第 Ⅷ 編

経 済 評 価

第Ⅷ編　経済評価

第1章　概　　説

本編では、タイ国民経済への寄与という立場からプロジェクトを評価する。本プロジェクトのタイ国経済への寄与は主として、

(1) エタンを原料とするエチレンの生産、ならびにエチレンのDownstream Projectsの実現による、タイ固有の天然資源であるSiam湾天然ガス中のエタン留分の付加価値上昇。

および、

(2) エチレンおよびVCMの国産化によるタイ国の外貨収支への寄与ならびに関連産業へのインパクト。

という立場からとらえることができる。

以下に、エチレンプロジェクトに関し、経済的便益と費用を解析し、それに基づき、経済的内部収益率（Economic Internal Rate of Return）を算出し、国民経済的立場から、本プロジェクトを定量的に評価する。

第2章　エチレンプロジェクトの経済評価

2－1　エチレンプロジェクトの経済的便益

経済的便益は、直接便益と間接便益に分けられる。

2－1－1　直接便益

直接便益は本プロジェクトに対する投資によって生産されるエチレンの経済的価値として評価をすることができる。第Ⅱ編にて言及したごとく、国際市場からLDPEやHDPEなどのエチレン誘導体を輸入する場合と比較すると、competitive[1]なエチレン価格は、およそUS$500／t（1980年固定価格）まで低下しなければならないと考えられる。従って本エチレンプロジェクトで生産されるエチレンの経済価格には、

1）この場合は経済評価を行っているので、LDPE、HDPEなどの輸入にかけられる関税は移転コスト（transferable cost）として除外しなければならない。従って、これらの輸入LDPE、HDPEと競合できるためには、前編の財務分析では、これらエチレン誘導体の関税を含めた輸入価格を前提にしてエチレン価格としてUS$800／tと設定しており、本編の経済分析では、これを差引くと約US$500／tというエチレン価格となる。

この価格を採用し、[1] 以下に経済的内部収益率を算出する。このエチレンは明らかに輸入代替であるという考え方ができるので、その価格には、シャドウレート[2]を適用する。

2－1－2　間接便益

本プロジェクトの間接便益として、次のようなものを列記できる。

(1)　雇用機会の創出と増加

本プロジェクトの間接便益の1つは、本プロジェクトの建設および操業にかかわるタイ国における雇用機会の増加であろう。

(2)　関連産業へのインパクト

建設資材の需要増加、タイ国におけるエンジニアリング産業、土木建設、運輸産業への波及効果が期待される。

(3)　地域経済開発への寄与

本プロジェクトは、直接的にRayong地域における地域経済の発展、ならびにタイの産業の地方分散に大きく寄与するものと期待される。

本プロジェクトの実現は、ここに述べたように数々の間接便益をタイ国にもたらすが、その定量的評価はむずかしい。従って、経済的内部収益率の算出には、これら間接便益を含めない。

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1) 現在Rayongではエチレンプラントの立地予定の東側約20Kmのところに、輸入エチレンを原料とするLDPEプラントが建設中であり、エチレン輸入に必要なjettyや低温の液化エチレンタンクも並行して建設されている。このLDPEプラントはエチレンプラントが完成しない場合には輸入エチレンを原料とする以外に他に方法はない。少なくともその完成までは、輸入エチレンに依存しなければならない。現在国際市場からエチレンを購入する場合、例えば現在商談が進められていると伝えられる日本の場合には、FOB：$800／t、輸送費；$140／t、CIFタイ：$940／t、程度が予想される。また他国からの輸入もこの価格とそう大差ないものとなろう。従ってここで述べたようにLDPEやHDPEというエチレン価格として、はるかに高いものとなる。経済分析にはこのような要因も考慮すべきであるが、ここでは控え目な見方をするという立場をとり、以下の経済分析では$500／tというエチレン価格を採用した。

2) Asian Development Bank (ADB)、"Report on the fassibility of rock salf-soda ash project in Thailand Vol.4" 1978によれば、Standard conversion factorは、0791である。従って、シャドウレートは、(Official exchange rate、Baht/$)／(0.791)となる。

2－2　経済的費用

本プロジェクトの経済的費用は次のものがあろう。

(1)　このプロジェクトの実現に不可欠な初期費用（資本コスト）

(2)　エチレンの生産によって消費される天然ガス中のエタン留分（ガス処理プラントにて分離される）

(3)　消費される労働力

(4)　エチレン生産に必要なその他の費用

これらの詳細を次に述べる。

(1)　プロジェクトの初期費用

本プロジェクトの実現に必要な初期費用[1]には、エチレンプラントコスト、創業準備費、試運転費、ならびに運転資金が含まれる。この費用のうち、外貨費用部分には前掲のシャドウレートが適用される。

(2)　エタンの経済費用

エタンの経済費用は、いいかえれば本エチレンプロジェクトを除いた場合のエタンの代替的な機会コストと考えることができる。ガス処理プラントにはすでに、本プロジェクトのフィージビリティ検討に先だち、エチレンプラントの規模あるいは、その実現性にかゝわりなく、８４％のエタン回収率が設定[2]されており、これに基づき290,000T／Y のエタンが回収されるよう実際プラントが建設されようとしている。

エチレンの原料として利用されないエタンは、それが原料ガス中に未分離のまゝ存在するエタンであろうとあるいは仮りに、ガス処理プラントで分離されたエタンであろうと、結局は、燃料として利用される以外には、その用途はないので、その評価は発電用燃料として発熱量ベースで重油と等価な評価を受けざるを得ない。従ってこのような、既成事実に基づくならば、エタンの経済費用はこの重油ベースの価格[3]に、ガス処理プラントにおけるエタン回収に必要な操業費[4]の増加分を上乗せしたものと考えることができる。

1）タイ国内で課税された分は移転費用（transferable cost）として除去されねばならないが、表Ⅵ－１、－２の総所要資金には、はじめから輸入関税その他は一切含まれていないので、この場合は必要はない。

2）PTTによる。

3）すでに述べたごとく、$255／bbl（1980年固定価格）。これを発熱量ベースでエタンと等価と考え、エタンの重量当り価格に換算すると$190／トンとなる。

4）つまり、同一のガス処理プラントの操業費をエタンの回収運転をする場合と、しない場合を比較し、その差額をとる。ガス処理プラントの設備設計内容がすでに決定され、その線にそって建設が進められているとすれば、本来エタンコストがかぶるべき固定費は、この場合除外して考えることができる。

現在設計中のガス処理プラントを将来、実際に操業するに際し、エタン回収なしで、これを運転する場合に比べて、エタン回収運転の場合では、どの程度の運転費の増加（固定費は同じと考えられるから、その差はほとんど動力費の差と考えることができる）があるかは、正確には現在ＰＴＴにて検討中のデータなしに行うことは不可能である。しかし、ガス処理プラントの設備費・動力費の過半数が原料ガス中の炭酸ガス除去工程によるものと予想され、かついずれの場合にも炭酸ガスの除去が必要であると考えれば、同一プラントでのエタン回収の有無による全体としての動力費の差は、相対的に小さいものと考えることができよう。この問題の解析は、詳細なデータ[1)]の提供とその解析に待たねばならないが、本フィージビリティスタディの経済評価では、この費用の増加をエタン１トン当りUS$50／トン[2)]と仮定し、これをUS$190／トンに上乗せした価格すなわちUS$240／トン をもってエタンの経済費用と考え経済的内部収益率の算出に供する。

(3) 労務費

0963というConversion factor[3)]を適用し換算した。

(4) その他の製造コスト items

Local supply 以外のもの、例えば触媒代、薬品代などには、シャドウレートを適用した。

２－３ 経済的内部収益率

前述の本エチレンプロジェクトに関する経済的便益と費用に基づき、経済的内部収益率を算出した。その結果を表Ⅶ－１に示す。経済的内部収益率は181%であり、これは既に算出した財務的内部収益率に近い。[4)] ゆえに国民経済的立場からも、このプロジェクトは正当化され得る。

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1) ガス処理プラントのプラントコストの詳細分類、これを構成する主要工程のエネルギーバランスなどのデータが必要になる。

2) 調査団の経験を基礎とする。

3) 前掲ADBレポート。
本プロジェクトは全体として高技能労働者を必要とするためシャドウ賃率の適用よりは、現行の賃率の適用が適当であろう。しかし、ここに示されているconversion factorがほとんど1に近いので、それをそのまゝ採用した。

4) すでに述べたごとく、PTTという組織の性格上、予め、プラントコストから機器の輸入税は除外されており、また収支計算には法人税は考慮されていないので、財務的内部収益率（Financial IRR）と経済的内部収益率（Economic IRR）とは、近い値を示すことが予想された。

Table VIII—1 ECONOMIC INTERNAL RATE OF RETURN
— PTT ETHYLENE PROJECT —

(Unit: Million Baht)

Year	Economic Cost			Economic Benefit	Discount Factor (at 18.1%)	Present Value (Discount Rate = 0.181)	
	Capital Cost	Operating Cost	Total			Economic Cost	Economic Benefit
1982	707		707		1.0000	707	
1983	1,607		1,607		0.8466	1,360	
1984	1,644		1,644		0.7167	1,178	
1985	877	454	1,341	868	0.6067	814	527
1986		994	994	1,849	0.5137	511	950
1987		1,026	1,026	1,940	0.4349	446	844
1988		1,139	1,139	2,211	0.3681	419	814
1989		1,200	1,200	2,366	0.3117	374	737
1990		1,240	1,240	2,454	0.2638	327	647
1991		1,298	1,298	2,583	0.2234	290	577
1992		1,339	1,339	2,677	0.1891	253	506
1993		1,384	1,384	2,777	0.1601	222	445
1994		1,475	1,475	2,980	0.1355	200	404
1995		1,470	1,470	2,980	0.1147	169	342
1996		1,465	1,465	2,980	0.0971	142	289
1997		1,465	1,465	2,980	0.0822	120	245
1998		1,465	1,465	2,980	0.0696	102	207
1999		1,465	1,465	2,980	0.0589	79	176
Total						7,713 =	7,710

Note: Economic Internal Rate of Return = 18.1%

第３章　VCMプロジェクトの経済評価

３－１　VCMプロジェクトの経済的便益

第Ⅱ編で説明したように、国際市場からＶＣＭを輸入した場合の価格はおよそUS$600／トン（１９８０年固定価格）である。またカセイソーダを同じように、国際市場から輸入した場合の価格はおよそUS$３００／トン（１９８０年固定価格）である。[1] 従って本ＶＣＭプラントで生産されるＶＣＭおよびカセイソーダの経済価格としてこれらの価格を採用して評価することとする。

これらのＶＣＭおよびカセイソーダは本計画が実現しない場合には、国内需要をみたすためには輸入しなければならず、輸入代替効果があるので、これらの価格にはシャドウレートを適用する。[2]

本計画もエチレンプロジェクト同様、雇用機会の創出効果、関連産業へのインパクト、地域経済開発への寄与等の間接便益が期待し得るが、定量的評価は困難なので経済的内部利益率の計算にはこれらの間接便益は含めない。

３－２　経済的費用

(1)　プロジェクトの初期費用

エチレン計画と同様、本ＶＣＭ計画で必要とするプラントコスト、操業準備費、運転資金が含まれる。費用のうち外貨部分についてはシャドウレートを用いて内貨換算を行なうことも同様である。

(2)　エチレンおよび原塩の費用

エチレンの経済費用は、本ＶＣＭプロジェクトがない場合のエチレンの代替的な機会コストと考えることができる。本ＶＣＭプラントはエチレンの供給先として、本調査で検討中のエチレンプラントを前提としている。この前提にたてばエチレンプラントより供給されるエチレンの代替的な機会コストは、ＶＣＭプラントに供給するために生産されたエチレンの原料であるエタンの機会コストを基礎にして考えてよいといえる。いいかえれば、ＶＣＭプラントに供給されるエチレンの機会コストは、エチレン製造のための原料エタンの機会コストにエチレン製造加工コストを加えたものと考えられる。エチレンプラントに供給される原料エタンの経済費用、即ちこの場合の機会

1）エチレン計画と同様、この場合も製品にかけられる輸入関税は移転コストとして除外される。従って本経済評価では輸入ＶＣＭおよびカセイソーダにかけられている関税を除外して、ＶＣＭの輸入価格はUS$600／トン、カセイソーダの輸入価格はUS$300／トンとした。

2）シャドウレートは２－１、エチレンプロジェクトの項参照のこと。

コストは、本編第2章で論じたようにUS$240／トンと想定されている。エチレンの加工コスト[1]はエチレンプラントの稼動率、その他の条件によって異なるが、本調査の対象としているエチレンプラントの平均製造コストは約US$200／トンと見なせる（第Ⅶ編第3章エチレンの製造原価参照）。従ってVCMプラントに供給されるエチレンの経済費用は次のように計算されよう。

US$240×1.25[2]＋US$200＝US$500

本経済分析はエチレンの経済費用としてこのUS$500／トンを用いて実施するものとする。

原塩については工場搬入価格450Baht／トンをそのまゝ経済費用と考える。

(3) 電力費

VCMプラントにEGAT／PEA より供給される電力の価格は1.1 Baht／KWHであるが換算率（conversion factor for electricity）1276[3]を適用して経済費用に換算した。

(4) 労務費

エチレン計画と同様、conversion factor 0963を適用した。

(5) その他の製造原価項目

化学薬品、電極、交換膜等の輸入品の項目には内貨換算に際してシャドウレートを適用した。

3－3 経済的内部収益率

前述の経済的便益と経済的費用にもとづき本VCMプロジェクトの経済的内部収益率を算出した。その結果を表Ⅷ－2に示す。経済的内部収益率は138%である。従って、国民経済的にみて本VCMプラント計画は一応好ましいプロジェクトであるといえる。第Ⅶ編にて算出した財務的内部収益率および財務評価の結果では問題があったが、国民経済的な観点からは成立するプロジェクトであるのでタイ政府およびPTTは本プロジェクトが成立し得るような奨励策をとることが望ましい。

1）エチレン製造コストから、エタンのコストを差引いたもの。
2）エチレン1トン生産に1.25トンのエタンが必要。
3）前掲 ADBレポート

Table VIII–2 ECONOMIC INTERNAL RATE OF RETURN
—THAI VCM PROJECT—

(Unit: Million Baht)

Year	Economic Cost			Economic Benefit	Discount Factor (at 13.79%)	Present Value (at 13.79%)		
	Capital Cost	Operating Cost	Total			Economic Cost		Economic Benefit
1983	914		914		1.0000	914		
1984	1,506		1,506		0.8788	1,323		
1985	758	374	1,132	592	0.7723	874		457
1986		857	857	1,291	0.6787	582		876
1987		915	915	1,407	0.5965	546		839
1988		977	977	1,530	0.5242	512		802
1989		1,035	1,035	1,645	0.4607	477		758
1990		1,035	1,035	1,645	0.4048	419		666
1991		1,035	1,035	1,645	0.3558	368		585
1992		1,035	1,035	1,645	0.3127	324		514
1993		1,035	1,035	1,645	0.2748	284		452
1994		1,035	1,035	1,645	0.2415	250		397
1995		1,032	1,032	1,645	0.2122	219		349
1996		1,029	1,029	1,645	0.1865	192		307
1997		1,029	1,029	1,645	0.1639	169		270
1998		1,029	1,029	1,645	0.1440	148		237
1999	−108	1,029	921	1,645	0.1266	117		208
Total						7,718	=	7,717

Note: Economic Internal Rate of Return = 13.79%

第　IX　編

プロジェクトの総合評価、ならびにエチレンおよびエタン価格の設定について

第Ⅸ編　プロジェクトの総合評価、ならびにエチレンおよびエタン価格の設定について

第1章　VCMプロジェクトの収益性改善の方策とエチレン価格

第Ⅶ編で実施した財務分析とその評価、ならびに本編の経済評価の結果を考察し、以下にエチレン価格とエタン価格という観点から本プロジェクトの総合評価を行う。

これまでの検討結果から明らかなように、エチレンプロジェクトは財務的にも、経済的にも成立する。また、潜在的にその収益性も高いものが予想され、あらゆる角度から見てフィージブルであり、その早期実現はタイ国経済にとっても望ましい。

財務分析は第Ⅱ編市場調査、および第Ⅳ編代替案に関する検討結果から導かれたエチレン販売価格US$800／トン、原料エタン供給価格US$350／トンに基づき実施されているが、エチレン販売価格が10%低下（US$720／トン）しても、なお、フィージブルなレベルにとどまり得ることは感度分析で確認されている。

また、このエチレンプロジェクトが実現しなければ、天然ガス中のエタンはUS$190／トン[1]という評価しか受けられないが、このエチレンプロジェクトはこのエタンに対し、US$300／トン以上という高い価値を賦与することのできる可能性のあるプロジェクトである。

ゆえに、本エチレンプロジェクトは天然ガス（中のエタン留分）の有効利用と付加価値の極大化という観点からも申し分のないプロジェクトであり、その実現によるタイ国経済への寄与は大きい。

一方VCMプロジェクトの場合は、原料エチレン価格がUS$800／トンという条件下では何とか財務的に成立し得る結果を与えているものの、その収益性は非常に低い。特に民間企業による本VCMプロジェクトへの投資は不可能に近い。

しかし、本フィージビリティスタディの前提条件がそうであったごとく、VCMプロジェクトを含む下流プロジェクトの実現なくしてエチレンプロジェクトの実現はありえないことは強調されねばならない。換言すれば、天然ガスの有効利用と付加価値の上昇は単にエチレンプロジェクトだけでなし得るものではなく、これら下流プロジェクトの成立が必要不可欠な条件である。

下流プロジェクトを担当する民間部門に投資の意欲をわかせ、PTTの計画するエチレンプロジェクトを核として、これを中心に積極的に総合石油化学コンプレックスを形成しようという参画意識を持たせるには、これら下流プロジェクトに対し政策的に魅力的な価

1）ガス処理プラントにおける分離費を考慮した場合は、US$240と予想した。

格でエチレンを供給することが不可欠である。

ガス処理プラント（エタン回収）、エチレンプラントおよびその下流プラントという3つのプロジェクトのどれ1つが欠けても、タイ国における石油化学工業は成立しないという基本的認識に立ち、この石油化学コンプレックスに参画するグループ間で総合的に合理的な利益とコストの配分方法を、エチレン価格およびエタン価格の設定を通して確立する必要がある。

今、VCMプラントに供給されるエチレン価格をUS$700／トン（1980年固定価格）と設定しても、エチレンプロジェクトとしては原料エタンがUS$300／トンという価格でガス処理プラントから供給されるならば、15%を上まわる財務的内部収益率が確実に達成されることは第Ⅶ編の感度分析の結果が証明している。

従って、ガス処理プロジェクト側としては依然として充分に高いエタン評価[1)]を受けることが出来る。また、VCMプロジェクト側ではIRRが101%から131%[2)]まで改善されフィージブルなレベルに達することはすでに第Ⅶ編にて見た通りである。

従って、本プロジェクトを全体としてフィージブルならしめている根本原因であるエタン価格には本質的にゆとりがあるので、それから生産されるエチレンの販売価格はかなり政策的、かつ弾力的に決められる余地が十分に残されている。

他方このような方策がとられない場合は、VCMプロジェクトの収益性から判断し、民間部門がこれに投資するという可能性はほとんどあり得ない。従ってPTTとしては、次のような代替的な方法によって本プロジェクトの実現をはからざるを得ない。

(1) PTT自体がVCM生産まで担当する

あるいは、

(2) VCMプロジェクトを除外し、エチレンプロジェクトを計画する。

これまでの検討結果から明らかなように、エチレンプロジェクトおよびガス処理プロジェクト（エタン価格）側のフィージビリティには本質的に、ゆとりがあるので、これら上流プロジェクトとともにPTT自体が収益性の低いVCMプロジェクトにまで担当したと

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1) エチレンプロジェクトもガス処理プロジェクトも100%PTTの管轄下で運営されるという前提の下には、原料エタン価格の設定は比較的に自由に行うことができるはずである。エタン価格設定の違いは単に天然ガス中のエタンからエチレンに至るまでの付加価値上昇分をガス処理プロジェクトとエチレンプロジェクトの間でどのように配分するかの問題であって、全体としてフィージブルになるような環境の下では、どのようなエタン価格を設定してもエチレンの販売価格が同一である限りは、PTT全体としての収益に変りはない。

2) まだIRRが15%というラインに達していないが、VCMプロジェクトの実行段階における諸設備投資の削減など、これを担当する民間企業の自助努力も必要である。仮りにプラントコストが10%cutされた場合、IRRとしては21%の上昇があることは第Ⅶ編で述べた。これを加味するとIRRとしては15%のラインに到達する。但し、機器の輸入関税の免除、法人税に対する長期の免税期間の設定など税制面からの支援体制も同時に必要である。

しても、プロジェクト全体として見た場合には、それをフィージブルならしめ正当化できる内部条件がある。従って、ＰＴＴがエチレン生産だけでなくＶＣＭ生産まで担当することは、プロジェクトの具体的実施方法として考え得る可能な代替案の１つである。この場合塩素源の供給方法として工業塩の電解プラントを併設するとすれば、少くとも苛性ソーダのマーケティング問題と関連し、タイ国における既存苛性ソーダメーカーの参画[1)]を求める必要があろう。また塩素源として輸入ＥＤＣを選定するとすれば、ＶＣＭ生産用エチレン需要は半減（ＶＣＭプラントのフル操業時で約19,000t/Yのエチレン需要の減少となる）することを銘記されねばならない。

残された最後の代替案は、収益性の低いＶＣＭ生産プロジェクトの除外である。この場合には本調査の前提条件たるＶＣＭ生産用エチレン需要は存在しないのでエチレンプラントの規模の縮少、ないしは、プラントの稼動率の低下は避けられず、そのため本調査で検討したエチレンプロジェクトに比べて、収益性の低下、換言すればこのエチレンプロジェクトをフィージブルならしめるために必要とされる原料エタン価格が低下することは明白である。

エタン評価価格の相対的低下および、エチレン用として供給されるエタン量の減少はガス処理プロジェクトの回収エタンを通じて得られる収入の大巾な減退となり、大きな機会損失をまねく。従ってこのような代替案は好ましい方法とはいえない。結局ＶＣＭプロジェクトが成立するようなエチレン価格を設定することによってこの問題の解決を計ることが最も望ましい。

第２章　エチレンの代替価格に対する財務分析

上述のように、天然ガスを原料とするタイの石油化学を上流から下流までを結合した観点でみると、第Ⅶ編の財務分析で前提条件としたエチレンの価格US$800／トンをＶＣＭプロジェクトの成立するようなUS$700／トンにした方が好ましいことがわかった。そこであらためて次のような条件でエチレンプラントおよびＶＣＭプラントの両計画の原価計算および財務分析とその評価を行うこととする。

	エチレンプラント	ＶＣＭプラント
原料価格：	エタンUS$300／トン	エチレンUS$700／トン
製品価格：	エチレンUS$700／トン	不変
その他の条件：	不変（第Ⅶ編第４章参照）	不変（第Ⅶ編第４章参照）

1）塩素価格の設定について、既述したエチレン価格の設定と同じような問題が生じる。

2－1　エチレンプロジェクト（詳細は付表Ⅸ－1参照）

(1)　エチレン製造コスト

エチレン製造コストおよびエチレン製造コストに占める主要原価要素の比率を表Ⅸ－1に示す。

(2)　収益性および財務的ポジション

財務分析の結果を本編の付表Ⅸ－1に添付する。投資に対する内部収益率（IRR）は17.3％であり、プロジェクトは充分にフィージブルである。

Income Statements によると商業運転開始後3年目より利益が計上されている。払込資本利益率は15年平均値で55.3％であり高い収益性が期待される。また債務返済比率は最低でも140であり、借入返済期間中の平均は296である。従って本プロジェクトの資金返済能力は充分高く、何ら問題はない。

2－2　VCMプロジェクト（詳細は付表Ⅸ－2参照）

(1)　VCMおよびカセイソーダの製造原価

VCMおよびカセイソーダの製造原価および主要原価要素の比率を表Ⅸ－2に示す。

(2)　収益性および財務的ポジション

エチレン価格をUS$700／トンとした場合の財務分析の結果を本編の付表Ⅸ－2に添付する。投資に対する内部収益率（IRR）はエチレン価格US$800／トンの場合の101％にくらべ131％に改善される。損益計算書によると損失の生じているのは操業開始後の4年間だけとなり、累積欠損も操業開始後7年目に解消する。15年間を平均した払込み資本利益率は275％となる。資金繰表および財務指標（債務返済比率は最低でも119あり、借入金返済期間中の平均は203である。）によれば資金不足による短期借入金の借り増しの必要はなく、資金返済も順調に行い得る。この結果からエチレン価格US$700／トンの場合にはUS$800／トンの場合にくらべ、財務的に著しく改善される。従ってプロジェクトはフィージブルでありVCMに対する投資の可能性があるといってよい。内部収益率131％の値はなお改善されることが望ましいので、実行段階で建設費を始めコストの検討、VCMおよびカセイソーダの販売価格の動向につき再検討することが必要である。

第3章　総合評価

これまでの検討結果と考察に基づき、本調査の総合評価として次の通り結論し勧告する。

Table IX–1 ETHYLENE PRODUCTION COST (CASE–B)

	1986: 142,700 t/y		1990: 189,400 t/y		1994: 230,000 t/y	
	$/t	%	$/t	%	$/t	%
Ethane	374.3	53.2	374.3	62.1	374.3	68.4
Cat. & Chem. Fuel Gas Raw Water Utilities Sale (to VCM, etc.)	5.1	0.7	6.4	1.0	11.5	2.1
Variable Cost	379.4	53.9	380.7	63.1	385.8	70.5
Labor Cost Plant Overhead Maintenance Insurance, etc.	71.9	10.2	54.2	9.0	44.6	8.1
Depreciation	149.6	21.2	112.7	18.7	92.8	17.0
Fixed Cost	221.5	31.4	166.9	27.7	137.4	25.1
Ex-factory Production Cost	600.9	85.3	547.6	90.8	523.2	95.6
Head Office Expenses and Interest Charges	103.3	14.7	55.6	9.2	24.1	4.4
Production Cost, Total	704.2	100.0	603.2	100.0	547.3	100.0

Table IX–2 PRODUCTION COST FOR VCM AND CAUSTIC SODA

Year	1986		1994	
· VCM Production	62,800 t/y		80,000 t/y	
Caustic Soca Production	40,506 t/y		51,600 t/y	
Breakdown of Production Cost	US$/T	%	US$/T	%
Raw Salt	25			
Ethylene	332	31	332	38
Oxygen	20			
Cat. and Chem.	16			
Raw Materials Cost	(393)	(37)	(393)	(45)
Power	106	10	106	12
Other utilities	53			
Cost for Waste Water Treatment	5			
Utilities Cost	(164)	(16)	(164)	(19)
Variable Cost	557	53	557	64
Depreciation	215	20	169	19
Labor Cost	13		10	
Maintenance	57		45	
Electrode & Ion Exchange Membrance	19	12	15	12
Insurance, etc.	28		22	
Plant Overhead	13		10	
Fixed Cost	345	32	271	31
Ex-factory Production Cost	902	85	828	95
Head Office Expenses and Interest Charges	153	15	46	5
Production Cost, Total	1,055	100	874	100

(1) 本プロジェクトは、本質的にフィージブルであり、その早期実現に努力すべきである。

(2) エチレンプロジェクトはＶＣＭプロジェクトの成立を前提に考えるべきである。

換言すれば、エチレン販売価格を低くすることによってＶＣＭプロジェクトの収益性を改善し、それを成立させる方が、ＶＣＭプロジェクトが成立せず、そのためその分だけエチレン需要が減退する場合よりも、エチレンプロジェクト側にとっても（ガス処理プロジェクトも含めて）経済的に得策である。

