganese	10 mg/l	
Chromes	2 mg/l	
Fluorines	15 mg/l	

(2) France

Liquid effluent standards are regulated for each industry and for disposal to each water territory, however no items are found for the standards to limit the disposal of calcium salts.

(3) West Germany

Liquid effluent standards are not established, but industries have to follow the effluent guidelines set by the Water Quality Control Committee. The Effluent guidelines state that the liquid should be disposed of only after the effluents are treated by the most advanced technology to remove the pollutants.

2-2-3 Liquid Effluent Standards in Thailand

The Thai standards are shown in Table AV-2-3; there are no substantial differences from Japanese standards, therefore the same discussion as in Section 2-3-1 above should be applied.

**Table AV-2-3 MINISTRY OF INDUSTRY NOTIFICATION ON
ENVIRONMENTAL PROTECTION STANDARDS
2ND ISSUE (1970) AND 11TH ISSUE (1979)**

22. Not to drain any water from industries before treated and the treated water must be as follows:

- (1) The pH value must be in the range of 5-9.
- (2) The permanganate contaminant not more than 60 milligrams per liter.
- (3) All the dissolved solids not more than 2,000 milligrams per liter.
- (4) Sulfide (calculated in the form of H₂S) not more than 1 milligram per liter.
- (5) Cyanide (calculated in the form of HCN) not more than 0.2 milligrams per liter.
- (6) The heavy metals limitations are as below.
 - 6.1 Zinc not more than 5 milligrams per liter.
 - 6.2 Chromium not more than 0.5 milligrams per liter.
 - 6.3 Arsenic not more than 0.25 milligrams per liter.
 - 6.4 Copper not more than 1 milligram per liter.
 - 6.5 Mercury not more than 0.005 milligrams per liter.
 - 6.6 Cadmium not more than 0.03 milligrams per liter.
 - 6.7 Barium not more than 1 milligram per liter.
 - 6.8 Selenium not more than 0.02 milligrams per liter.
 - 6.9 Lead not more than 0.2 milligrams per liter.
 - 6.10 Nickel not more than 0.2 milligrams per liter.
 - 6.11 Manganese not more than 5 milligrams per liter.
- (7) Treated water must contain no tar.
- (8) Oil & Grease not more than 5 milligrams per liter.
- (9) Formaldehyde not more than 1 milligram per liter.
- (10) Phenols & Cresols not more than 1 milligram per liter.

- (11) Free chlorine not more than 1 milligram per liter.
- (12) Insecticides and radiating elements must not appear.
- (13) If the ratios of the mixture of waste water to the public fresh water area in the range of 1:8 to 1:150, the polluted suspensions must not more than 30 ppm and if the ratios of the mixture of waste water to the public fresh water are in the range of 1:151 to 1:300, the polluted suspensions must not more than 60 ppm and if the ratios of the mixture of waste water to the public fresh water are in the range of 1:301 to 1:500, the polluted suspensions must not more than 150 ppm.
- (14) B.O.D. value (Biochemical Oxygen Demand) (measure 5 days at 20°C) must not more than 20 milligrams per liter or can be slightly more depending on climatic conditions and the drainage system must be accepted by the government authorities but not more than 60 milligrams per liter.
- (15) The temperature of wasted water must not more than 40°C.
- (16) Color and odor of wasted water before drained to the public must not be harmful and detestable.

Translated by Vinit Hansamuth

ANNEX V-3 OPTIMIZATION OF PROJECT SCHEME

In this part of the study, various conceivable alternatives are established in connection with planning of the construction of a soda ash plant, evaluation criteria are adopted in order to compare them, and the optimum alternative is selected.

3-1 DEFINITION OF ALTERNATIVES

As factors which influence selection of the project scheme for this soda ash plant, the following are identified.

1. Soda ash production process
2. Level of demand for soda ash, and soda ash production capacity
3. Level of demand for byproduct ammonium chloride, and ammonium chloride production capacity.
4. Initial investment cost
5. Unit production cost
6. Internal rate of return
7. Raw material inputs and waste output

From the above major factors, (4), (5) and (6) are suitably treated as evaluation criteria, and (1), (2), (3) and (7) are suitably treated as assumptions in establishing the alternatives.

3-1-1 Soda Ash Production Process

As in noted in Annex V-1, there are three processes available, as follows.

1. Solvay Process
2. Partial AC Process

3. Full AC Process

3-1-2 Level of Demand for Products, and Production Planning

Demand for soda ash and ammonium chloride within the ASEAN region is discussed in Part II and summarized in Table AV-3-1, from which it is evident that demand for the two products is growing at approximately the same rate, and the ratio of demand for the two is as follows.

$$\frac{\text{Ammonium chloride demand}}{\text{Soda ash demand}} = \frac{380}{500} = 0.76$$

Further, as discussed in the section on the market study in Part II, whereas it is possible to add some export demand for soda ash, such demand is very low in the case of ammonium chloride; while demand for ammonium chloride within the ASEAN nations is almost zero, the maximum level of exports to outside the ASEAN region is on the order of 50,000 t/y.

In connection with production planning, in view of the nature of the process of transfer of technology, and learning curves which may be expected of operators, the maximum attainable utilization of capacity is considered to be as follows.

Year of operation	Maximum technical utilization of capacity (%)
First	70
Second	80
Third	90
Forth	100

These limits are plotted for 400,000 t/y and 500,000 t/y capacity plants as shown in Figure AV-3-1.

Table AV-3-1 RESULTS OF DEMAND PROJECTIONS FOR SODA ASH AND AMMONIUM CHLORIDE

	(000 ton)						
	1985	1986	1987	1988	1989	1990	1995
Soda ash (ASEAN)	429.5	458.6	489.8	519.7	554.3	592.6	770.3
Ammonium chloride (Outside of Thailand)	283.1	309.6	326.5	342.9	359.0	373.2	433.2

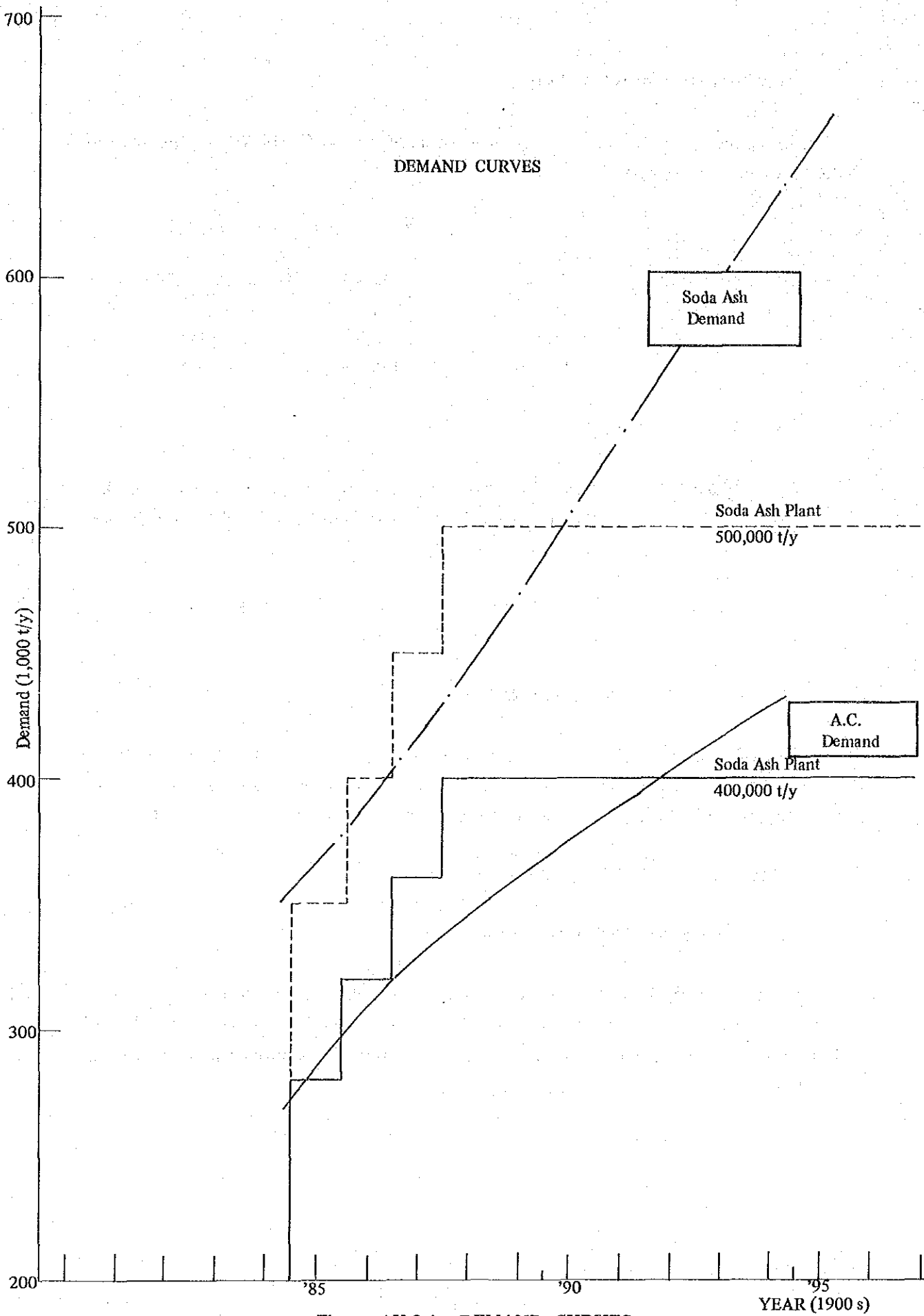


Figure AV-3-1 DEMAND CURVES
AV-17

3-1-3 Definition of Alternatives

On the basis of the information given in 2-2 above, and in Figure AV-3-1, the following alternatives are conceivable.

	Production Process	Production Capacity (t/y)	
		Soda Ash	Ammonium Chloride
Case A	Solvay	500,000	—
Case B	Partial AC	500,000	380,000
Case C	Full AC	400,000	400,000

Regarding Case C, the following was further defined:

Case C—D Production quantity of ammonium chloride taken as equal to domestic Thai demand. Therefore, production of soda ash is somewhat reduced.

Case C—E The soda ash plant is operated at full capacity, and surplus ammonium chloride is exported.

3-2 CONTENTS OF EACH ALTERNATIVE

The unit consumption of raw materials and utilities for each alternative are given in Table AV-3-2. A general plan of each was made on the basis of these raw material and utility requirements, and the major process plant equipment for each are as shown in Table AV-3-3.

3-3 EVALUATION OF EACH ALTERNATIVE

3-3-1 Estimation of Required Capital

On the basis of the outline of each alternative as defined in part 3 immediately above, capital requirements were estimated, with results as summarized in Tables AV-3-4, 5 and 6. That is, with the exception of interest during construction, the required capital for each case is as follows.

Table AV-3-2 UNIT CONSUMPTION OF RAW MATERIALS AND UTILITIES FOR EACH ALTERNATIVE

	(per ton of soda ash)		
	Case A Solvay Process	Case B Partial AC Process	Case C Full AC Process
Production scale (t/y)	500,000	500,000	400,000
Soda ash Ammonium chloride	—	380,000	400,000
Unit consumption of raw materials			
Salt (US\$17/t)	1,620 Kg	1,413 Kg	1,413 Kg
Limestone (US\$10.5/t)	1,280 Kg	307 Kg	—
Cokes (US\$210/t)	120 Kg	28.8 Kg	—
Carbon dioxide (0)	—	332 Nm ³	332 Nm ³
Ammonia (US\$175/t)	4.3 Kg	243 Kg	320 Kg
Sodium sulfide (US\$735/t)	0.76 Kg	—	—
Quicklime (US\$28/t)	—	46 Kg	46 Kg
Caustic soda (US\$420/t)	—	42 Kg	42 Kg
Unit consumption of utilities			
Electric power (US\$0.066/KWH)	250 KWH	524 KWH	496 KWH
Water (US\$0.108/m ³)	61.4 m ³	45.3 m ³	25.6 m ³
Heavy oil (US\$227/m ³)	0.30 m ³	0.280 m ³	0.208 m ³

Note: Figures in parentheses are projected prices as of 1985, with prices of raw materials escalated at 7% p.a. and of utilities escalated at 5% p.a. from 1980 prevailing prices.

Table AV-3-3 MAJOR PROCESS PLANT EQUIPMENT

	Case A		Case B		Case C		Remarks
	Solvay	500,000 t/y	Partial AC	500,000 t/y 380,000 t/y	Full AC	400,000 t/y 400,000 t/y	
Limestone vertical shaft kiln	4 sets		1 sets		None		
Ammonia still	3 sets		2 sets		2 sets		
Lime still	3 sets		None		None		
Kiln & mixed gas compressor	2 sets		2 sets		2 sets		
CO ₂ gas compressor	3 sets		3 sets		3 sets		
Carbonating tower	10 sets		20 sets		16 sets		
Calciner	5 sets		5 sets		4 sets		
Dense ash dryer	2 sets		2 sets		2 sets		
Raw salt purification unit	1 set		1 set		1 set		
Bicarbonate separator	6 sets		6 sets		5 sets		
Monohydrate crystallizer	3 sets		3 sets		3 sets		
Ammoniated solution coders	None		34 sets		26 sets		
Ammonium chloride centrifuge	None		8 sets		8 sets		
Ammonia refrigerator	None		6 sets		4 sets		
Ammonia chloride dryer	None		4 sets		4 sets		

Table AV-3-4 ESTIMATED CAPITAL REQUIREMENTS

CASE A: SOLVAY 500,000 t/Y

(US\$000)			
	Foreign	Local	Total
A. Land Acquisition	0	2,191	2,191
B. Site Preparation	0	3,659	3,659
C. Plant Direct Cost	86,880	28,895	115,775
D. Housing Colony	2,842	7,962	10,804
E. Construction Equipment	4,347	2,142	6,489
F. Ocean Freight, Insurance & Local Handling	13,477	3,617	17,094
G. Indirect Field Expenses	968	3,832	4,800
H. Services	24,709	2,415	27,124
I. Project Management	4,672	1,051	5,723
J. Pre-Operation Expenses	4,560	4,330	8,890
Base Project Cost (B/C) (in Sept. End--1980 Prices)	142,455	60,094	202,549
K. Physical Contingency (% of B/C)	11,706 (8.2%)	4,042 (6.7%)	15,748 (7.8%)
L. Price Contingency (% of B/C)	44,401 (31.2%)	27,043 (45.0%)	71,444 (35.3%)
M. Initial Working Capital (in Mid. -1985 Prices)	12,856	12,857	25,713
<u>Total Project Cost</u>	211,418	104,036	315,454

Table AV-3-5 ESTIMATED CAPITAL REQUIREMENTS

500,000 t/Y
CASE B: PARTIAL AC 380,000 t/Y

	(US\$000)		
	Foreign	Local	Total
A. Land Acquisition	0	1,155	1,155
B. Site Preparation	0	3,745	3,745
C. Plant Direct Cost	127,011	35,919	162,930
D. Housing Colony	2,842	7,962	10,804
E. Construction Equipment	6,046	3,768	9,814
F. Ocean Freight, Insurance & Local Handling	19,547	5,316	24,863
G. Indirect Field Expenses	1,363	5,393	6,756
H. Services	36,575	3,401	39,976
I. Project Management	4,672	1,051	5,723
J. Pre-Operation Expenses	5,224	5,111	10,335
<u>Base Project Cost (B/C)</u> (in Sept. End--1980 Prices)	203,280	72,821	276,101
K. Physical Contingency (% of B/C)	17,028 (8.4%)	5,078 (7.0%)	22,106 (8.0%)
L. Price Contingency (% of B/C)	63,426 (31.2%)	30,919 (42.5%)	94,345 (34.2%)
M. Initial Working Capital (in Mid. --1985 Prices)	14,583	14,584	29,167
<u>Total Project Cost</u>	298,317	123,402	421,719

Table AV-3-6 ESTIMATED CAPITAL REQUIREMENTS

400,000 t/Y
CASE C: FULL AC 400,000 t/Y

	(US\$000)		
	Foreign	Local	Total
A. Land Acquisition	0	1,155	1,155
B. Site Preparation	0	3,567	3,567
C. Plant Direct Cost	103,510	28,833	132,343
D. Housing Colony	2,842	7,962	10,804
E. Construction Equipment	5,108	2,778	7,886
F. Ocean Freight, Insurance & Local Handling	15,350	4,142	19,492
G. Indirect Field Expenses	1,070	4,237	5,307
H. Services	30,337	2,671	33,008
I. Project Management	4,672	1,051	5,723
J. Pre-Operation Expenses	4,213	3,756	7,969
<u>Base Project Cost (B/C)</u> (in Sept. End—1980 Prices)	167,102	60,152	227,254
K. Physical Contingency (% of B/C)	13,898 (8.3%)	4,167 (6.9%)	18,065 (7.9%)
L. Price Contingency (% of B/C)	52,156 (31.2%)	25,707 (42.7%)	77,863 (34.3%)
M. Initial Working Capital (in Mid. —1985 Prices)	12,787	12,787	25,574
<u>Total Project Cost</u>	245,943	102,813	348,756

	Case A	Case B	Case C
Land acquisition and site preparation cost	7,850	6,443	6,443
Construction cost	269,970	372,250	306,053
Pre-operation cost	11,921	13,859	10,686
Initial working capital	25,713	29,167	25,574
Total required capital	315,454	421,719	348,756

(construction completed in mid-1985)

As is shown above, from the viewpoint of the initial investment amount (capital requirement) Case A, the Solvay Process, is the best, and it is followed by the Full AC Process and the Partial AC Process is the least attractive.

3-3-2 Estimation of Production Cost

(1) Unit consumption of raw materials and utilities in each alternative

Unit consumption of raw materials and utilities for each alternative case, per ton of soda ash produced, are given in Table AV-3-2. Also in the Table, prices are given for raw materials and utilities.

(2) Unit production cost for each alternative

Based on the assumptions made in Part VII and prices for raw materials and utilities set above, unit production cost for each alternative is estimated in Table AV-3-7.

As indicated in Table AV-3-7, the order with regard to soda ash production cost is Case C, Case B, and Case A, in order of ascending cost. This indicates that the greater the use of the chlorine in rock salt (the sodium portion becomes soda ash), the lower the production cost. Moreover, in Case A and Case B, the cost of soda ash production is higher than the estimated market price of soda ash in Thailand in 1985, US\$225/ton.

3-3-3 Calculation of the Internal Rate of Return for Each Alternative

As a result of analysis of production cost, it was found that in Case A production cost exceeds the estimated market price, so in this case there is clearly no return on investment. Therefore the calculation of the internal rate of return was performed only for Case B and C. With regard to Case C, two cases were used, namely,

Table AV-3-7 UNIT PRODUCTION COST FOR EACH CASE

	Unit production cost (US\$000/ton)		
	Case A	Case B	Case C
Production scale (t/y)			
Process	Solvay	Partial AC	Full AC
Soda ash	500,000	500,000	400,000
Ammonium chloride	—	380,000	400,000
Raw material cost			
Rock salt	13,770 (9.03)	12,010 (6.20)	9,608 (6.30)
Limestone	6,720 (4.41)	1,610 (0.83)	—
Cokes	12,600 (8.26)	3,025 (1.56)	—
Carbon dioxide	—	—	—
Ammonia	377 (0.25)	21,263 (10.98)	22,400 (14.75)
Sodium sulfide	280 (0.18)	—	—
Quicklime	—	645 (0.33)	516 (0.34)
Caustic soda	—	8,820 (4.55)	7,056 (4.65)
Raw materials total	33,747 (22.13)	47,373 (24.45)	39,580 (26.07)
Utilities cost			
Electric power	9,250 (5.41)	17,290 (8.93)	13,096 (8.63)
Water	3,315 (2.17)	2,445 (1.26)	1,104 (0.73)
Fuel oil	35,070 (22.99)	31,780 (16.41)	18,888 (12.44)
Utilities total	46,635 (30.57)	51,515 (26.41)	33,088 (21.80)
Total variable cost	80,382 (52.70)	98,888 (51.05)	72,668 (47.87)
Fixed cost			
Depreciation	29,937 (19.61)	40,948 (21.15)	33,606 (22.13)
Labor	2,527 (1.66)	2,527 (1.30)	2,527 (1.66)
General & administrative	5,054 (3.31)	5,054 (2.61)	5,054 (3.33)
Maintenance & repair	7,581 (4.97)	11,167 (5.77)	9,182 (6.05)
Tax & insurance	802 (0.53)	1,080 (0.56)	894 (0.59)
Waste disposal	1,030 (0.68)	250 (0.13)	—
Return on investment (8%)	25,236 (16.54)	33,738 (17.43)	27,900 (18.37)
Total fixed costs	72,167 (47.30)	94,764 (48.95)	79,163 (52.13)
Total production cost (US\$1,000/ton)	152,549 (100.00)	193,652 (100.00)	151,831 (100.00)
Soda ash production cost (US\$/ton)*	305.5	273.30	229.6
Ammonium chloride production cost (US\$/ton)*	—	150.0	150.0

(Note) * Depreciation in 10-years straight line

Case C—D ••••• The market for ammonium chloride is limited to the domestic Thai market, and production of ammonium chloride is carried out only to satisfy that demand. Therefore, because this case calls for use of the Full AC Process, the level of soda ash production is the same as that of ammonium chloride, and the differential between soda ash supply and demand is amplified.