(3) ＶＣＭプロジェクトの実現に対しては、その実施を民間資本に期待する場合は、原料エタンに対して政策的配慮（少くともエチレン価格は＄700／トン以下）が払われねばならない。これにさらに税制上の配慮と優遇措置が加味されることなしには、民間企業によるＶＣＭプロジェクトへの参画は不可能である。

(4) ＶＣＭプロジェクトへのＰＴＴの参画はＰＴＴの資金および技能労働力の確保、マーケティングの能力等を考慮し、最終的にはＰＴＴによって判断されるべきであるが、調査団はこの分野における民間部門の機能と経験の積極的活用が、タイの石油化学工業の今後の発展という観点から望ましいものと判断する。

付 表 Ⅸ － 1

FINAL RESULTS OF THE FINANCIAL ANALYSIS OF THE ETHYLENE PROJECT

Ethane Price	:	$300/t
Ethylene Price	:	$700/t

- Income Statements
- Funds Flow Statements
- Balance Sheet
- Production and Sales Plan
- Production Cost Statements
- IRR Calculation
- Profitability and Financial Indicators

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
INCOME STATEMENTS (FOR YEARS ENDING DECEMBER 31)
(CASE-6 : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
PRODUCTION AND SALES															
CAPACITY	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.
CAPACITY UTILIZATION	0.307	0.620	0.651	0.742	0.794	0.823	0.867	0.898	0.932	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION	70500.	142700.	149700.	170600.	182600.	189400.	199300.	206600.	214300.	230000.	230000.	230000.	230000.	230000.	230000.
INCREASE IN INVENTORIES	3500.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME	67000.	142700.	149700.	170600.	182600.	189400.	199300.	206600.	214300.	230000.	230000.	230000.	230000.	230000.	230000.
SALES REVENUE	46900.	99890.	104790.	119420.	127820.	132580.	139510.	144620.	150010.	161000.	161000.	161000.	161000.	161000.	161000.
COST OF SALES	40369.	85756.	88240.	96389.	100921.	103706.	107760.	110750.	113903.	120333.	109656.	98979.	98979.	98979.	98979.
VARIABLE COST	26674.	54147.	56631.	64780.	69312.	72097.	76151.	79141.	82294.	88724.	88724.	88724.	88724.	88724.	88724.
DEPRECIATION & AMORTIZATION	10677.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	10677.	0.	0.	0.	0.
OTHER FIXED COST	5128.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.
(INC) IN PRODUCT INVENTORIES	-2109.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	6531.	14134.	16550.	23031.	26899.	28874.	31750.	33870.	36107.	40667.	51344.	62021.	62021.	62021.	62021.
LESS. SALES EXPENSES	850.	1715.	1765.	1928.	2018.	2074.	2155.	2215.	2278.	2407.	2193.	1980.	1980.	1980.	1980.
OPERATING PROFIT OR (LOSS)	5681.	12418.	14785.	21103.	24881.	26800.	29594.	31655.	33828.	38260.	49151.	60041.	60041.	60041.	60041.
LESS. INTEREST															
ON LONG TERM DEBT	6638.	13019.	12265.	11115.	9787.	8460.	7132.	5804.	4477.	3149.	1822.	751.	177.	0.	0.
ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	-957.	-600.	2520.	9988.	15093.	18340.	22462.	25851.	29352.	35111.	47329.	59290.	59864.	60041.	60041.
LESS. INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	-957.	-600.	2520.	9988.	15093.	18340.	22462.	25851.	29352.	35111.	47329.	59290.	59864.	60041.	60041.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
FUNDS FLOW STATEMENTS (FOR YEARS ENDING DECEMBER 31)
(CASE-B : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
SOURCES OF FUNDS	32087.	74869.	74869.	57557.	37481.	36474.	43557.	46846.	48530.	51496.	53412.	55608.	60482.	59827.	60041.	60041.	60041.	60041.
CASH GENERATED FROM OPERATION	0.	0.	0.	16358.	33772.	36139.	42457.	46234.	48154.	50948.	53009.	55182.	59614.	59827.	60041.	60041.	60041.	60041.
PROFIT BEFORE TAX, INTEREST	0.	0.	0.	5681.	12418.	14785.	21103.	24881.	26800.	29594.	31655.	33828.	38260.	49151.	60041.	60041.	60041.	60041.
DEPRECIATION & AMORTIZATION	0.	0.	0.	10677.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	10677.	0.	0.	0.	0.
FINANCIAL RESOURCES	32087.	74869.	74869.	37598.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SHARE CAPITAL	8022.	18717.	18717.	8022.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	24065.	56152.	56152.	29576.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN ACCT PAYABLE	0.	0.	0.	3601.	3709.	335.	1100.	612.	376.	547.	404.	426.	868.	0.	0.	0.	0.	0.
USES OF FUNDS	31972.	72578.	74306.	52008.	28882.	26630.	29883.	27630.	25761.	24756.	23158.	21872.	21377.	17213.	9324.	3135.	0.	0.
INVESTMENT IN FIXED ASSET	31972.	72578.	74306.	35055.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LAND AND SITE IMPROVEMENT	373.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	27991.	65312.	65312.	27991.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	864.	864.	2592.	4321.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	2744.	6402.	6402.	2744.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET OTHER THAN CASH	0.	0.	0.	9112.	7841.	728.	2174.	1248.	707.	1030.	759.	801.	1633.	0.	0.	0.	0.	0.
INCREDECR) ACC T RECEIVABLE	0.	0.	0.	6331.	7154.	662.	1975.	1134.	643.	936.	690.	728.	1484.	0.	0.	0.	0.	0.
INCREDECR) IN INVENTORIES																		
PRODUCTS	0.	0.	0.	2109.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MATERIALS	0.	0.	0.	672.	688.	67.	199.	114.	65.	94.	70.	73.	150.	0.	0.	0.	0.	0.
DEBT SERVICES	0.	0.	0.	7841.	21041.	25902.	27709.	26382.	25054.	23726.	22399.	21071.	19744.	17213.	9324.	3135.	0.	0.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	1203.	8022.	13637.	16594.	16594.	16594.	16594.	16594.	16594.	16594.	15391.	8573.	2958.	0.	0.
REPAYMNT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.	6638.	13019.	12265.	11115.	9787.	8460.	7132.	5804.	4477.	3149.	1822.	751.	177.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	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.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	115.	2291.	563.	5549.	8599.	9844.	13673.	19216.	22768.	26739.	30254.	33736.	39105.	42614.	50717.	56906.	60041.	60041.
BEGINNING CASH BALANCE	0.	115.	2406.	2968.	8517.	17116.	26960.	40634.	59850.	82618.	109358.	139612.	173347.	212452.	255067.	305784.	362690.	422731.
ENDING CASH BALANCE	115.	2406.	2968.	8517.	17116.	26960.	40634.	59850.	82618.	109358.	139612.	173347.	212452.	255067.	305784.	362690.	422731.	482772.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
BALANCE SHEET (FOR YEARS ENDING DECEMBER 31)
(CASE-B : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
ASSETS	32087.	106955.	181824.	220863.	215950.	205169.	195662.	198773.	200895.	207310.	216970.	230153.	249537.	281475.	332192.	389098.	449139.	509180.
CURRENT ASSETS	115.	2406.	2968.	17629.	34070.	44642.	60490.	80954.	104430.	132199.	163212.	197749.	238487.	281102.	331819.	388725.	448766.	508807.
CASH	115.	2406.	2968.	8517.	17116.	26960.	40634.	59850.	82618.	109358.	139612.	173347.	212452.	255067.	305784.	362690.	422731.	482772.
ACCOUNTS RECEIVABLE	0.	0.	0.	6331.	13485.	14147.	16122.	17256.	17898.	18834.	19524.	20251.	21735.	21735.	21735.	21735.	21735.	21735.
INVENTORIES																		
PRODUCTS	0.	0.	0.	2109.	2109.	2109.	2109.	2109.	2109.	2109.	2109.	2109.	2109.	2109.	2109.	2109.	2109.	2109.
MATERIALS	0.	0.	0.	672.	1359.	1426.	1625.	1739.	1804.	1899.	1968.	2041.	2191.	2191.	2191.	2191.	2191.	2191.
NET FIXED ASSETS	31972.	104550.	178856.	203234.	181880.	160526.	139173.	117819.	96465.	75111.	53758.	32404.	11050.	373.	373.	373.	373.	373.
INVESTMENT	31972.	104550.	178856.	213911.	213911.	213911.	213911.	213911.	213911.	213911.	213911.	213911.	213911.	213911.	213911.	213911.	213911.	213911.
LAND & SITE IMPROVEMENT	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.
CONSTRUCTED FACILITIES	27991.	93302.	158614.	186605.	186605.	186605.	186605.	186605.	186605.	186605.	186605.	186605.	186605.	186605.	186605.	186605.	186605.	186605.
PRE-INVEST. & START-UP EXP	864.	1728.	4321.	8641.	8641.	8641.	8641.	8641.	8641.	8641.	8641.	8641.	8641.	8641.	8641.	8641.	8641.	8641.
INTEREST DURING CONSTRUCTN	2744.	9146.	15548.	18292.	18292.	18292.	18292.	18292.	18292.	18292.	18292.	18292.	18292.	18292.	18292.	18292.	18292.	18292.
LESS.DEPRECIATN & AMORTIZTN	0.	0.	0.	10677.	32031.	53384.	74738.	96092.	117446.	138800.	160153.	181507.	202861.	213538.	213538.	213538.	213538.	213538.
LIABILITIES	24065.	80217.	136368.	168342.	164029.	150728.	135233.	119251.	103032.	86985.	70794.	54626.	38899.	23508.	14935.	11978.	11978.	11978.
CURRENT LIABILITIES	0.	0.	1203.	11623.	20947.	24240.	25340.	25952.	26328.	26875.	27278.	27704.	27369.	20551.	14935.	11978.	11978.	11978.
ACCOUNTS PAYABLE	0.	0.	0.	3601.	7310.	7645.	8745.	9357.	9733.	10280.	10684.	11110.	11978.	11978.	11978.	11978.	11978.	11978.
INCOME TAX PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT																		
LONG TERM DEBT	0.	0.	1203.	8022.	13637.	16594.	16594.	16594.	16594.	16594.	16594.	16594.	15391.	8573.	2958.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	24065.	80217.	135165.	156719.	143083.	126488.	109894.	93299.	76705.	60110.	43516.	26922.	11530.	2958.	-0.	-0.	-0.	-0.
LONG TERM DEBT BALANCE	24065.	80217.	135165.	156719.	143083.	126488.	109894.	93299.	76705.	60110.	43516.	26922.	11530.	2958.	-0.	-0.	-0.	-0.
STOCK HOLDERS EQUITY	8022.	26739.	45456.	52521.	51921.	54441.	64429.	79522.	97863.	120325.	146176.	175527.	210638.	257966.	317256.	377120.	437161.	497202.
SHARE CAPITAL	8022.	26739.	45456.	53478.	53478.	53478.	53478.	53478.	53478.	53478.	53478.	53478.	53478.	53478.	53478.	53478.	53478.	53478.
RETAINED EARNINGS	0.	0.	0.	-957.	-1557.	963.	10951.	26044.	44385.	66847.	92698.	122049.	157160.	204489.	263775.	323642.	383683.	443724.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
PRODUCTION AND SALES PLAN
(CASE-B) UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CAPACITY	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.
CAPACITY UTILIZATION	0.307	0.620	0.651	0.742	0.794	0.823	0.867	0.898	0.932	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION	70500.	142700.	149700.	170600.	182600.	189400.	199300.	206600.	214300.	230000.	230000.	230000.	230000.	230000.	230000.
INCREASE IN INVENTORY	3500.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME	67000.	142700.	149700.	170600.	182600.	189400.	199300.	206600.	214300.	230000.	230000.	230000.	230000.	230000.	230000.
UNIT PRICE	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000
SALES REVENUE	46900.	99890.	104790.	119420.	127820.	132580.	139510.	144620.	150010.	161000.	161000.	161000.	161000.	161000.	161000.
*** TOTAL SALES REVENUE ***	46900.	99890.	104790.	119420.	127820.	132580.	139510.	144620.	150010.	161000.	161000.	161000.	161000.	161000.	161000.
*** TOTAL SALES VOLUME ***	67000.	142700.	149700.	170600.	182600.	189400.	199300.	206600.	214300.	230000.	230000.	230000.	230000.	230000.	230000.
*** AVERAGE SALES PRICE ***	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000	0.7000

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
PRODUCTION COST STATEMENTS
(CASE-B : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
PRODUCTION	70500.	142700.	149700.	170600.	182600.	189400.	199300.	206600.	214300.	230000.	230000.	230000.	230000.	230000.	230000.
ETHANE	26389.	53414.	56034.	63857.	68349.	70894.	74600.	77332.	80215.	86091.	86091.	86091.	86091.	86091.	86091.
CATALYSTS & CHEMICALS	494.	999.	1048.	1194.	1278.	1326.	1395.	1446.	1500.	1610.	1610.	1610.	1610.	1610.	1610.
RAW MATERIAL COST	26882.	54413.	57082.	65051.	69627.	72220.	75995.	78779.	81715.	87701.	87701.	87701.	87701.	87701.	87701.
FUEL GAS (1)	1925.	3896.	4087.	4657.	4985.	5171.	5441.	5640.	5850.	6279.	6279.	6279.	6279.	6279.	6279.
FUEL GAS (2)	902.	1762.	1919.	2088.	2245.	2245.	2245.	2245.	2245.	2245.	2245.	2245.	2245.	2245.	2245.
RAW WATER (1)	66.	133.	139.	159.	170.	176.	185.	192.	199.	214.	214.	214.	214.	214.	214.
RAW WATER (2)	63.	122.	133.	145.	156.	156.	156.	156.	156.	156.	156.	156.	156.	156.	156.
UTILITIES SALE (TO VCM/HDPE)	-3164.	-6179.	-6730.	-7320.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.
UTILITIES COST	-209.	-266.	-451.	-271.	-315.	-143.	156.	362.	580.	1023.	1023.	1023.	1023.	1023.	1023.
VARIABLE COST	26674.	54147.	56631.	64780.	69312.	72097.	76151.	79141.	82294.	88724.	88724.	88724.	88724.	88724.	88724.
DEPRECIATION (PROCESS PLANT)	9330.	18660.	18660.	18660.	18660.	18660.	18660.	18660.	18660.	18660.	9330.	0.	0.	0.	0.
DEPRECIATION (PRE-INVEST)	432.	864.	864.	864.	864.	864.	864.	864.	864.	864.	432.	0.	0.	0.	0.
DEPRECIATION (INTEREST DUR.)	915.	1829.	1829.	1829.	1829.	1829.	1829.	1829.	1829.	1829.	915.	0.	0.	0.	0.
DEPRECIATION	10677.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	10677.	0.	0.	0.	0.
AMORTIZATION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEPRECIATION & AMORTIZATION	10677.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	21354.	10677.	0.	0.	0.	0.
LABOR COST	465.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.
OVERHEAD	465.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.
EMPLOYMENT COST	929.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.
MAINTENANCE COST	2799.	5598.	5598.	5598.	5598.	5598.	5598.	5598.	5598.	5598.	5598.	5598.	5598.	5598.	5598.
TAX & INSURANCE	1400.	2799.	2799.	2799.	2799.	2799.	2799.	2799.	2799.	2799.	2799.	2799.	2799.	2799.	2799.
OTHER FIXED COST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIRECT FIXED COST	5128.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.
EX-FACTORY PRODUCTION COST	42478.	85756.	88240.	96389.	100921.	103706.	107760.	110750.	113903.	120333.	109656.	98979.	98979.	98979.	98979.
UNIT DIRECT OPERATING COST	0.6025	0.6010	0.5894	0.5650	0.5527	0.5475	0.5407	0.5361	0.5315	0.5232	0.4768	0.4303	0.4303	0.4303	0.4303
HEAD OFFICE EXP.	850.	1715.	1765.	1928.	2018.	2074.	2155.	2215.	2278.	2407.	2193.	1980.	1980.	1980.	1980.
INTEREST ON LOAN NO.1	963.	1781.	1588.	1396.	1203.	1011.	818.	626.	433.	241.	48.	0.	0.	0.	0.
INTEREST ON LOAN NO.2	2246.	4380.	3931.	3481.	3032.	2583.	2134.	1685.	1235.	786.	337.	0.	0.	0.	0.
INTEREST ON LOAN NO.3	2246.	4492.	4380.	3931.	3481.	3032.	2583.	2134.	1685.	1235.	786.	337.	0.	0.	0.
INTEREST ON LOAN NO.4	963.	1925.	1925.	1877.	1685.	1492.	1300.	1107.	914.	722.	529.	337.	144.	0.	0.
INTEREST ON LOAN NO.5	220.	441.	441.	430.	386.	342.	298.	254.	209.	165.	121.	77.	33.	0.	0.
INTEREST ON LONG-TERM DEBT	6638.	13019.	12265.	11115.	9767.	8460.	7132.	5804.	4477.	3149.	1822.	751.	177.	0.	0.
INTEREST ON SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL PRODUCTION COST	49965.	100490.	102270.	109432.	112727.	114240.	117068.	118769.	120658.	125889.	113671.	101710.	101136.	100959.	100959.
UNIT PRODUCTION COST	0.7087	0.7042	0.6832	0.6415	0.6173	0.6032	0.5873	0.5749	0.5630	0.5473	0.4942	0.4422	0.4397	0.4390	0.4390

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
IRR CALCULATION ON TOTAL INVESTMENT
(CASE-B : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATN	INTEREST ON L-T DEBT	RETURN BEFORE TAX	DISCOUNT FACTOR	(BEFORE TAX) PRESENT VALUE INVEST.	(BEFORE TAX) PRESENT VALUE RETURN	(LESS) INCOME TAX	RETURN AFTER TAX	DISCOUNT FACTOR	(AFTER TAX) PRESENT VALUE INVEST.	(AFTER TAX) PRESENT VALUE RETURN
1982	29228.	0.	0.	0.	0.	1.0000	29228.	0.	0.	0.	1.0000	29228.	0.
1983	66176.	0.	0.	0.	0.	0.8522	56398.	0.	0.	0.	0.8522	56398.	0.
1984	67904.	0.	0.	0.	0.	0.7263	49320.	0.	0.	0.	0.7263	49320.	0.
1985	37822.	-957.	10677.	6638.	16358.	0.6190	23412.	10126.	0.	16358.	0.6190	23412.	10126.
1986	0.	-600.	21354.	13019.	33772.	0.5275	0.	17816.	0.	33772.	0.5275	0.	17816.
1987	0.	2520.	21354.	12265.	36139.	0.4496	0.	16248.	0.	36139.	0.4496	0.	16248.
1988	0.	9988.	21354.	11115.	42457.	0.3832	0.	16268.	0.	42457.	0.3832	0.	16268.
1989	0.	15093.	21354.	9787.	46234.	0.3265	0.	15098.	0.	46234.	0.3265	0.	15098.
1990	0.	18340.	21354.	8460.	48154.	0.2783	0.	13401.	0.	48154.	0.2783	0.	13401.
1991	0.	22462.	21354.	7132.	50948.	0.2372	0.	12084.	0.	50948.	0.2372	0.	12084.
1992	0.	25851.	21354.	5804.	53009.	0.2021	0.	10715.	0.	53009.	0.2021	0.	10715.
1993	0.	29352.	21354.	4477.	55182.	0.1723	0.	9506.	0.	55182.	0.1723	0.	9506.
1994	0.	35111.	21354.	3149.	59614.	0.1468	0.	8752.	0.	59614.	0.1468	0.	8752.
1995	0.	47329.	10677.	1822.	59827.	0.1251	0.	7486.	0.	59827.	0.1251	0.	7486.
1996	0.	59290.	0.	751.	60041.	0.1066	0.	6402.	0.	60041.	0.1066	0.	6402.
1997	0.	59864.	0.	177.	60041.	0.0909	0.	5456.	0.	60041.	0.0909	0.	5456.
1998	0.	60041.	0.	0.	60041.	0.0774	0.	4650.	0.	60041.	0.0774	0.	4650.
1999	-5884.	60041.	0.	0.	60041.	0.0660	-388.	3963.	0.	60041.	0.0660	-388.	3963.
TOTAL	195246.				741858.		157969.	157969.		741858.		157969.	157969.

***** INTERNAL RATE OF RETURN ***** 17.34 PER CENT (BEFORE TAX) 17.34 PER CENT (AFTER TAX)

***** PAY-OUT PERIOD ***** 5.92 YEAR (BEFORE TAX) 5.92 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 COST	373.
PLANT COST	186605.
PRE-INVEST AND START-UP EXP.	8641.
INTEREST DURING CONSTRUCTION	18292.
TOTAL FIXED CAPITAL	213911.
INITIAL WORKING CAPITAL	5511.
TOTAL CAPITAL COST	219422.

SOURCE OF FUNDS	
OWN CAPITAL	53478.
LONG TERM DEBT	165944.
SHORT TERM DEBT	0.
FINANCIAL RESOURCES	219422.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
PROFITABILITY AND FINANCIAL INDICATORS
(CASE-B : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

YEAR	(1) AFT TAX PROFIT -TO- SALES REV (PCT)	(2) AFT TAX PROFIT -TO- S/H EQUITY (PCT)	(3) BFR TAX PROFIT -TO- INVESTMNT (PCT)	(4) AFT TAX PROFIT -TO- S/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	-2.0	-1.8	-0.4	-1.8	1.52	1.28	2.09	75./ 25.	31.5	604.4	18.2
1986	-0.6	-1.2	-0.3	-1.1	1.63	1.46	1.61	73./ 27.	62.9	610.8	44.1
1987	2.4	4.6	1.1	4.7	1.84	1.70	1.40	70./ 30.	61.6	631.6	50.7
1988	8.4	15.5	4.6	18.7	2.39	2.24	1.53	63./ 37.	60.1	613.6	53.4
1989	11.8	19.0	6.9	28.2	3.12	2.97	1.75	54./ 46.	58.2	591.3	51.5
1990	13.8	18.7	8.4	34.3	3.97	3.82	1.92	44./ 56.	56.5	578.0	49.8
1991	16.1	18.7	10.2	42.0	4.92	4.77	2.15	33./ 67.	54.8	563.4	48.1
1992	17.9	17.7	11.8	48.3	5.98	5.83	2.37	23./ 77.	53.1	551.8	46.4
1993	19.6	16.7	13.4	54.9	7.14	6.99	2.62	13./ 87.	51.4	540.8	44.6
1994	21.8	16.7	16.0	65.7	8.71	8.56	3.02	5./ 95.	49.7	526.7	42.9
1995	29.4	18.3	21.6	88.5	15.68	13.47	3.48	1./ 99.	32.5	514.7	39.2
1996	36.8	18.7	27.0	110.9	22.22	21.93	6.44	-0./100.	15.7	479.5	27.9
1997	37.2	15.9	27.3	111.9	32.45	32.09	19.15	-0./100.	14.8	452.6	19.0
1998	37.3	13.7	27.4	112.3	37.47	37.11**********		-0./100.	14.6	439.0	14.6
1999	37.3	12.1	27.4	112.3	42.48	42.12**********		-0./100.	14.6	439.0	14.6
AVERAGE1	19.1	13.6	13.5	55.3	12.63	12.42**********		30./ 70.	42.1	542.5	37.7
AVERAGE2	21.8	15.1	13.5	55.3	9.63	9.44	2.96	22./ 78.			

(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.

付 表 Ⅸ － 2

FINAL RESULTS OF THE FINANCIAL ANALYSIS OF THE VCM PROJECT

Ethylene Price : $700/t

Income Statement

Funds Flow Statements

Balance Sheet

Production and Sales Plan

Production Cost Statements

IRR Calculation

Profitability and Financial Indicators

*** THAI VCM PROJECT ***
INCOME STATEMENTS (FOR YEARS ENDING DECEMBER 31)
- BASE CASE (ETHYLENE US$ 700/T) (US$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
SALES REVENUE	28102.	61277.	66741.	72596.	78060.	78060.	78060.	78060.	78060.	78060.	78060.	78060.	78060.	78060.	78060.
COST OF SALES	25756.	56675.	59799.	63145.	66269.	66269.	66269.	66269.	66269.	66269.	59523.	52777.	52777.	52777.	52777.
VARIABLE COST	17934.	35031.	38154.	41501.	44625.	44625.	44625.	44625.	44625.	44625.	44625.	44625.	44625.	44625.	44625.
DEPRECIATION & AMORTIZATION	6746.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	6746.	0.	0.	0.	0.
OTHER FIXED COST	4076.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.
(INCR) IN PRODUCT INVENTORIES	-3005.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	2346.	4602.	6943.	9450.	11791.	11791.	11791.	11791.	11791.	11791.	18537.	25283.	25283.	25283.	25283.
LESS. SALES EXPENSES	576.	1133.	1196.	1263.	1326.	1325.	1325.	1325.	1325.	1325.	1190.	1056.	1056.	1056.	1056.
OPERATING PROFIT OR (LOSS)	1770.	3469.	5747.	8187.	10465.	10465.	10465.	10465.	10465.	10465.	17346.	24227.	24227.	24227.	24227.
LESS. INTEREST															
ON LONG TERM DEBT	4239.	8418.	8073.	7374.	6526.	5678.	4830.	3982.	3135.	2287.	1439.	652.	149.	0.	0.
ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	-2469.	-4949.	-2326.	813.	3939.	4787.	5635.	6483.	7331.	8179.	15907.	23575.	24078.	24227.	24227.
LESS. INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	-2469.	-4949.	-2326.	813.	3939.	4787.	5635.	6483.	7331.	8179.	15907.	23575.	24078.	24227.	24227.

*** THAI VCM PROJECT ***
FUNDS FLOW STATEMENTS (FOR YEARS ENDING DECEMBER 31)
- BASE CASE (ETHYLENE US$ 700/T) (US$ 1000)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
SOURCES OF FUNDS	40585.	67642.	42516.	19268.	19660.	22131.	24379.	23957.	23957.	23957.	23957.	23957.	24092.	24227.	24227.	24227.	24227.
CASH GENERATED FROM OPERATION	0.	0.	8516.	16961.	19234.	21674.	23957.	23957.	23957.	23957.	23957.	23957.	24092.	24227.	24227.	24227.	24227.
PROFIT BEFORE TAX, INTEREST	0.	0.	1770.	3464.	5747.	8187.	10465.	10465.	10465.	10465.	10465.	10465.	17346.	24227.	24227.	24227.	24227.
DEPRECIATION & AMORTIZATION	0.	0.	6746.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	6746.	0.	0.	0.	0.
FINANCIAL RESOURCES	40585.	67642.	33578.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SHARE CAPITAL	10146.	16911.	6764.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	30439.	50732.	24814.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN ACCT PAYABLE	0.	0.	2422.	2307.	422.	492.	422.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
USES OF FUNDS	40163.	66103.	40201.	16078.	16953.	18790.	17887.	16277.	15429.	14581.	13733.	12885.	12037.	8206.	2630.	0.	0.
INVESTMENT IN FIXED ASSET	40163.	66103.	29018.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LAND AND SITE IMPROVEMENT	366.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	35609.	59349.	23740.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	1356.	2035.	3391.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	2831.	4719.	1888.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET OTHER THAN CASH	0.	0.	6943.	4617.	763.	817.	763.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE(-) ACC'T RECEIVABLE	0.	0.	3794.	4479.	738.	790.	738.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE(-) IN INVENTORIES																	
PRODUCTS	0.	0.	3005.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
MATERIALS	0.	0.	145.	138.	25.	27.	25.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEBT SERVICES	0.	0.	4239.	11462.	16190.	17972.	17125.	16277.	15429.	14581.	13733.	12885.	12037.	8206.	2630.	0.	0.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	3044.	9117.	10598.	10598.	10598.	10598.	10598.	10598.	10598.	10598.	7555.	2481.	0.	0.
REPAYMNT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	4239.	8418.	8073.	7374.	6526.	5678.	4830.	3982.	3135.	2287.	1439.	652.	149.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	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.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	422.	1539.	2315.	3184.	2707.	3341.	6491.	7681.	8528.	9376.	10224.	11072.	12055.	16021.	21597.	24227.	24227.
BEGINNING CASH BALANCE	0.	422.	1961.	4276.	7466.	10173.	13515.	20006.	27687.	36215.	45591.	55816.	66888.	78942.	94963.	116560.	140787.
ENDING CASH BALANCE	422.	1961.	4276.	7466.	10173.	13515.	20006.	27687.	36215.	45591.	55816.	66888.	78942.	94963.	116560.	140787.	165014.