Case C—E ••••• The soda ash plant is operated at full capacity and ammonium chloride which cannot be absorbed by the domestic Thai market is exported.

The internal rate of return was computed on the basis of a 12-years project life period. The results of calculation of the internal rate of return for each case are given in Tables AV-3-8, 9 and 10, and are:

	<u>Internal rate of return (IRR)</u>	
	<u>Before tax</u>	<u>After tax</u>
Case B	2.92%	2.18%
Case C—D	8.27%	7.32%
Case C—E	9.11%	8.22%

Only Case C—E has an internal rate of return which exceeds 8%. This Case C—E assumes that the quantity of ammonium chloride exports is less than 50,000 t, and since exports are possible, hereafter Case C—E is used to represent Case C. The assumptions used for calculation of the IRR are given in Part VII.

3-3-4 Waste Outputs in Each Alternative Case

Liquid and solid wastes are produced by soda ash plants; detailed study of the matter of waste products is given in Annex V-2. Discussion here is limited to liquid effluent from the plant.

Use of the Solvay Process, as in Case A, would result in production of 10.5 m³ of liquid effluent per ton soda ash, or 16,000 m³ each day of operation. In this effluent are contained soluble matter such as calcium chloride and salt, and insoluble matter such as calcium carbonate, slaked lime, and gypsum. Processing of the effluent would require a very large pond in which insoluble matter would be permitted to settle, so that the purified liquid could then be discharged. These settled solids have no commercial value but, rather, represent a dis-economy as their accumulation causes the settlement pond to become larger year by year. The

Table AV-3-8 ASEAN RS/SA PROJECT IN THAILAND
IRR CALCULATION ON TOTAL INVESTMENT (US\$ 1000)
- FULL AC (AHMO. CHL. DOMESTIC)

YEAR	PROFIT BEFORE TAX				INTEREST ON DEBT				(BEFORE TAX)				(AFTER TAX)				
	TOTAL INVESTMENT	TAX	DEPRECIATION	L-T DEBT	RETURN BEFORE TAX	DISCOUNT FACTOR	PRESENT VALUE INVEST.	RETURN	(LESS) INCOME TAX	RETURN AFTER TAX	DISCOUNT FACTOR	PRESENT VALUE INVEST.	RETURN	(LESS) INCOME TAX	RETURN AFTER TAX	DISCOUNT FACTOR	PRESENT VALUE INVEST.
1982	98258.	0.	0.	0.	0.	1.0000	98258.	0.	0.	0.	1.0000	98258.	0.	0.	0.	1.0000	98258.
1983	122420.	0.	0.	0.	0.	0.9236	113073.	0.	0.	0.	0.9318	114070.	0.	0.	0.	0.9318	114070.
1984	128077.	0.	0.	0.	0.	0.8531	109264.	0.	0.	0.	0.8682	111201.	0.	0.	0.	0.8682	111201.
1985	0.	-5496.	33606.	12883.	49993.	0.7880	32301.	32301.	40993.	0.8090	0.	33164.	0.	3821.	0.7538	0.	28963.
1986	0.	-6994.	33606.	11809.	38421.	0.7278	27963.	27963.	42863.	0.7024	0.	30108.	0.	44984.	0.6545	0.	29442.
1987	0.	-1479.	33606.	10736.	42863.	0.6722	28814.	28814.	4870.	0.6099	0.	29438.	0.	52151.	0.5883	0.	29635.
1988	0.	1716.	33606.	9662.	44984.	0.6209	27931.	27931.	52151.	0.5642	0.	28933.	0.	56701.	0.4934	0.	21974.
1989	0.	6075.	33606.	8589.	4870.	0.5735	27624.	27624.	56701.	0.5273	0.	27974.	0.	6662.	0.4597	0.	23112.
1990	0.	11029.	33606.	7515.	52151.	0.5297	26233.	26233.	7161.	0.4284	0.	21473.	0.	19422.	0.3992	0.	15255.
1991	0.	14594.	33606.	6441.	54642.	0.4892	25623.	25623.	19422.	0.3719	0.	14122.	0.	19867.	0.3719	0.	14122.
1992	0.	17727.	33606.	5368.	56701.	0.4519	25224.	25224.	19867.	0.3719	0.	14122.	0.	19867.	0.3719	0.	14122.
1993	0.	19035.	33606.	4294.	56936.	0.4174	25224.	25224.	19867.	0.3719	0.	14122.	0.	19867.	0.3719	0.	14122.
1994	0.	20460.	33606.	3221.	57287.	0.3855	25224.	25224.	19867.	0.3719	0.	14122.	0.	19867.	0.3719	0.	14122.
1995	0.	5492.	0.	2147.	57839.	0.3561	25224.	25224.	19867.	0.3719	0.	14122.	0.	19867.	0.3719	0.	14122.
1996	-32017.	56763.	0.	1074.	57837.	0.3289	10530.	19022.	19867.	0.3719	0.	14122.	0.	19867.	0.3719	0.	14122.
TOTAL	316739.				60874.		310065.	310065.	555611.			311622.		555611.			311622.

***** INTERNAL RATE OF RETURN ***** 8.27 PER CENT (BEFORE TAX) 7.32 PER CENT (AFTER TAX)

***** PAY-OUT PERIOD ***** 7.81 YEAR (BEFORE TAX) 7.81 YEAR (AFTER TAX)
(THE YEAR WHEN THE TOTAL CAPITAL COST WILL BE PAID OUT BY ACCUMULATED TOTAL RETURN, FROM THE BEG. OF OPERATION)

CAPITAL REQUIREMENTS

		SOURCE OF FUNDS
LAND AND SITE IMPROVEMENT	6443.	PAID-UP SHARE CAPITAL
CONSTRUCTED FACILITIES	306051.	LONG TERM DEBT
TRAINING COST	1680.	SHORT TERM DEBT
LOSS DG. START UP	8480.	FINANCIAL RESOURCES
SPARE PARTS	528.	
PRE-INVEST AND STAT-UP EXP	10688.	
INTEREST DURING CONSTRUCTION	19324.	
TOTAL FIXED CAPITAL	342506.	
INITIAL WORKING CAPITAL	25574.	
TOTAL CAPITAL COST	368080.	

Table AV-3-9 - ASEAN RS/SA PROJECT IN THAILAND
IRR CALCULATION ON TOTAL INVESTMENT
ANS# 1000

PARTIAL AC (CASE 8-0)

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATION	INTEREST ON L-T DEBT	(BEFORE TAX)			(AFTER TAX)		
					RETURN BEFORE TAX	DISCOUNT FACTOR	PRESENT VALUE INVEST.	RETURN AFTER TAX	DISCOUNT FACTOR	PRESENT VALUE INVEST.
1982	118118.	0.	0.	0.	0.0000	1.0000	118118.	0.	1.0000	118118.
1983	148900.	0.	0.	0.	0.9716	0.9716	144670.	0.	0.9786	145719.
1984	154701.	0.	0.	0.	0.9440	0.9440	146030.	0.	0.9577	148161.
1985	0.	-16690.	40948.	15578.	0.9172	0.9172	36536.	0.	0.9373	37336.
1986	0.	-22804.	40948.	14280.	0.8911	0.8911	28893.	0.	0.9172	29740.
1987	0.	-19309.	40948.	12982.	0.8658	0.8658	29974.	0.	0.8975	31076.
1988	0.	-16061.	40948.	11684.	0.8412	0.8412	36570.	0.	0.8785	32125.
1989	0.	-1249.	40948.	10385.	0.8173	0.8173	40084.	0.	0.8597	34460.
1990	0.	-9289.	40948.	9087.	0.7941	0.7941	40746.	0.	0.8413	34280.
1991	0.	-5942.	40948.	7789.	0.7715	0.7715	42794.	0.	0.8233	35235.
1992	0.	-4543.	40948.	6491.	0.7496	0.7496	42895.	0.	0.8058	34583.
1993	0.	-1715.	40948.	5193.	0.7283	0.7283	44425.	0.	0.7885	35031.
1994	0.	1380.	40948.	3895.	0.7076	0.7076	46222.	483.	0.7717	35296.
1995	0.	42166.	0.	2596.	0.6875	0.6875	46762.	15458.	0.7552	23641.
1996	-35610.	45663.	0.	1298.	0.6680	0.6680	-23787.	15982.	0.7391	-26318.
TOTAL	386109.			49340.			385037.	462417.		385679.

***** INTERNAL RATE OF RETURN ***** 2.92 PER CENT (BEFORE TAX) 2.18 PER CENT (AFTER TAX)

***** PAY-OUT PERIOD ***** 10.95 YEAR (BEFORE TAX) 11.44 YEAR (AFTER TAX)
(THE YEAR WHEN THE TOTAL CAPITAL COST WILL BE PAID OUT BY ACCUMULATED TOTAL RETURN, FROM THE BEG. OF OPERATION)

CAPITAL REQUIREMENTS		SOURCE OF FUNDS	
LAND AND SITE IMPROVEMENT	6443.	PAID-UP SHARE CAPITAL	133526.
CONSTRUCTED FACILITIES	372250.	LONG TERM DEBT	311560.
TRAINING COST	1680.	SHORT TERM DEBT	0.
LOSS DG. START UP	11539.	FINANCIAL RESOURCES	445086.
SPARE PARTS	640.		
PRE-INVEST AND START-UP EXP	13859.		
INTEREST DURING CONSTRUCTION	23367.		
TOTAL FIXED CAPITAL	415919.		
INITIAL WORKING CAPITAL	29167.		
TOTAL CAPITAL COST	445086.		

Table AV-3-10 ASEAN RS/SA PROJECT IN THAILAND
IRR CALCULATION ON TOTAL INVESTMENT (US\$ 1000)
- FULL AC (INTEREST 5%)

YEAR	PROFIT BEFORE TAX				INTEREST ON DEBT				(BEFORE TAX)				(AFTER TAX)			
	TOTAL INVESTMENT	DEPRECIATION	RETURN BEFORE TAX	DISCOUNT FACTOR	PRESENT VALUE INVEST.	RETURN	DISCOUNT FACTOR	PRESENT VALUE	RETURN AFTER TAX	DISCOUNT FACTOR	PRESENT VALUE INVEST.	RETURN	DISCOUNT FACTOR	PRESENT VALUE INVEST.	RETURN	
1982	98258.	0.	0.	1.0000	98258.	0.	0.	0.	0.	1.0000	98258.	0.	1.0000	98258.	0.	
1983	12420.	0.	0.	0.9165	112198.	0.	0.	0.	0.	0.9165	112198.	0.	0.9241	113125.	0.	
1984	123077.	0.	0.	0.8400	107582.	0.	0.	0.	0.	0.8400	107582.	0.	0.8539	109365.	0.	
1985	0.	-5496.	33606.	0.7698	0.	12883.	40993.	31558.	0.	0.7698	0.	40993.	0.7891	0.	32346.	
1986	0.	-3610.	33606.	0.7056	0.	11809.	41806.	29496.	0.	0.7056	0.	41806.	0.7291	0.	30482.	
1987	0.	3956.	33606.	0.6466	0.	10736.	42998.	31231.	0.	0.6466	0.	42998.	0.6738	0.	32542.	
1988	0.	11636.	33606.	0.5926	0.	9652.	54904.	32539.	0.	0.5926	0.	54904.	0.6226	0.	34184.	
1989	0.	12157.	33606.	0.5432	0.	8589.	54352.	29522.	0.	0.5432	0.	54352.	0.5753	0.	31271.	
1990	0.	14104.	33606.	0.4978	0.	7515.	52225.	27492.	0.	0.4978	0.	52225.	0.5317	0.	29360.	
1991	0.	15921.	33606.	0.4562	0.	6441.	55969.	25535.	0.	0.4562	0.	55969.	0.4913	0.	27497.	
1992	0.	17610.	33606.	0.4181	0.	5368.	56584.	23661.	0.	0.4181	0.	56584.	0.4540	0.	25688.	
1993	0.	15035.	33606.	0.3832	0.	4294.	56936.	21820.	0.	0.3832	0.	56936.	0.4195	0.	24090.	
1994	0.	20460.	33606.	0.3512	0.	3221.	57287.	20121.	0.	0.3512	0.	57287.	0.3877	0.	19431.	
1995	0.	54452.	0.	0.3219	0.	2147.	57639.	18554.	0.	0.3219	0.	57639.	0.3582	0.	13690.	
1996	-32017.	56763.	0.	0.2950	-9446.	1074.	57837.	17063.	0.	0.2950	-9446.	17063.	0.3310	-10598.	12569.	
TOTAL	316739.				637829.			308592.			308592.			584717.	310150.	

***** INTERNAL RATE OF RETURN ***** 9.11 PER CENT (BEFORE TAX) 8.22 PER CENT (AFTER TAX)
 ***** PAY-OUT PERIOD ***** 7-29 YEAR (BEFORE TAX) 7-29 YEAR (AFTER TAX)
 (THE YEAR WHEN THE TOTAL CAPITAL COST WILL BE PAID OUT BY ACCUMULATED TOTAL RETURN, FROM THE BEG. OF OPERATION)

CAPITAL REQUIREMENTS

		SOURCE OF FUNDS
LAND AND SITE IMPROVEMENT	6443.	PAID-UP SHARE CAPITAL
CONSTRUCTED FACILITIES	306051.	LONG TERM DEBT
TRAINING COST	1680.	SHORT TERM DEBT
LOSS DG. START UP	8480.	FINANCIAL RESOURCES
SPARE PARTS	528.	
PRE-INVEST AND START-UP EXP	10688.	
INTEREST DURING CONSTRUCTION	19224.	
TOTAL FIXED CAPITAL	342506.	
INITIAL WORKING CAPITAL	25574.	
TOTAL CAPITAL COST	368080.	

value of this diseconomy, excluding the cost of land acquisition, would be on the order of US\$1,000,000 a year for pond construction.

In Case B, wherein the Partial AC Process is used, effluent is also produced, but in less quantity than in Case A. Evaluating the diseconomy as in Case A, it comes to the sum of US\$250,000 a year.

The Full AC Process, used in Case C, yields effluent which includes 6% brine and which totals 1,200 m³ a day, and because the effluent is discharged into the ocean, no problems arise.

From the viewpoint of waste outputs, Case C is most suitable, and in Case A and Case B in addition to the cost problem, other problems (such as pollution, difficulty of reuse of the settlement pond, etc.) would arise.

3-3-5 Conclusion

As a result of the comparative evaluation described above, Case C is found to be superior in terms of production cost, internal rate of return, and disposal of waste from the plant, and in overall terms is considered to be the best alternative of the three. Therefore, in the Evaluation Study Case C (Case C—E) is used as the basis for evaluation.

ANNEX V-4 COST OF CONSTRUCTION OF THE WATER PIPELINE, AND COST OF WATER SUPPLY

This Evaluation Study has been performed on the assumption that water requirements for the soda ash plant will be met by water from among that which the IEAT will supply to the Laem Chabang industrial estate from one or more reservoirs, notably the Dok Krai reservoir. However, estimation has also been made of the cost of independently securing a supply of water for the plant and this annex gives the results of investigation of the cost of construction of a pipeline and cost of water supply.

4-1 ASSUMPTIONS

The following two cases are postulated:

- Case 1: A water pipeline with the capacity of 1,500 m³/hr is constructed for the exclusive use of the soda ash plant
- Case 2: Assuming that the water requirement of the industrial estate as a whole is 5,000 m³/hr, and a pipeline with that capacity is constructed.

The direct construction cost in Thailand in October, 1980, was used. The water source was assumed to be the Dok Krai reservoir, and the length of the pipeline is to be 56 km, as it would follow Route 33. The following facilities at the reservoir are included in the estimation:

1. Water intake pump station
2. Water intake engine pump
3. Fuel tank
4. Diesel engine power generator
5. Surge vessel
6. Air compressor
7. Installation in the pump station
 - Piping
 - Power cables
 - Instrumentation

4-2 DIRECT CONSTRUCTION COST, AND WATER SUPPLY COST

	Case 1	Case 2
A. Discharge/hour (m ³ /hr)	1,500	5,000
B. Discharge/year (330 d/y) (MM m ³ /h)	11.88	39.66
C. Pipeline specifications		
Length (km)	56	56
Physical specs (API 5L-Gr.B)	28" O.D. x 0.321" W.T.	42" O.D. x 0.375" W.T.
Pump	750 m ³ /hr x 125 m Head x 3 units	1,000 m ³ /hr x 150 m Head x 6 units
D. Fuel tank	200 m ³	600 m ³
E. Others	--- Equivalent ---	
F. Direct construction cost (MUS\$)		
Pipe and other materials	11,714.	21,627.
Installation & civil work	8,160.	10,162.
Direct construction cost	19,874.	31,789.
G. Annual direct operation cost (MUS\$/y)		
F x 1/10	1,987	3,179
H. Direct water supply cost (US\$/m ³)		
G/B	0.1673	0.0802

4-3 CONCLUSION

When the above estimated water costs and water service charges of IEAT study, in 1980 prices, are compared, summarized below.

1. When an independent pipeline is constructed for this project:

Case 1: US\$0.1673/m³

2. The construction is to be on the basis of IEAT supplying water to the entire estate:

Case 2: US\$0.0802/m³

3. When water is purchased from IEAT:

Case 3: US\$0.0850/m³

It is indicated that it is costly for the Project to have a water pipeline for its exclusive use and the recommendable way is to rely on water supply which IEAT is to establish for the industrial estate, and further that the IEAT's present water service charges are at a reasonable level for the IEAT to bear the expense of construction of a new water pipeline to Laem Chabang.

ANNEX V-5 ALTERNATIVES IN OCEAN SHIPPING OF PRODUCTS

Products which are to be shipped by ocean-going vessels from the Project are soda ash and rock salt. Both of these are to be shipped in bulk, in principle. The average level of shipments will be:

Soda ash	200,000 t/y
Rock salt	300,000 t/y
Total	500,000 t/y

Loading of ships is to be done by means of equipment possessed by the company operating the soda ash plant and installed on the pier at the Laem Chabang Deep Sea Port, and by belt conveyor between the plant and pierside loading facilities. However, in case that the completion of the deep sea port is delayed, a comparative study has been made of alternatives to use of the Laem Chabang Deep Sea Port facilities which is the original plan.

5-1 DEFINITION OF THE ALTERNATIVES, AND THE CHARACTERISTICS OF EACH ALTERNATIVE

The three alternatives and their characteristics are as follows.

Case 1: Use of Laem Chabang Deep Sea Port, as planned in this report.

Case 2: Use of Sattahip Port

This alternative calls for use of the railway spur laid into the soda ash plant site by freight cars loaded with product which is transported to Sattahip Port, for loading on ship there. Although there would be no problem in using hopper cars for shipping rock salt in this manner (rock salt will be transported from the mine to the plant in hopper cars), in the case of soda ash, bulk transport in open cars would involve the risk of entry of foreign matter into the product and hence for Case 2 soda ash would have to be shipped in bags. Further, since there is no crane at Sattahip Port which can be used for loading, loading would have to be done by means of the ship's derrick, slowing the loading speed (50-100 t/h) and increasing the port charges.

Case 3: Use of barging, and loading offshore near Ko Si Chang Island

This method calls for construction of a temporary jetty for barges at the shore at Laem Chabang, and use of barge operators for transport of the product to an offshore loading point which would be near Ko Si Chang island. In this case, similar to the second case, loading would have to be done by the ship's derrick and hence loading speed would be low. In this case, however, because special barges would be used, it is thought that bulk shipment would be possible for both rock salt and soda ash.

5-2 COMPARISON OF ALTERNATIVES

5-2-1 Assumptions

1. Direct construction cost and direct operation cost are compared on the base of 1980 prices.
2. Regarding direct operation cost, marginal cost is added to the cost of Case 1, as the base.
3. Direct fixed costs include 8% return on investment.
4. Depreciation: 10 years, straight-line method
5. When bulk products are to be loaded by ship's derrick, handling loss is to be taken as 1% (for soda ash, US\$220/t; for rock salt, US\$17/t).
6. The cost of bagging is US\$10/t.
7. Rail freight charges for Laem Chabang-Sattahip freight are US\$0.65/t in accordance with Thai railway tariff charges.
8. Product transported to Sattahip by rail is unloaded there and stored overnight prior to loading aboard ship. Warehouse charges and other costs are taken as being US\$3/t.
9. Barging cost is quoted by a Thai barging company to be US\$5.4/t from Laem Chabang coast to off-shore Ko Si Chang.

5-3-2 Comparative Study

Name of Case	Case 1	Case 2	Case 3
	The Project	Sattahip	Barging
Transport cost			
1. Transport to pier	Belt conveyor	Soda ash; bagged. Rail freight cars; 50km	Belt conveyor
Marginal cost (MUS\$/y)	0	2,325.	0
2. Transport to vessel	Ditto	Truck (US\$3/t)	Barge (US\$5.4/t)
Marginal cost (MUS\$/y)	0	1,500.	2,700.
3. Ship loading (speed) *	Ship loader (700 t/hr)	Ship's derrick (50 - 100 t/hr)	Ship's derrick (50 - 100 t/hr)
Handling loss (cost increase; MUS\$/y)	0	51.	491.
Marginal transport cost (MUS\$/y)	0	3,876.	3,191.
Direct construction cost (MUS\$)	11,735.	0	10,408.
Marginal depreciation cost	0	-1,174.	-133.
Marginal investment return	0	-939.	-106.
Marginal direct fixed cost (MUS\$/y)	0	-2,113.	-239.
Marginal direct operation cost (MUS\$/y)	0	1,763.	2,952.
Marginal cost per ton (US\$/t)	0	3.53	5.90

(Note) * There would be a difference in cost due to difference in loading speed but it is ignored here.

5-3 CONCLUSIONS

First, the plan envisioned as part of the Project proper is suitable.

Second, even in the event that construction of the Laem Chabang Deep Sea Port is delayed, it is physically possible to load the products on ships. However, in such an event, there would be need to accept the economic burden of US\$3.4 or more per ton of product (soda ash or rock salt). Moreover, if the above port project is delayed, it will not be possible to directly deliver ammonia to the plant and the cost of ammonia will be increased greatly.

ANNEX V-6 ALTERNATIVES FOR SUPPLY OF CARBON DIOXIDE

Three alternatives are possible as the method of supplying carbon dioxide to the soda ash plant:

- Case 1: Limestone and cokes are purchased, and roasted in a lime kiln, and the carbon dioxide in the top part of the kiln off-gas can be used. However, in this case, there is no market for the limestone which would be produced.
- Case 2: Waste carbon dioxide could be purchased from the gas processing plant which PTT is constructing in Rayong, and after compressing it, conveying it by means of a pipeline for the distance of 61 km to the soda ash plant.
- Case 3: Byproduct carbon dioxide could be purchased from the ammonia plant of the fertilizer complex now being planned, if that complex is constructed. In the event that the Full AC Process is used in the soda ash plant, ammonia, in addition to carbon dioxide, could be purchased from the fertilizer complex. In that case, the mol ratio of ammonia and carbon dioxide would be 2:1, exactly the same as the mol ratio for production of urea.

It is thought that of the above three cases, the last, Case 3, is the most economical, but because the fertilizer complex is still being planned, no data are available for use in the present evaluation study. Therefore, investigation here is confined to Cases 1 and 2.

6-1 ASSUMPTIONS FOR COMPARISON AND CALCULATION

The following are assumed.

1. Direct construction costs and direct costs are to be compared in 1980 prices.
2. The value of quicklime produced in Case 1 is zero.
3. The cost of waste carbon dioxide from PTT is zero.
4. A return on investment of 8% is anticipated.

6-2 COMPARISON

Item	Case 1	Case 2
Required quantity of raw materials (annual)	Limestone, 256,000 t Cokes, 24,000 t	Carbon dioxide, 132.8 x 106 m ³
Outline of equipment	Lime kilns, 4 units (vertical shaft type)	Compressors, 1,850 HP x 4 units; pipeline, 61 km
Direct construction cost in Thailand in 1980 (MUS\$)	13,143	16,918
Raw materials price, 1980 prices	Limestone, US\$7.5/ton Cokes, US\$150/ton	Carbon dioxide, zero cost
Direct cost (MUS\$/y)		
Materials	5,520	0
Depreciation (10%)	1,314	1,692
Profit	1,051	1,353
Total	7,885	3,045

6-3 CONCLUSION

Waste carbon dioxide from the PTT plant should be used for this Project.

ANNEX VII

FINANCIAL STATEMENTS

FINANCIAL STATEMENTS

ALTERNATIVE CASE

ROCK SALT MINE

ROCK SALT : 1,800,000 T/Y

ASIAN RES/SA PROJECT IN THAILAND
 INCOME STATEMENTS (FOR YEARS ENDING JUNE 30)
 - ROCK SALT MINE: ALTN CASE (1800000/Y) - (US\$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION AND SALES											
CAPACITY	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.
CAPACITY UTILIZATION	0.700	0.800	0.900	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION	1260000.	1440000.	1620000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.
INCREASE IN INVENTORIES	210000.	30000.	30000.	30000.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME	1050000.	1410000.	1590000.	1770000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.
SALES REVENUE											
	24118.	30981.	34970.	38732.	39532.	39809.	40044.	40280.	40515.	40751.	40986.
COST OF SALES											
VARIABLE COST	19472.	22390.	25194.	27988.	28020.	28031.	28041.	28050.	28060.	28069.	28078.
DEPRECIATION & AMORTIZATION	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.
OTHER FIXED COST	1093.	1076.	1059.	1042.	1025.	1008.	991.	974.	957.	940.	923.
(INC) IN PRODUCT INVENTORIES	-4027.	-564.	-553.	-544.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) OF SALES	3985.	4484.	5675.	6651.	6892.	7175.	7418.	7661.	7904.	8147.	8390.
LESS: SALES EXPENSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OPERATING PROFIT OR (LOSS)	3985.	4484.	5675.	6651.	6892.	7175.	7418.	7661.	7904.	8147.	8390.
LESS: INTEREST	1702.	1818.	1653.	1487.	1322.	1157.	992.	826.	661.	496.	331.
ON LONG TERM DEBT	0.	199.	46.	0.	0.	0.	0.	0.	0.	0.	0.
ON SHORT TERM DEBT											
NET PROFIT OR (LOSS) BEFORE TAX	2007.	2467.	3976.	5164.	5570.	6018.	6426.	6835.	7243.	7651.	8060.
LESS: INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	3259.	3443.	3627.
NET PROFIT OR (LOSS) AFTER TAX	2007.	2467.	3976.	5164.	5570.	6018.	6426.	6835.	3984.	4208.	4433.

ASEAN PS/SA PROJECT IN THAILAND)
 INCOME STATEMENTS (FOR YEARS ENDING JUNE 30)
 - POCK SALT MINE: ALTN CASE (1800000T/Y) - (US\$ 1000)

	1996	1997	1998	1999
PRODUCTION AND SALES				
CAPACITY	1800000.	1800000.	1800000.	1800000.
CAPACITY UTILIZATION	1.000	1.000	1.000	1.000
PRODUCTION	1800000.	1800000.	1800000.	1800000.
INCREASE IN INVENTORIES	0.	0.	0.	0.
SALES VOLUME	1800000.	1800000.	1800000.	1800000.
SALES REVENUE	41222.	41457.	41692.	41928.
COST OF SALES	32588.	32581.	32573.	32566.
VARIABLE COST	28088.	28097.	28107.	28116.
DEPRECIATION & AMORTIZATION	3594.	3594.	3594.	3594.
OTHER FIXED COST	906.	889.	872.	853.
(INC) IN PRODUCT INVENTORIES	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	8633.	8876.	9119.	9362.
LESS. SALES EXPENSES	0.	0.	0.	0.
OPERATING PROFIT OR (LOSS)	8633.	8876.	9119.	9362.
LESS. INTEREST				
ON LONG TERM DEBT	165.	0.	0.	0.
ON SHORT TERM DEBT	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	8468.	8876.	9119.	9362.
LESS. INCOME TAX	381.	3954.	4104.	4213.
NET PROFIT OR (LOSS) AFTER TAX	4657.	4882.	5016.	5149.

ASEAN RS/SA PROJECT IN THAILAND
 FUNDS FLOW STATEMENTS (FOR YEARS ENDING JUNE 30)
 - ROCK SALT MINE- ALTN CASE (18000007/Y) - (US\$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
SOURCES OF FUNDS											
CASH GENERATED FROM OPERATION	28897.	15865.	11899.	11193.	8784.	9503.	10478.	10489.	10770.	11013.	11256.
PROFIT BEFORE TAX, INTEREST	0.	0.	0.	3985.	4484.	5675.	6651.	6892.	7175.	7418.	7661.
DEPRECIATION & AMORTIZATION	0.	0.	0.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.
FINANCIAL RESOURCES	28897.	15865.	11899.	1992.	463.	0.	0.	0.	0.	0.	0.
SHARE CAPITAL	16998.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	11899.	15865.	11899.	1992.	463.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	1622.	242.	234.	234.	3.	1.	1.	1.
INCREASE IN ACCT PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
USES OF FUNDS											
INVESTMENT IN FIXED ASSET	17446.	21566.	16512.	12330.	8784.	6566.	5955.	4727.	4497.	4326.	4161.
LAND AND SITE IMPROVEMENT	1271.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	15282.	20376.	15282.	0.	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	893.	1190.	893.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET	0.	0.	337.	7041.	1470.	1099.	1062.	100.	35.	29.	29.
OTHER THAN CASH	0.	0.	0.	3015.	858.	499.	470.	100.	35.	29.	29.
INCR(DECR) ACC T RECEIVABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCR(DECR) IN INVENTORIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PRODUCTS	0.	0.	0.	4027.	564.	553.	544.	0.	0.	0.	0.
MATERIALS	0.	0.	337.	0.	48.	48.	48.	0.	0.	0.	0.
DEBT SERVICES	0.	0.	0.	5288.	7314.	5467.	4792.	4627.	4462.	4297.	4131.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	3305.	3305.	3305.	3305.	3305.	3305.	3305.	3305.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	1992.	1992.	463.	463.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.	1983.	1818.	1653.	1487.	1322.	1157.	992.	826.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	199.	199.	46.	46.	0.	0.	0.	0.
INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE JK (DECREASE)	11451.	-5702.	-6613.	-1136.	0.	2937.	4623.	5762.	6274.	6687.	7095.
BEGINNING CASH BALANCE	0.	11451.	5749.	1136.	0.	0.	2937.	7560.	13322.	19596.	26283.
ENDING CASH BALANCE	11451.	5749.	1136.	0.	0.	2937.	7560.	13322.	19596.	26283.	33378.

ASEAN RS/SA PROJECT IN THAILAND
 FUNDS FLOW STATEMENTS (FOR YEARS ENDING JUNE 30)
 - ROCK SALT MINE: ALTN CASE (1800000T/Y) - (US\$ 1000)

	1993	1994	1995	1996	1997	1998	1999
SOURCES OF FUNDS							
CASH GENERATED FROM OPERATION	11499	11742	11985	12228	12471	12714	12957
PROFIT BEFORE TAX, INTEREST, DEPRECIATION & AMORTIZATION	7904	8147	8390	8633	8876	9119	9362
FINANCIAL RESOURCES	3594	3594	3594	3594	3594	3594	3594
SHARE CAPITAL	0	0	0	0	0	0	0
LONG TERM DEBT	0	0	0	0	0	0	0
SHORT TERM DEBT	0	0	0	0	0	0	0
INCREASE IN ACCT PAYABLE	1	1	1	1	1	1	1
USES OF FUNDS							
INVESTMENT IN FIXED ASSET	3996	7090	7108	7127	3840	4024	4133
LAND AND SITE IMPROVEMENT	0	0	0	0	0	0	0
CONSTRUCTED FACILITIES	0	0	0	0	0	0	0
PRE-INVEST. & START-UP EXP	0	0	0	0	0	0	0
INTEREST DURING CONSTRUCTN	0	0	0	0	0	0	0
INCREASE IN CURRENT ASSET OTHER THAN CASH	29	29	29	29	29	29	29
INCR(DECR) ACC T RECEIVABLE INCR(DECR) IN INVENTORIES	29	29	29	29	29	29	29
PRODUCTS	0	0	0	0	0	0	0
MATERIALS	0	0	0	0	0	0	0
DEBT SERVICES	3966	3801	3636	3470	0	0	0
REPAYMENT OF LONG TERM DEBT	3305	3305	3305	3305	0	0	0
REPAYMENT OF SHORT TERM DEBT	0	0	0	0	0	0	0
INTEREST ON LONG TERM DEBT	661	496	331	165	0	0	0
INTEREST ON SHORT TERM DEBT	0	0	0	0	0	0	0
INCOME TAX PAYMENT	0	3259	3443	3627	3811	3994	4104
DIVIDENDS PAYMENT	0	0	0	0	0	0	0
CASH INCREASE OR (DECREASE)	7504	4653	4877	5102	8631	8691	8824
BEGINNING CASH BALANCE	33378	40882	45534	50412	55513	64145	72835
ENDING CASH BALANCE	40882	45534	50412	55513	64145	72835	81660

ASEAN RS/SA PROJECT IN THAILAND
 BALANCE SHEET (FOR YEARS ENDING JUNE 30) (US\$ 1000)
 - ROCK SALT MINE: ALTN CASE (1800000T/Y) -

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
ASSETS											
28897.	44761.	56660.	58971.	56846.	57288.	59379.	61647.	64361.	67483.	71013.	
CURRENT ASSETS	11451.	5749.	1473.	7378.	8878.	18570.	24432.	30740.	37456.	44581.	
CASH	11451.	5749.	1136.	0.	0.	2937.	7560.	13321.	19596.	26283.	33378.
ACCOUNTS RECEIVABLE	0.	0.	0.	3015.	3873.	4371.	4841.	4941.	4976.	5006.	5035.
INVENTORIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PRODUCTS	0.	0.	0.	4027.	4590.	5143.	5687.	5687.	5687.	5687.	5687.
MATERIALS	0.	0.	337.	337.	385.	433.	481.	481.	481.	481.	481.
NET FIXED ASSETS	17446.	39012.	55187.	51593.	47988.	44004.	40809.	37215.	33621.	30026.	26432.
INVESTMENT	17446.	39012.	55187.	55187.	55187.	55187.	55187.	55187.	55187.	55187.	55187.
LAND & SITE IMPROVEMENT	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.
CONSTRUCTED FACILITIES	15282.	35659.	50941.	50941.	50941.	50941.	50941.	50941.	50941.	50941.	50941.
PRE-INVEST. & START-UP EXP	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	893.	2082.	2975.	2975.	2975.	2975.	2975.	2975.	2975.	2975.	2975.
LESS DEPRECIATION & AMORTIZTN	0.	0.	0.	3594.	7189.	10763.	14378.	17972.	21566.	25161.	28755.
LIABILITIES	11899.	27763.	39662.	39971.	35379.	31845.	28773.	25470.	22166.	18862.	15557.
CURRENT LIABILITIES	0.	0.	3305.	6919.	5633.	5404.	5637.	5639.	5640.	5641.	5642.
ACCOUNTS PAYABLE	0.	0.	0.	1622.	1865.	2059.	2331.	2334.	2335.	2336.	2337.
INCOME TAX PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	0.	0.	3305.	3305.	3305.	3305.	3305.	3305.	3305.	3305.	3305.
SHORT TERM DEBT	0.	0.	0.	1992.	463.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	11899.	27763.	36357.	33032.	29746.	26441.	23136.	19831.	16526.	13221.	9915.
LONG TERM DEBT BALANCE	11899.	27763.	36357.	33032.	29746.	26441.	23136.	19831.	16526.	13221.	9915.
STOCK HOLDERS EQUITY	16998.	16998.	16998.	19000.	21467.	25443.	30606.	36176.	42194.	48621.	55456.
SHARE CAPITAL	16998.	16998.	16998.	16998.	16998.	16998.	16998.	16998.	16998.	16998.	16998.
RETAINED EARNINGS	0.	0.	0.	2002.	4469.	8443.	13608.	19178.	25196.	31623.	38458.

ASEAN RS/SA PROJECT IN THAILAND
 BALANCE SHEET (FOR YEARS ENDING JUNE 30)
 - ROCK SALT MINE: ALTN CASE (1800000T/Y) - (US\$ 1000)

	1993	1994	1995	1996	1997	1998	1999
ASSETS							
CURRENT ASSETS	74952.	76039.	77352.	78888.	83955.	89080.	94340.
CASH	52114.	56796.	61703.	66834.	75495.	84215.	93069.
ACCOUNTS RECEIVABLE	40882.	45334.	50412.	55513.	64145.	72835.	81660.
INVENTORIES	5064.	5054.	5123.	5153.	5182.	5212.	5241.
PRODUCTS	5687.	5687.	5687.	5637.	5637.	5687.	5687.
MATERIALS	481.	481.	481.	481.	481.	481.	481.
NET FIXED ASSETS	22837.	19243.	15649.	12054.	8460.	4865.	1271.
INVESTMENT	55187.	55187.	55187.	55187.	55187.	55187.	55187.
LAND & SITE IMPROVEMENT	1271.	1271.	1271.	1271.	1271.	1271.	1271.
CONSTRUCTED FACILITIES	50941.	50941.	50941.	50941.	50941.	50941.	50941.
PRE-INVEST. & START-UP EXP	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	2975.	2975.	2975.	2975.	2975.	2975.	2975.
LESS-DEPRECIATN & AMORTIZTN	32350.	35944.	39538.	43133.	46727.	50322.	53916.
LIABILITIES	15512.	12392.	9271.	6150.	6335.	6445.	6555.
CURRENT LIABILITIES	8902.	9086.	9271.	6150.	6335.	6445.	6555.
ACCOUNTS PAYABLE	2337.	2338.	2339.	2340.	2341.	2341.	2342.
INCOME TAX PAYABLE	3259.	3443.	3627.	3811.	3994.	4104.	4213.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT	3305.	3305.	3305.	3305.	3305.	3305.	3305.
LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	6610.	3305.	-0.	-0.	-0.	-0.	-0.
LONG TERM DEBT BALANCE	6610.	3305.	-0.	-0.	-0.	-0.	-0.
STOCK HOLDERS EQUITY	59439.	65648.	68081.	72738.	77620.	82635.	87785.
SHARE CAPITAL	16998.	16998.	16998.	16998.	16998.	16998.	16998.
RETAINED EARNINGS	42441.	48650.	51083.	55740.	60622.	65637.	70787.