*** THAI VCM PROJECT ***
BALANCE SHEET (FOR YEARS ENDING DECEMBER 31)
- BASE CASE (ETHYLENE US$ 700/T) (US$ 1000)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
ASSETS	40585.	108227.	139758.	134072.	124051.	114718.	108480.	102669.	97706.	93590.	90323.	87903.	93212.	109232.	130829.	155056.	179283.
CURRENT ASSETS	422.	1961.	11220.	19026.	22496.	26655.	33509.	41590.	50118.	59495.	69719.	80791.	92846.	108866.	130463.	154690.	178917.
CASH	422.	1961.	4276.	7466.	10173.	13515.	20006.	27667.	36215.	45591.	55816.	66888.	78942.	94963.	116560.	140787.	165014.
ACCOUNTS RECEIVABLE	0.	0.	3794.	8272.	9010.	9800.	10538.	10538.	10538.	10538.	10538.	10538.	10538.	10538.	10538.	10538.	10538.
INVENTORIES																	
PRODUCTS	0.	0.	3005.	3005.	3005.	3005.	3005.	3005.	3005.	3005.	3005.	3005.	3005.	3005.	3005.	3005.	3005.
MATERIALS	0.	0.	145.	283.	308.	335.	360.	360.	360.	360.	360.	360.	360.	360.	360.	360.	360.
NET FIXED ASSETS	40163.	106266.	128538.	115046.	101554.	88063.	74571.	61079.	47587.	34096.	20604.	7112.	366.	366.	366.	366.	366.
INVESTMENT	40163.	106266.	135284.	135284.	135284.	135284.	135284.	135284.	135284.	135284.	135284.	135284.	135284.	135284.	135284.	135284.	135284.
LAND & SITE IMPROVEMENT	366.	366.	366.	366.	366.	366.	366.	366.	366.	366.	366.	366.	366.	366.	366.	366.	366.
CONSTRUCTED FACILITIES	35600.	94958.	118698.	118698.	118698.	118698.	118698.	118698.	118698.	118698.	118698.	118698.	118698.	118698.	118698.	118698.	118698.
PRE-INVEST. & START-UP EXP	1356.	3391.	6782.	6782.	6782.	6782.	6782.	6782.	6782.	6782.	6782.	6782.	6782.	6782.	6782.	6782.	6782.
INTEREST DURING CONSTRUCTN	2841.	7550.	9438.	9438.	9438.	9438.	9438.	9438.	9438.	9438.	9438.	9438.	9438.	9438.	9438.	9438.	9438.
LESS:DEPRECIATN & AMORTIZTN	0.	0.	6746.	20238.	33729.	47221.	60713.	74205.	87697.	101188.	114680.	128172.	134918.	134918.	134918.	134918.	134918.
LIABILITIES	30439.	81170.	108406.	107670.	99975.	89828.	79651.	69053.	58454.	47856.	37257.	26659.	16060.	8506.	6024.	6024.	6024.
CURRENT LIABILITIES	0.	0.	5466.	12846.	15749.	16201.	16623.	16623.	16623.	16623.	16623.	16623.	13579.	8506.	6024.	6024.	6024.
ACCOUNTS PAYABLE	0.	0.	2422.	4729.	5151.	5603.	6024.	6024.	6024.	6024.	6024.	6024.	6024.	6024.	6024.	6024.	6024.
INCOME TAX PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT																	
LONG TERM DEBT	0.	0.	3044.	8117.	10598.	10598.	10598.	10598.	10598.	10598.	10598.	10598.	7555.	2481.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	30439.	81170.	102941.	94824.	84225.	73627.	63028.	52430.	41831.	31233.	20634.	10036.	2481.	-0.	-0.	-0.	-0.
LONG TERM DEBT BALANCE	30439.	81170.	102941.	94824.	84225.	73627.	63028.	52430.	41831.	31233.	20634.	10036.	2481.	-0.	-0.	-0.	-0.
STOCK HOLDERS EQUITY	10146.	27057.	31352.	26402.	24076.	24890.	28829.	33616.	39251.	45734.	53065.	61244.	77151.	100727.	124805.	149032.	173259.
SHARE CAPITAL	10146.	27057.	33821.	33821.	33821.	33821.	33821.	33821.	33821.	33821.	33821.	33821.	33821.	33821.	33821.	33821.	33821.
RETAINED EARNINGS	0.	0.	-2469.	-7419.	-9745.	-8931.	-4992.	-205.	5430.	11913.	19244.	27423.	43330.	66906.	90984.	115211.	139438.

*** THAI VCM PROJECT ***
PRODUCTION AND SALES PLAN
- BASE CASE (ETHYLENE US$ 700/T) (US$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
CAPACITY (VCM)	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.
CAPACITY UTILIZATION	0.402	0.785	0.855	0.930	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION (VCM)	32160.	62800.	68400.	74400.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.
INCREASE IN INVENTORY	3360.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME (VCM)	28800.	62800.	68400.	74400.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.
UNIT PRICE (VCM)	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
SALES REVENUE	21600.	47100.	51300.	55800.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.	60000.
CAPACITY (SODA)	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.
CAPACITY UTILIZATION	0.402	0.785	0.855	0.930	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION (SODA)	20743.	40506.	44118.	47986.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.
INCREASE IN INVENTORY	2167.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME (SODA)	18576.	40506.	44118.	47986.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.	51600.
UNIT PRICE (SODA)	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500	0.3500
SALES REVENUE	6502.	14177.	15441.	16796.	18060.	18060.	18060.	18060.	18060.	18060.	18060.	18060.	18060.	18060.	18060.
*** TOTAL SALES REVENUE ***	28102.	61277.	66741.	72596.	78060.	78060.	78060.	78060.	78060.	78060.	78060.	78060.	78060.	78060.	78060.
*** TOTAL SALES VOLUME ***	47376.	103306.	112518.	122386.	131600.	131600.	131600.	131600.	131600.	131600.	131600.	131600.	131600.	131600.	131600.
*** AVERAGE SALES PRICE ***	0.5932	0.5932	0.5932	0.5932	0.5932	0.5932	0.5932	0.5932	0.5932	0.5932	0.5932	0.5932	0.5932	0.5932	0.5932

*** THAI VCM PROJECT ***
PRODUCTION COST STATEMENTS
- BASE CASE (ETHYLENE US$ 700/T) (US$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
PRODUCTION (VCM)	32160.	62800.	68400.	74400.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.	80000.
RAW SALT	805.	1572.	1712.	1862.	2002.	2002.	2002.	2002.	2002.	2002.	2002.	2002.	2002.	2002.	2002.
ETHYLENE	10693.	20881.	22743.	24738.	26600.	26600.	26600.	26600.	26600.	26600.	26600.	26600.	26600.	26600.	26600.
O2	642.	1253.	1365.	1484.	1596.	1596.	1596.	1596.	1596.	1596.	1596.	1596.	1596.	1596.	1596.
CHEMICALS	511.	998.	1087.	1182.	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.	1271.
RAW MATERIAL COST	12651.	24703.	26906.	29266.	31469.	31469.	31469.	31469.	31469.	31469.	31469.	31469.	31469.	31469.	31469.
FUEL GAS	316.	617.	672.	731.	786.	786.	786.	786.	786.	786.	786.	786.	786.	786.	786.
POWER	3412.	6663.	7257.	7894.	8488.	8488.	8488.	8488.	8488.	8488.	8488.	8488.	8488.	8488.	8488.
STEAM (15K)	614.	1199.	1306.	1420.	1527.	1527.	1527.	1527.	1527.	1527.	1527.	1527.	1527.	1527.	1527.
STEAM (2K)	230.	448.	488.	531.	571.	571.	571.	571.	571.	571.	571.	571.	571.	571.	571.
FILTERED WATER	157.	307.	334.	364.	391.	391.	391.	391.	391.	391.	391.	391.	391.	391.	391.
DMW	83.	162.	177.	193.	207.	207.	207.	207.	207.	207.	207.	207.	207.	207.	207.
PORTABLE WATER	18.	35.	38.	42.	45.	45.	45.	45.	45.	45.	45.	45.	45.	45.	45.
INSTR/PLANT AIR	158.	308.	335.	365.	392.	392.	392.	392.	392.	392.	392.	392.	392.	392.	392.
N2	134.	262.	286.	311.	334.	334.	334.	334.	334.	334.	334.	334.	334.	334.	334.
UTILITIES COST	5122.	10002.	10894.	11849.	12741.	12741.	12741.	12741.	12741.	12741.	12741.	12741.	12741.	12741.	12741.
WASTE WATER TREATMENT	167.	326.	355.	386.	415.	415.	415.	415.	415.	415.	415.	415.	415.	415.	415.
VARIABLE COST	17939.	35031.	38154.	41501.	44625.	44625.	44625.	44625.	44625.	44625.	44625.	44625.	44625.	44625.	44625.
DEPRECIATION (PROCESS PLANT)	5935.	11870.	11870.	11870.	11870.	11870.	11870.	11870.	11870.	11870.	5935.	0.	0.	0.	0.
DEPRECIATION (PRE-INVEST)	339.	678.	678.	678.	678.	678.	678.	678.	678.	678.	339.	0.	0.	0.	0.
DEPRECIATION (INTEREST DUR.)	472.	944.	944.	944.	944.	944.	944.	944.	944.	944.	472.	0.	0.	0.	0.
DEPRECIATION	6746.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	6746.	0.	0.	0.	0.
AMORTIZATION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEPRECIATION & AMORTIZATION	6746.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	13492.	6746.	0.	0.	0.	0.
LABOUR COST	397.	794.	794.	794.	794.	794.	794.	794.	794.	794.	794.	794.	794.	794.	794.
OVERHEAD	397.	794.	794.	794.	794.	794.	794.	794.	794.	794.	794.	794.	794.	794.	794.
EMPLOYMENT COST	794.	1588.	1588.	1588.	1588.	1588.	1588.	1588.	1588.	1588.	1588.	1588.	1588.	1588.	1588.
MAINTENANCE COST	1780.	3561.	3561.	3561.	3561.	3561.	3561.	3561.	3561.	3561.	3561.	3561.	3561.	3561.	3561.
ELECTRODE & IEM	612.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.	1223.
TAX & INSURANCE	890.	1780.	1780.	1780.	1780.	1780.	1780.	1780.	1780.	1780.	1780.	1780.	1780.	1780.	1780.
DIRECT FIXED COST	4076.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.	8152.
EX-FACTORY PRODUCTION COST	28761.	56675.	59799.	63145.	66269.	66269.	66269.	66269.	66269.	66269.	59523.	52777.	52777.	52777.	52777.
UNIT DIRECT OPERATING COST	0.8943	0.9025	0.8742	0.8487	0.8284	0.8284	0.8284	0.8284	0.8284	0.8284	0.7440	0.6597	0.6597	0.6597	0.6597
ADMINISTRATIVE & SALES EXP.	575.	1133.	1196.	1263.	1325.	1325.	1325.	1325.	1325.	1325.	1190.	1056.	1056.	1056.	1056.
INTEREST ON LOAN NO.1	1218.	2374.	2131.	1887.	1644.	1400.	1157.	913.	670.	426.	183.	0.	0.	0.	0.
INTEREST ON LOAN NO.2	2029.	4059.	3957.	3551.	3145.	2740.	2334.	1928.	1522.	1116.	710.	304.	0.	0.	0.
INTEREST ON LOAN NO.3	812.	1623.	1623.	1583.	1420.	1258.	1096.	933.	771.	609.	446.	284.	122.	0.	0.
INTEREST ON LOAN NO.4	181.	362.	362.	353.	317.	280.	244.	208.	172.	136.	99.	63.	27.	0.	0.
INTEREST ON LONG-TERM DEBT	4239.	8418.	8073.	7374.	6526.	5678.	4830.	3982.	3135.	2287.	1439.	652.	149.	0.	0.
INTEREST ON SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL PRODUCTION COST	33576.	66226.	69067.	71782.	74121.	73273.	72425.	71577.	70729.	69881.	62153.	54485.	53982.	53833.	53833.
UNIT PRODUCTION COST	1.0440	1.0546	1.0098	0.9648	0.9265	0.9159	0.9053	0.8947	0.8841	0.8735	0.7769	0.6811	0.6748	0.6729	0.6729

*** THAI VCM PROJECT ***
IRR CALCULATION ON TOTAL INVESTMENT
- BASE CASE (ETHYLENE US$ 700/T) (US$ 1000)

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATN	INTEREST ON L-T DEBT	RETURN BEFORE TAX	DISCOUNT FACTOR	(BEFORE TAX) PRESENT VALUE INVEST.	(BEFORE TAX) PRESENT VALUE RETURN	(LESS) INCOME TAX	RETURN AFTER TAX	DISCOUNT FACTOR	(AFTER TAX) PRESENT VALUE INVEST.	(AFTER TAX) PRESENT VALUE RETURN
1983	37332.	0.	0.	0.	0.	1.0000	37332.	0.	0.	0.	1.0000	37332.	0.
1984	61384.	0.	0.	0.	0.	0.8845	54294.	0.	0.	0.	0.8845	54294.	0.
1985	31652.	-2469.	6746.	4239.	8516.	0.7823	24763.	6662.	0.	8516.	0.7823	24763.	6662.
1986	0.	-4949.	13492.	8418.	16961.	0.6920	0.	11737.	0.	16961.	0.6920	0.	11737.
1987	0.	-2326.	13492.	8073.	19239.	0.6121	0.	11775.	0.	19239.	0.6121	0.	11775.
1988	0.	813.	13492.	7374.	21679.	0.5414	0.	11737.	0.	21679.	0.5414	0.	11737.
1989	0.	3939.	13492.	6526.	23957.	0.4788	0.	11472.	0.	23957.	0.4788	0.	11472.
1990	0.	4787.	13492.	5678.	23957.	0.4235	0.	10147.	0.	23957.	0.4235	0.	10147.
1991	0.	5635.	13492.	4830.	23957.	0.3746	0.	8975.	0.	23957.	0.3746	0.	8975.
1992	0.	6483.	13492.	3982.	23957.	0.3314	0.	7938.	0.	23957.	0.3314	0.	7938.
1993	0.	7331.	13492.	3135.	23957.	0.2931	0.	7022.	0.	23957.	0.2931	0.	7022.
1994	0.	8179.	13492.	2287.	23957.	0.2592	0.	6211.	0.	23957.	0.2592	0.	6211.
1995	0.	15907.	6746.	1439.	24092.	0.2293	0.	5524.	0.	24092.	0.2293	0.	5524.
1996	0.	23575.	0.	652.	24227.	0.2028	0.	4914.	0.	24227.	0.2028	0.	4914.
1997	0.	24078.	0.	149.	24227.	0.1794	0.	4346.	0.	24227.	0.1794	0.	4346.
1998	0.	24227.	0.	0.	24227.	0.1587	0.	3844.	0.	24227.	0.1587	0.	3844.
1999	-4888.	24227.	0.	0.	24227.	0.1403	-686.	3400.	0.	24227.	0.1403	-686.	3400.
TOTAL	125480.				331138.		115703.	115703.		331138.		115703.	115703.

***** INTERNAL RATE OF RETURN ***** 13.06 PER CENT (BEFORE TAX) 13.06 PER CENT (AFTER TAX)

***** PAY-OUT PERIOD ***** 7.06 YEAR (BEFORE TAX) 7.06 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	366.	PAID-UP SHARE CAPITAL	33821.
CONSTRUCTED FACILITIES	118698.	LONG TERM DEBT	105985.
PRE-INVEST AND START-UP EXP	6782.	SHORT TERM DEBT	0.
INTEREST DURING CONSTRUCTION	9438.	FINANCIAL RESOURCES	139806.
TOTAL FIXED CAPITAL	135284.		
INITIAL WORKING CAPITAL	4522.		
TOTAL CAPITAL COST	139806.		

*** THAI VCM PROJECT ***
PROFITABILITY AND FINANCIAL INDICATORS
- BASE CASE (ETHYLENE US$ 700/T) (US$ 1000)

YEAR	(1) AFT TAX PROFIT -TO- SALES REV (PCT)	(2) AFT TAX PROFIT -TO- S/H EQUITY (PCT)	(3) BFR TAX PROFIT -TO- INVESTMNT (PCT)	(4) AFT TAX PROFIT -TO- S/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	-6.8	-7.9	-1.8	-7.3	2.05	1.48	2.01	77./ 23.	47.1	931.6	26.0
1986	-8.1	-18.7	-3.5	-14.6	1.48	1.23	1.48	78./ 22.	94.0	888.2	61.3
1987	-3.5	-9.7	-1.7	-6.9	1.43	1.22	1.19	78./ 22.	92.8	931.2	76.0
1988	1.1	3.3	0.6	2.4	1.65	1.44	1.21	75./ 25.	90.5	925.9	81.4
1989	5.0	13.7	2.8	11.6	2.04	1.84	1.40	69./ 31.	87.7	890.3	78.7
1990	6.1	14.2	3.4	14.2	2.50	2.30	1.47	61./ 39.	85.1	879.7	76.1
1991	7.2	14.4	4.0	16.7	3.02	2.81	1.55	52./ 48.	82.5	869.1	73.4
1992	8.3	14.2	4.6	19.2	3.58	3.38	1.64	41./ 59.	79.8	858.5	70.8
1993	9.4	13.8	5.2	21.7	4.19	3.99	1.74	28./ 72.	77.2	847.9	68.2
1994	10.5	13.4	5.9	24.2	4.86	4.66	1.86	14./ 86.	74.5	837.3	65.5
1995	20.4	20.6	11.4	47.0	6.84	6.59	2.00	3./ 97.	50.7	825.1	62.6
1996	30.2	23.4	16.9	69.7	12.80	12.40	2.95	-0./100.	27.2	775.5	50.5
1997	30.8	19.3	17.2	71.2	21.66	21.10	9.21	-0./100.	25.6	705.8	33.3
1998	31.0	16.3	17.3	71.6	25.68	25.12**********		-0./100.	25.2	672.9	25.2
1999	31.0	14.0	17.3	71.6	29.70	29.14**********		-0./100.	25.2	672.9	25.2
AVERAGE1	11.4	9.6	6.6	27.5	8.23	7.91**********		38./ 62.	64.3	834.1	58.3
AVERAGE2	12.8	14.0	6.6	27.5	5.68	5.42	2.03	37./ 63.			

(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.

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MEMBERS LIST OF JAPANESE SURVEY TEAM

Name	Attached to	Function of the project
(1) Member of assigned experts		
Mr. Takeshi CHINO	UNICO International Corp.	Project Leader Market Analyst
Dr. Shigeo UEKI	Japan Consulting Institute	General Adviser
Mr. Ryuzo NAGAOKA	Toyo Engineering Corp.	Assistant Leader Technical Study
Mr. Kiko NAGASAWA	UNICO International Corp.	Market Study Financial and Economic Study
Mr. Yoshiaki NAKAMURA	UNICO International Corp.	Technical Study Financial and Economic Suty
Mr. Shigeru TANAKA	Toyo Engineering Corp.	Technical Study (Offsite and Infrastructure)
Mr. Masaaki AOKI	Toyo Engineering Corp.	Technical Study (Utilities)
Mr. Hiroshi KONDO	Toyo Engineering Corp.	Technical Study (Ethylene Process)
Mr. Ken WAKATSUKI	Toyo Engineering Corp.	Financial and Economic Study (Legal and Financial Condition)
Mr. Tanzo ZIZAIMARU	Asahi Glass Co., Ltd.	Technical Study (Salt Electrolysis Process)
Mr. Yoshimitsu OYAMADA	Mitsui Toatsu Chemicals Inc.	Technical Study (VCM Process)
Mr. Shin-ichi YAMAGUCHI	Japan Consulting Institute	Technical Study (Environment)

Name	Attached to
(2) Officer in charge of JICA	
Mr. Akihiro MITARAI	Head of Industry Division
Mr. Norio FUKUBAYASHI	Industry Division

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LIST OF COUNTERPARTS IN THAILAND

Petroleum Authority of Thailand (PTT)

Messrs.	Pratin Pathanaporn	Deputy Governor, Technical and Planning
	Sirin Nimmanakaeminda	Deputy Governor, Finance
	Pala Sookawesh	Director, Policy and Planning Department
	Patchara Pariwatvorn	Director, Research and Development Department
	Sahat Thongjen	Director, Engineering Division
	Adul Leelapatranuruk	Director, Project Planning Division
	Sirote Rhuwadhana	Director, Cooperation and Control Division
	Siri Jirapongphan	Assistant Director, Policy Division
	Vithaya Tivayanonda	Assistant Director, Oil and Gas Technology Division
	Pravith Veahongs	Project Planning Division
	Krittaya Chantarakka	Project Planning Division
	Pasook Puengbua	Project Planning Division
	Charoonrith Khampanya	Research and Development Department
	Kosol Pimthanothai	Research and Development Department
	Apisit Rujikeatkamjorn	Construction Manager

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LIST OF ORGANIZATIONS VISITED AND PERSONS INTERVIEWED

(1) List of organizations visited

- Department of Technical and Economic Cooperation
- Ministry of Industry
- The Board of Investment

- Embassy of Japan
- Japan International Cooperation Agency, Bangkok

- Royal Irrigation Department
- Industrial Estate Authority of Thailand
- National Environment Board
- Highway Department, Ministry of Communication
- Harbour Department, Ministry of Communication
- Bank of Thailand

- Electricity Generating Authority of Thailand
- Provincial Electricity Authority
- Express Transportation Organization of Thailand

- Japan External Trade Organization, Bangkok

- Fluor Ocean International Services Inc.
- Thai Plastic and Chemical Co., Ltd.
- Thai Asahi Caustic Soda Co., Ltd.
- Thai Petrochemical Industry Co., Ltd.
- Thai United Polymer Co., Ltd.
- Dow Chemical Thailand Co., Ltd.
- Thai Synthetic Fiber Manufacturers Association

- Universal Export-Import Co., Ltd.
- Bhasichason Cord Factory
- Century Plastic Factory
- Thai Kayan

– Metropolitan Plastic Industry Co., Ltd.
– Thai Pipe Industry Co., Ltd.
– Sieng Watana Ltd.

– Sino-Thai Engineering Co., Ltd.
– Thai Ohbayashi Corp.
– Thai Takenaka International Corp.
– N.Y.K. Transport Service (Thailand) Co., Ltd.

(2) Persons interviewed with the study team

Name	Title
Fluor Ocean International Services Inc. (FOSI)	
Messrs. Anon Tulyanon	Project Coordinator
On Piescott	Deputy Project Director
Electricity Generating Authority of Thailand (EGAT)	
Mr. Om Srid Aphaiphaminart	Director, Planning Department
Royal Irrigation Department	
Mr. Udom Rackhanya	Director of O&M Division
Industrial Estate Authority of Thailand (IEAT)	
Messrs. Wanchak Voradilok	Governor
Chavalt Chokratauachi	Acting Chief of Planning and Design Division
Ministry of Industry (MOI)	
Mr. Trakarn Chairt	Director, Office of the National Committee on Fertilizer and Pesticide Industry Development
National Environment Board (NEB)	
Messrs. Sirithan Boriboon	Industrial Impact Section Head
Mongkol Pwasarteeree	Technology of Environmental Management
Pichak Tanherwhongs	Water Quality Standard Section
Ratana Suthapong	Industrial Impact Section

Name	Title
Highway Department, Ministry of Communication	
Messrs. Panja Cooparat	Planning Division
Sajja Kamolvet	Programming Section
Harbour Department, Ministry of Communication	
Messrs. Surin Charoenvat	Director of Harbour Master Division
Pakit Sangkaprija Samboon	Harbour Master
Express Transportation Organization of Thailand (ETO)	
Messrs. Preecha Vichaikutka	Assistant Director, Transportation Department
Saneh Niyamaha	Interior Transport Center
Rurtai Charuchinta	International Freight Center
Domrong Kauhakamchiva	Chief International Division
Pradit Ruomthony	Chief of Commercial Division
Somkuan Chongdarakul	Chief of Domestic Transportation Division
Department of Technical and Economic Cooperation (DTEC)	
Mr. Pracha Chaowasilp	Chief of Colombo Plan Division
Bank of Thailand	
Messrs. Prateep Vachrongkura	
Kanitta Margaret Meesook	
Provincial Electricity Authority (PEA)	
Messrs. Pramual Kachataya	Assistant General Manager
Sakol Wongbuddher	Director of Planning and Civil Works Department
Sunthorn Tanthavorn	Chief of Project and Planning Division
Kitti Ting Panpong	Assistant Chief of General Construction Division
Kamol Pernpipat	Assistant Chief of Research Division
Sudchi Lophangse	Assistant Chief of Power Economic Division
Chakchi Chandrasupsang	Chief of Project Area No. 3 Section

ON-THE-SPOT SURVEY SCHEDULE

October 7 (Tuesday)	Arrangements at the Embassy and JICA office Kick-off meeting at PTT
October 8 (Wednesday)	Sub-committee meeting
October 9 (Thursday)	Arrangements with EGAT, Royal Irrigation Dept., Thai Plastic & Chemical Co. and civil engineering firms Visit to JETRO office One member arrive Bangkok
October 10 (Friday)	Arrangements with Highway Dept. of MOC, IEAT, DTEC, Thai Asahi Caustic Soda Co. and Thai United Polymer Co. Ltd. Visit to MOI (Statistics Bureau)
October 11 (Saturday)	Arrangement with Thai Petrochemical Industry Co.
October 12 (Sunday)	All members move from Bangkok to Pattaya via Laem Chabang
October 13 (Monday)	On-the-spot survey: Dok Krai Reservoir, LDPE plant site, PTT LPG plant site, Sattahip port
October 14 (Tuesday)	On-the-spot survey: Arrangement at PTT plant site, Rayong city and fishing port Move to Bangkok
October 15 (Wednesday)	Arrangement with FOSI and MOI Visit to the Thai Plastic & Chemical Co. plant
October 16 (Thursday)	Arrangement with FOSI and Harbour Dept. of MOC Sub-committee meeting Visit to Thai Asahi Caustic Soda Co. plant

October 17 (Friday)	Arrangement with NEB, BOI, ETO, engineering company and plastic trading company
October 18 (Saturday)	Internal arrangements
October 19 (Sunday)	Five members leave Bangkok for home Two members move from Bangkok for Chiang Mai: local market survey
October 20 (Monday)	Local market survey (in Chiang Mai City) Visit to plastic processing company Sub-committee meeting Move from Chiang Mai to Bangkok
October 21 (Tuesday)	Sub-committee meeting One member leave Bangkok for home
October 22 (Wednesday)	Arrangement with Bank of Thailand, Thai Plastic and Chemical Co. Visit plastic processing company One member arrive Bangkok
October 23 (Thursday)	Visit Nakohn Pathom: Local market survey
October 24 (Friday)	Arrangement with Embassy and JICA office Visit to plastic processing companies
October 25 (Saturday)	Three members move from Bangkok to Pattaya: on-the-spot survey: Laem Chabang, Dok Krai Reservoir LDPE plant site, PTT LPG plant site Sattahip commercial port
October 26 (Sunday)	Move to Bangkok Internal Arrangement

October 27 (Monday)	Sub-committee meeting Visit to plastic processing company
October 28 (Tuesday)	Visit to plastic processing company Arrangement with PEA, Thai Synthetic Fiber Manufacturers Association One member arrive Bangkok
October 29 (Wednesday)	Internal arrangement Preparation of an interim report
October 30 (Thursday)	Plenary session Submit the interim report
October 31 (Friday)	Report the survey results to the Embassy and JICA office
November 1 (Saturday)	Internal arrangement
November 2 (Sunday)	Seven members leave Bangkok for home

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SCOPE OF WORK

FOR

FEASIBILITY STUDY FOR ETHYLENE AND VINYL CHLORIDE MONOMER PLANTS

IN

THE KINGDOM OF THAILAND

SCOPE OF WORK

FOR

FEASIBILITY STUDY FOR ETHYLENE AND VINYL CHLORIDE MONOMER PLANTS

IN

THE KINGDOM OF THAILAND

Agreed

Between

THE PETROLEUM AUTHORITY OF THAILAND

THE MINISTRY OF INDUSTRY

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Dated: July 25th, 1980

Dr. TONGCHAT HONGLADAROMP	Mr. AKIHIRO MITARAI
Governor	Team Leader
Petroleum Authority of Thailand	Preliminary Survey Team

in the presence of

for Mr. APILAS OSATANANDA
Director General
Department of Technical
and Economic Cooperation

Discussions were held on the scope of work for feasibility study of Ethylene and Vinyl Chloride Mononer Plants Project with the Thai authority concerned, between the Japanese preliminary survey team (the team), headed by Mr. Akihiro Mitarai, and counterpart personnel headed by Dr. Thongchat Hongladaromp, Governor of Petroleum Authority of Thailand (PTT), during the visit of the team to Thailand from July 20 to July 27, 1980. The discussions were conducted in a most friendly and cordial atmosphere.

The followings are the main point confirmed.

1) LPG Gas Plant

1.1 First unit of LPG plant will be commissioning by October 1983. Capacity of first unit of LPG plant is 350 MMSCFD.

1.2 Total capacity of LPG plant will be 2x350 MMSCFD.

1.3 Product mixtures are methane rich gas, ethane, LPG, and natural gasoline.

1.4 Availability of ethane based on the first unit of LPG plant at 350 MMSCFD capacity is 187,500 metric tons/year (55% recovery)

2) Ethane Price

Ethane price will be considered that PTT's produced ethylene price equivalent to competitive in world market.

3) Chlorine

Both parties recognized that the supplying methods of chlorine for the project is necessary to be studied.

4) Plant Site

The Thai party indicated that the project site for ethylene plant next to the LPG plant at Mabtaput in Rayong Province. The site for VCM plant will be recommended in the feasibility

study by considered the transportation cost of raw material and finished product including environmental effects. Concerning the environmental aspects, Thai party, PTT, will coordinate in supporting the information necessary to the study team.

The following is the overall scope of work confirmed by both parties.

I. INTRODUCTION

In response to a request by the Government of the Kingdom of Thailand, the Government of Japan has decided to conduct a Feasibility Study for Ethylene and Vinyl Chloride Monomer Plants, in accordance with the laws and regulations in force in Japan. The Japan Internaitonal Cooperation Agency (JICA), the official agency responsible for the implementation of the Technical Cooperation Programmes of the Government of Japan, will carry out the study in close cooperation with the Petroleum Authority of Thailand (PTT), and the authorities concerned of the Government of the Kingdom of Thailand.

II. BACKGROUND

The Petroleum Authority of Thailand (PTT) will start natural gas production by September, 1981, using the gas found in the Gulf of Thailand. This natural gas contains about 9 percent of ethane. The PTT is building an LPG Gas Processing Plant at Rayong which is expected to be completed by the middle of 1983. The plant includes an Ethane Recovery Unit, the product of which can be utilised as feed for ethylene production.

There are some projects in Thailand for the production of LDPE and HDPE, initiated by private sectors, and a plant to produce

PVC from imported Vinyl Chloride Monomer (VCM) has already been installed by the Thai Plastic & Chemical Co., Ltd. According to the Thai authorities concerned, the demand for ethylene by 1983 is estimated to be approximately 100,000 - 150,000 tons per year.

The PTT aims to supply ethylene and VCM to these industries to replace the imported materials. Therefore, the PTT will be likely to expedite the building work in order to be able to start production to meet the growing demands of ethylene and its derivatives, as soon as the LPG Gas Processing Plant is completed.

III. OBJECTIVES

The objectives of the Feasibility Study are:-

1) To confirm the demand for ethylene and its derivatives and thereby recommend a suitable scale of plants for this project.
2) To confirm technical, economic and financial feasibility.
3) To Provide information on the schedule and recommendable procedures for project execution.

IV. SCOPE OF THE STUDY

A) Ethylene and Vinyl Chloride Monomer Plants and Supplying methods of chlorine to be studied

The ethylene and Vinyl Chloride Monomer Plants examined in the study will ascertain the technical, economic and financial feasibility of a suitably scaled plant to produce Ethylene and VCM to meet the domestic petrochemical industries' requirements at the same time

to study the supplying methods of chlorine for VCM plant.

B) Activities of the Study

In order to achieve the objectives mentioned above, the Study will include the main activities listed below.

1). Raw Material Study

1. Availability of raw material (Ethane, Propane, Salt)

(1). Methods and conditions of supply

(2). Quantities available

(3). Composition

2. Raw material price

2) Market Survey (Reviews and forecasts in domestic market)

1. LDPE
2. HDPE
3. PVC/VCM
4. Caustic-soda (NaOH)
5. Chlorine
6. Other major ethylene derivatives such as Ethylene Oxide, (EO)/Ethylene Glycol (EG)

3). Technical Study (Ethylene , VCM Plants and Supplying methods of Chlorine.)

1. Decision on a suitable capacity
2. Outline of plants and manufacturing processes
3. Overall material and utility balance
4. Elaboration on the layout of plants and site

5. Organization and personnel

6. Storage and transportation systems for Ethylene, VCM and others

7. Environmental aspect

8. Applicable laws and regulations

9. Infrastructures and utilities

4). Economic and Financial Study

1. Estimate of investment and operating costs

2. Pricing & Revenue

3. Calculation of Internal Rate of Return (IRR)

4. Sensitivity analysis

5. Social cost benefit analysis

6. Financial analysis

5). Overall evaluation and recommendaitons

6). Recommendations for procedure of project execution

V. TIME SCHEDULE

The feasibility study team will be dispatched within three months of completion of the preliminary survey.

JICA will prepared and submit to the Petroleum Authority of Thailand the following reports in English:-

1. Reconnaissance Report to be submitted before the Study Team leaves Thailand for Tokyo.
2. Draft Final Report to be submitted within five months of completion of the field survey.
3. Final Report (50 copies) to be submitted within two months after the receipt of PTT's comments on the findings of the Draft Report.

VI. COUNTERPARTS

1). The PTT will assign a qualified counterpart to be responsible for liaison between the PTT and the sutudy team during the whole period of the study.

2). Provided that the Japanese Government receives a request from the Thai Government, two PTT senior engineers will visit Japan for one to two weeks under JICA's counterparts programme, subject to the approval of JICA, to review the interim results and also to discuss the presentation of the draft report with the study team.

VII. CONTRIBUTION OF THE GOVERNMENT OF THE KINGDOM OF THAILAND

1). The Government of Thailand and the authorities concerned will provide the study team with the necessary and available information and data.

2). The Government will make arrangements for visitting the authorities concerned.

3). The Government will make an effort to arrange the study team with an office and transportation means for the study and will also arrange suitable accommodation facilities in the vicinity of the plant site.

付 録 － 6

MINUTES OF MEETING

ON

THE DRAFT REPORT OF FEASIBILITY STUDY

FOR ETHYLENE AND VINYLCHLORIDE MONOMER

PLANTS IN THE KINGDOM OF THAILAND

MINUTES OF MEETING

ON

THE DRAFT REPORT OF FEASIBILITY STUDY

FOR ETHYLENE AND VINYLCHLORIDE MONOMER

PLANTS IN THE KINGDOM OF THAILAND

BETWEEN

THE PETROLEUM AUTHORITY OF THAILAND

AND

JICA STUDY TEAM

DATED : MARCH 9,1981

Mr. Pratin Pathanaporn	Mr. Takeshi Chino
Deputy Governer	Team Leader
Petroleum Authority of Thailand (PTT)	JICA Study Team

1. Review meetings on the feasibility study for ethylene and vinylchloride monomer plants in the Kingdom of Thailand were held between the PTT headed by Mr.Pratin and the JICA study team headed by Mr.Chino in an unofficial discussion on Feb. 2-5, 1980 in Japan and a presentation on the 5th and 6th of March 1980 at PTT office in Bangkok. The presentation of the draft report was made to PTT and various government authorities.

2. In these meetings, both parties reviewed the draft feasibility report (hereinafter designated as case I) which was prepared by the JICA study team and submitted to the PTT on Jan. 31, 1981.

   This report contains:

   -- An ethylene plant whose capacity is 230,000 MTA based on 287,000 MTA of ethane which can be recovered from the first unit of the gas processing plant,

   -- A VCM plant of 80,000 MTA capacity, including a Chloro-Alkali plant to produce 48,000 MTA of chlorine and 51,600 MTA of caustic soda.

Conceptual design, and financial and economic analysis were carried out on the above project. It is concluded in this report that both ethylene and VCM projects are feasible and therefore, their early implementation is highly recommendable.

3. In addition to the above mentioned feasibility report, the JICA study team submitted to PTT on March 4, 1981 an additional report for a separate study with modification in assumptions on market conditions and larger ethylene capacities which has been prepared in accordance with the request made by PTT. (hereinafter designated as case II).

/This ...

This case II study was made for ethylene plants of which capacities are 300,000 MTA and 350,000 MTA respectively.

It is concluded that these larger sizes of ethylene plants are also feasible provided that the following conditions are satisfied:

-- Ethane will be recovered from more than one unit of 350 MMSCFD gas processing.

-- Potential domestic demand of ethylene can be effectuated by the timely implementation of all downstream plants (such as LDPE, HDPE, VCM/PVC, and EO/EG) without any delay in their construction on the condition that their plant will always have certain excess capacities compared with their demand,

-- Expected rate of substitution of polypropylene (PP) demand by polyethylene (PE) to be produced domestically would take place.

The followings are major points of discussions made between the two parties:

(a) PTT expressed that the trend of PE in 1978-1979 looks suspicious and should be checked with 1980 figure and that if it shows an increase over 1979 figure, then the correlation starting from 1975 including 1980 should be used.

The Japanese feasibility study team replied as follows:

According to the foreign trade statistics informed by the PTT's telex dated Feb.23,1981 , imports of PE and PP in 1980 are 40,238 and 39,585 tons respectively. On the other hand, the Japanese feasibility study team's demand projection for PE and PP in 1980 are 72,400 and 41,200 tons respectively.

The difference between the actual imports and forecasted demand was caused by an increase in inventory especially for PE during the year 1979. When this inventory is used up, the demand in 1980 is expected

/to...

to coincide to the study team's demand forecast. For the reason described above, the study team considers that the demand forecast shown in the draft report is reasonable and there is no need to change the model.

(b) PTT pointed out that the aggregate ethylene demand should include polystyrene(PS). The study team indicated that the consumption of PS is too small for a styrene monomer plant to be constructed in Thailand. At present the minimum economics size of styrene plant is about 100,000 MTA. In addition the production of styrene monomer requires benzene as main raw material and unit consumption of ethylene required for the production of styrene is rather small. A possibility of construction of styrene monomer plant can be found only after the year 1995.

(c) PTT expressed its opinion that the capacity of EG plant should be 40,000 MTA and can be started in 1985.

The study team answered that this size of EG plant may be too small to be justified and it would be better to delay the construction of EG plant at the time when an economical size of the plant can be justified, because even a small reactor for the synthesis of EO is very expensive.

However, the study team mentioned that a 60,000 t/y plant in terms of EO will be taken into account in the finalization of the supplemental report based on the assumption that it will go on stream starting from 1985.

/(d) ...

(d) PTT requested the study team to make a separate analysis for LDPE and HDPE. The study team explained that in the Thai trade statistics imports figures for PE are not broken down into LDPE and HDPE. The trade statistics of export countries, for example, of Japan, do not have separate figures either until 1976. In order to analyze the historical trend in PE demand from 1970 to 1979, the study team can not help adopting statistical figures for total PE.

(e) PTT expressed its opinion that 50% of forecast figure for PP demand should be substituted by PE immediately after the initiation of the commercial operation of ethylene plant expected in 1985, and therefore PTT considers that the study team should take it into account in the demand forecast for ethylene based on which the size of ethylene plant should be determined. The study team considers that the 50% substitution of PP demand by PE from the year 1985 is unrealistic, because the imports of PP would continue at least up to 1985 and a gradual substitution will be expected from 1985 onwards and the 50% substitution may be assumed to be accomplished by 1990.

(f) PTT requested that the study team studies larger size of ethylene capacity taking into account the following conditions and assumptions:

(i) Ethane availability is not be limited to only one unit (350 MMSCFD) of the gas processing plant.

(ii) Potential demand of ethylene is considered as actual demand, and used in calculating IRR.

(iii) Capacity expansion of downstream plants is implemented as soon as there is excess demand and large enough to satisfy demand for at least 3 years.

/This ..

This additional study is almost completed and preliminary results were presented in the supplemental report as case II at the March meeting.

(g) PTT suggested that in the finalization of the additional study, the following conditions be taken into account:

(i) capital cost is based on 100% loan

(ii) cost of products

ethane	$300	(financial),	$240 (economic)
ethylene	$700	(financial)	$600 (economic)

(iii) relatively small capacity of ethylene plant is penalized for not satisfying domestic demand in the calculation of economic internal rate of return.

The study team expressed that the additional study would be continued based on these conditions.

(h) In reply to the question on the date of completion of final report, the study team expressed that the final report would be available by the middle of April 1981.

(i) PTT requests that analysis worldwide ethylene, LDPE, HDPE and PP supply demand balance should be included. The study team will comply with this request in a separate document.

(j) The final Report will consist of 3 volumes;

Volume 1	-	Executive summary and Recommendation
Volume 2	-	Main Report (Case I)
Volume 3	-	Supplementary Report (Case II)

The executive summary and recommendation should be an integrated discussion of the case I and Case II study.

第 III 部

追 加 調 査

I 序　　論

本追加調査は調査報告本文とは独立に、下記のような前提条件が満たされるという仮定に基づきエチレンプラントの生産能力の比較検討を行ったものである。

追加調査の前提条件

A. 原料エタンは現在設計中の第1期のガス処理プラント（350MMSCFD）より回収されるものだけでなく、将来の第2期ガス処理プラントより回収されるエタンも利用するものとする。

B. エチレン誘導品（LDPE、HDPE、VCM/PVC および EO/EG）の国内需要を満たすようにダウンストリームプラントが建設されるものとする。すなわち、エチレンの潜在需要がそのまま有効需要になるように、ダウンストリームプラントは常に需要を上廻る能力をもつものとする。[1)]

C. 天然ガスをオレフィン原料として使用する場合、エチレンに比べてプロピレンの得られる量が少なく、プロピレンの生産量は限定される。またタイ国の石油精製パターンを考慮すると、リファイナリーからの回収プロピレンも多量は期待できない。従って国産のプロピレン国内供給可能量だけではポリプロピレンの需要を満たし得ない。従って、国産ポリプロピレンの供給不足はポリエチレンで極力代替されるものとする。

これらの前提条件が満たされた場合のエチレンの需要量の予測、および予測需要量をもとにしたエチレンプラントの生産規模による経済性の評価について、以下に述べる。

1) 例えば国内需要が生産能力をこえた時点で直ちに増設を行なうものとする。

Ⅱ 市 場 調 査

1. 需要予測

1－1 プラスチック材料

本節ではポリエチレンによるポリプロピレンの代替の可能性について検討した。なお、ポリエチレン、ポリプロピレンを除く他のプラスチック材料の需要分析と需要予測は本文と同様である。

1－1－1 ポリエチレンによるポリプロピレンの代替について

(1) ポリエチレンとポリプロピレン

ポリエチレンとポリプロピレンとは多くのプラスチック材料のなかで、特に似通った特性をもっているので、特殊な分野を除いて、ほぼ同じ成形方法で、同一用途に用いられることが多い。

表Ⅱ－1は需要分野別にポリエチレン製品とポリプロピレン製品の特長を比較したものである。ポリプロピレンはポリエチレンにない多くの利点があるため、世界的にその需要は増加している。

タイ国においては、ポリプロピレンの需要は１９７０年の5,700t／yから１９７９年の51,000t／yまで、平均年率２８％の伸びを示しており、ポリエチレンの平均需要伸び率９％／yの３倍以上の急成長を遂げた。従って、ポリオレフィン中におけるポリプロピレンの需要比率は、１９７０年の１３％から１９７９年の３９％まで増加した。これはポリプロピレンがタイ国のプラスチック産業に導入され、その成形上、製品品質上の利点が認められたため急速に市場に滲透し、定着して来たことを意味する。

また最近は、ポリプロピレンの価格がポリエチレンよりも安くなったため、フィルムなどの用途分野で後者から前者への代替も生じているようである。しかし、価格の安いことによる代替効果は、既に述べた技術的要因に比べてかなり小さいものと推定される。すなわち、タイ国の、ポリオレフィン中のポリプロピレンの比率をW（％）とすると、次のような回帰式が得られる。

$$W = 14.67 + 1.98t - 0.29v$$

（相関係数：0.9566）

ここに、tは１９７０年を０とする年数、vはポリプロピレンとポリエチレンの価格差とポリエチレン価格との比率（％）

上記の回帰式は、ポリプロピレンのポリオレフィン中の比率が、価格に無関係に

Table II–1 ADVANTAGES AND DISADVANTAGES OF POLYPROPYLENE IN APPLICATIONS WHERE IT COMPETES WITH POLETHYLENE

	Advantages	Disadvantages
Film	High rigidity.	
	Good transparency.	
	Productivity of CPP and OPP is high and OPP film is used as high-grade wrapping material in place of cellophane.	HDPE is superior for very thin film.
Woven bags	Nonslip quality; stacked bags stay in place.	Weaving is difficult because of high stiffness and nonslip qualities.
Rope, net		Somewhat stiff.
Injection molded products	High stiffness.	
	High surface hardness.	
	Good gloss.	
	Good anti-creep properties.	Homopolymers have low impact strength.
	High hinge strength.	
	Shrinkage during molding is less than that of HDPE; this with low directionality bias facilitate molding.	Molding of large products is difficult.
	Reinforcement with glass fiber is possible.	
Blow molded products	Stretched blow molding is possible.	Processability of blow-molded products is generally difficult; inferior in impact strength.

毎年約２％づつ上昇し、それに対して、価格の影響は、価格差１％に対して、約０３％程度であることを示している。

従って、将来国産ポリエチレン価格が輸入ポリプロピレンよりも安くなったとしても、それだけでポリプロピレンの需要の多くの部分をポリエチレンに置き換えることは困難である。

しかしながら、表Ⅱ－１に示した用途分野の大部分は、日本においては以前に、またアメリカ、ヨーロッパにおいては現在でもポリエチレンが用いられている分野であり、理論上代替不可能の分野ではない。但し、ポリプロピレンをポリエチレンで代替することによって生ずる技術的問題点を解決することが必要である。さもなければ、供給不足によるポリプロピレンの需要減はあっても、それが直ちにポリエチレンの需要増には結び付かないことになる。

(2) ポリオレフィン中に占めるポリプロピレンの比率

ポリプロピレンの大きな需要分野であるフィルム、射出成形およびファイバー（スパン、フィルム）の３分野に関して、LDPE、HDPE、PP３樹脂の需要比率を、日本、アメリカおよび西ヨーロッパについて比較すると大よそ次のようになる（表Ⅱ－２参照）。

（単位：％）

	日本			アメリカ			西ヨーロッパ		
	LDPE	HDPE	PP	LDPE	HDPE	PP	LDPE	HDPE	PP
フィルム	59	18	23	90	5	5	91	4	5
射出成形	10	26	64	23	35	42	22	35	43
フィラメント・ファイバー	0	48	52	0	0	100	0	12	88

すなわち、日本においてはポリオレフィンの国内需要の３６％に相当するフィルム分野でポリプロピレンの需要はフィルム全体の２３％を占めており、アメリカ、西ヨーロッパの５％をはるかにこえている。タイ国においても既に述べたように、フィルム中に占めるポリプロピレンの比率はきわめて高い。従って、タイ国のポリプロピレンフィルムはＬＤＰＥフィルムによってかなり置換される可能性を示している。

射出成形品はポリオレフィンの需要のなかで、２７％（日本）、２０％（アメリカ）、２３％（西ヨーロッパ）を占めているが、そのうちで、ポリプロピレンの占める割合は、射出成形品全体のなかで、日本は６４％、アメリカは４２％、西ヨーロッパは４３％である。タイ国も日本と同様ポリプロピレンの占める比率が高く、将来LDPE、HDPEに置換される可能性を示している。

Table II–2 POLYETHYLENE AND POLYPROPYLENE CONSUMPTION IN MAJOR APPLICATION FIELD (1979)

(1) Japan

(Unit: 1,000 t/y)

	LDPE	HDPE	PP	Total
Blow Molding	49	119	25	193
Film	549	167	213	929
Coating	154	–	–	154
Wire and Cable	76	–	–	76
Injection Molding	67	178	441	686
Pipe	9	13	–	22
Fiber and Stretched Tape	1	116	127	244
Others	96	71	86	253
Domestic Consumption Total	1,001	665	892	2,558

Source: Association of Petrochemical Industries of Japan.

(continued)

(2) America

(Unit: 1,000 t/y)

	LDPE	HDPE	PP	Total
Blow Molding	26	764	28	818
Injection Molding	295	466	550	1,311
Extrusion Molding				
Coating	250	–	–	250
Film	1,941	102	123	2,166
Pipe	15	239	11	265
Sheet	13	30	15	58
Wire & Cable	191	59	5	255
Fiber & Filament	–	–	455	455
Others	36	20	28	84
Others	330	229	216	775
Domestic Consumption Total	3,097	1,914	1,431	6,442

(3) West Europe

(Unit: 1,000 t/y)

	LDPE	HDPE	PP	Total
Blow Molding	102	622	–	724
Film & Sheet	2,708	115	145	2,968
Coating	196	–	–	196
Injection Molding	329	513	633	1,475
Spun Fiber	–	–	155	155
Film Fiber	–	39	287	326
Pipe	122	89	–	211
Wire & Cable	167	10	–	177
Others	116	32	–	148
Total	3,740	1,424	1,220	6,384

Source: Modern Plastics International (Jan., 1980).