ASEAN RSTSA PROJECT IN THAILAND											
PRODUCTION AND SALES PLAN											
- ROCK SALT MINE: ALTN CASE (1800000T/Y) - (US\$ 1000)											
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
CAPACITY	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.
CAPACITY UTILIZATION	0.700	0.800	0.900	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION (S/A PLANT)	1260000.	1440000.	1620000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.
INCREASE IN INVENTORY	210000.	30000.	30000.	30000.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME (S/A PLANT)	1050000.	1410000.	1590000.	1770000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.
UNIT PRICE (S/A PLANT)	0.0230	0.0220	0.0220	0.0219	0.0220	0.0221	0.0222	0.0224	0.0225	0.0226	0.0228
SALES REVENUE	24118.	30981.	34970.	38732.	39532.	39809.	40044.	40280.	40515.	40751.	40986.
*** TOTAL SALES REVENUE ***	24118.	30981.	34970.	38732.	39532.	39809.	40044.	40280.	40515.	40751.	40986.
*** TOTAL SALES VOLUME ***	1050000.	1410000.	1590000.	1770000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.
*** AVERAGE SALES PRICE ***	0.0230	0.0220	0.0220	0.0219	0.0220	0.0221	0.0222	0.0224	0.0225	0.0226	0.0228

ASEAN RS/SA PROJECT IN THAILAND
 PRODUCTION AND SALES PLAN
 - ROCK SALT MINE: ALTN CASE (1800000T/Y) -

(US\$ 1000)

	1996	1997	1998	1999
CAPACITY	1800000.	1800000.	1800000.	1800000.
CAPACITY UTILIZATION	1.000	1.000	1.000	1.000
PRODUCTION (S/A PLANT)	1800000.	1800000.	1800000.	1800000.
INCREASE IN INVENTORY	0.	0.	0.	0.
SALES VOLUME (S/A PLANT)	1800000.	1800000.	1800000.	1800000.
UNIT PRICE (S/A PLANT)	0.0229	0.0230	0.0232	0.0233
SALES REVENUE	41222.	41457.	41692.	41928.
*** TOTAL SALES REVENUE ***	41222.	41457.	41692.	41928.
*** TOTAL SALES VOLUME ***	1800000.	1800000.	1800000.	1800000.
*** AVERAGE SALES PRICE ***	0.0229	0.0230	0.0232	0.0233

ASEAN RS/SA PROJECT IN THAILAND
 PRODUCTION COST STATEMENTS
 - ROCK SALT MINE: ALTN CASE (1800000T/Y) -
 (US\$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION (3/A PLANT)	1260000.	1440000.	1620000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.	1800000.
DIRECT LABOUR	1399.	1598.	1798.	1998.	1998.	1998.	1998.	1998.	1998.	1998.	1998.
MATERIALS	4045.	4622.	5200.	5778.	5778.	5778.	5778.	5778.	5778.	5778.	5778.
POWER	464.	530.	597.	663.	663.	663.	663.	663.	663.	663.	663.
DIRECT OP. COST	5907.	6751.	7595.	8439.	8439.	8439.	8439.	8439.	8439.	8439.	8439.
TRANSPORTATION COST	12600.	14400.	16200.	18000.	18000.	18000.	18000.	18000.	18000.	18000.	18000.
ROYALTY	965.	1239.	1399.	1549.	1549.	1592.	1602.	1611.	1621.	1630.	1639.
VARIABLE COST	19472.	22390.	25194.	27988.	28020.	28031.	28041.	28050.	28060.	28069.	28078.
DEPRECIATION	3396.	3396.	3396.	3396.	3396.	3396.	3396.	3396.	3396.	3396.	3396.
AMORTIZATION (INTEREST OUR.)	198.	198.	198.	198.	198.	198.	198.	198.	198.	198.	198.
AMORTIZATION	198.	198.	198.	198.	198.	198.	198.	198.	198.	198.	198.
DEPRECIATION & AMORTIZATION	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.
LABOUR COST	482.	482.	482.	482.	482.	482.	482.	482.	482.	482.	482.
MATERIALS	335.	335.	335.	335.	335.	335.	335.	335.	335.	335.	335.
TAX & INSURANCE	276.	259.	242.	225.	208.	191.	174.	157.	140.	123.	106.
DIRECT FIXED COST	1093.	1076.	1059.	1042.	1025.	1008.	991.	974.	957.	940.	923.
EX-FACTORY PRODUCTION COST	24159.	27061.	29847.	32625.	32640.	32634.	32626.	32619.	32611.	32604.	32596.
UNIT DIRECT OPERATING COST	0.0192	0.0188	0.0184	0.0181	0.0181	0.0181	0.0181	0.0181	0.0181	0.0181	0.0181
ADMINISTRATIVE & SALES EXP.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG-TERM DEBT	1983.	1818.	1653.	1487.	1322.	1157.	992.	826.	661.	496.	331.
INTEREST ON SHORT-TERM DEBT	0.	199.	46.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL PRODUCTION COST	26142.	29078.	31546.	34112.	33962.	33791.	33618.	33445.	33272.	33099.	32926.
UNIT PRODUCTION COST	0.0207	0.0202	0.0195	0.0190	0.0189	0.0188	0.0187	0.0186	0.0185	0.0184	0.0183

ASEAN RS/SA PROJECT IN THAILAND
 PRODUCTION COST STATEMENTS
 - ROCK SALT MINE: ALTN CASE (1800000T/Y) - (US\$ 1000)

	1996	1997	1998	1999
PRODUCTION (S/A PLANT)	1800000.	1800000.	1800000.	1800000.
DIRECT LABOUR	5778.	5778.	5778.	5778.
MATERIALS	663.	663.	663.	663.
POWER	8439.	8439.	8439.	8439.
DIRECT OP. COST	18000.	18000.	18000.	18000.
TRANSPORTATION COST	1649.	1658.	1668.	1677.
ROYALTY				
VARIABLE COST	28088.	28097.	28107.	28116.
DEPRECIATION	3396.	3396.	3396.	3396.
AMORTIZATION (INTEREST CUR.)	198.	198.	198.	198.
AMORTIZATION	198.	198.	198.	198.
DEPRECIATION & AMORTIZATION	5594.	5594.	5594.	5594.
LABOUR COST	482.	482.	482.	482.
MATERIALS	335.	335.	335.	335.
TAX & INSURANCE	89.	72.	55.	38.
DIRECT FIXED COST	906.	889.	872.	855.
EX-FACTORY PRODUCTION COST	32588.	32581.	32573.	32566.
UNIT DIRECT OPERATING COST	0.0181	0.0181	0.0181	0.0181
ADMINISTRATIVE & SALES EXP.	0.	0.	0.	0.
INTEREST ON LONG-TERM DEBT	165.	0.	0.	0.
INTEREST ON SHORT-TERM DEBT	0.	0.	0.	0.
TOTAL PRODUCTION COST	32754.	32581.	32573.	32566.
UNIT PRODUCTION COST	0.0182	0.0181	0.0181	0.0181

ASEAN RS/SA PROJECT IN THAILAND
 IRR CALCULATION ON TOTAL INVESTMENT (US\$ 1,000)
 - ROCK SALT MINE: ALTN CASE (1800000/7Y) -

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATION	INTEREST ON L-T DEBT	(BEFORE TAX)			RETURN AFTER TAX	(LESS) INCOME TAX	(AFTER TAX)		
					RETURN BEFORE TAX	DISCOUNT FACTOR	PRESENT VALUE			DISCOUNT FACTOR	INVEST.	RETURN
1982	16553	0	0	0	0	1.0000	16553	0	0	1.0000	16553	0
1983	20376	0	0	0	0	0.8757	17844	0	0	0.8874	18081	0
1984	16755	0	0	0	0	0.7669	12849	0	0	0.7874	13193	0
1985	0	2002	3594	1983	7580	0.6715	5090	0	7580	0.6987	0	5296
1986	0	2467	3594	1818	7879	0.5881	4633	0	7879	0.6200	0	4885
1987	0	3976	3594	1653	9223	0.5150	4750	0	9223	0.5501	0	5074
1988	0	5164	3594	1487	10245	0.4510	4620	0	10245	0.4882	0	5001
1989	0	5570	3594	1322	10486	0.3949	4141	0	10486	0.4332	0	4542
1990	0	6018	3594	1157	10769	0.3458	3724	0	10769	0.3844	0	4140
1991	0	6426	3594	992	11012	0.3028	3335	0	11012	0.3411	0	3756
1992	0	6835	3594	826	11255	0.2652	2985	0	11255	0.3027	0	3407
1993	0	7243	3594	661	11499	0.2322	2670	3259	8239	0.2686	0	2213
1994	0	7651	3594	496	11742	0.2034	2388	3443	8298	0.2383	0	1978
1995	0	8060	3594	331	11985	0.1781	2134	3627	8358	0.2115	0	1767
1996	0	8468	3594	165	12228	0.1560	1907	3811	8417	0.1876	0	1579
1997	0	8876	3594	0	12471	0.1366	1703	3994	8476	0.1665	0	1411
1998	0	9284	3594	0	12714	0.1196	1520	4104	8610	0.1477	0	1272
1999	-2744	9362	3594	0	12957	0.1047	-287	4213	8744	0.1311	-360	1146
TOTAL	50941				164044		46958		137593		47468	47467

***** INTERNAL RATE OF RETURN ***** 14.19 PER CENT (BEFORE TAX) 12.70 PER CENT (AFTER TAX)

***** PAY-OUT PERIOD ***** 6.04 YEAR (BEFORE TAX) 6.04 YEAR (AFTER TAX)
 (THE YEAR WHEN THE TOTAL CAPITAL COST WILL BE PAID OUT BY ACCUMULATED TOTAL RETURN, FROM THE BEG. OF OPERATION)

CAPITAL REQUIREMENTS

		SOURCE OF FUNDS
LAND & SITE IMPROVEMENT	1271	PAID-UP SHARE CAPITAL
PLANT DIRECTS (HARD)	33967	LONG TERM DEBT
FREIGHT & INSURANCE	1415	SHORT TERM DEBT
SERVICES & MNGMNT	12116	FINANCIAL RESOURCES
RAILWAY SPUR	3443	
CONSTRUCTED FACILITIES	50941	
PRE-INVEST AND STAT-UP EXP	0	
INTEREST DURING CONSTRUCTION	2975	
TOTAL FIXED CAPITAL	55187	
INITIAL WORKING CAPITAL	1473	
TOTAL CAPITAL COST	56660	

ASEAN RS/SA PROJECT IN THAILAND
 PROFITABILITY AND FINANCIAL INDICATORS (US\$ 1000)
 - ROCK SALT MINE: ALTN CASE (1800000T/Y) -

YEAR	(1) AFT TAX PROFIT -TO- SALES REV S/H (PCT)	(2) AFT TAX PROFIT -TO- EQUITY INVESTMENT (PCT)	(3) BFR TAX PROFIT -TO- INVESTMENT (PCT)	(4) AFT TAX PROFIT -TO- CAPITAL (PCT)	(5) CURRENT RATIO	(6) QUICK RATIO	(7) DEBT SERVICE RATIO	(8) L/T DEBT -TO- S/H EQUITY	(9)* PROFIT B-E-P CAPACITY UTILIZE (PCT)	(10)* CASH B-E-P SALES PRICE (PRICE)	(11)* CASH B-E-P CAPACITY UTILIZE (PCT)
1985	8.3	10.5	3.5	11.8	1.07	0.44	1.43	63.7/37.	49.3	24.6	47.2
1986	8.0	11.5	4.4	14.5	1.57	0.69	1.54	58.7/42.	57.8	20.4	55.3
1987	11.4	15.6	7.0	23.4	2.38	1.35	1.86	51.7/49.	54.8	19.7	52.3
1988	13.3	16.9	9.1	30.4	3.29	2.20	2.14	43.7/57.	53.7	19.1	51.2
1989	14.1	15.4	9.8	32.8	4.33	3.24	2.27	35.7/65.	51.6	18.7	49.1
1990	15.1	14.3	10.6	35.4	5.45	4.36	2.41	28.7/72.	48.9	18.6	46.4
1991	16.0	13.2	11.3	37.8	6.64	5.55	2.56	21.7/79.	46.5	18.5	44.1
1992	17.0	12.3	12.1	40.2	7.90	6.81	2.72	15.7/85.	44.1	18.4	41.7
1993	9.8	6.7	12.8	23.4	5.85	5.16	2.08	10.7/90.	41.8	18.3	39.5
1994	10.3	6.6	13.5	24.8	6.25	5.57	2.18	5.7/95.	39.7	18.2	37.4
1995	10.8	6.5	14.2	26.1	6.66	5.99	2.30	-0.7/100.	37.6	18.1	35.3
1996	11.3	6.4	14.9	27.4	10.87	9.86	2.43	-0.7/100.	35.5	18.0	33.3
1997	11.8	6.3	15.7	28.7	11.92	10.94*****	*****	-0.7/100.	33.6	16.1	6.7
1998	12.0	6.1	16.1	29.5	13.07	12.11*****	*****	-0.7/100.	32.9	16.1	6.4
1999	12.3	5.9	16.5	30.3	14.20	13.26*****	*****	-0.7/100.	32.2	16.1	6.2
AVERAGE1	12.1	10.3	11.4	27.8	6.76	5.83*****	*****	22.7/78.	44.0	18.6	36.8
AVERAGE2	12.3	9.0	11.4	27.8	6.83	5.93	2.62	19.7/81.			

(AVERAGE1) : SUM OF ANNUAL FIGURES OF PERCENTAGE AND RATIO IS DIVIDED BY NO. OF YEARS(SIMPLE AVERAGE)
 (AVERAGE2) : AVERAGE FIGURES ARE CALCULATED BY ACTUAL VALUES ACCUMULATED OVER THE PROJECT LIFE(WEIGHTED AVERAGE)
 * NOTE FOR (9)(10)(11)

WHEN THERE ARE TWO OR MORE PRODUCTS, AND DURING THE YEARS WHEN ALL OF PRODUCTS ARE NOT PRODUCED AT THE SAME RATE OF CAPACITY UTILIZATION, ABOVE BREAK-EVEN-POINTS CANNOT GIVE CORRECT FIGURES.

FINANCIAL STATEMENTS

BASE CASE

ROCK SALT MINE

ROCK SALT : 1,200,000 T/Y

ASEAN RS/SA PROJECT IN THAILAND
 INCOME STATEMENTS (FOR YEARS ENDING JUNE 30)
 - ROCK SALT MINE: BASE CASE (1200000T/Y) - (US\$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION AND SALES											
CAPACITY UTILIZATION	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.
PRODUCTION	0.880	0.700	0.794	0.855	0.867	0.885	0.898	0.913	0.927	0.941	0.955
INCREASE IN INVENTORIES	816000.	840000.	952800.	1026000.	1040400.	1062000.	1077600.	1095600.	1112400.	1129200.	1146000.
SALES VOLUME	136000.	4000.	18800.	12200.	2400.	3600.	2600.	3000.	2800.	2800.	2800.
	680000.	836000.	934000.	1013800.	1038000.	1058400.	1075000.	1092600.	1109600.	1126400.	1143200.
SALES REVENUE	18135.	21794.	24473.	26632.	27339.	27943.	28444.	28961.	29469.	29972.	30476.
COST OF SALES	14499.	17795.	19240.	20525.	20946.	21247.	21499.	21760.	22014.	22264.	22514.
VARIABLE COST	14741.	15210.	14974.	16136.	16375.	16717.	16966.	17251.	17518.	17785.	18052.
DEPRECIATION & AMORTIZATION	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.
OTHER FIXED COST	1093.	1076.	1059.	1042.	1025.	1008.	991.	974.	957.	940.	923.
(INC) IN PRODUCT INVENTORIES	-2900.	-85.	-387.	-247.	-48.	-72.	-52.	-60.	-56.	-55.	-55.
GROSS PROFIT OR (LOSS) ON SALES	3637.	3999.	5233.	6107.	6393.	6696.	6944.	7201.	7455.	7708.	7962.
LESS: SALES EXPENSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OPERATING PROFIT OR (LOSS)	3637.	3999.	5233.	6107.	6393.	6696.	6944.	7201.	7455.	7708.	7962.
LESS: INTEREST											
ON LONG TERM DEBT	1983.	1818.	1653.	1487.	1322.	1157.	992.	826.	661.	496.	331.
ON SHORT TERM DEBT	0.	51.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	1653.	2090.	3580.	4620.	5071.	5539.	5953.	6375.	6794.	7212.	7632.
LESS: INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	3057.	3246.	3436.
NET PROFIT OR (LOSS) AFTER TAX	1653.	2090.	3580.	4620.	5071.	5539.	5953.	6375.	3736.	3967.	4197.

ASEAN RS/SA PROJECT IN THAILAND
 INCOME STATEMENTS (FOR YEARS ENDING JUNE 30)
 - ROCK SALT PINE: BASE CASE (1200000T/Y) - (US\$ 1,000)

	1996	1997	1998	1999
PRODUCTION AND SALES				
CAPACITY UTILIZATION	1200000.	1200000.	1200000.	1200000.
CAPACITY UTILIZATION	0.970	0.984	0.998	1.000
PRODUCTION	1184000.	1180800.	1197600.	1200000.
INCREASE IN INVENTORIES	3000.	2800.	2800.	400.
SALES VOLUME	1181000.	1178000.	1194800.	1199600.
SALES REVENUE	30957.	31505.	32009.	32309.
COST OF SALES	42779.	25039.	23285.	23360.
VARIABLE COST	18337.	18604.	18871.	18918.
DEPRECIATION & AMORTIZATION	3594.	3594.	3594.	3594.
OTHER FIXED COST	906.	889.	872.	855.
(INC) IN PRODUCT INVENTORIES	-59.	-55.	-55.	-8.
GROSS PROFIT OR (LOSS) ON SALES	8219.	8472.	8725.	8948.
LESS: SALES EXPENSES	0.	0.	0.	0.
OPERATING PROFIT OR (LOSS)	8219.	8472.	8725.	8948.
LESS: INTEREST				
ON LONG TERM DEBT	105.	0.	0.	0.
ON SHORT TERM DEBT	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	8053.	8472.	8725.	8948.
LESS: INCOME TAX	5624.	5812.	5926.	4027.
NET PROFIT OR (LOSS) AFTER TAX	4429.	4659.	4799.	4922.

ASEAN ASYSA PROJECT IN THAILAND
 FUNDS FLOW STATEMENTS (FOR YEARS ENDING JUNE 30)
 - ROCK SALT MINE: BASE CASE (1200000T/Y) - (US\$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
SOURCES OF FUNDS											
CASH GENERATED FROM OPERATION	28897.	15865.	11899.	9200.	7635.	8974.	9798.	10007.	10319.	10559.	10820.
PROFIT BEFORE TAX, INTEREST DEPRECIATION & AMORTIZATION	0.	0.	0.	3637.	3999.	5233.	6107.	6393.	6696.	6944.	7201.
FINANCIAL RESOURCES	28897.	15865.	11899.	910.	3594.	3594.	3594.	3594.	3594.	3594.	3594.
SHARE CAPITAL	16998.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	11899.	15865.	11899.	0.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	910.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN ACCT PAYABLE	0.	0.	0.	1059.	42.	147.	97.	20.	28.	21.	24.
USES OF FUNDS											
INVESTMENT IN FIXED ASSET	17446.	21566.	16393.	10455.	6673.	5710.	5329.	4768.	4615.	4415.	4261.
LAND AND SITE IMPROVEMENT	1271.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	15282.	20376.	15282.	0.	0.	0.	0.	0.	0.	0.	0.
PRE-INVST. & START-UP EXP	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	843.	1190.	893.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET	0.	0.	218.	5167.	549.	752.	536.	141.	154.	119.	129.
OTHER THAN CASH	0.	0.	0.	2267.	457.	335.	270.	88.	75.	63.	65.
INCR(DECR) ACC T RECEIVABLE	0.	0.	0.	2900.	85.	387.	247.	48.	72.	52.	60.
INCR(DECR) IN INVENTORIES	0.	0.	0.	218.	6.	30.	20.	4.	6.	4.	5.
PRODUCTS	0.	0.	0.	5288.	6124.	4958.	4792.	4627.	4462.	4297.	4131.
MATERIALS	0.	0.	0.	3305.	3305.	3305.	3305.	3305.	3305.	3305.	3305.
DEBT SERVICES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	1983.	1818.	1653.	1487.	1322.	1157.	992.	826.
INTEREST ON LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)											
	11451.	-5702.	-4494.	-1255.	962.	3264.	4469.	5239.	5703.	6144.	6559.
BEGINNING CASH BALANCE											
	0.	11451.	5749.	1255.	0.	962.	4226.	8695.	13934.	19638.	25782.
ENDING CASH BALANCE											
	11451.	5749.	1255.	0.	962.	4226.	8695.	13934.	19638.	25782.	32341.

ASEAN RS/SA PROJECT IN THAILAND
 FUNDS FLOW STATEMENTS (FOR YEARS ENDING JUNE 30)
 - ROCK SALT MINE: BASE CASE (1200000T/Y) - (US\$ 1000)

	1993	1994	1995	1996	1997	1998	1999
SOURCES OF FUNDS							
CASH GENERATED FROM OPERATION	11071.	11325.	11579.	11837.	12088.	12342.	12547.
PROFIT BEFORE TAX, INTEREST	7455.	7708.	7962.	8219.	8472.	8725.	8948.
DEPRECIATION & AMORTIZATION	3594.	3594.	3594.	3594.	3594.	3594.	3594.
FINANCIAL RESOURCES	0.	0.	0.	0.	0.	0.	0.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INCREASE IN ACCT PAYABLE	22.	22.	22.	24.	22.	22.	4.
USES OF FUNDS	4090.	6981.	7004.	7033.	3747.	3934.	3972.
INVESTMENT IN FIXED ASSET	0.	0.	0.	0.	0.	0.	0.
LAND AND SITE IMPROVEMENT	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	0.	0.	0.	0.	0.	0.	0.
INTEREST CURING CONSTRUCTN	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET	123.	123.	123.	129.	123.	122.	46.
OTHER THAN CASH	63.	63.	63.	65.	63.	63.	38.
INCR(DECR) ACC T RECEIVABLE	56.	55.	55.	59.	55.	55.	8.
INCR(DECR) IN INVENTORIES	4.	4.	4.	5.	4.	4.	1.
MATERIALS	3966.	3801.	3636.	3470.	0.	0.	0.
DEBT SERVICES	3305.	3305.	3305.	3305.	0.	0.	0.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	631.	436.	331.	165.	0.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INCOME TAX PAYMENT	0.	3057.	3246.	3434.	3624.	3812.	3926.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	6982.	4344.	4575.	4803.	8342.	8408.	8574.
BEGINNING CASH BALANCE	52341.	39322.	43666.	48241.	53044.	61386.	69794.
ENDING CASH BALANCE	39322.	43666.	48241.	53044.	61386.	69794.	78368.