Table II–3 REQUISITE CONDITIONS FOR DEMAND FORECAST FOR POLYOLEFINS IN THAILAND

GDP Growth Rate	6.5 %/y
Average GDP (Bil. Baht) (at 1972 Price)	
1981 – 1990	435.7
1991 – 2000	817.9
GDP Elasticity	
1981 – 1990	1.2523
1991 – 2000	1.1217
Average Price of Polyolefins (at 1972 Prices)	8.3 Baht/kg

Source: Table II-29, Vol. II

フィラメント、延伸テープ、ファイバーはアメリカ、西ヨーロッパでは、マルチ・フィラメントが多く、ポリエチレンの代替は不可能であるが、日本では延伸テープ（ポリなわ、ウーブンバッグ）が多く用いられている。タイ国においても日本とほぼ同じ状況であるため、ポリプロピレンをＨＤＰＥに置き換えることはある程度可能と考えられる。

現在ポリオレフィン中に占めるポリプロピレンの比率は、日本４０％、アメリカ２２％、西ドイツ、フランス１５％（西ヨーロッパ平均２０％）（本文第Ⅱ編第１章１－１－１参照）で、タイ国は日本同様４０％を占めている。

タイ国で国産エチレンによるＬＤＰＥ、ＨＤＰＥが生産開始される１９８５年までは、ポリプロピレンは依然として輸入され、従来と同じ需要構造を維持するものと考えられるが、自後、ポリプロピレンに４０％以上の関税障壁を設け、適切なポリエチレンの価格政策（例えば政府による価格統制）と販売政策が奏功して、ポリエチレンによるポリプロピレンの代替が進んだ場合を想定して、タイ国の将来のポリプロピレンの需要比率を１９９０年に２０％まで下った場合を想定した[1]（表Ⅱ－３参照）。

１－１－２　ポリオレフィンの需要予測

(1)　ポリオレフィン

ポリエチレン（ＬＤＰＥ、ＨＤＰＥ）とポリプロピレンの合計について、実質ＧＤＰと実質価格とに関する弾力性分析を行なった。[2]

弾力性分析の結果は次の通りである。

$$\log Q = -11076 + 1.7349 \log \theta - 12626 \log P$$

ここに、　Ｑ：ポリオレフィンの需要量（1,000ｔ／ｙ）

θ：実質ＧＤＰ（10^9Baht）

Ｐ：実質価格（Baht／Kg）

（ＰＥとＰＰの荷重平均価格）

表Ⅱ－３は需要予測に必要な前提条件である。これに基づくポリオレフィンの需要予測の結果を表Ⅱ－４に示した。

(2)　ポリエチレン、ポリプロピレン

１９８５年まではポリエチレンもポリプロプレンも現在の需要の傾向がそのまま続くと仮定し、ポリオレフィン中のポリプロピレンの比率が１９９０年２０％と漸

1）タイ国におけるプロピレンの供給は、ＦＣＣプラント（ＴＯＲＣの増設を含む）によるものが約４万ｔで、将来、１０万ｔ程度が可能と考えられる。従って、１９９０年のポリプロピレンの需要を輸入も含めて約４８万ｔ、ポリオレフィン中の比率を２０％と想定した。

2）本文第Ⅱ編参照。

Table II—4 DEMAND FORECAST FOR POLYOLEFINS

	(Unit: 1,000 t/y)
1981	118.0
1982	127.7
1983	138.1
1984	149.5
1985	161.8
1986	175.0
1987	189.4
1988	204.9
1989	221.7
1990	239.9
1991	257.5
1992	276.4
1993	296.6
1994	318.3
1995	341.6
1996	366.6
1997	393.4
1998	422.2
1999	453.1
2000	486.3

次低くなるものとしてポリプロピレンの需要量を算出した。（表Ⅱ－5、図Ⅱ－3参照）。

ＬＤＰＥとＨＤＰＥの比率は、本文第Ⅱ編第１章表Ⅱ－３４と同じ数値を用いた。計算結果を表Ⅱ－６に示す。

2. エチレン誘導品プラント

本文では誘導品プラントの次期新増設が、国内に十分需要が喚起されてから（例えば、第Ⅱ期プラントが少くとも５０％稼動になった時点で）建設されることを前提としている。従って、誘導品の国内需給にはある程度のギャップを生じ、不足分を輸入でまかなうことになる。

しかし、エチレンの有効利用という観点から見て、最初は小規模の誘導品プラントの建設および増設は止むを得ないと考え、出来るだけ潜在需要を顕在化することを考慮した。

2－1　プラスチック材料

2－1－1　ポリエチレン

国内需要が誘導プラントの生産能力を超越した時点で、新増設プラントが稼動し、増設後のプラント稼動率が少なくとも７５％以上になるようにすると、タイ国の場合、ＬＤＰＥの最初のプラントが現在建設中の７3,０００t／y、ＨＤＰＥが３6,０００t／yといわれているので、前節の需要予測によれば必要の新増設計画は次のようになる。（図Ⅱ－１）。

（単位：1,０００t／y）

ＬＤＰＥ	１９８２	７３	第Ⅰ期新設プラント
	１９８７	３７	増　設
	１９９０	５０	〃
	１９９４	６０	}第Ⅱ期新設プラント
	１９９８	８０	
ＨＤＰＥ	１９８３	３６	第Ⅰ期新設プラント
	１９８５	１４	増　設（５万t含みで最初から建設）
	１９８８	２３	増　設
	１９９２	３７	}第Ⅱ期新設プラント
	１９９７	４０	

Table II–5 ESTIMATED CONSUMPTION PATTERN OF POLYETHYLENE AND POLYPROPYLENE

(Unit: %)

	LDPE	HDPE	PP	Total
1981	36	24	40	100
1982	36	24	40	100
1983	36	24	40	100
1984	36	24	40	100
1985	37	23	40	100
1986	40	24	36	100
1987	43	25	32	100
1988	45	27	28	100
1989	48	28	24	100
1990	50	30	20	100
1991	51	29	20	100
1992	52	28	20	100
1993	52	28	20	100
1994	52	28	20	100
1995	52	28	20	100
1996	52	28	20	100
1997	52	28	20	100
1998	52	28	20	100
1999	52	28	20	100
2000	52	28	20	100

Table II–6 DEMAND FORECAST FOR POLYETHYLENE AND POLYPROPYLENE

(Unit: 1,000 t/y)

	LDPE	HDPE	PP
1981	42.5	28.3	47.2
1982	46.0	30.6	51.1
1983	49.7	33.1	55.2
1984	53.8	35.9	59.8
1985	59.9	37.2	64.7
1986	70.0	42.0	63.0
1987	81.4	47.4	60.6
1988	92.2	55.3	57.4
1989	106.4	62.1	53.2
1990	120.0	72.0	48.0
1991	131.3	74.7	51.5
1992	143.7	77.4	55.3
1993	154.2	83.0	59.3
1994	165.5	89.1	63.7
1995	177.6	95.6	68.3
1996	190.6	102.6	73.3
1997	204.6	110.2	78.7
1998	219.5	118.2	84.4
1999	235.6	126.9	90.6
2000	252.9	136.2	97.3

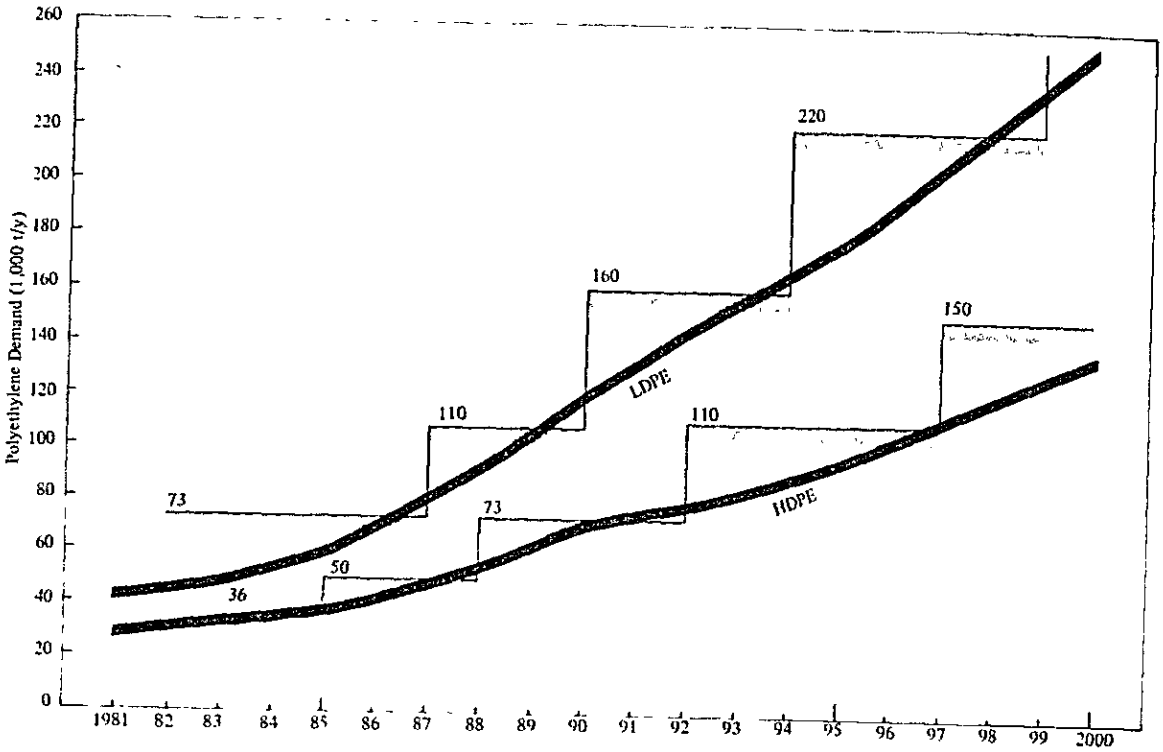


Fig. II–1 SUPPLY/DEMAND BALANCE OF POLYETHYLENE

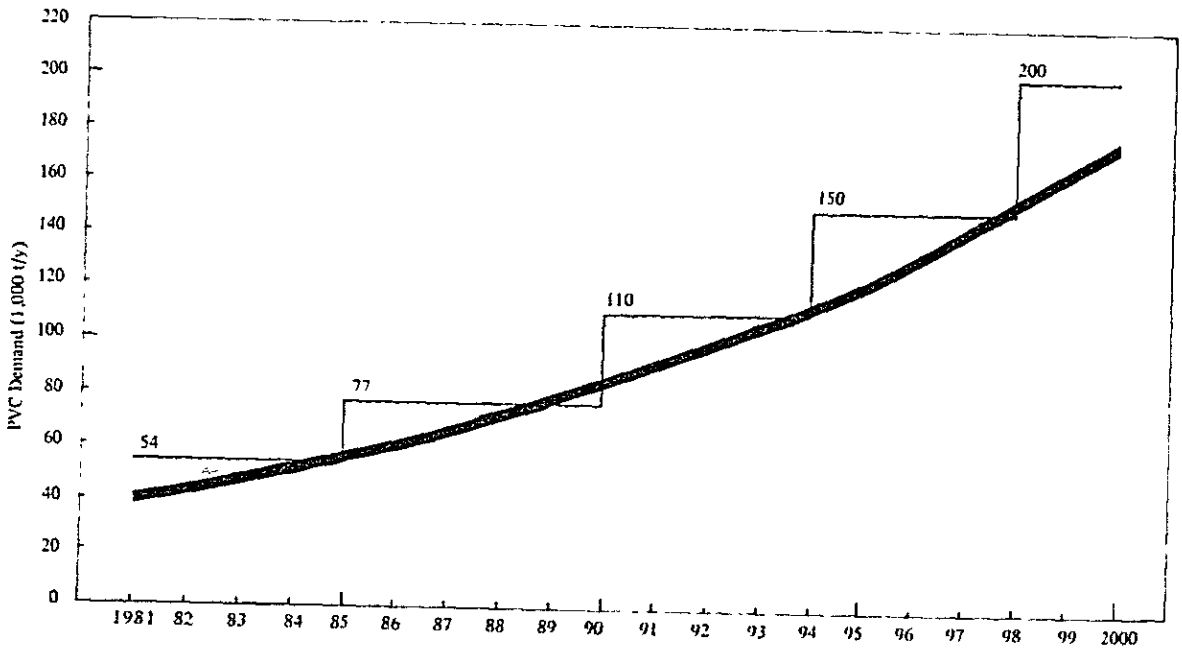


Fig. II–2 SUPPLY/DEMAND BALANCE OF PVC

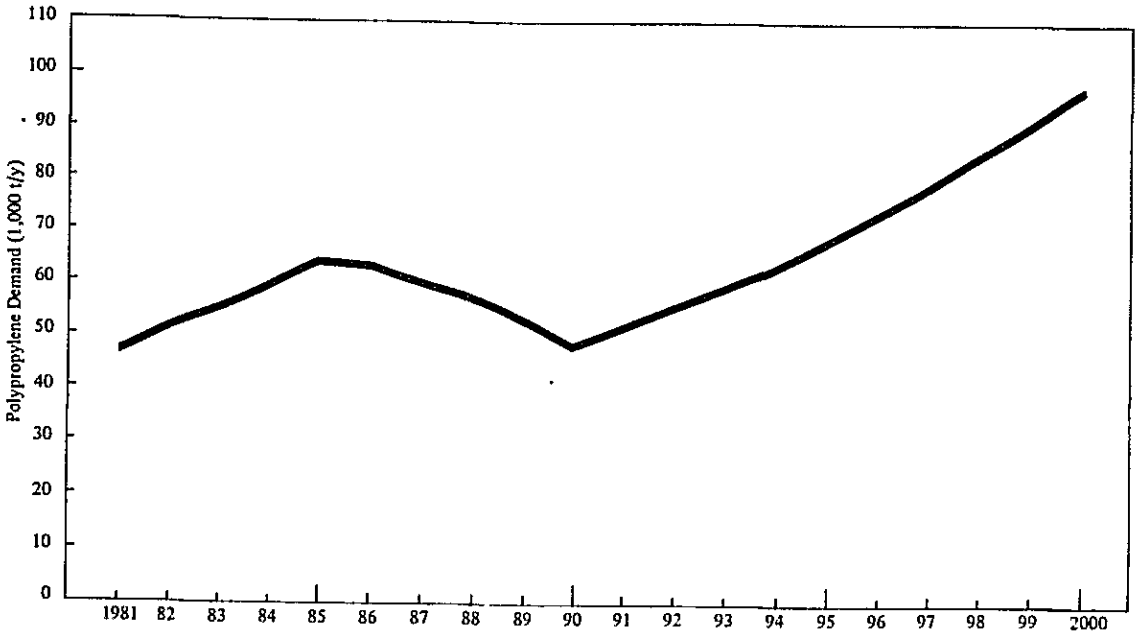


Fig. II–3 DEMAND FOR POLYPROPYLENE

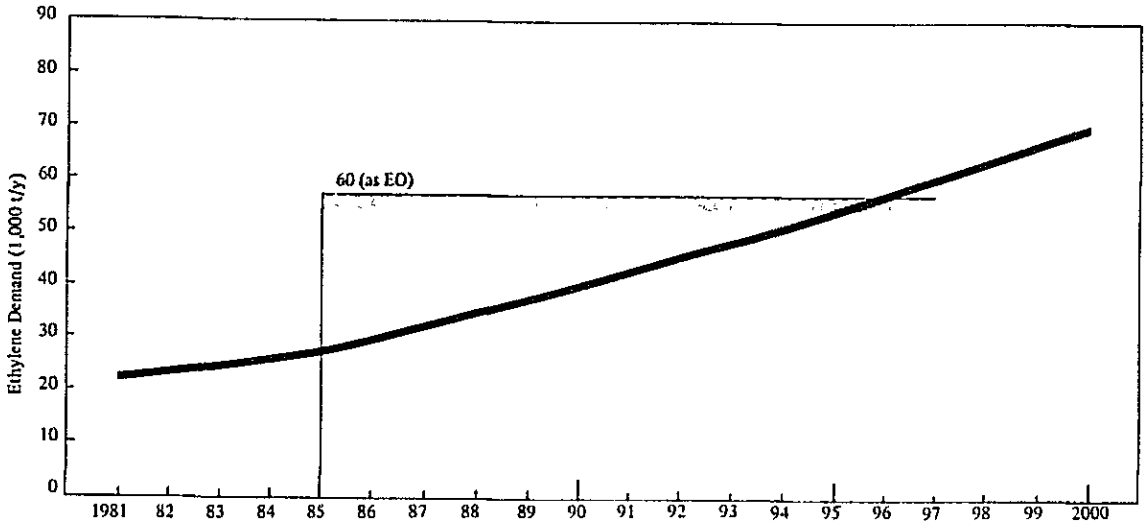


Fig. II–4 SUPPLY/DEMAND BALANCE OF ETHYLENE OXIDE

上記の増設計画のうち、ＬＤＰＥの3.7万ｔ／ｙと５万ｔ／ｙの新設はリアクターとペレタイザーの建設費が割高になるため実現性がかなり薄いものと考えられる。従って、次の第Ⅱ期新設プラントの建設を早め、その間既設プラントの手直し増設程度で補うということになろう。そのためにＬＤＰＥの国内需給ギャップが生ずることはある程度止むを得ないものと思われる。

ＨＤＰＥの場合は、ＬＤＰＥに比較して、リアクターとペレタイザーの建設費が大きくなく、現在でも３万ｔ／ｙ程度のプラント建設は最低経済単位ではないが、可能と考えられる。従って、上記のプログラムによるＨＤＰＥの新増設の実現性は高い。

２－１－２　Ｐ　Ｖ　Ｃ

本文第Ⅱ編第２章図Ⅱ－１５に示すように、韓国においては５万ｔ／ｙ程度の小刻み増設が過去に何回も実施されており、ほとんど国内需要は満たされている。輸入はペーストレジンなど極限られたグレードである。タイ国の場合には、前節と同じ考え方でＰＶＣの新増設を行うとすると次のようになる。

（単位：1,000ｔ／ｙ）

１９８４以前	５４	
１９８５	２３	増　設
１９９０	３３	〃
１９９５	４０	}第Ⅱ期新設プラント
１９９８	５０	

ＰＶＣの場合は比較的小形のプラントの増設が可能であるから、１９８５年の2.3万ｔ／ｙの増設は可能であり、１９９０年の３３万ｔ／ｙの増設も既存プラントのスクラップアンドビルドの形で実施することが可能であろう。

新規プラントまたは新規メーカーのタイ国のＰＶＣ業界への参入は１９９５年以降になるものと推定される。

２－２　エチレングリコール

現在新設のエチレンオキサイド／エチレングリコールプラントはその生産規模は最低１０万ｔ／ｙ、最大３０万ｔ／ｙといわれる。しかし、タイ国の場合、エチレンの有効利用という観点から見て、エチレンオキサイド換算６万ｔ／ｙ程度のプラントの建設が１９８５年に完了した場合を考えてみる（図Ⅱ－４）。

タイ国のエチレン・グリコールの需要は本調査団の予測によれば、１９８５年にエチレンオキサイド換算３万ｔ／ｙであるから、５０％稼動でスタートし、フル稼動にな

るのが１９９５年と１０年後である。仮に４万ｔ／ｙの生産能力でスタートしても、１９９１年には６万ｔ／ｙに増設しなければならぬことから、リアクターは始めから６万ｔ／ｙにして置くことが望ましく、蒸溜塔は生産量に応じて増加することが可能であろう。

６万ｔ／ｙのプラントを低負荷で運転する場合の問題点は、用役原単位がきわめて大きくなることで、設備償却費、金利が割高になることに加えて生産コストが高くなることは否めない。これをカバーするためには、供給するエチレン価格の設定に考慮を払う必要があろう。

3. エチレン需要量とエチレンプラントの生産能力

3－1　エチレン需要量

上述のように、誘導品プラントが逐次国内需要を満たすように建設されればエチレン需要量は表Ⅱ－７および図Ⅱ－５（Case Ⅱ）のようになる。すなわち、

（単位：1,000ｔ／ｙ）

１９８５	１５７
１９９０	２８４
１９９５	４０２
２０００	５６６

となる

3－2　エチレンプラントの生産能力

エチレンプラントの最低稼動率は５０％であるから、表Ⅱ－７から得られる１９８６年のエチレン需要量173,000ｔ／ｙに対し[1]、１９８５年央完成のエチレンプラントの最高可能生産能力は３５万ｔ／ｙである。

また、１９８５年にはエチレンプラントは５炉（または予備１炉を加えた）、２５万ｔ／ｙ前後とし、内需に合わせて逐次生産能力を増強することが望ましい。

1)　１９８５年央完成の場合、１９８５年は半年間の稼動であるため、この場合、１９８６年の生産量が基準になる。

Table II–7 ETHYLENE DEMAND

(Unit: 1,000 t/y)

	PE	PVC	Ethylene for EO	Ethylene Demand
1985	97.1	56.1	27.9	157.3
1986	112.0	61.0	30.0	177.5
1987	128.8	66.4	32.4	200.2
1988	147.5	72.2	34.8	225.1
1989	168.5	78.6	37.5	252.9
1990	191.9	85.6	40.4	283.8
1991	206.0	92.0	42.9	304.3
1992	221.1	99.0	45.6	326.3
1993	237.3	106.5	48.5	349.9
1994	254.6	114.5	51.6	375.0
1995	273.3	123.2	54.8	402.1
1996	293.3	132.5	57.6	430.5
1997	314.7	142.6	60.6	460.9
1998	337.8	153.4	63.7	493.6
1999	362.5	164.9	67.0	528.4
2000	389.0	177.4	70.5	565.9

Note: (Ethylene Demand) = (PE) x 1.05 + (PVC) x 0.49 + (Ethylene for EO).

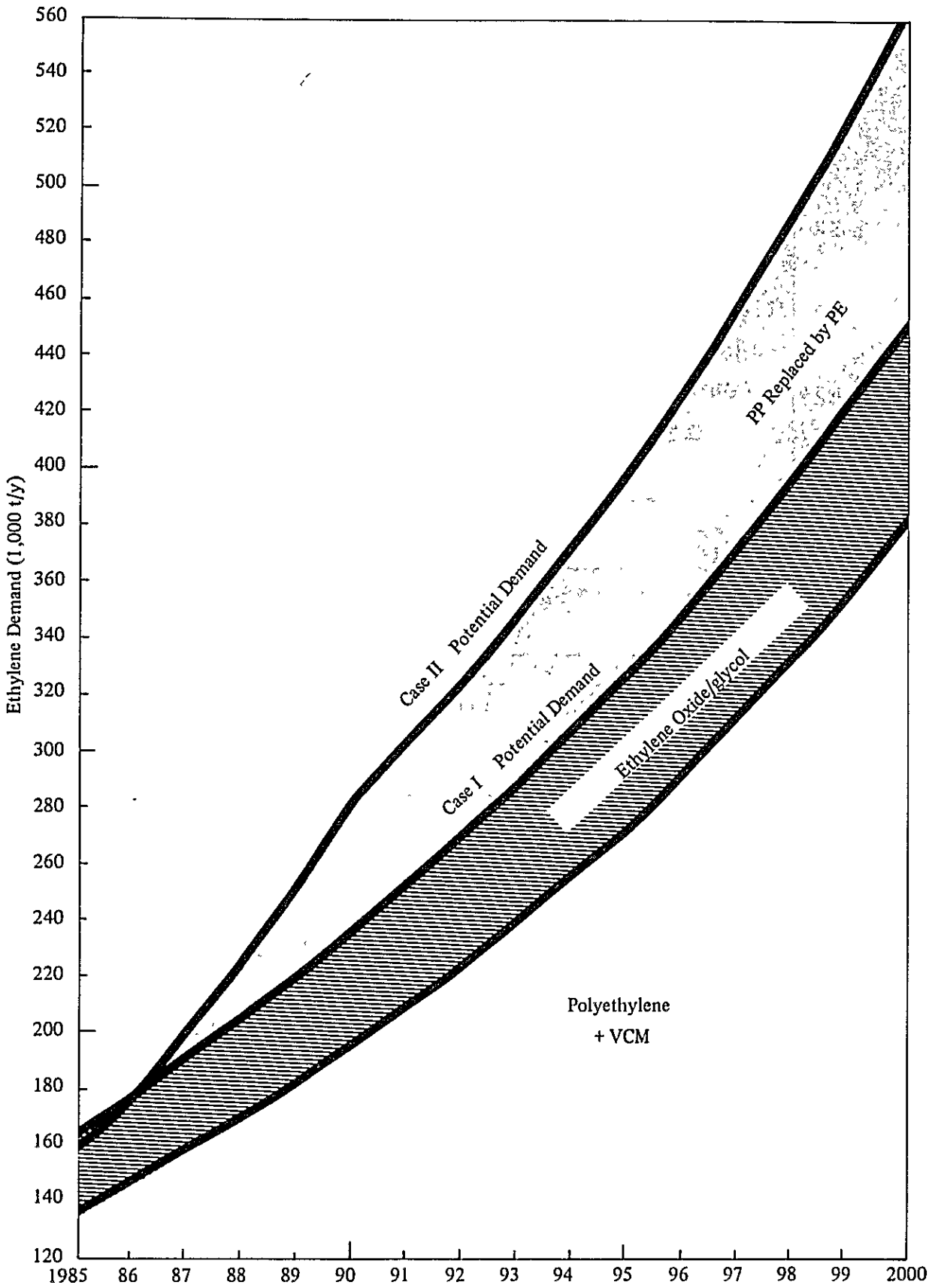


Fig. II—5 SUPPLY/DEMAND BALANCE FOR ETHYLENE

Ⅲ　技術的、財務的、経済的検討

1.　技術的検討

技術的検討の詳細は調査報告本文に記載されている。従って、ここでは、主として300,000MTAエチレンプラントの原料・用役バランス、および投資額の内訳を示すにとどめる。

1－1　原料・用役バランス

表Ⅲ－1に300,000MTAエチレンプラントの場合の原料・用役バランスを示す。350,000MTAエチレンプラントの場合は、300,000MTAエチレンプラントの場合に比べて原単位が変らないものとし、財務・経済分析に必要な原料・用役所要量を算出した。

1－2　投資額

総投資額は、次の通りである。

(US$ thousand in constant 1980 prices)

エチレンプラント規模	外　貨	内　貨	合　計
230,000MTA	153,775	79,988	233,763
300,000MTA	174,028	87,637	261,645
350,000MTA	186,126	93,910	280,336

表Ⅲ－2　に300,000MTAエチレンプラントの場合の投資額の内訳を示す。

2.　財務的、経済的検討

2－1　財務、経済的検討の基礎

財務的、経済的検討の前提条件は以下に明記されている条件を除き、調査報告本文に記載の通りである。

(1)　エチレンの生産および販売計画

本追加報告書、Ⅱ（市場調査）の結果に基づき、表Ⅲ－3の通りエチレンの生産販売計画を設定した。

Table III–1 ESTIMATED BLANCE AND REQUIREMENTS FOR RAW MATERIALS AND UTILITIES (ETHYLENE 300,000 MT/Y)

(Unit: MT/H) 8,000 hrs/year basis

Companies, Plants and Facilities / Requirements of Raw Materials and Utilities	Petrochemical Complex., Total																	
	Petroleum Authority of Thailand (PTT)												Outside of PTT					
		Utilities Center											Thai VCM Co.					
	Ethylene plant	Raw Water Claifier and Sand filter	Demineralizer	Polisher	Deaerator & BFW pump & Drivers	Cooling Water System	Portable Water	Steam & Power Generation	Instrument & Plant Air Generation	Air Separation	Utilities Center Sub-total	PTT Sub-total	VCM Plant	Chlor-Alkali Plant	Thai VCM Sub-total	HDPE Plant	Sub-total	Total (Supply from outside)
Ethylene	Δ37.5										–	Δ37.5	4.75		4.75		–	Δ32.75
VCM											–	–	Δ10.0		Δ10.0		Δ10.0	Δ10.0
Caustic Soda (as 100%)											–	–		Δ6.45	Δ6.45		Δ6 45	Δ6.45
Ethane	46.79										–	46.79					–	46.79
Salt											–	–		11.4	11.4		11.4	11.4
Chlorine											–	–	6.0	Δ6.0	–		–	–
Hydrochloric Acid											–	–	Δ0.9	0.9	–		–	–
Fuel Gas (MMBTu/H)	59.5							227.5			227.5	287					–	287
Raw Water		530									530	530					–	530
Power (KW)	1535	303	113	57		623	9	Δ3400		760	Δ1535	–	2367	17280	19647	5300	24947	24947
Steam, 42K	18				3.52	14 68		Δ48.54	3.64		Δ26.7	Δ8 7				8.7	8.7	–
Steam, 15K								Δ8.6			Δ8.6	Δ8.6	6.2	2.4	8.6		8.6	–
Steam, 2K					22.77	Δ14.68		Δ8.95	Δ3.64		Δ4.5	Δ4.5	4.5		4.5		4.5	–
Filtered Water		487.46	62.46			276	10				Δ139	Δ139	80	14	94	45	139	–
DMW			Δ49.97	40.17							Δ9.8	Δ9.8		9.8	9.8		9.8	–
Condensate	Δ166			166							166	–					–	–
Polished Water				Δ203.52	203.52						–	–					–	–
BFW	162				Δ229.71			67.71			Δ162	–					–	–
Portable Water	5						Δ10				Δ10	Δ5	2.5	2.5	5		5	–
Cooling Water	7780					Δ8280		350	50	100	Δ7780	–					–	–
Instr.&Plant Air (Nm^3/H)	1168	20	20	20	20	20		50	Δ2500	140	Δ2210	Δ1042	450	592	1042		1042	–
Oxygen (Nm^3/H)										Δ1050	Δ1050	Δ1050	1050		1050		1050	–
Inert Gas (Nm^3/H)	500									Δ1130	Δ1130	Δ630	200	20	220		220	Δ410
Catalysts Chemicals ($/H)	187	9	12	3		38					62	249	11	148	159		159	408

Note Δ = Generation or production.

Table III–2 CAPITAL COST ESTIMATE FOR PTT ETHYLENE PROJECT (300,000 MT/Y ETHYLENE PLANT)

(US$ thousand in constant 1980 prices)

	Ethylene			Tank Yard			Utilities Center			Offsite			Total		
	F.C[3]	L.C[4]	Total	F.C	L.C	Total	F.C	L.C	Total	F.C	L.C	Total	F.C	L.C	Total
FOB Equipment[1]	54,743	-	54,743	8,279	–	8,279	19,070	–	19,070	8,232	–	8,232	90,324	–	90,324
License, Basic & Detail Engineering, Project Management	18,046	–	18,046	605	–	605	2,186	–	2,186	2,093	–	2,093	22,930	–	22,930
Transportation	8,279	2,093	10,372	3,302	1,116	4,418	2,605	698	3,303	1,805	474	2,279	15,991	4,381	20,372
Supervising	4,744	698	5,442	814	116	930	1,860	279	2,139	814	116	930	8,232	1,209	9,441
Erection	3,298	11,679	14,977	1,065	4,098	5,163	1,553	5,981	7,534	721	2,581	3,302	6,637	24,339	30,976
Civil	2,056	10,874	12,930	56	409	465	595	3,033	3,628	2,770	15,141	17,911	5,477	29,457	34,934
Plant Cost (as erected)	91,166	25,344	116,510	14,121	5,739	19,860	27,869	9,991	37,880	16,435	18,312	34,747	149,591	59,386	208,977
Land Cost													–	373	373
Preoperation and Star-up Expenses													1,256	10,889	12,145
Interest during Construction													23,181	10,856	34,037
Total Fixed Capital													174,028	81,504	255,532
Initial Working Capital													–	6,133	6,113
Total Capital Investment													174,028	87,637	261,645

Notes: 1) Incld. spareparts and catalysts for 2 years operation
2) Incld inland transportation
3) Foreign currency portion
4) Local currency portion.

Table III—3 PRODUCTION AND SALES PLAN

	Ethylene plant capacity 300,000 MTA			Ethylene plant capacity 350,000 MTA			Ethylene plant capacity 230,000 MTA		
	Production	Sales	Inventory	Production	Sales	Inventory	Production	Sales	Inventory
1985	82,200	78,700	3,500	82,200	78,700	3,500	82,200	78,700	3,500
1986	177,500	177,500	3,500	177,500	177,500	3,500	177,500	177,500	3,500
1987	200,200	200,200	3,500	200,200	200,200	3,500	200,200	200,200	3,500
1988	225,100	225,100	3,500	225,100	225,100	3,500	225,100	225,100	3,500
1989	252,900	252,900	3,500	252,900	252,900	3,500	230,000	230,000	3,500
1990	283,800	283,800	3,500	283,800	283,800	3,500	230,000	230,000	3,500
1991	300,000	300,000	3,500	304,300	304,300	3,500	230,000	230,000	3,500
1992	300,000	300,000	3,500	326,300	326,300	3,500	230,000	230,000	3,500
1993	300,000	300,000	3,500	349,900	349,900	3,500	230,000	230,000	3,500
1994	300,000	300,000	3,500	350,000	350,000	3,500	230,000	230,000	3,500
1995	300,000	300,000	3,500	350,000	350,000	3,500	230,000	230,000	3,500
1996	300,000	300,000	3,500	350,000	350,000	3,500	230,000	230,000	3,500
1997	300,000	300,000	3,500	350,000	350,000	3,500	230,000	230,000	3,500
1998	300,000	300,000	3,500	350,000	350,000	3,500	230,000	230,000	3,500
1999	300,000	300,000	3,500	350,000	350,000	3,500	230,000	230,000	3,500

(2) エチレンおよびエタン価格

	財務分析	経済分析
エチレン	＄７００／t	＄６００／t
エタン	＄３００／t	＄２１０／t

(3) 資金ソースおよび金融条件[1)]

資本金／借入金比率 ： 全額借入金とする。

金　利 ：

長期借入金 ； 平均金利　９８％／年

短期借入金 ； 平均金利　１８％／年

返済期間 ：

長期借入金 ； 返済猶予期間３年を含め１３年とした。

短期借入金 ； 翌年

２－２　財務的、経済的検討の結果

財務分析の結果得られた財務諸表を付表として添付する。図Ⅲ－１は、財務的内部収益率および経済的内部収益率とエチレンプラントの生産能力との関係を図示したものである。財務的内部収益率には有意な差は認められない。

将来のエチレン需要に対して予想される機会ロス[2)]を考慮に入れると２３０,０００ＭＴＡプラントの経済的内部収益率は、３００,０００ＭＴＡおよび３５０,０００ＭＴＡプラントの場合に比べてかなり低下する。経済的内部収益率の計算結果を表Ⅲ－４，５，６に示す。

---

1) 昭和５６年３月５日、６日、バンコックでのＰＴＴとの打合せ時に表明されたＰＴＴの意向を考慮し、暫定的に仮定した。

2) 例えば２３０,０００ＭＴＡエチレンプラントの機会ロス（３５０,０００ＭＴＡエチレンプラントと比較した場合の）は次の方式によって算出した。

$$\sum_{m=1}^{15} (Qm - qm)(P_I - Pp)(E_s)$$

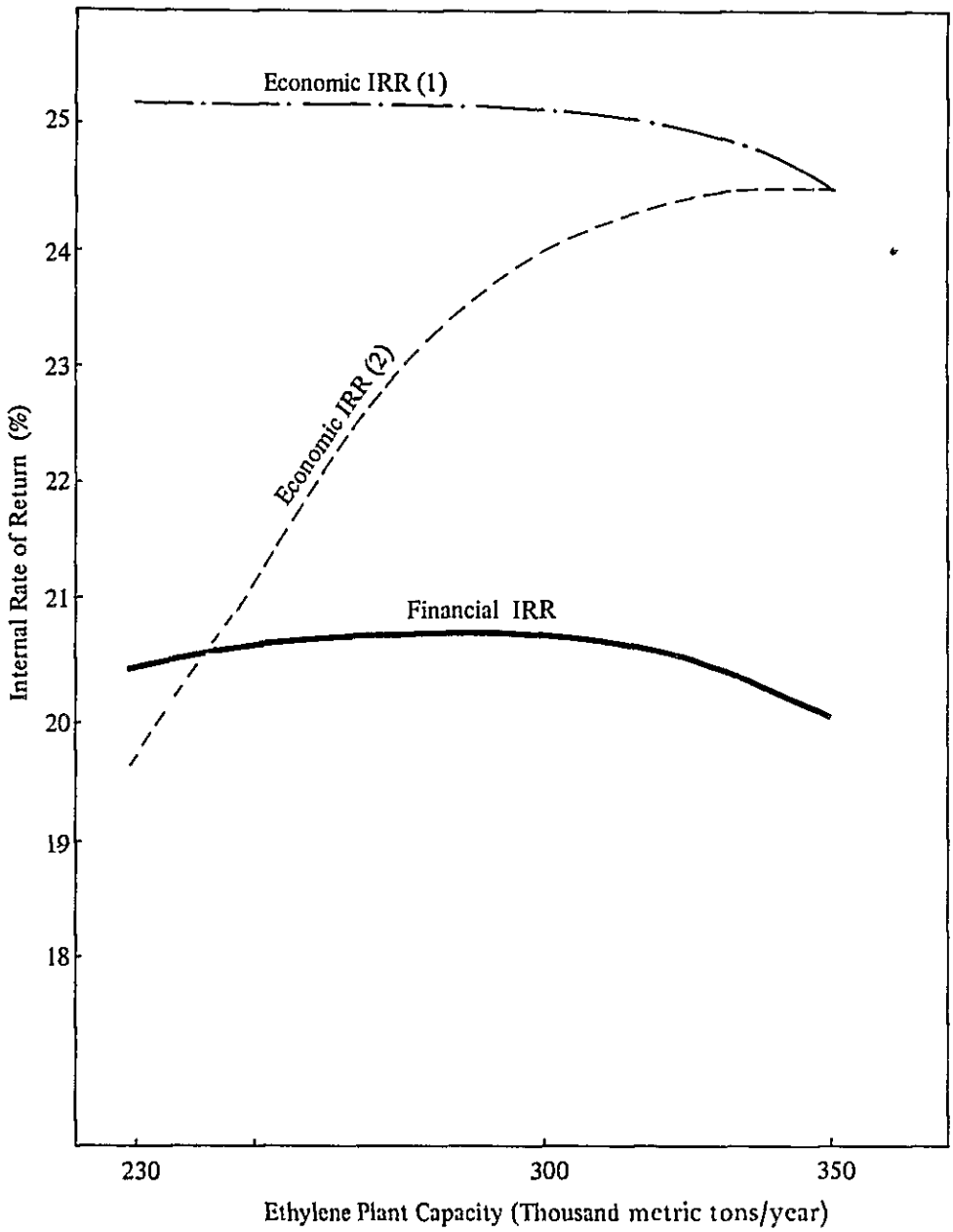
ここに、Qm：操業開始後第m年目の３５０,０００MTAプラントから実際に生産されるエチレン量(トン)

qm：操業開始後第m年目の２３０,０００MTAプラントから実際に生産されるエチレン量(トン)

P_I：輸入エチレン価格：＄１,０００／トンと仮定

Pp：生産されるエチレンのEconomic price、＄６００／トン

Es：Shadow exchange rate、(205)／(0791)＝2591Baht／＄



Note: 1) Opportunity loss is not taken into account
2) Opportunity loss is taken into account

Fig. III—1 COMPARISON OF INTERNAL RATE OF RETURN FOR DIFFERENT PRODUCTION CAPACITIES OF ETHYLENE PLANT

Table III—4 COMPARATIVE ECONOMIC INTERNAL RATE OF RETURN (230,000 MTA ETHYLENE PLANT)

(Unit: Million Baht)

	Economic Cost				Economic Benefit	Discount Factor	Present Value (Discount Rate = 0.192)	
	Capital Cost	Operating Cost	Opportunity Loss	Total			Economic Cost	Economic Benefit
1982	711			711		1.0000	711	
1983	1,611			1,611		0.8389	1,351	
1984	1,655			1,655		0.7038	1,165	
1985	938	622		1,560	1,224	0.5904	921	723
1986		1,416		1,416	2,760	0.4953	701	1,367
1987		1,568		1,568	3,113	0.4155	652	1,293
1988		1,734		1,734	3,500	0.3486	604	1,220
1989		1,761	237	1,998	3,577	0.2925	584	1,046
1990		1,761	558	2,319	35,77	0.2454	569	875
1991		1,761	770	2,531	3,577	0.2058	521	736
1992		1,761	998	2,759	3,577	0.1727	476	615
1993		1,761	1,243	3,004	3,577	0.1449	435	515
1994		1,761	1,244	3,005	3,577	0.1215	365	435
1995		1,756	1,244	3,000	3,577	0.1020	306	365
1996		1,750	1,244	2,994	3,577	0.0855	256	306
1997		1,750	1,244	2,994	3,577	0.0718	215	257
1998		1,750	1,244	2,994	3,577	0.0602	180	215
1999		1,750	1,244	2,994	3,731	0.0505	151	188
Total							10,163	≒10,165

Note. EIRR = 19.2%

Table III—5 COMPARATIVE ECONOMIC INTERNAL RATE OF RETURN (300,000 MTA ETHYLENE PLANT)

(Unit: Million Baht)

Year	Economic Cost				Economic Benefit	Discount Factor	Present Value (Discount Rate = 0.240)	
	Capital Cost	Operating Cost	Opportunity Loss	Total			Economic Cost	Economic Benefit
1982	797			797		1.0000	797	
1983	1,809			1,809		0.8065	1,459	
1984	1,860			1,860		0.6504	1,210	
1985	1,041	630		1,671	1,224	0.5245	876	642
1986		1,434		1,434	2,760	0.4230	607	1,167
1987		1,585		1,585	3,113	0.3411	541	1,062
1988		1,750		1,750	3,500	0.2751	481	963
1989		1,937		1,937	3,933	0.2218	430	872
1990		2,152		2,152	4,413	0.1789	385	789
1991		2,265	45	2,310	4,665	0.1443	333	673
1992		2,265	273	2,538	4,665	0.1164	295	543
1993		2,265	517	2,782	4,665	0.0938	261	438
1994		2,265	518	2,783	4,665	0.0757	211	353
1995		2,259	518	2,777	4,665	0.0610	169	285
1996		2,253	518	2,771	4,665	0.0492	136	230
1997		2,253	518	2,771	4,665	0.0397	110	185
1998		2,253	518	2,771	4,665	0.0320	89	149
1999		2,253	518	2,771	4,822	0.0258	71	124
Total							8,461	≒8,475

Note: EIRR = 24.0%

Table III–6 COMPARATIVE ECONOMIC INTERNAL RATE OF RETURN (350,000 MTA ETHYLENE PLANT)

(Unit: Million Baht)

	Economic Cost				Economic Benefit	Discount Factor	Present Value (Discount Rate = 0.245)	
	Capital Cost	Operating Cost	Opportunity Loss	Total			Economic Cost	Economic Benefit
1982	854			854		1.0000	854	
1983	1,938			1,938		0.8032	1,557	
1984	1,995			1,995		0.6451	1,287	
1985	1,110	637		1,747	1,224	0.5182	905	634
1986		1,451		1,451	2,760	0.4162	604	1,149
1987		1,602		1,602	3,113	0.3343	536	1,041
1988		1,767		1,767	3,500	0.2685	474	940
1989		1,954		1,954	3,933	0.2156	421	848
1990		2,170		2,170	4,413	0.1732	376	764
1991		2,313		2,313	4,732	0.1391	322	658
1992		2,467		2,467	5,074	0.1117	276	567
1993		2,632		2,632	5,441	0.0897	236	488
1994		2,633		2,633	5,443	0.0721	190	392
1995		2,626		2,626	5,443	0.0579	152	315
1996		2,620		2,620	5,443	0.0465	122	253
1997		2,620		2,620	5,443	0.0373	98	203
1998		2,620		2,620	5,443	0.0300	79	163
1999		2,620		2,620	5,601	0.0241	63	135
Total							8,552	≒8,550

Note: EIRR = 24.5%

付表Ⅲ－1

FINANCIAL STATEMENTS FOR 230,000 MTA ETHYLENE PLANT PROJECT

- Income Statement
- Fund Flow Statement
- Balance Sheet
- Production Cost Statement
- IRR Calculation on Total Investment
- Profitability and Financial Indicators

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
INCOME STATEMENTS (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION AND SALES											
CAPACITY	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.	230000.
CAPACITY UTILIZATION	0.357	0.772	0.870	0.979	1.000	1.000	1.000	1.000	1.000	1.000	1.000
PRODUCTION	82200.	177500.	200200.	225100.	230000.	230000.	230000.	230000.	230000.	230000.	230000.
INCREASE IN INVENTORIES	3500.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME	78700.	177500.	200200.	225100.	230000.	230000.	230000.	230000.	230000.	230000.	230000.
SALES REVENUE	55090.	124250.	140140.	157570.	161000.	161000.	161000.	161000.	161000.	161000.	161000.
COST OF SALES	45919.	101590.	110304.	120091.	121715.	121715.	121715.	121715.	121715.	121715.	110346.
VARIABLE COST	31464.	68598.	77311.	87098.	88722.	88722.	88722.	88722.	88722.	88722.	88722.
DEPRECIATION & AMORTIZATION	11369.	22737.	22737.	22737.	22737.	22737.	22737.	22737.	22737.	22737.	11369.
OTHER FIXED COST	5128.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.
(INC) IN PRODUCT INVENTORIES	-2042.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	9171.	22660.	29836.	37479.	39285.	39285.	39285.	39285.	39285.	39285.	50654.
LESS. SALES EXPENSES	959.	2028.	2206.	2402.	2434.	2434.	2434.	2434.	2434.	2434.	2207.
OPERATING PROFIT OR (LOSS)	8212.	20332.	27630.	35077.	36851.	36851.	36851.	36851.	36851.	36851.	48447.
LESS. INTEREST											
ON LONG TERM DEBT	11524.	22600.	21261.	19273.	16968.	14663.	12358.	10053.	7748.	5443.	3138.
ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	-3312.	-1768.	6350.	15805.	19883.	22188.	24493.	26798.	29103.	31408.	45309.
LESS. INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	-3312.	-1768.	6350.	15805.	19883.	22188.	24493.	26798.	29103.	31408.	45309.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
INCOME STATEMENTS (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1996	1997	1998	1999
PRODUCTION AND SALES				
CAPACITY	230000.	230000.	230000.	230000.
CAPACITY UTILIZATION	1.000	1.000	1.000	1.000
PRODUCTION	230000.	230000.	230000.	230000.
INCREASE IN INVENTORIES	0.	0.	0.	0.
SALES VOLUME	230000.	230000.	230000.	230000.
SALES REVENUE	161000.	161000.	161000.	161000.
COST OF SALES	98977.	98977.	98977.	98977.
VARIABLE COST	88722.	88722.	88722.	88722.
DEPRECIATION & AMORTIZATION	0.	0.	0.	0.
OTHER FIXED COST	10255.	10255.	10255.	10255.
(INC) IN PRODUCT INVENTORIES	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	62023.	62023.	62023.	62023.
LESS. SALES EXPENSES	1980.	1980.	1980.	1980.
OPERATING PROFIT OR (LOSS)	60043.	60043.	60043.	60043.
LESS. INTEREST				
ON LONG TERM DEBT	1283.	297.	0.	0.
ON SHORT TERM DEBT	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	56761.	59746.	60043.	60043.
LESS. INCOME TAX	0.	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	56761.	59746.	60043.	60043.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
FUNDS FLOW STATEMENTS (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
SOURCES OF FUNDS	34162.	79712.	79712.	64005.	48555.	51571.	59130.	59808.	59589.	59589.	59589.
CASH GENERATED FROM OPERATION	0.	0.	0.	19581.	43569.	50366.	57815.	59589.	59589.	59589.	59589.
PROFIT BEFORE TAX, INTEREST	0.	0.	0.	8212.	20832.	27630.	35077.	36851.	36851.	36851.	36851.
DEPRECIATION & AMORTIZATION	0.	0.	0.	11369.	22737.	22737.	22737.	22737.	22737.	22737.	22737.
FINANCIAL RESOURCES	34162.	79712.	79712.	40177.	0.	0.	0.	0.	0.	0.	0.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	34162.	79712.	79712.	40177.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN ACCT PAYABLE	0.	0.	0.	4248.	4966.	1203.	1321.	219.	0.	0.	0.
USES OF FUNDS	33958.	76973.	79060.	61253.	44232.	43001.	45239.	40854.	38039.	35734.	33429.
INVESTMENT IN FIXED ASSET	33958.	76973.	79060.	37758.	0.	0.	0.	0.	0.	0.	0.
LAND AND SITE IMPROVEMENT	373.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	27991.	65312.	65312.	27991.	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	1043.	1043.	3130.	5217.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	4550.	10618.	10618.	4550.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET OTHER THAN CASH	0.	0.	0.	10262.	10244.	2361.	2590.	510.	0.	0.	0.
INCR(DECR) ACCT RECEIVABLE	0.	0.	0.	7437.	9337.	2145.	2353.	463.	0.	0.	0.
INCR(DECR) IN INVENTORIES											
PRODUCTS	0.	0.	0.	2042.	0.	0.	0.	0.	0.	0.	0.
MATERIALS	0.	0.	0.	783.	906.	216.	237.	47.	0.	0.	0.
DEBT SERVICES	0.	0.	0.	13233.	33987.	40639.	42649.	40344.	38039.	35734.	33429.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	1708.	11387.	19359.	23376.	23376.	23376.	23376.	23376.
REPAYMNT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.	11524.	22600.	21281.	19273.	16968.	14663.	12358.	10053.
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)	205.	2739.	652.	2752.	4424.	8570.	13897.	18954.	21549.	23854.	26159.
BEGINNING CASH BALANCE	0.	205.	2944.	3596.	6348.	10672.	19242.	33139.	52093.	73642.	97497.
ENDING CASH BALANCE	205.	2944.	3596.	6348.	10672.	19242.	33139.	52093.	73642.	97497.	123656.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
FUNDS FLOW STATEMENTS (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1993	1994	1995	1996	1997	1998	1999
SOURCES OF FUNDS	59589.	59589.	59816.	60043.	60043.	60043.	60043.
CASH GENERATED FROM OPERATION	59589.	59589.	59816.	60043.	60043.	60043.	60043.
PROFIT BEFORE TAX, INTEREST	36851.	36851.	48447.	60043.	60043.	60043.	60043.
DEPRECIATION & AMORTIZATION	22737.	22737.	11369.	0.	0.	0.	0.
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	0.	0.	0.	0.	0.	0.	0.
USES OF FUNDS	31125.	28820.	24807.	13272.	4315.	0.	0.
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 OTHER THAN CASH	0.	0.	0.	0.	0.	0.	0.
INCR(DECR) ACCT RECEIVABLE	0.	0.	0.	0.	0.	0.	0.
INCR(DECR) IN INVENTORIES							
PRODUCTS	0.	0.	0.	0.	0.	0.	0.
MATERIALS	0.	0.	0.	0.	0.	0.	0.
DEBT SERVICES	31125.	28820.	24807.	13272.	4315.	0.	0.
REPAYMENT OF LONG TERM DEBT	23376.	23376.	21668.	11989.	4018.	0.	0.
REPAYMNT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	7748.	5443.	3138.	1283.	297.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	28464.	30769.	35009.	46772.	55729.	60043.	60043.
BEGINNING CASH BALANCE	123656.	152120.	182889.	217898.	264670.	320398.	380442.
ENDING CASH BALANCE	152120.	182889.	217898.	264670.	320398.	380442.	440485.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
BALANCE SHEET (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
ASSETS	34162.	113874.	193586.	232990.	224820.	213015.	206764.	203490.	202302.	203419.	206841.
CURRENT ASSETS	205.	2944.	3596.	16611.	31179.	42110.	58597.	78061.	99610.	123465.	149624.
CASH	205.	2944.	3596.	6348.	10672.	19242.	33139.	52093.	73642.	97497.	123656.
ACCOUNTS RECEIVABLE	0.	0.	0.	7437.	16774.	18919.	21272.	21735.	21735.	21735.	21735.
INVENTORIES											
PRODUCTS	0.	0.	0.	2042.	2042.	2042.	2042.	2042.	2042.	2042.	2042.
MATERIALS	0.	0.	0.	783.	1691.	1907.	2144.	2191.	2191.	2191.	2191.
NET FIXED ASSETS	33958.	110930.	189990.	216379.	193642.	170904.	148167.	125429.	102692.	79954.	57217.
INVESTMENT	33958.	110930.	189990.	227748.	227748.	227748.	227748.	227748.	227748.	227748.	227748.
LAND & SITE IMPROVEMENT	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.
CONSTRUCTED FACILITIES	27991.	93362.	159614.	186605.	186605.	186605.	186605.	186605.	186605.	186605.	186605.
PRE-INVEST. & START-UP EXP	1043.	2087.	5217.	10434.	10434.	10434.	10434.	10434.	10434.	10434.	10434.
INTEREST DURING CONSTRUCTN	4550.	15108.	25786.	30336.	30336.	30336.	30336.	30336.	30336.	30336.	30336.
LESS.DEPRECIATN & AMORTIZTN	0.	0.	0.	11369.	34106.	56844.	79581.	102319.	125056.	147794.	170531.
LIABILITIES	34162.	113874.	193586.	236302.	229901.	211746.	189691.	166533.	143157.	119781.	96405.
CURRENT LIABILITIES	0.	0.	1708.	15635.	28592.	33813.	35135.	35354.	35354.	35354.	35354.
ACCOUNTS PAYABLE	0.	0.	0.	4248.	9234.	10437.	11758.	11977.	11977.	11977.	11977.
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											
LONG TERM DEBT	0.	0.	1708.	11387.	19359.	23376.	23376.	23376.	23376.	23376.	23376.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	34162.	113874.	191878.	220667.	201309.	177932.	154556.	131180.	107803.	84427.	61051.
LONG TERM DEBT BALANCE	34162.	113874.	191878.	220667.	201309.	177932.	154556.	131180.	107803.	84427.	61051.
STOCK HOLDERS EQUITY	0.	0.	0.	-3312.	-5060.	1269.	17074.	36957.	59145.	83638.	110436.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RETAINED EARNING	0.	0.	0.	-3312.	-5060.	1269.	17074.	36957.	59145.	83638.	110436.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
BALANCE SHEET (FOR YEARS ENDING DECEMBER 31)
(CASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1993	1994	1995	1996	1997	1998	1999
ASSETS	212507.	220596.	244239.	291011.	346739.	406763.	466826.
CURRENT ASSETS	178068.	208857.	243866.	290638.	346366.	406410.	466453.
CASH	152120.	182809.	217898.	264670.	320398.	380442.	440485.
ACCOUNTS RECEIVABLE	21735.	21735.	21735.	21735.	21735.	21735.	21735.
INVENTORIES							
PRODUCTS	2042.	2042.	2042.	2042.	2042.	2042.	2042.
MATERIALS	2191.	2191.	2191.	2191.	2191.	2191.	2191.
NET FIXED ASSETS	34479.	11742.	373.	373.	373.	373.	373.
INVESTMENT	227748.	227748.	227748.	227748.	227748.	227748.	227748.
LAND & SITE IMPROVEMENT	373.	373.	373.	373.	373.	373.	373.
CONSTRUCTED FACILITIES	186605.	186605.	186605.	186605.	186605.	186605.	186605.
PRE-INVEST. & START-UP EXP	10434.	10434.	10434.	10434.	10434.	10434.	10434.
INTEREST DURING CONSTRUCTN	30336.	30336.	30336.	30336.	30336.	30336.	30336.
LESS.DEPRECIATN & AMORTIZTN	193269.	216006.	227375.	227375.	227375.	227375.	227375.
LIABILITIES	73026.	49652.	27984.	15995.	11977.	11977.	11977.
CURRENT LIABILITIES	35354.	33646.	23966.	15995.	11977.	11977.	11977.
ACCOUNTS PAYABLE	11977.	11977.	11977.	11977.	11977.	11977.	11977.
INCOME TAX PAYABLE	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT							
LONG TERM DEBT	23376.	21668.	11989.	4018.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	37675.	16007.	4018.	0.	0.	0.	0.
LONG TERM DEBT BALANCE	37675.	16007.	4018.	0.	0.	0.	0.
STOCK HOLDERS EQUITY	139539.	170946.	216255.	275016.	334762.	394805.	454849.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.
RETAINED EARNINGS	139539.	170946.	216255.	275016.	334762.	394805.	454849.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***

PRODUCTION COST STATEMENTS

(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION	82200.	177500.	200200.	225100.	230000.	230000.	230000.	230000.	230000.	230000.	230000.
ETHANE	30767.	66438.	74935.	84255.	86089.	86089.	86089.	86089.	86089.	86089.	86089.
CATALYSTS & CHEMICALS	575.	1243.	1401.	1576.	1610.	1610.	1610.	1610.	1610.	1610.	1610.
RAW MATERIAL COST	31343.	67681.	76336.	85831.	87699.	87699.	87699.	87699.	87699.	87699.	87699.
FUEL GAS (1)	2244.	4846.	5465.	6145.	6279.	6279.	6279.	6279.	6279.	6279.	6279.
FUEL GAS (2)	902.	1762.	1919.	2088.	2245.	2245.	2245.	2245.	2245.	2245.	2245.
RAW WATER (1)	76.	165.	186.	209.	214.	214.	214.	214.	214.	214.	214.
RAW WATER (2)	63.	122.	133.	145.	156.	156.	156.	156.	156.	156.	156.
UTILITIES SALE (TO VCM/MOPC)	-3164.	-6179.	-6730.	-7320.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.
UTILITIES COST	122.	717.	975.	1267.	1023.	1023.	1023.	1023.	1023.	1023.	1023.
VARIABLE COST	31464.	68398.	77311.	87098.	88722.	88722.	88722.	88722.	88722.	88722.	88722.
DEPRECIATION (PROCESS PLANT)	9330.	18660.	18660.	18660.	18660.	18660.	18660.	18660.	18660.	18660.	9330.
DEPRECIATION (PRE-INVEST)	522.	1043.	1043.	1043.	1043.	1043.	1043.	1043.	1043.	1043.	522.
DEPRECIATION (INTEREST DUR.)	1517.	3034.	3034.	3034.	3034.	3034.	3034.	3034.	3034.	3034.	1517.
DEPRECIATION	11369.	22737.	22737.	22737.	22737.	22737.	22737.	22737.	22737.	22737.	11369.
AMORTIZATION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEPRECIATION & AMORTIZATION	11369.	22737.	22737.	22737.	22737.	22737.	22737.	22737.	22737.	22737.	11369.
LABOR COST	465.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.
OVERHEAD	465.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.
EMPLOYMENT COST	929.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.
MAINTENANCE COST	2799.	5598.	5598.	5598.	5598.	5598.	5598.	5598.	5598.	5598.	5598.
TAX & INSURANCE	1400.	2799.	2799.	2799.	2799.	2799.	2799.	2799.	2799.	2799.	2799.
OTHER FIXED COST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIRECT FIXED COST	5128.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.	10255.
EX-FACTORY PRODUCTION COST	47901.	101390.	110304.	120091.	121715.	121715.	121715.	121715.	121715.	121715.	110346.
UNIT DIRECT OPERATING COST	0.5825	0.5712	0.5510	0.5335	0.5292	0.5292	0.5292	0.5292	0.5292	0.5292	0.4798
HEAD OFFICE EXP.	959.	2028.	2206.	2402.	2434.	2434.	2434.	2434.	2434.	2434.	2207.
INTEREST ON LOAN NO.1	1664.	3116.	2779.	2442.	2105.	1768.	1432.	1095.	758.	421.	84.
INTEREST ON LOAN NO.2	3930.	7603.	6877.	6091.	5305.	4519.	3733.	2947.	2161.	1375.	589.
INTEREST ON LOAN NO.3	3930.	7860.	7663.	6877.	6091.	5305.	4519.	3733.	2947.	2161.	1375.
INTEREST ON LOAN NO.4	1684.	3368.	3368.	3284.	2947.	2611.	2274.	1937.	1600.	1263.	926.
INTEREST ON LOAN NO.5	297.	593.	593.	578.	519.	460.	400.	341.	282.	222.	163.
INTEREST ON LONG-TERM DEBT	11524.	22600.	21281.	19273.	16968.	14663.	12358.	10053.	7748.	5443.	3138.
INTEREST ON SHORT-TERM DEBT	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
TOTAL PRODUCTION COST	60445.	126018.	122790.	141765.	141117.	138812.	136507.	134202.	131897.	129592.	115691.
UNIT PRODUCTION COST	0.7353	0.7100	0.6663	0.6298	0.6136	0.6035	0.5935	0.5835	0.5735	0.5634	0.5030