ASEAN PS/SA PROJECT IN THAILAND
 BALANCE SHEET (FOR YEARS ENDING JUNE 30)
 - ROCK SALT MINE: BASE CASE (1200000T/Y) - (US\$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
ASSETS											
CURRENT ASSETS											
CASH	11431.	5749.	1473.	5385.	10912.	15917.	21298.	27155.	33417.	40105.	
ACCOUNTS RECEIVABLE	11431.	5749.	1255.	0.	962.	4226.	8695.	13934.	19638.	25782.	32341.
INVENTORIES	0.	0.	0.	2267.	2724.	3059.	3329.	3417.	3493.	3555.	3620.
PRODUCTS	0.	0.	0.	2900.	2985.	3372.	3619.	3668.	3740.	3792.	3852.
MATERIALS	0.	0.	218.	218.	225.	255.	274.	278.	284.	288.	293.
NET FIXED ASSETS	17446.	39012.	55187.	51593.	47998.	44404.	40809.	37215.	33621.	30026.	26432.
INVESTMENT	17446.	39012.	55187.	55187.	55187.	55187.	55187.	55187.	55187.	55187.	55187.
LAND & SITE IMPROVEMENT	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.
CONSTRUCTED FACILITIES	15282.	35659.	50941.	50941.	50941.	50941.	50941.	50941.	50941.	50941.	50941.
PRE-INVEST. & START-UP EXP	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	893.	2082.	2975.	2975.	2975.	2975.	2975.	2975.	2975.	2975.	2975.
LESS DEPRECIATION & AMORTIZTN	0.	0.	0.	3594.	7189.	10783.	14378.	17972.	21566.	25161.	28755.
LIABILITIES	11899.	27763.	39662.	38326.	34152.	30994.	27785.	24500.	21224.	17939.	14658.
CURRENT LIABILITIES	0.	0.	3305.	5274.	4406.	4552.	4649.	4669.	4698.	4718.	4742.
ACCOUNTS PAYABLE	0.	0.	0.	1059.	1100.	1247.	1344.	1364.	1393.	1413.	1437.
INCOME TAX PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT	0.	0.	3305.	3305.	3305.	3305.	3305.	3305.	3305.	3305.	3305.
LONG TERM DEBT	0.	0.	0.	910.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	11899.	27763.	36357.	33052.	29746.	26441.	23136.	19831.	16526.	13221.	9915.
LONG TERM DEBT BALANCE	11899.	27763.	36357.	33052.	29746.	26441.	23136.	19831.	16526.	13221.	9915.
STOCK HOLDERS EQUITY	16998.	16998.	16998.	18651.	20742.	24322.	28941.	34012.	39552.	45504.	51880.
SHARE CAPITAL	16998.	16998.	16998.	16998.	16998.	16998.	16998.	16998.	16998.	16998.	16998.
RETAINED EARNINGS	0.	0.	0.	1653.	3744.	7324.	11943.	17014.	22554.	28506.	34882.

ASEAN RS/SA PROJECT IN THAILAND
 BALANCE SHEET (FOR YEARS ENDING JUNE 30)
 - ROCK SALT MINE: BASE CASE (1200000T/Y) - (US\$ 1000)

	1993	1994	1995	1996	1997	1998	1999
ASSETS							
70048.	70920.	72023.	73361.	78231.	83166.	88192.	
CURRENT ASSETS	47210.	51677.	56375.	61307.	69771.	78301.	86921.
CASH	39322.	43666.	48241.	53044.	61386.	69794.	78368.
ACCOUNTS RECEIVABLE	3684.	3747.	3810.	3875.	3938.	4001.	4039.
INVENTORIES	3907.	3962.	4018.	4076.	4131.	4186.	4194.
PRODUCTS	297.	302.	306.	311.	316.	320.	321.
MATERIALS							
NET FIXED ASSETS	22837.	19243.	15649.	12054.	8460.	4865.	1271.
INVESTMENT	55187.	55187.	55187.	55187.	55187.	55187.	55187.
LAND & SITE IMPROVEMENT	1271.	1271.	1271.	1271.	1271.	1271.	1271.
CONSTRUCTED FACILITIES	50941.	50941.	50941.	50941.	50941.	50941.	50941.
PRE-INVEST. & START-UP EXP	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	2975.	2975.	2975.	2975.	2975.	2975.	2975.
LESS DEPRECIATION & AMORTIZTN	32350.	35944.	39538.	43133.	46727.	50322.	53916.
LIABILITIES	14452.	11337.	8243.	5151.	5362.	5498.	5603.
CURRENT LIABILITIES	7822.	8032.	8243.	5151.	5362.	5498.	5603.
ACCOUNTS PAYABLE	1459.	1481.	1504.	1527.	1550.	1572.	1576.
INCOME TAX PAYABLE	5057.	3246.	3434.	3624.	3812.	3926.	4027.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT	3305.	3305.	3305.	0.	0.	0.	0.
LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	6610.	3305.	-0.	-0.	-0.	-0.	-0.
LONG TERM DEBT BALANCE	6610.	3305.	-0.	-0.	-0.	-0.	-0.
STOCK HOLDERS EQUITY	55616.	59583.	63780.	68210.	72869.	77668.	82590.
SHARE CAPITAL	16998.	16998.	16998.	16998.	16998.	16998.	16998.
RETAINED EARNINGS	38618.	42585.	46782.	51212.	55871.	60670.	65592.

ASEAN RS7SA PROJECT IN THAILAND

PRODUCTION AND SALES PLAN

- ROCK SALT MINE: BASE CASE (1200000T/Y) - (US\$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
CAPACITY UTILIZATION	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.
PRODUCTION (S/A PLANT)	0.680	0.700	0.794	0.855	0.867	0.885	0.898	0.913	0.927	0.941	0.955
INCREASE IN INVENTORY	816000.	400000.	952800.	1026000.	1040400.	1062000.	1077600.	1095600.	1112400.	1129200.	1146000.
SALES VOLUME (S/A PLANT)	136000.	4000.	188000.	12200.	2400.	3600.	2600.	3000.	2800.	2800.	2800.
UNIT PRICE (S/A PLANT)	680000.	836000.	934000.	1013800.	1038000.	1058400.	1075000.	1092600.	1109600.	1126400.	1143200.
	0.0267	0.0261	0.0262	0.0263	0.0263	0.0264	0.0265	0.0265	0.0266	0.0266	0.0267
SALES REVENUE	18135.	21794.	24473.	26622.	27339.	27943.	28444.	28961.	29469.	29972.	30476.
*** TOTAL SALES REVENUE ***	18135.	21794.	24473.	26632.	27339.	27943.	28444.	28961.	29469.	29972.	30476.
*** TOTAL SALES VOLUME ***	680000.	836000.	934000.	1013800.	1038000.	1058400.	1075000.	1092600.	1109600.	1126400.	1143200.
*** AVERAGE SALES PRICE ***	0.0267	0.0261	0.0262	0.0263	0.0263	0.0264	0.0265	0.0265	0.0266	0.0266	0.0267

ASEAN K/S/A PROJECT IN THAILAND
 PRODUCTION AND SALES PLAN
 - RUCK SALT MINE: BASE CASE (120000T/Y) - (US\$ 1000)

	1996	1997	1998	1999
CAPACITY UTILIZATION	1200000.	1200000.	1200000.	1200000.
PRODUCTION (S/A PLANT)	0.970	0.984	0.998	1.000
INCREASE IN INVENTORY	1164000.	1180800.	1197600.	1200000.
SALES VOLUME (S/A PLANT)	3000.	2800.	2800.	400.
UNIT PRICE (S/A PLANT)	1161000.	1178000.	1194800.	1199600.
	0.0267	0.0267	0.0268	0.0269
SALES REVENUE	30997.	31505.	32009.	32309.
*** TOTAL SALES REVENUE ***	30997.	31505.	32009.	32309.
*** TOTAL SALES VOLUME ***	1161000.	1178000.	1194800.	1199600.
*** AVERAGE SALES PRICE ***	0.0267	0.0267	0.0268	0.0269

ASEAN RSTSA PROJECT IN THAILAND
 PRODUCTION COST STATEMENTS
 - RUCK SALT MINE: BASE CASE (1200000T/Y) -
 (US\$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION (S/A PLANT)	816000.	840000.	952800.	1026000.	1040400.	1062000.	1077600.	1095600.	1112400.	1129200.	1146000.
DIRECT LABOUR	906.	932.	1058.	1139.	1155.	1179.	1196.	1216.	1235.	1253.	1272.
MATERIALS	2619.	2696.	3058.	3293.	3340.	3409.	3459.	3517.	3571.	3629.	3679.
POWER	301.	306.	351.	378.	383.	391.	397.	404.	410.	416.	422.
DIRECT OP. COST	3826.	3938.	4467.	4810.	4878.	4979.	5052.	5137.	5215.	5294.	5373.
TRANSPORTATION COST	8160.	8400.	9528.	10260.	10404.	10620.	10776.	10956.	11124.	11292.	11460.
ROYALTY	725.	872.	979.	1065.	1094.	1118.	1138.	1158.	1179.	1199.	1219.
VARIABLE COST	12711.	13210.	14974.	16136.	16375.	16717.	16966.	17251.	17518.	17785.	18052.
DEPRECIATION	3396.	3396.	3396.	3396.	3396.	3396.	3396.	3396.	3396.	3396.	3396.
AMORTIZATION (INTEREST CUR.)	198.	198.	198.	198.	198.	198.	198.	198.	198.	198.	198.
AMORTIZATION	198.	198.	198.	198.	198.	198.	198.	198.	198.	198.	198.
DEPRECIATION & AMORTIZATION	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.	3594.
LABOUR COST	482.	482.	482.	482.	482.	482.	482.	482.	482.	482.	482.
MATERIALS	335.	335.	335.	335.	335.	335.	335.	335.	335.	335.	335.
TAX & INSURANCE	276.	259.	242.	225.	208.	191.	174.	157.	140.	123.	106.
DIRECT FIXED COST	1093.	1076.	1059.	1042.	1025.	1008.	991.	974.	957.	940.	923.
EX-FACTORY PRODUCTION COST	17398.	17880.	19627.	20772.	20995.	21319.	21551.	21819.	22070.	22319.	22569.
UNIT DIRECT OPERATING COST	0.0213	0.0213	0.0206	0.0202	0.0202	0.0201	0.0200	0.0199	0.0198	0.0198	0.0197
ADMINISTRATIVE & SALES EXP.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG-TERM DEBT	1963.	1818.	1653.	1487.	1322.	1157.	992.	826.	661.	496.	331.
INTEREST ON SHORT-TERM DEBT	0.	91.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL PRODUCTION COST	19382.	19789.	21280.	22259.	22317.	22476.	22543.	22646.	22731.	22815.	22900.
UNIT PRODUCTION COST	0.0238	0.0236	0.0223	0.0217	0.0215	0.0212	0.0209	0.0207	0.0204	0.0202	0.0200

ASEAN RS/SA PROJECT IN THAILAND
 PRODUCTION COST STATEMENTS
 - ROCK SALT MINE: BASE CASE (1200000T/Y) -

(US\$ 1000)

	1996	1997	1998	1999
PRODUCTION (3/A PLANT)	1164000.	1180800.	1197600.	1200000.
DIRECT LABOUR	1292.	1311.	1329.	1332.
MATERIALS	3736.	3790.	3844.	3852.
POWER	429.	435.	441.	442.
DIRECT OP. COST	5457.	5536.	5615.	5626.
TRANSPORTATION COST	11640.	11808.	11976.	12000.
ROYALTY	1240.	1260.	1280.	1292.
VARIABLE CCST	18337.	18604.	18871.	18918.
DEPRECIATION	3356.	3396.	3396.	3396.
AMORTIZATION (INTEREST DUR.)	198.	198.	198.	198.
AMORTIZATION	198.	198.	198.	198.
DEPRECIATION & AMORTIZATION	3594.	3594.	3594.	3594.
LABOUR CCST	482.	482.	482.	482.
MATERIALS	335.	335.	335.	335.
TAX & INSURANCE	89.	72.	55.	38.
DIRECT FIXED COST	906.	889.	872.	855.
EX-FACTORY PRODUCTION COST	22858.	23088.	23338.	23368.
UNIT DIRECT OPERATING COST	0.0196	0.0196	0.0195	0.0195
ADMINISTRATIVE & SALES EXP.	0.	0.	0.	0.
INTEREST ON LONG-TERM DEBT	165.	0.	0.	0.
INTEREST ON SHORT-TERM DEBT	0.	0.	0.	0.
TOTAL PRODUCTION COST	23003.	23088.	23338.	23368.
UNIT PRODUCTION COST	0.0198	0.0196	0.0195	0.0195

ASEAN RS/SA PROJECT IN THAILAND
 IRR CALCULATION ON TOTAL INVESTMENT
 - ROCK SALT MINE: BASE CASE (1200000/Y) - (US\$ 1000)

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATION	INTEREST ON DEBT	(BEFORE TAX)			(AFTER TAX)		
					RETURN	DISCOUNT FACTOR	PRESENT VALUE	RETURN	DISCOUNT FACTOR	PRESENT VALUE
1982	16553	0	0	0	1.0000	16553	0	1.0000	16553	0
1983	20376	0	0	0	0.8808	17948	0	0.8926	18188	0
1984	16755	0	0	0	0.7758	12999	0	0.7967	13349	0
1985	0	1635	3594	1983	0.6833	0	4941	0.7111	0	5142
1986	0	2090	3594	1818	0.6019	0	4516	0.6348	0	4762
1987	0	3580	3594	1652	0.5302	0	4680	0.5666	0	5001
1988	0	4620	3594	1487	0.4670	0	4530	0.5057	0	4906
1989	0	5071	3594	1325	0.4113	0	4108	0.4514	0	4508
1990	0	5525	3594	1157	0.3623	0	3728	0.4029	0	4146
1991	0	5983	3594	992	0.3191	0	3363	0.3596	0	3790
1992	0	6372	3594	826	0.2811	0	3034	0.3210	0	3466
1993	0	6774	3594	661	0.2476	0	2735	0.2865	0	2990
1994	0	7212	3594	466	0.2181	0	2465	0.2557	0	2661
1995	0	7632	3594	331	0.1921	0	2220	0.2283	0	2454
1996	0	8023	3594	162	0.1692	0	1998	0.2038	0	2200
1997	0	8472	3594	0	0.1490	0	1798	0.1819	0	1951
1998	0	8725	3594	0	0.1312	0	1617	0.1623	0	1763
1999	-2744	8946	3594	0	0.1156	-317	1450	0.1449	-398	1234
TOTAL	50741			157524		47183	47183		132388	47693

***** INTERNAL RATE OF RETURN ***** 15.93 PER CENT (BEFORE TAX) 12.03 PER CENT (AFTER TAX)

***** PAY-JUT PERIOD ***** (BEFORE TAX) 6.30 YEAR (AFTER TAX) (THE YEAR WHEN THE TOTAL CAPITAL COST WILL BE PAID OUT BY ACCUMULATED TOTAL RETURN, FROM THE BEG. OF OPERATION)

CAPITAL REQUIREMENTS

LAND & SITE IMPROVEMENT	1271	PAID-UP SHARE CAPITAL	16938
PLANT DIRECTS (HARD)	33967	LONG TERM DEBT	39662
FREIGHT & INSURANCE	1415	SHORT TERM DEBT	0
SERVICES & MNGMT	12116	FINANCIAL RESOURCES	56660
RAILWAY SPUR	3443		
UNSTRUCTURED FACILITIES	50941		
PRE-INVEST AND STAT-UP EXP	0		
INTEREST DURING CONSTRUCTION	2975		
TOTAL FIXED CAPITAL	55187		
INITIAL WORKING CAPITAL	1473		
TOTAL CAPITAL COST	56660		

SOURCE OF FUNDS

PAID-UP SHARE CAPITAL	16938
LONG TERM DEBT	39662
SHORT TERM DEBT	0
FINANCIAL RESOURCES	56660

ASEAN RS/SA PROJECT IN THAILAND
 PROFITABILITY AND FINANCIAL INDICATORS (US\$ 1000)
 - ROCK SALT MINE: BASE CASE (1200000/Y) -

YEAR	(1) AFT TAX PROFIT	(2) AFT TAX PROFIT -TO- SALES REV	(3) BEF TAX PROFIT -TO- EQUITY INVESTMENT	(4) AFT TAX PROFIT -TO- CAPITAL (PCT)	(5) CURRENT RATIO	(6) QUICK RATIO	(7) DEBT SERVICE RATIO	(8) L/T DEBT -TO- S/H EQUITY	(9)* PROFIT B-E-P CAPACITY UTILIZE (PCT)	(10)* CASH B-E-P SALES PRICE (PRICE)	(11)* CASH B-E-P CAPACITY UTILIZE (PCT)
1985	9.1	8.9	2.9	9.7	1.02	0.43	1.37	64./ 36.	50.1	28.1	47.9
1986	9.0	10.1	3.7	12.3	1.57	0.84	1.46	59./ 41.	53.0	23.3	50.7
1987	14.6	14.7	6.3	21.1	2.40	1.60	1.78	52./ 48.	50.1	22.5	47.8
1988	17.3	16.0	8.2	27.2	3.42	2.59	2.02	44./ 56.	48.4	21.7	46.1
1989	18.5	14.9	8.9	29.8	4.56	3.72	2.16	37./ 63.	46.7	21.2	44.4
1990	19.3	14.0	9.8	32.6	5.78	4.92	2.31	29./ 71.	45.0	21.0	42.8
1991	20.9	13.1	10.5	35.0	7.08	6.22	2.45	23./ 77.	43.4	20.7	41.1
1992	22.0	12.3	11.3	37.5	8.46	7.58	2.61	16./ 84.	41.8	20.5	39.5
1993	12.7	6.7	12.0	22.0	6.04	5.50	2.01	11./ 89.	40.2	20.2	38.0
1994	13.2	6.7	12.7	23.3	6.43	5.90	2.12	5./ 95.	38.6	20.0	36.4
1995	13.8	6.6	13.5	24.7	6.84	6.31	2.23	-0./ 100.	37.0	19.8	34.8
1996	14.3	6.5	14.2	26.1	11.90	11.05	2.56	-0./ 100.	35.5	19.6	33.3
1997	14.8	6.4	15.0	27.4	13.01	12.18	*****	-0./ 100.	34.0	18.5	6.7
1998	15.0	6.2	15.4	28.2	14.24	13.42	*****	-0./ 100.	33.7	18.5	6.6
1999	15.2	6.0	15.8	29.0	15.51	14.71	*****	-0./ 100.	33.2	18.5	6.4
AVERAGE1	15.4	9.9	10.7	25.7	7.22	6.46	*****	23./ 77.	42.1	20.5	34.8
AVERAGE2	15.0	8.8	10.7	25.7	7.34	6.62	2.52	20./ 80.			

(AVERAGE1) : SUM OF ANNUAL FIGURES OF PERCENTAGE AND RATIO IS DIVIDED BY NO. OF YEARS(SIMPLE AVERAGE)
 (AVERAGE2) : AVERAGE FIGURES ARE CALCULATED BY ACTUAL VALUES ACCUMULATED OVER THE PROJECT LIFE(WEIGHTED AVERAGE)
 * NOTE FOR (9)(10)(11)
 WHEN THERE ARE TWO OR MORE PRODUCTS, AND DURING THE YEARS WHEN ALL OF PRODUCTS ARE NOT PRODUCED AT THE SAME RATE
 OF CAPACITY UTILIZATION, ABOVE BREAK-EVEN-POINTS CANNOT GIVE CORRECT FIGURES.

FINANCIAL STATEMENTS

BASE CASE

SODA ASH PLANT

SODA ASH : 400,000 T/Y

AMMONIUM
CHLORIDE : 400,000 T/Y

ASFSAN RS/SA PROJECT IN THAILAND
 INCOME STATEMENTS (FOR YEARS ENDING JUNE 30)
 - BASE CASE (SODA ASH PLANT) - (US\$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
SALES REVENUE	94466.	116115.	129883.	143502.	145508.	146271.	146855.	147278.	147437.	147595.	147754.
COST OF SALES	91449.	106912.	115236.	123550.	124485.	124382.	124280.	124177.	124074.	123971.	123869.
VARIABLE COST	58645.	67023.	75401.	83779.	83779.	83779.	83779.	83779.	83779.	83779.	83779.
DEPRECIATION & AMORTIZATION	22563.	22563.	22563.	22563.	22563.	22563.	22563.	22563.	22563.	22563.	22563.
OTHER FIXED COST	18555.	18452.	18349.	18246.	18143.	18041.	17938.	17835.	17732.	17630.	17527.
(INC) IN PRODUCT INVENTORIES	-8313.	-1125.	-1077.	-1038.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	3016.	9203.	14647.	20052.	21023.	21889.	22576.	23101.	23362.	23624.	23885.
LESS- SALES EXPENSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OPERATING PROFIT OR (LOSS)	3016.	9203.	14647.	20052.	21023.	21889.	22576.	23101.	23362.	23624.	23885.
LESS- INTEREST											
ON LONG TERM DEBT	12966.	12102.	11237.	10373.	9508.	8644.	7780.	6915.	6051.	5186.	4322.
ON SHORT TERM DEBT	0.	25.	188.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	-9950.	-2924.	3222.	9679.	11514.	13245.	14796.	16186.	17312.	18437.	19563.
LESS- INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	7790.	8297.	8803.
NET PROFIT OR (LOSS) AFTER TAX	-9950.	-2924.	3222.	9679.	11514.	13245.	14796.	16186.	9521.	10141.	10760.

ASEAN MS/SR PROJECT IN THAILAND
 INCOME STATEMENTS (FOR YEARS ENDING JUNE 30)
 - BASE CASE (SOCA ASH PLANT) - (US\$ 1000)

	1996	1997	1998	1999
SALES REVENUE	147913.	148071.	148230.	148388.
COST OF SALES	123766.	123663.	123560.	123458.
VARIABLE COST	83779.	83779.	83779.	83779.
DEPRECIATION & AMORTIZATION	22563.	22563.	22563.	22563.
OTHER FIXED COST	17424.	17321.	17219.	17116.
(INC) IN PRODUCT INVENTORIES	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	24147.	24408.	24670.	24931.
LESS: SALES EXPENSES	0.	0.	0.	0.
OPERATING PROFIT OR (LOSS)	24147.	24408.	24670.	24931.
LESS: INTEREST				
ON LONG TERM DEBT	3456.	2593.	1729.	864.
ON SHORT TERM DEBT	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	20689.	21815.	22941.	24067.
LESS: INCOME TAX	9310.	9817.	10323.	10830.
NET PROFIT OR (LOSS) AFTER TAX	11379.	11998.	12617.	13237.

ASEAN MS/SA PROJECT IN THAILAND
FUNDS FLOW STATEMENTS (FOR YEARS ENDING JUNE 30)
- BASE CASE (SCDA ASH PLANT) - (US\$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
SOURCES OF FUNDS	111137.	148183.	111137.	30717.	34344.	37908.	43312.	43585.	44452.	45138.	45664.
CASH GENERATED FROM OPERATION	0.	0.	0.	25579.	31766.	37210.	42615.	43585.	44452.	45138.	45664.
PROFIT BEFORE TAX, INTEREST DEPRECIATION & AMORTIZATION	0.	0.	0.	3016.	9203.	14647.	20052.	21023.	21889.	22576.	23101.
FINANCIAL RESOURCES	111137.	148183.	111137.	252.	1880.	22563.	22563.	22563.	22563.	22563.	22563.
SHARE CAPITAL	33341.	44455.	33341.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	77796.	103728.	77796.	0.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	252.	1880.	0.	0.	0.	0.	0.	0.
INCREASE IN ACCT PAYABLE	0.	0.	0.	4885.	698.	698.	698.	0.	0.	0.	0.
USES OF FUNDS	104769.	131101.	114929.	50376.	34344.	34237.	31259.	27035.	26027.	25141.	24256.
INVESTMENT IN FIXED ASSET	104769.	131101.	109014.	0.	0.	0.	0.	0.	0.	0.	0.
LAND AND SITE IMPROVEMENT	6443.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	92491.	123322.	92491.	0.	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	0.	0.	10688.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	5835.	7780.	5835.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET	0.	0.	5915.	20121.	4677.	3643.	3598.	238.	95.	73.	53.
OTHER THAN CASH	0.	0.	0.	11808.	2706.	1721.	1715.	238.	95.	73.	53.
INCR(DECR) ACC Y RECEIVABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCR(DECR) IN INVENTORIES	0.	0.	0.	8313.	1125.	1077.	1038.	0.	0.	0.	0.
PRODUCTS	0.	0.	5915.	0.	845.	845.	845.	0.	0.	0.	0.
MATERIALS	0.	0.	0.	30254.	29667.	30594.	27661.	26796.	25932.	25068.	24203.
DEBT SERVICES	0.	0.	0.	17288.	17288.	17288.	17288.	17288.	17288.	17288.	17288.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	0.	252.	1880.	0.	0.	0.	0.	0.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	12966.	12102.	11237.	10373.	9508.	8644.	7780.	6915.
INTEREST ON LONG TERM DEBT	0.	0.	0.	0.	25.	188.	0.	0.	0.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	6369.	17082.	-3792.	-19659.	0.	3672.	12054.	16551.	18424.	19998.	21408.
BEGINNING CASH BALANCE	0.	6369.	23451.	19655.	0.	0.	3672.	15725.	32276.	50700.	70698.
ENDING CASH BALANCE	6369.	23451.	19659.	0.	0.	3672.	15725.	32276.	50700.	70698.	92105.

ASIAN RS/SA PROJECT IN THAILAND
FUNDS FLOW STATEMENTS (FOR YEARS ENDING JUNE 30)
- BASE CASE (SUDA ASH PLANT) - (US\$ 1000)

	1993	1994	1995	1996	1997	1998	1999
SOURCES OF FUNDS							
CASH GENERATED FROM OPERATION	45925.	46187.	46448.	46709.	46971.	47232.	47494.
PROFIT BEFORE TAX, INTEREST DEPRECIATION & AMORTIZATION	23362.	23624.	23885.	24147.	24408.	24670.	24931.
FINANCIAL RESOURCES	22563.	22563.	22563.	22563.	22563.	22563.	22563.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INCREASE IN ACCT PAYABLE	0.	0.	0.	0.	0.	0.	0.
USES OF FUNDS	23359.	30285.	29927.	29565.	29211.	28953.	28496.
INVESTMENT IN FIXED ASSET	0.	0.	0.	0.	0.	0.	0.
LAND AND SITE IMPROVEMENT	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET	20.	20.	20.	20.	20.	20.	20.
OTHER THAN CASH	20.	20.	20.	20.	20.	20.	20.
INCR(DECR) ACC T RECEIVABLE	20.	20.	20.	20.	20.	20.	20.
INCR(DECR) IN INVENTORIES	0.	0.	0.	0.	0.	0.	0.
PRODUCTS	0.	0.	0.	0.	0.	0.	0.
MATERIALS	0.	0.	0.	0.	0.	0.	0.
DEBT SERVICES	23339.	22474.	21610.	20746.	19881.	19017.	18152.
REPAYMENT OF LONG TERM DEBT	17288.	17288.	17288.	17288.	17288.	17288.	17288.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	6051.	5186.	4322.	3458.	2593.	1729.	864.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INCOME TAX PAYMENT	0.	7790.	8297.	8803.	9310.	9817.	10323.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	22566.	19902.	16521.	17140.	17760.	18375.	19998.
BEGINNING CASH BALANCE	92105.	114672.	130574.	147095.	164236.	181995.	200374.
ENDING CASH BALANCE	114672.	130574.	147095.	164236.	181995.	200374.	219372.

ASEAN MS/SA PROJECT IN THAILAND
BALANCE SHEET (FOR YEARS ENDING JUNE 30)
- BASE CASE (SODA ASH PLANT) -
(US\$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
ASSETS											
111137.	259321.	370458.	348358.	330472.	315223.	308312.	302339.	298495.	296003.	294901.	
CURRENT ASSETS	6369.	23451.	25574.	26037.	30713.	38028.	53679.	70468.	88988.	109058.	130519.
CASH	6369.	23451.	19659.	0.	3672.	15725.	32276.	50700.	70698.	92105.	12105.
ACCOUNTS RECEIVABLE	0.	0.	11808.	0.	14514.	16235.	17950.	18188.	18284.	18357.	18410.
INVENTORIES	0.	0.	0.	8313.	9439.	10515.	11554.	11554.	11554.	11554.	11554.
PRODUCTS	0.	0.	5915.	5915.	6760.	7605.	8450.	8450.	8450.	8450.	8450.
MATERIALS	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET FIXED ASSETS	104769.	235870.	344884.	322321.	299759.	277196.	254633.	232070.	209508.	186945.	164382.
INVESTMENT	104769.	235870.	344884.	344884.	344884.	344884.	344884.	344884.	344884.	344884.	344884.
LAND & SITE IMPROVEMENT	6443.	6443.	6443.	6443.	6443.	6443.	6443.	6443.	6443.	6443.	6443.
CONSTRUCTED FACILITIES	92491.	215813.	308304.	308304.	308304.	308304.	308304.	308304.	308304.	308304.	308304.
PRE-INVEST. & START-UP EXP	0.	0.	10688.	10688.	10688.	10688.	10688.	10688.	10688.	10688.	10688.
INTEREST DURING CONSTRUCTN	5835.	13614.	19449.	19449.	19449.	19449.	19449.	19449.	19449.	19449.	19449.
LESS DEPRECIATION & AMORTIZTN	0.	0.	0.	22563.	45125.	67688.	90251.	112814.	135376.	157939.	180502.
LIABILITIES	77796.	181524.	259321.	247170.	232208.	213737.	197147.	179859.	162571.	145283.	127995.
CURRENT LIABILITIES	0.	0.	17288.	22425.	24751.	23569.	24267.	24267.	24267.	24267.	24267.
ACCOUNTS PAYABLE	0.	0.	0.	4885.	5883.	6281.	6979.	6979.	6979.	6979.	6979.
INCOME TAX PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	0.	0.	17288.	17288.	17288.	17288.	17288.	17288.	17288.	17288.	17288.
SHORT TERM DEBT	0.	0.	0.	252.	1880.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	77796.	181524.	242033.	224745.	207456.	190168.	172880.	155992.	138304.	121016.	103728.
LONG TERM DEBT BALANCE	77796.	181524.	242033.	224745.	207456.	190168.	172880.	155992.	138304.	121016.	103728.
STOCK HOLDERS EQUITY	33341.	77796.	111137.	101166.	98264.	101486.	111165.	122679.	135924.	150720.	166906.
SHARE CAPITAL	33341.	77796.	111137.	111137.	111137.	111137.	111137.	111137.	111137.	111137.	111137.
RETAINED EARNINGS	0.	0.	0.	-9950.	-12874.	-9651.	28.	11542.	24787.	39583.	55769.

ASEAN S/SA PROJECT IN THAILAND
 BALANCE SHEET (FOR YEARS ENDING JUNE 30)
 - BASE CASE (SCDA ASH PLANT) - (US\$ 1000)

	1993	1994	1995	1996	1997	1998	1999
ASSETS							
294925.	288284.	282262.	276860.	272077.	267913.	264368.	
CURRENT ASSETS	153105.	169027.	185568.	202725.	220508.	238907.	257925.
CASH	114672.	130574.	147095.	164236.	181995.	200374.	219372.
ACCOUNTS RECEIVABLE	18430.	18449.	18469.	18489.	18509.	18529.	18549.
INVENTORIES	11554.	11554.	11554.	11554.	11554.	11554.	11554.
PRODUCTS	8450.	8450.	8450.	8450.	8450.	8450.	8450.
MATERIALS							
NET FIXED ASSETS	141819.	119257.	96694.	74131.	51568.	29006.	6443.
INVESTMENT	344884.	344884.	344884.	344884.	344884.	344884.	344884.
LAND & SITE IMPROVEMENT	6443.	6443.	6443.	6443.	6443.	6443.	6443.
CONSTRUCTED FACILITIES	308304.	308304.	308304.	308304.	308304.	308304.	308304.
PRE-INVEST. & START-UP EXP	10688.	10688.	10688.	10688.	10688.	10688.	10688.
INTEREST DURING CONSTRUCTN	19449.	19449.	19449.	19449.	19449.	19449.	19449.
LESS DEPRECIATION & AMORTIZATION	203065.	236627.	248190.	270753.	293316.	315878.	338441.
LIABILITIES	118497.	101716.	84934.	68153.	51372.	34590.	17809.
CURRENT LIABILITIES	32057.	32564.	33070.	33577.	34084.	34590.	17809.
ACCOUNTS PAYABLE	6979.	6979.	6979.	6979.	6979.	6979.	6979.
INCOME TAX PAYABLE	7790.	8297.	8803.	9310.	9817.	10323.	10830.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT	17288.	17288.	17288.	17288.	17288.	17288.	17288.
LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	86440.	69152.	51864.	34576.	17288.	-0.	-0.
LONG TERM DEBT BALANCE	86440.	69152.	51864.	34576.	17288.	-0.	-0.
STOCK HOLDERS EQUITY	176427.	166568.	197328.	208707.	220705.	233322.	246559.
SHARE CAPITAL	111137.	111137.	111137.	111137.	111137.	111137.	111137.
RETAINED EARNINGS	65290.	75431.	86190.	97569.	109568.	122185.	135422.

ASEAN FS/SA PROJECT IN THAILAND
 PRODUCTION AND SALES PLAN
 - BASE CASE (SCDA ASH PLANT) -

(US\$ 1000)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
CAPACITY (SJCA ASH)	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
CAPACITY UTILIZATION	0.700	0.800	0.900	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION	280000.	320000.	360000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
INCREASE IN INVENTORY	23332.	3333.	3333.	3333.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME	256667.	316666.	356667.	396667.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
UNIT PRICE	0.2180	0.2187	0.2160	0.2155	0.2163	0.2172	0.2178	0.2182	0.2186	0.2190	0.2194
SALES REVENUE	55966.	68615.	77042.	85473.	86525.	86895.	87119.	87278.	87437.	87595.	87754.
CAPACITY (AMMO. CHL-)	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
CAPACITY UTILIZATION	0.700	0.800	0.900	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION	280000.	320000.	360000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
INCREASE IN INVENTORY	23332.	3333.	3333.	3333.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME	256667.	316667.	356667.	396667.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
UNIT PRICE	0.1500	0.1500	0.1482	0.1465	0.1475	0.1484	0.1493	0.1500	0.1500	0.1500	0.1500
SALES REVENUE	38500.	47500.	52841.	58128.	58983.	59376.	59736.	60000.	60000.	60000.	60000.
*** TOTAL SALES REVENUE ***	94466.	116115.	129883.	143602.	145508.	148271.	146855.	147278.	147437.	147595.	147754.
*** TOTAL SALES VOLUME ***	513334.	633333.	713334.	793334.	800000.	800000.	800000.	800000.	800000.	800000.	800000.
*** AVERAGE SALES PRICE ***	0.1840	0.1833	0.1821	0.1810	0.1819	0.1828	0.1836	0.1841	0.1843	0.1845	0.1847

ASEAN MS/SA PROJECT IN THAILAND /
 PRODUCTION AND SALES PLAN
 - BASE CASE (SODA ASH PLANT) -

(US\$ 1000)

	1996	1997	1998	1999
CAPACITY (SODA ASH)	400000.	400000.	400000.	400000.
CAPACITY UTILIZATION	1.000	1.000	1.000	1.000
PRODUCTION	400000.	400000.	400000.	400000.
INCREASE IN INVENTORY	0.	0.	0.	0.
SALES VOLUME	400000.	400000.	400000.	400000.
UNIT PRICE	0.2198	0.2202	0.2206	0.2210
SALES REVENUE	87919.	88071.	88230.	88388.
CAPACITY (AMMO. CHL.)	400000.	400000.	400000.	400000.
CAPACITY UTILIZATION	1.000	1.000	1.000	1.000
PRODUCTION	400000.	400000.	400000.	400000.
INCREASE IN INVENTORY	0.	0.	0.	0.
SALES VOLUME	400000.	400000.	400000.	400000.
UNIT PRICE	0.1500	0.1500	0.1500	0.1500
SALES REVENUE	60000.	60000.	60000.	60000.
*** TOTAL SALES REVENUE ***	147919.	148071.	148230.	148388.
*** TOTAL SALES VOLUME ***	800000.	800000.	800000.	800000.
*** AVERAGE SALES PRICE ***	0.1849	0.1851	0.1853	0.1855

ASEAN F5/S4 PROJECT IN THAILAND
 PRODUCTION COST STATEMENTS
 - BASE CASE (SODA ASH PLANT) -

(US\$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION	280000.	320000.	360000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
ROCK SALT	10286.	11756.	13225.	14695.	14695.	14695.	14695.	14695.	14695.	14695.	14695.
AMMONIA	21056.	24064.	27072.	30080.	30080.	30080.	30080.	30080.	30080.	30080.	30080.
QUICK LIME	361.	413.	464.	516.	516.	516.	516.	516.	516.	516.	516.
SODA ASH	3780.	4320.	4860.	5400.	5400.	5400.	5400.	5400.	5400.	5400.	5400.
RAW MATERIAL	35484.	40553.	45622.	50691.	50691.	50691.	50691.	50691.	50691.	50691.	50691.
FUEL OIL	13222.	15110.	16999.	18888.	18888.	18888.	18888.	18888.	18888.	18888.	18888.
WATER	775.	883.	994.	1104.	1104.	1104.	1104.	1104.	1104.	1104.	1104.
POWER	9167.	10477.	11786.	13096.	13096.	13096.	13096.	13096.	13096.	13096.	13096.
UTILITIES COST	23162.	26470.	29779.	33088.	33088.	33088.	33088.	33088.	33088.	33088.	33088.
VARIABLE COST	56645.	67023.	75401.	83779.	83779.	83779.	83779.	83779.	83779.	83779.	83779.
DEPRECIATION	20554.	20554.	20554.	20554.	20554.	20554.	20554.	20554.	20554.	20554.	20554.
AMORTIZATION(PRE-INVEST)	713.	713.	713.	713.	713.	713.	713.	713.	713.	713.	713.
AMORTIZATION(INTEREST DUR.)	1297.	1297.	1297.	1297.	1297.	1297.	1297.	1297.	1297.	1297.	1297.
AMORTIZATION	2009.	2009.	2009.	2009.	2009.	2009.	2009.	2009.	2009.	2009.	2009.
DEPRECIATION & AMORTIZATION	22563.	22563.	22563.	22563.	22563.	22563.	22563.	22563.	22563.	22563.	22563.
LABOUR COST	2527.	2527.	2527.	2527.	2527.	2527.	2527.	2527.	2527.	2527.	2527.
OVER HEAD	5054.	5054.	5054.	5054.	5054.	5054.	5054.	5054.	5054.	5054.	5054.
EMPLOYMENT COST	7581.	7581.	7581.	7581.	7581.	7581.	7581.	7581.	7581.	7581.	7581.
MAINTENANCE COST	9249.	9249.	9249.	9249.	9249.	9249.	9249.	9249.	9249.	9249.	9249.
TAX & INSURANCE	1724.	1622.	1519.	1416.	1313.	1211.	1108.	1005.	902.	800.	697.
DIRECT FIXED COST	16555.	18452.	18349.	18246.	18143.	18041.	17938.	17835.	17732.	17630.	17527.
EX-FACTORY PRODUCTION COST	99763.	108038.	116313.	124588.	124485.	124382.	124280.	124177.	124074.	123971.	123869.
UNIT DIRECT OPERATING COST	0.3563	0.3376	0.3231	0.3115	0.3112	0.3110	0.3107	0.3104	0.3102	0.3099	0.3097
ADMINISTRATIVE & SALES EXP.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG-TERM DEBT	12966.	12102.	11237.	10373.	9508.	8644.	7780.	6915.	6051.	5186.	4322.
INTEREST ON SHORT-TERM DEBT	0.	25.	188.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL PRODUCTION COST	112749.	120165.	127738.	134981.	133994.	133026.	132059.	131092.	130125.	129158.	128191.
UNIT PRODUCTION COST	0.4026	0.3755	0.3548	0.3374	0.3350	0.3326	0.3301	0.3277	0.3253	0.3229	0.3205

ASBEN RS/SR PROJECT IN IF-AILAND
 PRODUCTION COST STATEMENTS
 - BASE CASE (SCDA ASH PLANT) -

(US\$ 1000)