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
PRODUCTION COST STATEMENTS
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1996	1997	1998	1999
PRODUCTION	230000.	230000.	230000.	230000.
ETHANE	86089.	86089.	86089.	86089.
CATALYSTS & CHEMICALS	1610.	1610.	1610.	1610.
RAW MATERIAL COST	87699.	87699.	87699.	87699.
FUEL GAS (1)	6279.	6279.	6279.	6279.
FUEL GAS (2)	2245.	2245.	2245.	2245.
RAW WATER (1)	214.	214.	214.	214.
RAW WATER (2)	156.	156.	156.	156.
UTILITIES SALE (TO VCM/HDPE)	-7871.	-7871.	-7871.	-7871.
UTILITIES COST	1023.	1023.	1023.	1023.
VARIABLE COST	88722.	88722.	88722.	88722.
DEPRECIATION (PROCESS PLANT)	0.	0.	0.	0.
DEPRECIATION (PRE-INVEST)	0.	0.	0.	0.
DEPRECIATION (INTEREST CON.)	0.	0.	0.	0.
DEPRECIATION	0.	0.	0.	0.
AMORTIZATION	0.	0.	0.	0.
DEPRECIATION & AMORTIZATION	0.	0.	0.	0.
LABOR COST	929.	929.	929.	929.
OVERHEAD	929.	929.	929.	929.
EMPLOYMENT COST	1858.	1858.	1858.	1858.
MAINTENANCE COST	5598.	5598.	5598.	5598.
TAX & INSURANCE	2799.	2799.	2799.	2799.
OTHER FIXED COST	0.	0.	0.	0.
DIRECT FIXED COST	10255.	10255.	10255.	10255.
EX-FACTORY PRODUCTION COST	98977.	98977.	98977.	98977.
UNIT DIRECT OPERATING COST	0.4303	0.4303	0.4303	0.4303
HEAD OFFICE EXP.	1980.	1980.	1980.	1980.
INTEREST ON LOAN NO.1	0.	0.	0.	0.
INTEREST ON LOAN NO.2	0.	0.	0.	0.
INTEREST ON LOAN NO.3	569.	0.	0.	0.
INTEREST ON LOAN NO.4	565.	253.	0.	0.
INTEREST ON LOAN NO.5	104.	44.	0.	0.
INTEREST ON LONG-TERM DEBT	1263.	297.	0.	0.
INTEREST ON SHORT-TERM DEBT	0.	0.	0.	0.
TOTAL PRODUCTION COST	102239.	101154.	100957.	100957.
UNIT PRODUCTION COST	0.4445	0.4402	0.4389	0.4389

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
IRR CALCULATION ON TOTAL INVESTMENT
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATION	INTEREST ON L-T DEBT	RETURN BEFORE TAX	DISCOUNT FACTOR	(BEFORE TAX) PRESENT VALUE INVEST.	(BEFORE TAX) PRESENT VALUE RETURN	(LESS) INCOME TAX	RETURN AFTER TAX	DISCOUNT FACTOR	(AFTER TAX) PRESENT VALUE INVEST.	(AFTER TAX) PRESENT VALUE RETURN
1982	29407.	0.	0.	0.	0.	1.0000	29407.	0.	0.	0.	1.0000	29407.	0.
1983	66355.	0.	0.	0.	0.	0.8302	55085.	0.	0.	0.	0.8302	55085.	0.
1984	68442.	0.	0.	0.	0.	0.6892	47167.	0.	0.	0.	0.6892	47167.	0.
1985	39222.	-3312.	11369.	11524.	19581.	0.5721	22439.	11202.	0.	19581.	0.5721	22439.	11202.
1986	0.	-1768.	22737.	22600.	43569.	0.4749	0.	20693.	0.	43569.	0.4749	0.	20693.
1987	0.	6350.	22737.	21281.	50368.	0.3943	0.	19859.	0.	50368.	0.3943	0.	19859.
1988	0.	15805.	22737.	19273.	57815.	0.3273	0.	18923.	0.	57815.	0.3273	0.	18923.
1989	0.	19863.	22737.	16968.	59569.	0.2717	0.	16191.	0.	59589.	0.2717	0.	16191.
1990	0.	22188.	22737.	14663.	59589.	0.2256	0.	13441.	0.	59589.	0.2256	0.	13441.
1991	0.	24493.	22737.	12358.	59589.	0.1873	0.	11158.	0.	59589.	0.1873	0.	11158.
1992	0.	26798.	22737.	10053.	59589.	0.1555	0.	9263.	0.	59589.	0.1555	0.	9263.
1993	0.	29103.	22737.	7748.	59589.	0.1290	0.	7690.	0.	59569.	0.1290	0.	7690.
1994	0.	31408.	22737.	5443.	59589.	0.1071	0.	6384.	0.	59589.	0.1071	0.	6384.
1995	0.	45309.	11369.	3136.	59816.	0.0889	0.	5320.	0.	59816.	0.0889	0.	5320.
1996	0.	58761.	0.	1283.	60043.	0.0738	0.	4433.	0.	60043.	0.0738	0.	4433.
1997	0.	59746.	0.	297.	60043.	0.0613	0.	3680.	0.	60043.	0.0613	0.	3680.
1998	0.	60043.	0.	0.	60043.	0.0509	0.	3055.	0.	60043.	0.0509	0.	3055.
1999	-6388.	60043.	0.	0.	60043.	0.0422	-270.	2536.	0.	60043.	0.0422	-270.	2536.
TOTAL	157039.				828853.		153829.	153829.		828853.		153829.	153829.

***** INTERNAL RATE OF RETURN ***** 20.46 PER CENT (BEFORE TAX) 20.46 PER CENT (AFTER TAX)

***** PAY-OUT PERIOD ***** 5.05 YEAR (BEFORE TAX) 5.05 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 COST	573.	OWN CAPITAL	0.
PLANT COST	186605.	LONG TERM DEBT	233763.
PRE-INVEST AND START-UP EXP.	10434.	SHORT TERM DEBT	0.
INTEREST DURING CONSTRUCTION	30336.	FINANCIAL RESOURCES	233763.
TOTAL FIXED CAPITAL	227748.		
INITIAL WORKING CAPITAL	6015.		
TOTAL CAPITAL COST	233763.		

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
PROFITABILITY AND FINANCIAL INDICATORS
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

YEAR	(1) AFT TAX PROFIT -TD- SALES REV (PCT)	(2) AFT TAX PROFIT -TC- S/H EQUITY (PCT)	(3) BFR TAX PROFIT -TC- INVESTMNT (PCT)	(4) AFT TAX PROFIT -TD- S/CAPITAL (PCT)	(5) CURRENT RATIO	(6) QUICK RATIO	(7) DEBT SERVICE RATIO	(8) L/T DEBT -TD- 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	-6.0	100.0	-1.4	*******	1.06	0.98	1.48	102./ -2.	39.9	645.3	26.1
1986	-1.4	34.8	-0.8	*******	1.09	0.96	1.28	103./ -3.	79.7	646.0	63.4
1987	4.5	500.3	2.7	*******	1.25	1.13	1.24	99./ 1.	77.9	651.4	73.1
1988	10.0	92.6	6.8	*******	1.67	1.55	1.36	90./ 10.	75.1	632.6	76.1
1989	12.3	53.8	8.5	*******	2.21	2.09	1.48	78./ 22.	71.5	616.3	72.4
1990	13.8	37.5	9.5	*******	2.82	2.70	1.57	65./ 35.	68.2	606.3	69.1
1991	15.2	29.3	10.5	*******	3.49	3.37	1.67	50./ 50.	64.9	596.3	65.8
1992	16.6	24.3	11.5	*******	4.23	4.11	1.78	36./ 64.	61.6	586.3	62.5
1993	18.1	20.9	12.4	*******	5.04	4.92	1.91	21./ 79.	58.3	576.2	59.2
1994	19.5	18.4	13.4	*******	6.21	6.08	2.07	9./ 91.	55.0	566.2	55.9
1995	28.1	21.0	19.4	*******	10.18	10.00	2.41	2./ 98.	35.3	547.8	50.0
1996	36.5	21.4	25.1	*******	18.17	17.91	4.52	0./100.	16.4	496.6	33.5
1997	37.1	17.8	25.6	*******	28.92	28.56	13.92	0./100.	15.0	457.7	20.7
1998	37.3	15.2	25.7	*******	33.93	33.58	**********	0./100.	14.6	438.9	14.6
1999	37.3	13.2	25.7	*******	38.94	38.59	**********	0./100.	14.6	438.9	14.6
AVERAGE1	16.5	66.7	13.0	*******	10.61	10.43	**********	44./ 56.	49.9	566.9	50.5
AVERAGE2	23.2	15.7	15.0	*******	6.86	6.71	2.18	34./ 66.			

(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.

付表Ⅲ－2

FINANCIAL STATEMENTS FOR 300,000 MTA ETHYLENE PLANT PROJECT

- Income Statement
- Fund Flow Statement
- Balance Sheet
- Production Cost Statement
- IRR Calculation on Total Investment
- Profitability and Financial Indicators

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
INCOME STATEMENTS (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION AND SALES											
CAPACITY	300000.	300000.	300000.	300000.	300000.	300000.	300000.	300000.	300000.	300000.	300000.
CAPACITY UTILIZATION	0.274	0.592	0.667	0.750	0.843	0.946	1.000	1.000	1.000	1.000	1.000
PRODUCTION	82200.	177500.	200200.	225100.	252900.	283800.	300000.	300000.	300000.	300000.	300000.
INCREASE IN INVENTORIES	3500.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME	78700.	177500.	200200.	225100.	252900.	283800.	300000.	300000.	300000.	300000.	300000.
SALES REVENUE	55090.	124250.	140140.	157570.	177030.	198660.	210000.	210000.	210000.	210000.	210000.
COST OF SALES	47544.	104755.	113614.	123342.	134279.	146860.	153456.	153456.	153456.	153456.	140698.
VARIABLE COST	31270.	67977.	76637.	86565.	97501.	110082.	116678.	116678.	116678.	116678.	116678.
DEPRECIATION & AMORTIZATION	12750.	25516.	25516.	25516.	25516.	25516.	25516.	25516.	25516.	25516.	12758.
OTHER FIXED COST	5631.	11262.	11262.	11262.	11262.	11262.	11262.	11262.	11262.	11262.	11262.
(INC) IN PRODUCT INVENTORIES	-2114.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	7546.	19495.	26526.	34228.	42751.	51800.	56544.	56544.	56544.	56544.	69302.
LESS. SALES EXPENSES	993.	2095.	2272.	2467.	2686.	2937.	3069.	3069.	3069.	3069.	2814.
OPERATING PROFIT OR (LOSS)	6553.	17400.	24253.	31761.	40066.	48863.	53475.	53475.	53475.	53475.	66488.
LESS. INTEREST											
ON LONG TERM DEBT	12099.	25294.	23814.	21563.	18963.	16403.	13823.	11244.	8664.	6084.	3504.
ON SHORT TERM DEBT	0.	0.	523.	751.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	-5546.	-7894.	-483.	9446.	21103.	32460.	39652.	42231.	44811.	47391.	62984.
LESS. INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	-5546.	-7894.	-483.	9446.	21103.	32460.	39652.	42231.	44811.	47391.	62984.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
INCOME STATEMENTS (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1996	1997	1998	1999
PRODUCTION AND SALES				
CAPACITY	300000.	300000.	300000.	300000.
CAPACITY UTILIZATION	1.000	1.000	1.000	1.000
PRODUCTION	300000.	300000.	300000.	300000.
INCREASE IN INVENTORIES	0.	0.	0.	0.
SALES VOLUME	300000.	300000.	300000.	300000.
SALES REVENUE	210000.	210000.	210000.	210000.
COST OF SALES	127940.	127940.	127940.	127940.
VARIABLE COST	116676.	116676.	116676.	116676.
DEPRECIATION & AMORTIZATION	0.	0.	0.	0.
OTHER FIXED COST	11262.	11262.	11262.	11262.
(INC) IN PRODUCT INVENTORIES	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	82060.	82060.	82060.	82060.
LESS. SALES EXPENSES	2559.	2559.	2559.	2559.
OPERATING PROFIT OR (LOSS)	79501.	79501.	79501.	79501.
LESS. INTEREST				
ON LONG TERM DEBT	1426.	326.	0.	0.
ON SHORT TERM DEBT	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	78075.	79175.	79501.	79501.
LESS. INCOME TAX	0.	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	78075.	79175.	79501.	79501.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
FUNDS FLOW STATEMENTS (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
SOURCES OF FUNDS	38330.	89436.	89436.	67975.	52997.	55140.	58590.	67058.	76077.	79881.	78991.
CASH GENERATED FROM OPERATION	0.	0.	0.	19311.	42916.	49769.	57277.	65582.	74379.	78991.	78991.
PROFIT BEFORE TAX, INTEREST	0.	0.	0.	6553.	17400.	24253.	31761.	40066.	48863.	53475.	53475.
DEPRECIATION & AMORTIZATION	0.	0.	0.	12758.	25516.	25516.	25516.	25516.	25516.	25516.	25516.
FINANCIAL RESOURCES	38330.	89436.	89436.	44443.	5120.	4175.	0.	0.	0.	0.	0.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	38330.	89436.	89436.	44443.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	5120.	4175.	0.	0.	0.	0.	0.
INCREASE IN ACCT PAYABLE	0.	0.	0.	4221.	4955.	1196.	1313.	1476.	1698.	890.	0.
USES OF FUNDS	38040.	86269.	88698.	67675.	48315.	53944.	55244.	48040.	45782.	41673.	37408.
INVESTMENT IN FIXED ASSET	38040.	86269.	88698.	42525.	0.	0.	0.	0.	0.	0.	0.
LAND AND SITE IMPROVEMENT	373.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	31347.	73142.	73142.	31347.	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	1215.	1215.	3644.	6073.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCT.	5106.	11913.	11913.	5106.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET											
OTHER THAN CASH	0.	0.	0.	10335.	10244.	2361.	2590.	2892.	3214.	1685.	0.
INCR(DECR) ACCT RECEIVABLE	0.	0.	0.	7437.	9337.	2145.	2353.	2627.	2920.	1531.	0.
INCR(DECR) IN INVENTORIES											
PRODUCTS	0.	0.	0.	2114.	0.	0.	0.	0.	0.	0.	0.
MATERIALS	0.	0.	0.	783.	908.	216.	237.	265.	294.	154.	0.
DEBT SERVICES	0.	0.	0.	14816.	38071.	51563.	52654.	45148.	42568.	39988.	37408.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	1916.	12777.	21720.	26165.	26165.	26165.	26165.	26165.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	5126.	4175.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.	12899.	25294.	23814.	21563.	18983.	16403.	13823.	11244.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	523.	751.	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)	290.	3167.	738.	300.	4682.	1196.	3346.	15019.	30295.	38208.	41583.
BEGINNING CASH BALANCE	0.	290.	3457.	4195.	4495.	9177.	10373.	13719.	32737.	63032.	101241.
ENDING CASH BALANCE	290.	3457.	4195.	4495.	9177.	10373.	13719.	32737.	63032.	101241.	142823.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
FUNDS FLOW STATEMENTS (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1993	1994	1995	1996	1997	1998	1999
SOURCES OF FUNDS	78991.	78991.	79246.	79501.	79501.	79501.	79501.
CASH GENERATED FROM OPERATION	78991.	78991.	79246.	79501.	79501.	79501.	79501.
PROFIT BEFORE TAX, INTEREST	53475.	53475.	66488.	79501.	79501.	79501.	79501.
DEPRECIATION & AMORTIZATION	25516.	25516.	12758.	0.	0.	0.	0.
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	0.	0.	0.	0.	0.	0.	0.
USES OF FUNDS	34826.	32248.	27752.	14816.	4773.	0.	0.
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 OTHER THAN CASH	0.	0.	0.	0.	0.	0.	0.
INCREASE(DECR) ACCT RECEIVABLE	0.	0.	0.	0.	0.	0.	0.
INCREASE(DECR) IN INVENTORIES							
PRODUCTS	0.	0.	0.	0.	0.	0.	0.
MATERIALS	0.	0.	0.	0.	0.	0.	0.
DEBT SERVICES	34826.	32248.	27752.	14816.	4773.	0.	0.
REPAYMENT OF LONG TERM DEBT	26165.	26165.	24246.	13368.	4444.	0.	0.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	8661.	6083.	3504.	1448.	329.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	44165.	46742.	51494.	64685.	74728.	79501.	79501.
BEGINNING CASH BALANCE	140865.	185030.	233772.	285222.	349907.	424636.	504137.
ENDING CASH BALANCE	185030.	231772.	285222.	349907.	424636.	504137.	583638.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
BALANCE SHEET (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
ASSETS	38330.	127766.	217202.	257604.	247014.	225056.	205476.	201870.	209804.	224242.	240308.
CURRENT ASSETS	290.	3457.	4195.	14630.	29756.	35313.	39249.	61160.	94669.	134563.	176146.
CASH	290.	3457.	4195.	4495.	9177.	10373.	13719.	32737.	63032.	101241.	142823.
ACCOUNTS RECEIVABLE	0.	0.	0.	7437.	16774.	18919.	21272.	23899.	26819.	28350.	28350.
INVENTORIES											
PROJECTS	0.	0.	0.	2114.	2114.	2114.	2114.	2114.	2114.	2114.	2114.
MATERIALS	0.	0.	0.	703.	1691.	1907.	2144.	2409.	2703.	2858.	2858.
NET FIXED ASSETS	38040.	124309.	213007.	242774.	217258.	191742.	166226.	140710.	115195.	89679.	64163.
INVESTMENT	38040.	124309.	213007.	255532.	255532.	255532.	255532.	255532.	255532.	255532.	255532.
LAND & SITE IMPROVEMENT	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.
CONSTRUCTED FACILITIES	31347.	104486.	177630.	208977.	208977.	208977.	208977.	208977.	208977.	208977.	208977.
PRE-INVEST. & START-UP EXP	1215.	2429.	6073.	12145.	12145.	12145.	12145.	12145.	12145.	12145.	12145.
INTEREST DURING CONSTRUCTN	5106.	17018.	26931.	34037.	34037.	34037.	34037.	34037.	34037.	34037.	34037.
LESS:DEPRECIATN & AMORTIZTN	0.	0.	0.	12758.	38274.	63790.	89306.	114822.	140337.	165853.	191369.
LIABILITIES	38330.	127766.	217202.	263950.	261255.	259780.	210754.	186065.	161599.	136325.	110161.
CURRENT LIABILITIES	0.	0.	1916.	16998.	36023.	40712.	37851.	39327.	41026.	41916.	41916.
ACCOUNTS PAYABLE	0.	0.	0.	4221.	9177.	10373.	11660.	13163.	14861.	15752.	15752.
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											
LONG TERM DEBT	0.	0.	1916.	12777.	21720.	26165.	26165.	26165.	26165.	26165.	26165.
SHORT TERM DEBT	0.	0.	0.	0.	5126.	4175.	0.	0.	0.	0.	0.
FIXED LIABILITIES	38330.	127766.	215286.	246952.	225232.	199067.	172903.	146738.	120574.	94409.	68245.
LONG TERM DEBT BALANCE	38330.	127766.	215286.	246952.	225232.	199067.	172903.	146738.	120574.	94409.	68245.
STOCK HOLDERS EQUITY	0.	0.	0.	-6346.	-14241.	-14724.	-5278.	15805.	48265.	87916.	130148.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RETAINED EARNINGS	0.	0.	0.	-6346.	-14241.	-14724.	-5278.	15805.	48265.	87916.	130148.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
BALANCE SHEET (FOR YEARS ENDING DECEMBER 31)
(BASE : UTILITIES CENTER IS INTEGRATED)

(US$ 1000)

	1993	1994	1995	1996	1997	1998	1999
ASSETS	258955.	280182.	316916.	383603.	458331.	537632.	617333.
CURRENT ASSETS	220308.	267051.	318545.	383230.	457958.	537459.	616960.
CASH	188986.	233728.	285222.	349907.	424636.	504137.	583638.
ACCOUNTS RECEIVABLE	28350.	28350.	28350.	28350.	28350.	28350.	28350.
INVENTORIES							
PRODUCTS	2114.	2114.	2114.	2114.	2114.	2114.	2114.
MATERIALS	2858.	2858.	2858.	2858.	2858.	2858.	2858.
NET FIXED ASSETS	38647.	13131.	373.	373.	373.	373.	373.
INVESTMENT	255532.	255532.	255532.	255532.	255532.	255532.	255532.
LAND & SITE IMPROVEMENT	373.	373.	373.	373.	373.	373.	373.
CONSTRUCTED FACILITIES	208977.	208977.	208977.	208977.	208977.	208977.	208977.
PRE-INVEST. & START-UP TAX	12145.	12145.	12145.	12145.	12145.	12145.	12145.
INTEREST DURING CONSTRUCTN	34037.	34037.	34037.	34037.	34037.	34037.	34037.
LESS.DEPRECIATN & AMORTIZTN	216885.	242401.	255159.	255159.	255159.	255159.	255159.
LIABILITIES	33990.	57532.	33564.	20196.	15752.	15752.	15752.
CURRENT LIABILITIES	41916.	40000.	29139.	20196.	15752.	15752.	15752.
ACCOUNTS PAYABLE	15752.	15752.	15752.	15752.	15752.	15752.	15752.
INCOME TAX PAYABLE	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT							
LONG TERM DEBT	26164.	24248.	13388.	4444.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	42060.	17532.	4444.	0.	0.	0.	0.
LONG TERM DEBT BALANCE	42060.	17532.	4444.	0.	0.	0.	0.
STOCK HOLDERS EQUITY	174959.	222350.	285334.	363407.	442579.	522081.	601582.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.
RETAINED EARNINGS	174959.	222350.	285334.	363407.	442579.	522081.	601582.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***

PRODUCTION COST STATEMENTS

(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION	82200.	177500.	200200.	225100.	252900.	283800.	300000.	300000.	300000.	300000.	300000.
ETHANE	30767.	66438.	74935.	84255.	94660.	106226.	112290.	112290.	112290.	112290.	112290.
CATALYSTS & CHEMICALS	575.	1243.	1401.	1576.	1770.	1987.	2100.	2100.	2100.	2100.	2100.
RAW MATERIAL COST	31343.	67681.	76336.	85831.	96431.	108213.	114390.	114390.	114390.	114390.	114390.
FUEL GAS (1)	2055.	4437.	5005.	5627.	6322.	7095.	7500.	7500.	7500.	7500.	7500.
FUEL GAS (2)	902.	1762.	1919.	2080.	2245.	2245.	2245.	2245.	2245.	2245.	2245.
RAW WATER (1)	71.	153.	172.	194.	217.	244.	258.	258.	258.	258.	258.
RAW WATER (2)	63.	124.	133.	145.	156.	156.	156.	156.	156.	156.	156.
UTILITIES SALE (TO VCM/HDPE)	-3164.	-6179.	-6730.	-7320.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.
UTILITIES COST	-73.	296.	500.	734.	1070.	1869.	2288.	2288.	2288.	2288.	2288.
VARIABLE COST	31270.	67977.	76837.	86565.	97501.	110082.	116678.	116678.	116678.	116678.	116678.
DEPRECIATION (PROCESS PLANT)	10449.	20898.	20898.	20898.	20898.	20898.	20898.	20898.	20898.	20898.	10449.
DEPRECIATION (PRE-INVEST)	607.	1214.	1214.	1214.	1214.	1214.	1214.	1214.	1214.	1214.	607.
DEPRECIATION (INTEREST DURD.)	1702.	3404.	3404.	3404.	3404.	3404.	3404.	3404.	3404.	3404.	1702.
DEPRECIATION	12758.	25516.	25516.	25516.	25516.	25516.	25516.	25516.	25516.	25516.	12758.
AMORTIZATION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEPRECIATION & AMORTIZATION	12758.	25516.	25516.	25516.	25516.	25516.	25516.	25516.	25516.	25516.	12758.
LABOR COST	465.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.
OVERHEAD	465.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.
EMPLOYMENT COST	929.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.
MAINTENANCE COST	3135.	6269.	6269.	6269.	6269.	6269.	6269.	6269.	6269.	6269.	6269.
TAX & INSURANCE	1567.	3135.	3135.	3135.	3135.	3135.	3135.	3135.	3135.	3135.	3135.
OTHER FIXED COST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIRECT FIXED COST	5631.	11262.	11262.	11262.	11262.	11262.	11262.	11262.	11262.	11262.	11262.
EX-FACTORY PRODUCTION COST	49659.	104755.	113614.	123342.	134279.	146860.	153456.	153456.	153456.	153456.	140698.
UNIT DIRECT OPERATING COST	0.6041	0.5902	0.5675	0.5479	0.5310	0.5175	0.5115	0.5115	0.5115	0.5115	0.4690
HEAD OFFICE EXP.	955.	2095.	2272.	2467.	2686.	2937.	3069.	3069.	3069.	3069.	2814.
INTEREST ON LOAN NO.1	1890.	3446.	3116.	2740.	2362.	1984.	1606.	1226.	850.	472.	94.
INTEREST ON LOAN NO.2	4409.	8598.	7716.	6834.	5952.	5071.	4189.	3307.	2425.	1543.	661.
INTEREST ON LOAN NO.3	4409.	8818.	8598.	7716.	6834.	5952.	5071.	4189.	3307.	2425.	1543.
INTEREST ON LOAN NO.4	1890.	3779.	3779.	3685.	3307.	2929.	2551.	2173.	1795.	1417.	1039.
INTEREST ON LOAN NO.5	301.	603.	603.	588.	527.	467.	407.	347.	286.	226.	166.
INTEREST ON LONG-TERM DEBT	12899.	25294.	23814.	21563.	18953.	16403.	13825.	11244.	8664.	6084.	3504.
INTEREST ON SHORT-TERM DEBT	0.	0.	923.	751.	0.	0.	0.	0.	0.	0.	0.
TOTAL PRODUCTION COST	63931.	132144.	140623.	148124.	155947.	166200.	170348.	167769.	165189.	162609.	147016.
UNIT PRODUCTION COST	0.7731	0.7445	0.7024	0.6580	0.6166	0.5856	0.5678	0.5592	0.5506	0.5420	0.4901