	1956	1957	1958	1959
PRODUCTION	400000.	400000.	400000.	400000.
ROCK SALT	14695.	14695.	14695.	14695.
AMONIA	30080.	30080.	30080.	30080.
QUICK TIME	516.	516.	516.	516.
SODA ASH	5400.	5400.	5400.	5400.
RAW MATERIAL	50691.	50691.	50691.	50691.
FUEL OIL	18888.	18888.	18888.	18888.
WATER	1104.	1104.	1104.	1104.
POWER	13096.	13096.	13096.	13096.
UTILITIES COST	33088.	33088.	33088.	33088.
VARIABLE COST	83779.	83779.	83779.	83779.
DEPRECIATION	20554.	20554.	20554.	20554.
AMORTIZATION(PRE-INVEST)	713.	713.	713.	713.
AMORTIZATION(INTEREST DEF.)	1297.	1297.	1297.	1297.
AMORTIZATION	2009.	2009.	2009.	2009.
DEPRECIATION & AMORTIZATION	22563.	22563.	22563.	22563.
LABOUR COST	2527.	2527.	2527.	2527.
OVER-HEAD	5054.	5054.	5054.	5054.
EMPLOYMENT COST	7581.	7581.	7581.	7581.
MAINTENANCE COST	9249.	9249.	9249.	9249.
TAX & INSURANCE	594.	491.	388.	286.
DIRECT FIXED COST	17424.	17321.	17219.	17116.
EX-FACTORY PRODUCTION COST	123766.	123663.	123560.	123458.
UNIT DIRECT OPERATING COST	0.3094	0.3092	0.3089	0.3086
ADMINISTRATIVE & SALES EXP.	0.	0.	0.	0.
INTEREST ON LONG-TERM DEBT	3458.	2593.	1729.	864.
INTEREST ON SHRT-TERM DEBT	0.	0.	0.	0.
TOTAL PRODUCTION COST	127223.	126256.	125289.	124322.
UNIT PRODUCTION COST	0.3181	0.3156	0.3132	0.3108

ASEAN RS/SA PROJECT IN THAILAND
 IRR CALCULATION ON TOTAL INVESTMENT (US\$ 1000)
 - BASE CASE (SOOA ASH PLANT) -

YEAR	(BEFORE TAX)				(AFTER TAX)						
	TOTAL INVESTMENT	PROFIT BEFORE TAX	INTEREST RETURN ON DEBT TAX	DEPRECIATION	PRESENT VALUE INVEST.	RETURN INVEST.	(LESS) INCOME TAX	RETURN AFTER TAX	DISCOUNT FACTOR	PRESENT VALUE INVEST.	RETURN
1982	98934.	0.	0.	0.	58934.	0.	0.	0.	1.0000	98934.	0.
1983	12322.	0.	0.	0.	11768.	0.	0.	0.	0.9306	115833.	0.
1984	128753.	0.	0.	0.	111512.	0.	0.	0.	0.8661	113592.	0.
1985	0.	0.	0.	22563.	25579.	25579.	0.	25579.	0.8282	0.	21197.
1986	0.	-9950.	12966.	22563.	31740.	31740.	0.	31740.	0.7784	0.	24705.
1987	0.	-2924.	12102.	22563.	11237.	37022.	0.	37022.	0.7311	0.	27057.
1988	0.	3272.	11237.	22563.	10373.	42615.	0.	42615.	0.6867	0.	29264.
1989	0.	5679.	10373.	22563.	9508.	43585.	0.	43585.	0.6450	0.	28113.
1990	0.	11514.	9508.	22563.	8644.	44452.	0.	44452.	0.6058	0.	26931.
1991	0.	13245.	8644.	22563.	7780.	45138.	0.	45138.	0.5691	0.	25686.
1992	0.	14756.	7780.	22563.	6915.	45664.	0.	45664.	0.5345	0.	24407.
1993	0.	16186.	6915.	22563.	6051.	45925.	0.	45925.	0.5020	0.	19145.
1994	0.	17312.	6051.	22563.	5186.	46137.	0.	46137.	0.4716	0.	17867.
1995	0.	18437.	5186.	22563.	4322.	46448.	0.	46448.	0.4429	0.	16674.
1996	0.	19563.	4322.	22563.	3458.	46709.	0.	46709.	0.4160	0.	15559.
1997	0.	20689.	3458.	22563.	2593.	46971.	0.	46971.	0.3908	0.	14519.
1998	0.	21815.	2593.	22563.	1729.	47232.	0.	47232.	0.3670	0.	13547.
1999	0.	22941.	1729.	22563.	864.	47494.	0.	47494.	0.3448	0.	12640.
2000	0.	24067.	864.	22563.	0.	47756.	0.	47756.	0.3233	0.	11838.
TOTAL	518992.		642761.		315781.			577591.		317321.	317321.

**** INTERNAL RATE OF RETURN ***** 7.45 PER CENT (BEFORE TAX) 6.46 PER CENT (AFTER TAX)
 ***** PAY-OUT PERIOD ***** 5.19 YEAR (BEFORE TAX) 9.44 YEAR (AFTER TAX)
 (THE YEAR WHEN THE TOTAL CAPITAL COST WILL BE PAID OUT BY ACCUMULATED TOTAL RETURN, FROM THE BEG. OF OPERATION)

CAPITAL REQUIREMENTS

	AMOUNT	SOURCE OF FUNDS
LAND AND SITE IMPROVEMENT	6443.	PAID-UP SHARE CAPITAL
CONSTRUCTED FACILITIES	306051.	LONG TERM DEBT
RAILWAY SPUR	2253.	SHORT TERM DEBT
CONSTRUCTED FACILITIES	308304.	FINANCIAL RESOURCES
PRE-INVEST AND START-UP EXP	10688.	
INTEREST DURING CONSTRUCTION	14449.	
TOTAL FIXED CAPITAL	344884.	
INITIAL WORKING CAPITAL	25574.	
TOTAL CAPITAL COST	370458.	

ASEAN AS/SE PROJECT IN THAILAND
 PROFITABILITY AND FINANCIAL INDICATORS
 - BASE CASE (SCDA ASH PLANT) - (US\$ 1000)

YEAR	(1) AFT TAX PROFIT -TO-	(2) AFT TAX PROFIT -TO-	(3) BFR TAX PROFIT -TO-	(4) AFT TAX PROFIT -TO-	(5) CURRENT RATIO	(6) QUICK RATIO	(7) DEBT SERVICE RATIO	(8) L/T DEBT -TO- S/H EQUITY	(9)* 8-E-P CAPACITY UTILIZE (PCT)	(10)* CASH SALES PRICE (PRICE)	(11)* CASH 8-E-P CAPACITY UTILIZE (PCT)
1985	-10.5	-9.8	-2.7	-9.0	1.16	0.53	0.85	69./ 31.	85.3	418.7	76.9
1986	-2.5	-3.0	-0.8	-2.6	1.24	0.59	1.08	68./ 32.	84.5	362.8	76.1
1987	2.5	3.2	0.9	2.9	1.61	0.84	1.30	65./ 35.	84.6	343.4	76.0
1988	6.7	8.7	2.6	8.7	2.21	1.39	1.54	61./ 39.	83.9	326.9	75.2
1989	7.9	9.4	3.1	10.4	2.90	2.08	1.63	56./ 44.	81.3	321.8	72.8
1990	9.1	9.7	3.6	11.9	3.67	2.84	1.71	50./ 50.	78.8	319.4	70.4
1991	10.1	9.8	4.0	13.3	4.49	3.67	1.80	45./ 55.	76.5	317.0	68.2
1992	11.0	9.7	4.4	14.6	5.38	4.55	1.89	38./ 62.	74.5	314.5	66.2
1993	6.5	5.4	4.7	8.6	4.78	4.15	1.63	33./ 67.	72.8	312.1	64.5
1994	6.9	5.4	5.0	9.1	5.19	4.58	1.69	27./ 73.	71.1	309.7	62.8
1995	7.3	5.5	5.3	9.7	5.61	5.01	1.74	21./ 79.	69.4	307.3	61.2
1996	7.7	5.5	5.6	10.2	6.04	5.44	1.80	14./ 86.	67.7	304.9	59.5
1997	8.1	5.4	5.9	10.8	6.47	5.88	1.87	7./ 93.	66.1	302.5	57.9
1998	8.5	5.4	6.2	11.4	6.91	6.33	1.94	-0./ 100.	64.4	300.0	56.2
1999	8.9	5.4	6.5	11.9	14.48	13.36	2.02	-0./ 100.	62.8	297.6	54.6
AVERAGE1	5.9	5.0	3.6	8.1	4.81	4.08	1.63	37./ 63.	74.9	323.9	66.6
AVERAGE2	6.4	5.5	3.6	8.1	4.82	4.12	1.59	39./ 61.			

(AVERAGE1) : SUM OF ANNUAL FIGURES OF PERCENTAGE AND RATIO IS DIVIDED BY NO. OF YEARS (SIMPLE AVERAGE)
 (AVERAGE2) : AVERAGE FIGURES ARE CALCULATED BY ACTUAL VALUES ACCUMULATED OVER THE PROJECT LIFE (WEIGHTED AVERAGE)

* NOTE FOR (9)(10)(11)
 WHEN THERE ARE TWO OR MORE PRODUCTS, AND DURING THE YEARS WHEN ALL OF PRODUCTS ARE NOT PRODUCED AT THE SAME RATE
 OF CAPACITY UTILIZATION, ABOVE BREAK-EVEN POINTS, CANNOT GIVE CORRECT FIGURES.

FINANCIAL STATEMENTS

BASE CASE

ENTIRE PROJECT

ROCK SALT : 1,200,000 T/Y

SODA ASH : 400,000 T/Y

AMMONIUM
CHLORIDE : 400,000 T/Y

ASEAN RS/JA PROJECT IN THAILAND
 INCOME STATEMENTS (PER YEARS ENDING JUNE 30)
 - OVERALL PROJECT BASE CASE - (US\$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
SALES REVENUE	100845.	124084.	139450.	154215.	157730.	159167.	160311.	161251.	161924.	162592.	163259.
COST OF SALES	96881.	114312.	122607.	130745.	132098.	132296.	132447.	132604.	132757.	132905.	133053.
VARIABLE COST	61069.	68477.	77150.	85219.	85660.	85801.	86050.	86335.	86602.	86869.	87136.
DEPRECIATION & AMORTIZATION	26157.	26157.	26157.	26157.	26157.	26157.	26157.	26157.	26157.	26157.	26157.
OTHER FIXED COST	21010.	20890.	20771.	20651.	20531.	20411.	20292.	20172.	20052.	19932.	19813.
(INC) IN PRODUCT INVENTORIES	-11356.	-1213.	-1471.	-1282.	-50.	-73.	-52.	-99.	-54.	-54.	-53.
GROSS PROFIT OR (LOSS) ON SALES	3964.	10372.	16850.	23470.	25631.	26866.	27864.	28647.	29167.	29687.	30206.
LESS. SALES EXPENSES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
OPERATING PROFIT OR (LOSS)	3964.	10372.	16850.	23470.	25631.	26866.	27864.	28647.	29167.	29687.	30206.
LESS. INTEREST											
ON LONG TERM DEBT	14949.	15953.	12956.	11959.	10865.	9966.	8969.	7973.	6976.	5980.	4983.
ON SHORT TERM DEBT	0.	75.	240.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	-10985.	-3660.	3654.	11511.	14668.	16902.	18895.	20674.	22191.	23708.	25223.
LESS. INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	9986.	10668.	11350.
NET PROFIT OR (LOSS) AFTER TAX	-10985.	-3660.	3654.	11511.	14668.	16902.	18895.	20674.	12205.	13039.	13873.

ASEAN RAJASA PROJECT IN THAILAND
 INCOME STATEMENTS (FOR YEARS ENDING JUNE 30) (US\$ 1000)
 - OVERALL PROJECT BASE CASE -

	1996	1997	1998	1999
SALES REVENUE	169939.	164612.	165279.	165771.
COST OF SALES	133215.	133367.	133514.	133486.
VARIABLE COST	87421.	87688.	87555.	88002.
DEPRECIATION & AMORTIZATION	26157.	26157.	26157.	26157.
OTHER FIXED COST	19693.	19573.	19453.	19334.
(INC) IN PRODUCT INVENTORIES	-56.	-52.	-51.	-7.
GROSS PROFIT OR (LOSS) ON SALES	30724.	31245.	31765.	32286.
LESS: SALES EXPENSES	0.	0.	0.	0.
OPERATING PROFIT OR (LOSS)	30724.	31245.	31765.	32286.
LESS: INTEREST				
ON LONG TERM DEBT	3986.	2996.	1993.	997.
ON SHORT TERM DEBT	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	26738.	28255.	29771.	31289.
LESS: INCOME TAX	12032.	12715.	13597.	14060.
NET PROFIT OR (LOSS) AFTER TAX	14706.	15540.	16374.	17209.

ASEAN KESJA PROJECT IN THAILAND
FUNDS FLOW STATEMENTS FOR YEARS ENDING JUNE 30
- OVERALL PROJECT BASE CASE -
(US\$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
SOURCES OF FUNDS	128135.	170647.	128135.	35996.	39544.	43729.	50299.	51808.	53053.	54042.	54828.
CASH GENERATED FROM OPERATION	0.	0.	0.	30121.	36529.	43007.	45627.	51788.	53025.	54021.	54804.
PROFIT BEFORE TAX, INTEREST DEPRECIATION & AMORTIZATION	0.	0.	0.	3964.	10372.	16850.	23470.	25831.	26868.	27864.	28647.
FINANCIAL RESOURCES	128135.	170847.	128135.	788.	26157.	26157.	26157.	26157.	26157.	26157.	26157.
SHARE CAPITAL	38441.	51254.	38441.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	89695.	119593.	89695.	0.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	788.	2398.	0.	0.	0.	0.	0.	0.
INCREASE IN ACCT PAYABLE	0.	0.	0.	5087.	617.	722.	672.	20.	28.	21.	24.
USES OF FUNDS	122215.	152668.	129389.	58842.	39544.	39444.	35619.	31384.	30151.	29097.	28882.
INVESTMENT IN FIXED ASSET	122215.	152668.	125169.	0.	0.	0.	0.	0.	0.	0.	0.
LAND AND SITE IMPROVEMENT	7714.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	10773.	143698.	10773.	0.	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	0.	0.	10688.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	6727.	8570.	6727.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET OTHER THAN CASH	0.	0.	4200.	23961.	4793.	3918.	3727.	489.	252.	195.	177.
INCR(DECR) ACC T RECEIVABLE INCR(DECR) IN INVENTORIES	0.	0.	0.	12606.	2980.	1847.	1845.	439.	179.	143.	118.
PRODUCTS	0.	0.	11356.	1213.	1471.	1282.	50.	73.	52.	59.	59.
MATERIALS	0.	0.	4200.	0.	600.	600.	0.	0.	0.	0.	0.
DEBT SERVICES	0.	0.	0.	34881.	34751.	35526.	31891.	30895.	29898.	28902.	27905.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	19932.	19932.	19932.	19932.	19932.	19932.	19932.	19932.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	788.	2398.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.	14949.	13933.	12958.	11959.	10963.	9966.	8969.	7973.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	79.	240.	0.	0.	0.	0.	0.
INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	5921.	18180.	-1254.	-22647.	0.	4266.	14680.	20424.	22903.	24945.	26746.
BEGINNING CASH BALANCE	0.	5921.	24100.	22847.	0.	0.	4280.	18966.	39391.	62293.	87238.
ENDING CASH BALANCE	5921.	24100.	22847.	0.	4266.	18566.	39391.	62293.	87238.	113984.	

ASEAN MS/SA PROJECT IN THAILAND
 FUNDS FLOW STATEMENTS (FOR YEARS ENDING JUNE 30)
 - OVERALL PROJECT BASE CASE - (US\$ 1000)

	1993	1994	1995	1996	1997	1998	1999
SOURCES OF FUNDS	55347.	55837.	56380.	56905.	57423.	57944.	58447.
CASH GENERATED FROM OPERATION	55324.	55844.	56363.	56881.	57402.	57922.	58443.
PROFIT BEFORE TAX, INTEREST	29167.	29687.	30206.	30724.	31245.	31765.	32286.
DEPRECIATION & AMORTIZATION	26157.	26157.	26157.	26157.	26157.	26157.	26157.
FINANCIAL RESOURCES	0.	0.	0.	0.	0.	0.	0.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INCREASE IN ACCT PAYABLE	22.	22.	22.	24.	22.	22.	4.
USES OF FUNDS	27047.	36035.	35720.	35410.	35090.	34775.	34395.
INVESTMENT IN FIXED ASSET	0.	0.	0.	0.	0.	0.	0.
LAND AND SITE IMPROVEMENT	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTION	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET OTHER THAN CASH	134.	137.	136.	141.	136.	134.	69.
INCR(DECR) ACC T RECEIVABLE	84.	85.	83.	85.	84.	83.	62.
INCR(DECR) IN INVENTORIES	54.	54.	53.	56.	52.	51.	7.
PRODUCTS	0.	0.	0.	0.	0.	0.	0.
MATERIALS	26908.	25912.	24915.	23919.	22922.	21925.	20929.
DEBT SERVICES	15932.	19932.	19932.	19932.	19932.	19932.	19932.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.
REPAYMENT OF SHORT TERM DEBT	6976.	5980.	4983.	3985.	2990.	1993.	997.
INTEREST ON LONG TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	9966.	10668.	11350.	12032.	12715.	13397.
INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	26500.	19832.	20666.	21495.	22335.	23169.	24052.
BEGINNING CASH BALANCE	113984.	142284.	162115.	182761.	204276.	226611.	249780.
ENDING CASH BALANCE	142284.	162115.	182761.	204276.	226611.	249780.	273833.

ASEAN PS/SA PROJECT IN THAILAND
 BALANCE SHEET FOR YEARS ENDING JUNE 30
 - OVERALL PROJECT BASE CASE -

(US\$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
ASSETS											
126135. 298983. 427118. 402075. 380711. 362757. 355008. 349764. 345745. 346510.											
CURRENT ASSETS	5921.	24100.	27047.	28161.	32954.	41157.	59565.	80479.	103633.	128774.	155696.
CASH	5921.	24100.	22847.	0.	0.	4286.	18966.	39391.	62393.	87238.	113984.
ACCOUNTS RECEIVABLE	0.	0.	0.	12606.	15585.	17832.	19277.	19716.	19896.	20039.	20156.
INVENTORIES	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PRODUCTS	0.	0.	0.	11356.	12568.	14039.	15322.	15371.	15444.	15496.	15555.
MATERIALS	0.	0.	4200.	4200.	4800.	5400.	6001.	6001.	6001.	6001.	6001.
NET FIXED ASSETS	122215.	276882.	400071.	373914.	347757.	321600.	295442.	269285.	243128.	216971.	190814.
INVESTMENT	122215.	276882.	400071.	400071.	400071.	400071.	400071.	400071.	400071.	400071.	400071.
LAND & SITE IMPROVEMENT	7714.	7714.	7714.	7714.	7714.	7714.	7714.	7714.	7714.	7714.	7714.
CONSTRUCTED FACILITIES	10773.	251471.	359245.	359245.	359245.	359245.	359245.	359245.	359245.	359245.	359245.
PRE-INVEST. & START-UP EXP	0.	0.	10688.	10688.	10688.	10688.	10688.	10688.	10688.	10688.	10688.
INTEREST DURING CONSTRUCTN	6727.	15697.	22424.	22424.	22424.	22424.	22424.	22424.	22424.	22424.	22424.
LESS DEPRECIATION & AMORTIZTN	0.	0.	0.	26157.	52314.	78471.	104629.	130786.	156943.	183100.	209257.
LIABILITIES	89695.	209288.	298983.	284925.	267221.	245613.	226353.	206441.	186537.	166625.	146717.
CURRENT LIABILITIES	0.	0.	19932.	25807.	28035.	26359.	27031.	27051.	27079.	27100.	27124.
ACCOUNTS PAYABLE	0.	0.	0.	5087.	5704.	6427.	7099.	7119.	7147.	7168.	7192.
INCOME TAX PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	0.	0.	19932.	19932.	19932.	19932.	19932.	19932.	19932.	19932.	19932.
SHORT TERM DEBT	0.	0.	0.	788.	2398.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	89695.	209288.	279050.	259118.	239186.	219254.	199322.	179390.	159457.	139525.	119593.
LONG TERM DEBT BALANCE	89695.	209288.	279050.	259118.	239186.	219254.	199322.	179390.	159457.	139525.	119593.
STOCK HOLDERS EQUITY	38441.	89695.	128135.	117150.	113490.	117144.	128655.	143423.	160225.	179119.	199793.
SHARE CAPITAL	38441.	89695.	128135.	128135.	128135.	128135.	128135.	128135.	128135.	128135.	128135.
RETAINED EARNINGS	0.	0.	0.	-10985.	-14645.	-10991.	520.	15188.	32090.	50584.	71658.

ASEAN RS/JA PROJECT IN THAILAND
 BALANCE SHEET (FOR YEARS ENDING JUNE 30)
 - OVERALL PROJECT BASE CASE -

(US\$ 1000)

	1993	1994	1995	1996	1997	1998	1999
ASSETS							
CURRENT ASSETS							
CASH	184135.	204104.	224906.	246542.	269012.	292316.	316437.
ACCOUNTS RECEIVABLE	122284.	162115.	182781.	204276.	226611.	249780.	273833.
INVENTORIES	20241.	20324.	20401.	20492.	20576.	20660.	20721.
RECEIVABLES	15610.	15864.	15717.	15772.	15824.	15875.	15882.
MATERIALS	6001.	6001.	6001.	6001.	6001.	6001.	6001.
NET FIXED ASSETS	164657.	198500.	112343.	86185.	60026.	33871.	7714.
INVESTMENT	400071.	400071.	400071.	400071.	400071.	400071.	400071.
LAND & SITE IMPROVEMENT	7714.	7714.	7714.	7714.	7714.	7714.	7714.
CONSTRUCTED FACILITIES	359245.	359245.	359245.	359245.	359245.	359245.	359245.
PRE-INVEST. & START-UP EXP	10688.	10688.	10688.	10688.	10688.	10688.	10688.
INTEREST DURING CONSTRUCTN	22424.	22424.	22424.	22424.	22424.	22424.	22424.
LESS DEPRECIATION & AMORTIZIN	235414.	261371.	287728.	313886.	340045.	366200.	392357.
LIABILITIES							
CURRENT LIABILITIES							
ACCOUNTS PAYABLE	37132.	37837.	38541.	39246.	39951.	40656.	21411.
INCOME TAX PAYABLE	7214.	7236.	7258.	7282.	7304.	7327.	7331.
DIVIDENDS PAYABLE	9986.	10688.	11350.	12032.	12715.	13397.	14080.
CURRENT PORTION OF DEBT	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	19932.	19932.	19932.	19932.	19932.	19932.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	99661.	75725.	59797.	39864.	19932.	-0.	-0.
LONG TERM DEBT BALANCE	99661.	75725.	59797.	39864.	19932.	-0.	-0.
STOCK HOLDERS EQUITY							
211999.	225038.	239910.	253616.	269157.	285531.	302740.	
SHARE CAPITAL	128135.	128135.	128135.	128135.	128135.	128135.	128135.
RETAINED EARNINGS	83863.	96902.	110775.	125481.	141021.	157396.	174605.

ASSEN KASIA PROJECT IN THAILAND
 PRODUCTION AND SALES PLAN

(US\$ 1000)

- OVERALL PROJECT BASE CASE -

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
CAPACITY (SODA ASH)	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
CAPACITY UTILIZATION	0.700	0.900	0.900	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION	280000.	320000.	360000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
INCREASE IN INVENTORY	23332.	3333.	3333.	3333.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME	256667.	316666.	356667.	396667.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
UNIT PRICE	0.2180	0.2167	0.2160	0.2155	0.2163	0.2172	0.2178	0.2182	0.2186	0.2190	0.2194
SALES REVENUE	55966.	68615.	77042.	85473.	86525.	86895.	87119.	87278.	87437.	87595.	87754.
CAPACITY (AMMO. CHL.)	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.	1200000.
CAPACITY UTILIZATION	0.680	0.700	0.794	0.855	0.867	0.885	0.898	0.913	0.927	0.941	0.955
PRODUCTION (S/S PLANT)	816000.	640000.	952800.	1026000.	1040400.	1062000.	1077600.	1095600.	1112400.	1129200.	1146000.
INCREASE IN INVENTORY	136000.	4000.	18800.	12200.	2400.	3600.	2600.	3000.	2800.	2800.	2800.
SALES VOLUME	680000.	830000.	934000.	1013800.	1038000.	1058400.	1075000.	1092600.	1109600.	1126400.	1143200.
UNIT PRICE	0.0694	0.0102	0.0102	0.0105	0.0118	0.0122	0.0125	0.0128	0.0131	0.0133	0.0136
SALES REVENUE	6379.	8565.	9573.	10613.	12222.	12893.	13456.	13973.	14488.	14997.	15505.
CAPACITY (AMMO. CHL.)	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
CAPACITY UTILIZATION	0.700	0.800	0.900	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION	280000.	320000.	360000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
INCREASE IN INVENTORY	23332.	3333.	3333.	3333.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME	256667.	316667.	356667.	396667.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
UNIT PRICE	0.1900	0.1500	0.1482	0.1465	0.1475	0.1484	0.1493	0.1500	0.1500	0.1500	0.1500
SALES REVENUE	38500.	47500.	52841.	58125.	58963.	59376.	59736.	60000.	60000.	60000.	60000.
*** TOTAL SALES REVENUE ***	100845.	124084.	139456.	154215.	157730.	159164.	160311.	161251.	161924.	162592.	163259.
*** TOTAL SALES VOLUME ***	1193334.	1469333.	1647334.	1807134.	1838000.	1858400.	1875000.	1892600.	1909600.	1926400.	1943200.
*** AVERAGE SALES PRICE ***	0.0845	0.0849	0.0847	0.0853	0.0858	0.0856	0.0855	0.0852	0.0848	0.0844	0.0840

ESPAN RS/52 PROJECT IN THAILAND
 PRODUCTION AND SALES PLAN
 - OVERALL PROJECT BASE CASE -

(US\$ 1000)

	1996	1997	1998	1999
CAPACITY (SODA ASH)	400000.	400000.	400000.	400000.
CAPACITY UTILIZATION	1.000	1.000	1.000	1.000
PRODUCTION	400000.	400000.	400000.	400000.
INCREASE IN INVENTORY	0.	0.	0.	0.
SALES VOLUME	400000.	400000.	400000.	400000.
UNIT PRICE	0.2198	0.2202	0.2206	0.2210
SALES REVENUE	87913.	88071.	88230.	88388.
CAPACITY	1200000.	1200000.	1200000.	1200000.
CAPACITY UTILIZATION	0.970	0.984	0.998	1.000
PRODUCTION (R/S PLANT)	1164000.	1180800.	1197600.	1200000.
INCREASE IN INVENTORY	300.	2800.	2800.	400.
SALES VOLUME	1161000.	1178000.	1194800.	1199600.
UNIT PRICE	0.0138	0.0140	0.0143	0.0145
SALES REVENUE	16027.	16541.	17049.	17383.
CAPACITY (AMMO. CHL.)	400000.	400000.	400000.	400000.
CAPACITY UTILIZATION	1.000	1.000	1.000	1.000
PRODUCTION	400000.	400000.	400000.	400000.
INCREASE IN INVENTORY	0.	0.	0.	0.
SALES VOLUME	400000.	400000.	400000.	400000.
UNIT PRICE	0.1500	0.1500	0.1500	0.1500
SALES REVENUE	60000.	60000.	60000.	60000.
*** TOTAL SALES REVENUE ***	163939.	164612.	165279.	165771.
*** TOTAL SALES VOLUME ***	1961000.	1978000.	1994600.	1999600.
*** AVERAGE SALES PRICE ***	0.0836	0.0832	0.0829	0.0829

ASIAN WUSA PROJECT IN THAILAND
 PRODUCTION COST STATEMENTS
 - OVERALL PROJECT BASE CASE -

(US\$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION	280000.	320000.	360000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.	400000.
AMMUNIA	21056.	24064.	27072.	30080.	30080.	30080.	30080.	30080.	30080.	30080.	30080.
QUICK LINE	361.	413.	464.	516.	516.	516.	516.	516.	516.	516.	516.
SODA ASH	3780.	4320.	4860.	5400.	5400.	5400.	5400.	5400.	5400.	5400.	5400.
RAW MATERIAL	25197.	28797.	32396.	35996.	35996.	35996.	35996.	35996.	35996.	35996.	35996.
UTILITIES	23162.	26476.	29779.	33088.	33088.	33088.	33088.	33088.	33088.	33088.	33088.
DIRECT GP. COST	3826.	3938.	4051.	4164.	4277.	4390.	4503.	4616.	4729.	4842.	4955.
TRANSPORTATION COST	8160.	8400.	8640.	8880.	9120.	9360.	9600.	9840.	10080.	10320.	10560.
ROYALTY	725.	872.	979.	1065.	1094.	1118.	1138.	1158.	1179.	1199.	1219.
VARIABLE COST	61069.	68477.	77150.	85219.	85460.	85801.	86050.	86335.	86602.	86869.	87136.
DEPRECIATION	23950.	23950.	23950.	23950.	23950.	23950.	23950.	23950.	23950.	23950.	23950.
AMORTIZATION(PRE-INVEST)	713.	713.	713.	713.	713.	713.	713.	713.	713.	713.	713.
AMORTIZATION(INTEREST DUR.)	1495.	1495.	1495.	1495.	1495.	1495.	1495.	1495.	1495.	1495.	1495.
AMORTIZATION	2207.	2207.	2207.	2207.	2207.	2207.	2207.	2207.	2207.	2207.	2207.
DEPRECIATION & AMORTIZATION	26157.	26157.	26157.	26157.	26157.	26157.	26157.	26157.	26157.	26157.	26157.
LABOUR (S/A)	2527.	2527.	2527.	2527.	2527.	2527.	2527.	2527.	2527.	2527.	2527.
LABOUR (R/S)	482.	482.	482.	482.	482.	482.	482.	482.	482.	482.	482.
OVER HEAD	5054.	5054.	5054.	5054.	5054.	5054.	5054.	5054.	5054.	5054.	5054.
EMPLOYMENT COST	8063.	8063.	8063.	8063.	8063.	8063.	8063.	8063.	8063.	8063.	8063.
MAINTENANCE COST	10777.	10777.	10777.	10777.	10777.	10777.	10777.	10777.	10777.	10777.	10777.
TAX & INSURANCE	1835.	1715.	1595.	1478.	1356.	1236.	1116.	997.	877.	757.	637.
MATERIALS	335.	335.	335.	335.	335.	335.	335.	335.	335.	335.	335.
DIRECT FIXED COST	21010.	20690.	20771.	20651.	20531.	20411.	20292.	20172.	20052.	19932.	19813.
EX-FACTORY PRODUCTION COST	108237.	119525.	124077.	132027.	132148.	132370.	132499.	132664.	132812.	132959.	133106.
UNIT DIRECT OPERATING COST	0.3666	0.3610	0.3547	0.3301	0.3304	0.3309	0.3312	0.3317	0.3320	0.3324	0.3328
ADMINISTRATIVE & SALES EXP.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG-TERM DEBT	14949.	13953.	12950.	11959.	10963.	9966.	8969.	7973.	6976.	5980.	4983.
INTEREST ON SHORT-TERM DEBT	0.	79.	240.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL PRODUCTION COST	123166.	129556.	137273.	143987.	143111.	142336.	141468.	140636.	139788.	138938.	138089.
UNIT PRODUCTION COST	0.4399	0.4049	0.3813	0.3600	0.3578	0.3558	0.3537	0.3516	0.3495	0.3473	0.3452

ASEAN F3/SA PROJECT IN THAILAND
 PRODUCTION COST STATEMENTS
 - CUMULATIVE PROJECT BASE CASE -

(US\$ 1000)

	1996	1997	1998	1999
PRODUCTION	400000.	400000.	400000.	400000.
AMMONIA	30080.	30080.	30080.	30080.
QUICK LIME	516.	516.	516.	516.
SODA ASH	5400.	5400.	5400.	5400.
RAW MATERIAL	35996.	35996.	35996.	35996.
UTILITIES	33088.	33088.	33088.	33088.
DIRECT OP. COST	5457.	5536.	5615.	5626.
TRANSPORTATION COST	11040.	11808.	11976.	12000.
ROYALTY	1240.	1260.	1280.	1292.
VARIABLE COST	87421.	87683.	87955.	88002.
DEPRECIATION	23950.	23950.	23950.	23950.
AMORTIZATION(PRE-INVEST)	713.	713.	713.	713.
AMORTIZATION(INTEREST DUR.)	1495.	1495.	1495.	1495.
AMORTIZATION	2207.	2207.	2207.	2207.
DEPRECIATION & AMORTIZATION	26157.	26157.	26157.	26157.
LABOUR (S/A)	2527.	2527.	2527.	2527.
LABOUR (R/S)	482.	482.	482.	482.
OVER HEAD	5054.	5054.	5054.	5054.
EMPLOYMENT COST	8063.	8063.	8063.	8063.
MAINTENANCE COST	10777.	10777.	10777.	10777.
TAX & INSURANCE	518.	398.	278.	158.
MATERIALS	335.	335.	335.	335.
DIRECT FIXED COST	18693.	19573.	19453.	19334.
EX-FACTORY PRODUCTION COST	133271.	133418.	133565.	133493.
UNIT DIRECT OPERATING COST	0.3332	0.3335	0.3339	0.3337
ADMINISTRATIVE & SALES EXP.	0.	0.	0.	0.
INTEREST ON LONG-TERM DEBT	3980.	2990.	1993.	997.
INTEREST ON SHORT-TERM DEBT	0.	0.	0.	0.
TOTAL PRODUCTION COST	137258.	136408.	135559.	134489.
UNIT PRODUCTION COST	0.3431	0.3410	0.3389	0.3362

ASEAN 45/54 PROJECT IN THAILAND
IRR CALCULATION ON TOTAL INVESTMENT (US\$ 1000)
- OVERALL PROJECT BASE CASE -

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATION	INTEREST ON L-T DEBT	RETURN BEFORE TAX	(BEFORE TAX)		DISCOUNT FACTOR	RETURN AFTER TAX	(LESS) INCOME TAX	(AFTER TAX)	
						PRESENT VALUE INVEST.	RETURN				DISCOUNT FACTOR	PRESENT VALUE INVEST.
1982	115487.	0.	0.	0.	0.	115487.	0.	1.0000	0.	0.	1.0000	115487.
1983	143698.	0.	0.	0.	0.	139255.	0.	0.9273	0.	0.	0.9366	134584.
1984	145508.	0.	0.	0.	0.	125128.	0.	0.8599	0.	0.	0.8772	127636.
1985	0.	-10985.	26157.	14949.	30121.	0.	24020.	0.7974	0.	0.	0.8215	0.
1986	0.	-3660.	26157.	13953.	36450.	0.	26955.	0.7395	0.	0.	0.7694	0.
1987	0.	3654.	26157.	12956.	42767.	0.	29328.	0.6858	0.	0.	0.7206	0.
1988	0.	11511.	26157.	11959.	49627.	0.	31529.	0.6359	0.	0.	0.6749	0.
1989	0.	14666.	26157.	10963.	51788.	0.	30540.	0.5897	0.	0.	0.6321	0.
1990	0.	16902.	26157.	9966.	53025.	0.	28997.	0.5469	0.	0.	0.5920	0.
1991	0.	18895.	26157.	8969.	54021.	0.	27395.	0.5071	0.	0.	0.5545	0.
1992	0.	20674.	26157.	7973.	54804.	0.	25772.	0.4703	0.	0.	0.5193	0.
1993	0.	22181.	26157.	6976.	55324.	0.	24126.	0.4361	0.	9986.	0.	
1994	0.	23708.	26157.	5980.	55844.	0.	22583.	0.4044	0.	10688.	0.	
1995	0.	25223.	26157.	4983.	56363.	0.	21137.	0.3750	0.	11350.	0.	
1996	0.	26738.	26157.	3986.	56881.	0.	19761.	0.3478	0.	12032.	0.	
1997	0.	28255.	26157.	2990.	57402.	0.	18511.	0.3225	0.	12715.	0.	
1998	0.	29771.	26157.	1993.	57922.	0.	17321.	0.2990	0.	13397.	0.	
1999	-34761.	31289.	26157.	997.	58443.	0.	16207.	0.2773	0.	14080.	0.	
TOTAL	369933.				770784.		364231.		686555.			366297.

**** INTERNAL RATE OF RETURN **** 7.94 PER CENT (BEFORE TAX) 6.77 PER CENT (AFTER TAX)

**** PAY-DUT PERIOD **** (BEFORE TAX) 8.99 YEAR (AFTER TAX) 9.20 YEAR
(THE YEAR WHEN THE TOTAL CAPITAL COST WILL BE PAID OUT BY ACCUMULATED TOTAL RETURN, FROM THE BEG. OF OPERATION)

CAPITAL REQUIREMENTS

SOURCE OF FUNDS

LAND & SITE IMPROVEMENT	7714.	PAY-UP SHARE CAPITAL	128135.
S/A PLANT	306051.	LONG TERM DEBT	298983.
R/S PLANT	47498.	SHORT TERM DEBT	0.
RAILWAY SPUR	5686.	FINANCIAL RESOURCES	427118.
CONSTRUCTED FACILITIES	359245.		
PRE-INVEST AND START-UP EXP	10688.		
INTEREST DURING CONSTRUCTION	24424.		
TOTAL FIXED CAPITAL	400071.		
INITIAL WORKING CAPITAL	27047.		
TOTAL CAPITAL COST	427118.		

ASIAN S/S/S PROJECT IN THAILAND
 PROFITABILITY AND FINANCIAL INDICATORS
 - OVERALL PROJECT BASE CASE -
 (US\$ 1000)

YEAR	(1) AFT TAX PROFIT -TO-		(2) AFT TAX PROFIT -TO-		(3) BFS TAX PROFIT -TO-		(4) AFT TAX PROFIT -TO-		(5) CURRENT RATIO		(6) QUICK RATIO		(7) DEBT SERVICE RATIO		(8) L/T DEBT -TO- S/H EQUITY		(9)* PROFIT B.E.P. CAPACITY UTILIZE		(10)* CASH B.E.P. SALES PRICE		(11)* CASH B.E.P. CAPACITY UTILIZE	
	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)	(PCT)
1985	-10.9	-9.4	-2.6	-6.6	1.09	0.49	0.86	69.7/31.	88.8	455.7	79.9											
1986	-2.9	-3.2	-0.9	-2.9	1.18	0.56	1.03	68.7/32.	85.0	389.5	76.3											
1987	2.6	3.1	0.9	2.9	1.56	0.82	1.30	65.7/35.	85.1	367.4	76.3											
1988	7.5	8.9	2.7	9.0	2.20	1.41	1.56	61.7/39.	83.6	347.3	74.7											
1989	9.3	10.2	3.4	11.4	2.98	2.19	1.68	56.7/44.	79.8	342.2	71.2											
1990	10.6	10.5	4.0	13.2	3.83	3.04	1.77	50.7/50.	77.1	340.3	68.6											
1991	11.6	10.5	4.4	14.7	4.75	3.96	1.87	44.7/56.	74.6	338.1	66.2											
1992	12.8	10.3	4.8	16.1	5.74	4.95	1.96	37.7/63.	72.5	336.0	64.2											
1993	7.5	5.8	5.2	9.5	4.96	4.38	1.68	32.7/68.	70.6	333.9	62.3											
1994	8.0	5.8	5.5	10.2	5.39	4.82	1.74	26.7/74.	68.8	331.8	60.5											
1995	8.5	5.8	5.9	10.6	5.84	5.27	1.81	20.7/80.	66.9	329.7	58.8											
1996	9.0	5.8	6.3	11.5	6.28	5.73	1.88	14.7/86.	65.1	327.6	57.0											
1997	9.4	5.3	6.6	12.1	6.73	6.19	1.95	7.7/93.	63.3	325.5	55.2											
1998	9.9	5.7	7.0	12.8	7.19	6.65	2.03	-0.7/100.	61.6	323.3	53.5											
1999	10.4	5.7	7.3	13.4	14.78	13.76	2.12	-0.7/100.	59.8	320.7	51.8											
AVERAGE1	6.9	5.4	4.0	9.1	4.57	4.28	1.69	37.7/63.	73.5	347.3	65.1											
AVERAGE2	7.6	5.9	4.0	9.1	5.03	4.37	1.64	38.7/62.														

(AVERAGE1) : SUM OF ANNUAL FIGURES OF PERCENTAGE AND RATIO IS DIVIDED BY NO. OF YEARS(SIMPLE AVERAGE)
 (AVERAGE2) : AVERAGE FIGURES ARE CALCULATED BY ACTUAL VALUES ACCUMULATED OVER THE PROJECT LIFE(WEIGHTED AVERAGE)
 * NOTE FOR (9)(10)(11)
 WHEN THERE ARE TWO OR MORE PRODUCTS, AND DURING THE YEARS WHEN ALL OF PRODUCTS ARE NOT PRODUCED AT THE SAME RATE
 OF CAPACITY UTILIZATION, ABOVE BREAK-EVEN-POINTS CANNOT GIVE CORRECT FIGURES.