*** FINANCIAL PROJECTIONS FOR THE ETHYLENE PLANT PROJECT ***

PRODUCTION COST STATEMENTS

(CASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

	1996	1997	1998	1999
PRODUCTION	300000.	300000.	300000.	300000.
ETHANE	112290.	112290.	112290.	112290.
CATALYSTS & CHEMICALS	2100.	2100.	2100.	2100.
RAW MATERIAL COST	114390.	114390.	114390.	114390.
FUEL GAS (1)	7500.	7500.	7500.	7500.
FUEL GAS (2)	2245.	2245.	2245.	2245.
RAW WATER (1)	258.	258.	258.	258.
RAW WATER (2)	156.	156.	156.	156.
UTILITIES SALE (TO VCM/PUPE)	-7671.	-7671.	-7671.	-7671.
UTILITIES COST	2288.	2288.	2288.	2288.
VARIABLE COST	116678.	116678.	116678.	116678.
DEPRECIATION (PROCESS PLANT)	0.	0.	0.	0.
DEPRECIATION (PRE-INVEST)	0.	0.	0.	0.
DEPRECIATION (INTEREST DCR.)	0.	0.	0.	0.
DEPRECIATION	0.	0.	0.	0.
AMORTIZATION	0.	0.	0.	0.
DEPRECIATION & AMORTIZATION	0.	0.	0.	0.
LABOR COST	929.	929.	929.	929.
OVERHEAD	929.	929.	929.	929.
EMPLOYMENT COST	1858.	1858.	1858.	1858.
MAINTENANCE COST	6269.	6269.	6269.	6269.
TAX & INSURANCE	3135.	3135.	3135.	3135.
OTHER FIXED COST	0.	0.	0.	0.
DIRECT FIXED COST	11262.	11262.	11262.	11262.
EX-FACTORY PRODUCTION COST	127940.	127940.	127940.	127940.
UNIT DIRECT OPERATING COST	0.4265	0.4265	0.4265	0.4265
HEAD OFFICE EXP.	2559.	2559.	2559.	2559.
INTEREST ON LOAN NO.1	0.	0.	0.	0.
INTEREST ON LOAN NO.2	0.	0.	0.	0.
INTEREST ON LOAN NO.3	661.	0.	0.	0.
INTEREST ON LOAN NO.4	661.	283.	0.	0.
INTEREST ON LOAN NO.5	105.	45.	0.	0.
INTEREST ON LONG-TERM DEBT	1426.	329.	0.	0.
INTEREST ON SHORT-TERM DEBT	0.	0.	0.	0.
TOTAL PRODUCTION COST	131327.	130827.	130499.	130499.
UNIT PRODUCTION COST	0.4395	0.4361	0.4350	0.4350

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
IRR CALCULATION ON TOTAL INVESTMENT
(BASE : UTILITIES CENTER IS INTEGRATED) , (US$ 1000)

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATION	INTEREST ON L-T DEBT	RETURN BEFORE TAX	DISCOUNT FACTOR	(BEFORE TAX) PRESENT VALUE INVEST.	(BEFORE TAX) PRESENT VALUE RETURN	(LESS) INCOME TAX	RETURN AFTER TAX	DISCOUNT FACTOR	(AFTER TAX) PRESENT VALUE INVEST.	(AFTER TAX) PRESENT VALUE RETURN
1982	32934.	0.	0.	0.	0.	1.0000	32934.	0.	0.	0.	1.0000	32934.	0.
1983	74356.	0.	0.	0.	0.	0.8284	61596.	0.	0.	0.	0.8284	61596.	0.
1984	76785.	0.	0.	0.	0.	0.6862	52691.	0.	0.	0.	0.6862	52691.	0.
1985	43532.	-6346.	12758.	12899.	19311.	0.5684	24746.	10977.	0.	19311.	0.5684	24746.	10977.
1986	0.	-7854.	25516.	25294.	42916.	0.4709	0.	20209.	0.	42916.	0.4709	0.	20209.
1987	0.	-483.	25516.	23814.	48847.	0.3901	0.	19054.	0.	48847.	0.3901	0.	19054.
1988	0.	5446.	25516.	21563.	56525.	0.3231	0.	18265.	0.	56525.	0.3231	0.	18265.
1989	0.	21363.	25516.	16463.	65562.	0.2677	0.	17555.	0.	65562.	0.2677	0.	17555.
1990	0.	32463.	25516.	16463.	74379.	0.2217	0.	16493.	0.	74379.	0.2217	0.	16493.
1991	0.	35692.	25516.	13823.	78991.	0.1837	0.	14509.	0.	78991.	0.1837	0.	14509.
1992	0.	42231.	25516.	11244.	78991.	0.1522	0.	12019.	0.	78991.	0.1522	0.	12019.
1993	0.	44611.	25516.	8664.	78991.	0.1260	0.	9957.	0.	78991.	0.1260	0.	9957.
1994	0.	47391.	25516.	6084.	78991.	0.1044	0.	8248.	0.	78991.	0.1044	0.	8248.
1995	0.	62964.	12756.	3504.	79246.	0.0865	0.	6854.	0.	79246.	0.0865	0.	6854.
1996	0.	78073.	0.	1428.	79501.	0.0717	0.	5696.	0.	79501.	0.0717	0.	5696.
1997	0.	79173.	0.	329.	79501.	0.0594	0.	4719.	0.	79501.	0.0594	0.	4719.
1998	0.	79501.	0.	0.	79501.	0.0492	0.	3909.	0.	79501.	0.0492	0.	3909.
1999	-6486.	79501.	0.	0.	79501.	0.0407	-264.	3238.	0.	79501.	0.0407	-264.	3238.
TOTAL	221122.				1020775.		171703.	171702.		1020775.		171703.	171702.

***** INTERNAL RATE OF RETURN ***** 20.72 PER CENT (BEFORE TAX) 20.72 PER CENT (AFTER TAX)

***** PAY-OUT PERIOD ***** 5.36 YEAR (BEFORE TAX) 5.36 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 COST	373.	OWN CAPITAL	0.
PLANT COST	208977.	LONG TERM DEBT	261645.
PRE-INVEST AND START-UP EXP.	12145.	SHORT TERM DEBT	0.
INTEREST DURING CONSTRUCTION	34037.	FINANCIAL RESOURCES	261645.
TOTAL FIXED CAPITAL	255532.		
INITIAL WORKING CAPITAL	6113.		
TOTAL CAPITAL COST	261645.		

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
PROFITABILITY AND FINANCIAL INDICATORS
(BASE : UTILITIES CENTER IS INTEGRATED) (US$ 1000)

YEAR	(1) AFT TAX PROFIT -TO- SALES REV (PCT)	(2) AFT TAX PROFIT -TO- S/H EQUITY (PCT)	(3) BFR TAX PROFIT -TO- INVESTMNT (PCT)	(4) AFT TAX PROFIT -TO- S/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	-11.5	100.0	-2.4	*******	0.87	0.70	1.30	103./ -3.	33.9	669.8	22.2
1986	-0.4	55.4	-3.0	*******	0.83	0.72	1.13	107./ -7.	67.8	672.7	53.9
1987	-0.3	3.3	-0.2	*******	0.62	0.72	1.07	108./ -8.	67.3	683.5	63.1
1988	0.0	-179.0	3.0	*******	1.04	0.92	1.18	103./ -3.	64.7	660.9	65.4
1989	11.9	133.4	6.1	*******	1.56	1.44	1.45	90./ 10.	61.2	619.2	61.9
1990	16.3	67.3	12.4	*******	2.31	2.19	1.75	71./ 29.	56.7	587.9	59.5
1991	18.9	45.1	15.2	*******	3.21	3.09	1.98	52./ 48.	56.1	570.0	56.8
1992	20.1	32.4	16.1	*******	4.20	4.08	2.11	34./ 66.	53.2	561.4	53.9
1993	21.3	25.6	17.1	*******	5.26	5.14	2.27	19./ 81.	50.3	552.8	51.1
1994	22.6	21.3	18.1	*******	6.68	6.55	2.45	7./ 93.	47.5	544.2	48.2
1995	30.0	22.1	24.1	*******	10.93	10.76	2.66	2./ 98.	30.4	528.4	43.1
1996	37.2	21.5	29.3	*******	18.98	18.73	5.37	0./100.	14.0	484.4	28.7
1997	37.7	17.9	30.3	*******	29.07	28.76	16.66	0./100.	12.8	450.9	17.7
1998	37.9	15.2	30.4	*******	34.12	33.81**********		0./100.	12.4	435.0	12.4
1999	37.9	13.2	30.4	*******	39.17	38.85**********		0./100.	12.4	435.0	12.4
AVERAGE1	13.0	26.3	12.3	*******	10.60	10.43**********		46./ 54.	42.8	563.7	43.3
AVERAGE2	21.9	21.1	15.3	*******	7.14	6.99	2.40	32./ 68.			

(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.

付表Ⅲ－3

FINANCIAL STATEMENTS FOR 350,000 MTA ETHYLENE PLANT PROJECT

- Income Statement
- Fund Flow Statement
- Balance Sheet
- Production Cost Statement
- IRR Calculation on Total Investment
- Profitability and Financial Indicators

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
INCOME STATEMENTS (FOR YEARS ENDING DECEMBER 31)
- ALTERNATIVE ETHYLENE 350000 MT/Y -

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION AND SALES											
CAPACITY	350000.	350000.	350000.	350000.	350000.	350000.	350000.	350000.	350000.	350000.	350000.
CAPACITY UTILIZATION	0.235	0.507	0.572	0.643	0.723	0.811	0.869	0.932	1.000	1.000	1.000
PRODUCTION	82200.	177500.	200200.	225100.	252900.	283800.	304300.	326300.	349900.	350000.	350000.
INCREASE IN INVENTORIES	3500.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
SALES VOLUME	78700.	177500.	200200.	225100.	252900.	283800.	304300.	326300.	349900.	350000.	350000.
SALES REVENUE	55090.	124250.	140140.	157570.	177030.	198660.	213010.	228410.	244930.	245000.	245000.
COST OF SALES	48757.	107286.	116148.	125876.	136812.	149393.	157740.	166098.	176307.	176347.	162657.
VARIABLE COST	31270.	67977.	76837.	86565.	97501.	110082.	118429.	127386.	136995.	137036.	137036.
DEPRECIATION & AMORTIZATION	13690.	27380.	27380.	27380.	27380.	27380.	27380.	27380.	27380.	27380.	13690.
OTHER FIXED COST	5966.	11932.	11932.	11932.	11932.	11932.	11932.	11932.	11932.	11932.	11932.
(INC) IN PRODUCT INVENTORIES	-2166.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	6333.	16962.	23992.	31694.	40218.	49267.	55270.	61712.	68623.	68653.	82343.
LESS. SALES EXPENSES	1018.	2148.	2323.	2518.	2736.	2966.	3155.	3334.	3526.	3527.	3253.
OPERATING PROFIT OR (LOSS)	5315.	14814.	21669.	29177.	37482.	46279.	52115.	58378.	65097.	65126.	79089.
LESS. INTEREST											
ON LONG TERM DEBT	13821.	27100.	25512.	23098.	20354.	17570.	14606.	12041.	9277.	6513.	3749.
ON SHORT TERM DEBT	0.	197.	1827.	2539.	2486.	489.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	-8506.	-12481.	-5670.	3540.	14662.	28224.	37310.	46337.	55820.	58613.	75340.
LESS. INCOME TAX	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	-8506.	-12481.	-5670.	3540.	14662.	28224.	37310.	46337.	55820.	58613.	75340.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
INCOME STATEMENTS (FOR YEARS ENDING DECEMBER 31)
- ALTERNATIVE ETHYLENE 350000 MT/Y -

	1956	1957	1958	1959
PRODUCTION AND SALES				
CAPACITY	350000.	350000.	350000.	350000.
CAPACITY UTILIZATION	1.000	1.000	1.000	1.000
PRODUCTION	350000.	350000.	350000.	350000.
INCREASE IN INVENTORIES	0.	0.	0.	0.
SALES VOLUME	350000.	350000.	350000.	350000.
SALES REVENUE	245000.	245000.	245000.	245000.
COST OF SALES	148968.	148968.	148968.	148968.
VARIABLE COST	137036.	137036.	137036.	137036.
DEPRECIATION & AMORTIZATION	0.	0.	0.	0.
OTHER FIXED COST	11932.	11932.	11932.	11932.
(INC) IN PRODUCT INVENTORIES	0.	0.	0.	0.
GROSS PROFIT OR (LOSS) ON SALES	96032.	96032.	96032.	96032.
LESS. SALES EXPENSES	2979.	2979.	2979.	2979.
OPERATING PROFIT OR (LOSS)	93053.	93053.	93053.	93053.
LESS. INTEREST				
ON LONG TERM DEBT	1526.	350.	0.	0.
ON SHORT TERM DEBT	0.	0.	0.	0.
NET PROFIT OR (LOSS) BEFORE TAX	91527.	92703.	93053.	93053.
LESS. INCOME TAX	0.	0.	0.	0.
NET PROFIT OR (LOSS) AFTER TAX	91527.	92703.	93053.	93053.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
FUNDS FLOW STATEMENTS (FOR YEARS ENDING DECEMBER 31)
- ALTERNATIVE ETHYLENE 350000 MT/Y -

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
SOURCES OF FUNDS	41125.	95959.	95959.	71612.	57500.	64349.	71678.	69030.	75357.	80622.	86967.
CASH GENERATED FROM OPERATION	0.	0.	0.	19004.	42196.	49049.	56556.	64861.	73658.	79495.	85758.
PROFIT BEFORE TAX, INTEREST	0.	0.	0.	5315.	14816.	21669.	29177.	37482.	46279.	52115.	58378.
DEPRECIATION & AMORTIZATION	0.	0.	0.	13690.	27380.	27380.	27380.	27380.	27380.	27380.	27380.
FINANCIAL RESOURCES	41125.	95959.	95959.	48386.	10149.	14105.	13809.	2693.	0.	0.	0.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
LONG TERM DEBT	41125.	95959.	95959.	47292.	0.	0.	0.	0.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	1094.	10149.	14105.	13809.	2693.	0.	0.	0.
INCREASE IN ACCT PAYABLE	0.	0.	0.	4221.	4955.	1196.	1313.	1476.	1698.	1127.	1209.
USES OF FUNDS	40772.	92475.	95158.	72030.	52344.	63153.	70365.	67554.	51995.	44972.	42364.
INVESTMENT IN FIXED ASSET	40772.	92475.	95158.	45765.	0.	0.	0.	0.	0.	0.	0.
LAND AND SITE IMPROVEMENT	373.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
CONSTRUCTED FACILITIES	33579.	76351.	78351.	33579.	0.	0.	0.	0.	0.	0.	0.
PRE-INVEST. & START-UP EXP	1342.	1342.	4025.	6708.	0.	0.	0.	0.	0.	0.	0.
INTEREST DURING CONSTRUCTN	5478.	12782.	12782.	5478.	0.	0.	0.	0.	0.	0.	0.
INCREASE IN CURRENT ASSET OTHER THAN CASH	0.	0.	0.	10389.	10244.	2361.	2590.	2892.	3214.	2133.	2289.
INCR(DECR) ACCT RECEIVABLE	0.	0.	0.	7437.	9337.	2145.	2353.	2627.	2923.	1937.	2079.
INCR(DECR) IN INVENTORIES											
PRODUCTS	0.	0.	0.	2168.	0.	0.	0.	0.	0.	0.	0.
MATERIALS	0.	0.	0.	783.	908.	216.	237.	265.	294.	195.	210.
DEBT SERVICE	0.	0.	0.	15877.	42100.	60792.	67775.	64662.	48781.	42839.	40075.
REPAYMENT OF LONG TERM DEBT	0.	0.	0.	2056.	13708.	23304.	28034.	28034.	28034.	28034.	28034.
REPAYMNT OF SHORT TERM DEBT	0.	0.	0.	0.	1094.	10149.	14105.	13809.	2693.	0.	0.
INTEREST ON LONG TERM DEBT	0.	0.	0.	13821.	27100.	25512.	23658.	20334.	17570.	14806.	12041.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	197.	1827.	2539.	2486.	485.	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)	354.	3485.	801.	-418.	4955.	1196.	1313.	1476.	23362.	35650.	44604.
BEGINNING CASH BALANCE	0.	354.	3838.	4640.	4221.	9177.	10373.	11686.	13163.	36525.	72174.
ENDING CASH BALANCE	354.	3838.	4640.	4221.	9177.	10373.	11686.	13163.	36525.	72174.	116778.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
FUNDS FLOW STATEMENTS (FOR YEARS ENDING DECEMBER 31)
- ALTERNATIVE ETHYLENE 350000 MT/Y

	1993	1994	1995	1996	1997	1998	1999
SOURCES OF FUNDS	93774.	92511.	92779.	93053.	93053.	93053.	93053.
CASH GENERATED FROM OPERATION	94477.	92505.	92779.	93053.	93053.	93053.	93053.
PROFIT BEFORE TAX, INTEREST	65097.	65126.	79089.	93053.	93053.	93053.	93053.
DEPRECIATION & AMORTIZATION	27380.	27380.	13690.	0.	0.	0.	0.
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	1297.	5.	0.	0.	0.	0.	0.
USES OF FUNDS	34766.	34557.	29726.	15851.	5079.	0.	0.
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	2455.	10.	0.	0.	0.	0.	0.
(INCREASE) ACCT RECEIVABLE	2230.	5.	0.	0.	0.	0.	0.
(INCREASE) IN INVENTORIES							
PRODUCTS	0.	0.	0.	0.	0.	0.	0.
MATERIALS	225.	1.	0.	0.	0.	0.	0.
COST SERVICES	37311.	34547.	29726.	15851.	5079.	0.	0.
REPAYMENT OF LONG TERM DEBT	28034.	28034.	25977.	14325.	4729.	0.	0.
REPAYMENT OF SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INTEREST ON LONG TERM DEBT	9277.	6513.	3749.	1526.	350.	0.	0.
INTEREST ON SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
INCOME TAX PAYMENT	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYMENT	0.	0.	0.	0.	0.	0.	0.
CASH INCREASE OR (DECREASE)	59708.	57954.	63053.	77202.	87974.	93053.	93053.
BEGINNING CASH BALANCE	116775.	176786.	228740.	291793.	368995.	456969.	550022.
ENDING CASH BALANCE	176786.	228740.	291793.	368995.	456969.	550022.	643075.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
BALANCE SHEET (FOR YEARS ENDING DECEMBER 31)
- ALTERNATIVE ETHYLENE 350000 MT/Y -

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
ASSETS	41125.	137084.	233044.	275089.	262909.	239087.	215611.	192600.	191737.	202199.	221712.
CURRENT ASSETS	354.	3838.	4640.	14610.	29810.	33367.	37271.	41639.	68215.	105998.	152890.
CASH	354.	3838.	4640.	4221.	9177.	10373.	11686.	13163.	36525.	72174.	116778.
ACCOUNTS RECEIVABLE	0.	0.	0.	7437.	16774.	18919.	21272.	23899.	26819.	28756.	30835.
INVENTORIES											
PRODUCTS	0.	0.	0.	2168.	2168.	2168.	2168.	2168.	2168.	2168.	2168.
MATERIALS	0.	0.	0.	783.	1691.	1907.	2144.	2409.	2703.	2899.	3108.
NET FIXED ASSETS	40772.	133246.	228404.	260479.	233100.	205720.	176340.	150961.	123581.	96202.	68822.
INVESTMENT	40772.	133246.	228404.	274169.	274169.	274169.	274169.	274169.	274169.	274169.	274169.
LAND & SITE IMPROVEMENT	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.	373.
CONSTRUCTED FACILITIES	33579.	111930.	190281.	223860.	223860.	223860.	223860.	223860.	223860.	223860.	223860.
PRE-INVEST. & START-UP EXP	1342.	2683.	6708.	13416.	13416.	13416.	13416.	13416.	13416.	13416.	13416.
INTEREST DURING CONSTRUCTN	5478.	18260.	31042.	36520.	36520.	36520.	36520.	36520.	36520.	36520.	36520.
LESS.DEPRECIATN & AMORTIZTN	0.	0.	0.	13690.	41069.	68449.	95829.	123208.	150588.	177967.	205347.
LIABILITIES	41125.	137084.	233044.	283595.	283897.	265745.	238729.	201055.	172027.	145120.	118296.
CURRENT LIABILITIES	0.	0.	2056.	19024.	42630.	52511.	53529.	43889.	42895.	44021.	45231.
ACCOUNTS PAYABLE	0.	0.	0.	4221.	9177.	10373.	11686.	13163.	14861.	15988.	17197.
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											
LONG TERM DEBT	0.	0.	2056.	13706.	23304.	26034.	28034.	28034.	28034.	28034.	28034.
SHORT TERM DEBT	0.	0.	0.	1094.	10149.	14105.	13809.	2693.	0.	0.	0.
FIXED LIABILITIES	41125.	137084.	230987.	264571.	241267.	213233.	185200.	157166.	129133.	101099.	73065.
LONG TERM DEBT BALANCE	41125.	137084.	230987.	264571.	241267.	213233.	185200.	157166.	129133.	101099.	73065.
STOCK HOLDERS EQUITY	0.	0.	0.	-8506.	-20987.	-26657.	-23117.	-8455.	19769.	57079.	103416.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
RETAINED EARNINGS	0.	0.	0.	-8506.	-20987.	-26657.	-23117.	-8455.	19769.	57079.	103416.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
BALANCE SHEET (FOR YEARS ENDING DECEMBER 31)
- ALTE-NATIVE ETHYLENE 350000 MT/Y -

	1993	1994	1995	1996	1997	1998	1999
ASSETS	250796.	281380.	330743.	407945.	495919.	586972.	682025.
CURRENT ASSETS	209355.	267317.	330370.	407572.	495546.	588599.	681652.
CASH	170786.	226740.	291793.	368995.	456969.	550022.	643075.
ACCOUNTS RECEIVABLE	33066.	33075.	33075.	33075.	33075.	33075.	33075.
INVENTORIES							
PRODUCTS	2168.	2168.	2168.	2168.	2168.	2168.	2168.
MATERIALS	3333.	3334.	3334.	3334.	3334.	3334.	3334.
NET FIXED ASSETS	41442.	14063.	373.	373.	373.	373.	373.
INVESTMENT	274169.	274169.	274169.	274169.	274169.	274169.	274169.
LAND & SITE IMPROVEMENT	373.	373.	373.	373.	373.	373.	373.
CONSTRUCTED FACILITIES	223860.	223860.	223860.	223860.	223860.	223860.	223860.
PRE-INVEST. & START-UP EXP	13416.	13416.	13416.	13416.	13416.	13416.	13416.
INTEREST DURING CONSTRUCTN	36520.	36520.	36520.	36520.	36520.	36520.	36520.
LESS:DEPRECIATN & AMORTIZTN	232727.	260106.	273796.	273796.	273796.	273796.	273796.
LIABILITIES	91500.	63532.	37554.	23229.	18500.	18500.	18500.
CURRENT LIABILITIES	46528.	44477.	32825.	23229.	18500.	18500.	18500.
ACCOUNTS PAYABLE	18494.	18500.	18500.	18500.	18500.	18500.	18500.
INCOME TAX PAYABLE	0.	0.	0.	0.	0.	0.	0.
DIVIDENDS PAYABLE	0.	0.	0.	0.	0.	0.	0.
CURRENT PORTION OF DEBT							
LONG TERM DEBT	28034.	25977.	14325.	4729.	0.	0.	0.
SHORT TERM DEBT	0.	0.	0.	0.	0.	0.	0.
FIXED LIABILITIES	45032.	19054.	4729.	0.	0.	0.	0.
LONG TERM DEBT BALANCE	45032.	19054.	4729.	0.	0.	0.	0.
STOCK HOLDERS EQUITY	159264.	217848.	293189.	384716.	477419.	570472.	663525.
SHARE CAPITAL	0.	0.	0.	0.	0.	0.	0.
RETAINED EARNINGS	159264.	217848.	293189.	384716.	477419.	570472.	663525.

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***

PRODUCTION COST STATEMENTS

- ALTERNATIVE ETHYLENE 350000 MT/Y -

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
PRODUCTION	82200.	177500.	200200.	225100.	252900.	263800.	334300.	326300.	349900.	350000.	350000.
ETHANE	30767.	66438.	74935.	84255.	94660.	106226.	113899.	122134.	130968.	131005.	131005.
CATALYSTS & CHEMICALS	575.	1243.	1401.	1576.	1770.	1987.	2130.	2284.	2449.	2450.	2450.
RAW MATERIAL COST	31343.	67681.	76336.	85831.	96431.	108213.	116030.	124418.	133417.	133455.	133455.
FUEL GAS (1)	2055.	4437.	5005.	5627.	6322.	7095.	7607.	8157.	8747.	8750.	8750.
FUEL GAS (2)	902.	1762.	1919.	2088.	2245.	2245.	2245.	2245.	2245.	2245.	2245.
RAW WATER (1)	71.	153.	172.	194.	217.	244.	262.	281.	301.	301.	301.
RAW WATER (2)	63.	122.	135.	145.	156.	156.	156.	156.	156.	156.	156.
UTILITIES SALE (TO VCM/ALP-1)	-3164.	-6175.	-6730.	-7320.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.	-7871.
UTILITIES COST	-73.	296.	500.	734.	1070.	1669.	2399.	2968.	3578.	3581.	3581.
VARIABLE COST	31270.	67977.	76837.	86565.	97501.	110082.	118429.	127366.	136995.	137036.	137036.
DEPRECIATION (PROCESS PLANT)	11193.	22386.	22386.	22386.	22366.	22386.	22386.	22366.	22386.	22386.	11193.
DEPRECIATION (PRE-INVEST)	671.	1342.	1342.	1342.	1342.	1342.	1342.	1342.	1342.	1342.	671.
DEPRECIATION (INTEREST DURING)	1826.	3652.	3652.	3652.	3652.	3652.	3652.	3652.	3652.	3652.	1826.
DEPRECIATION	13690.	27360.	27360.	27360.	27360.	27360.	27360.	27360.	27380.	27380.	13690.
AMORTIZATION	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DEPRECIATION & AMORTIZATION	13690.	27360.	27360.	27380.	27360.	27360.	27380.	27380.	27380.	27380.	13690.
LABOR COST	465.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.
OVERHEAD	465.	929.	929.	929.	929.	929.	929.	929.	929.	929.	929.
EMPLOYMENT COST	929.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.	1858.
MAINTENANCE COST	3356.	6716.	6716.	6716.	6716.	6716.	6716.	6716.	6716.	6716.	6716.
TAX & INSURANCE	1679.	3358.	3358.	3358.	3358.	3358.	3358.	3358.	3358.	3358.	3358.
OTHER FIXED COST	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
DIRECT FIXED COST	5966.	11932.	11932.	11932.	11932.	11932.	11932.	11932.	11932.	11932.	11932.
EX-FACTORY PRODUCTION COST	50925.	107286.	116146.	125876.	136812.	149353.	157740.	166698.	176307.	176347.	162657.
UNIT DIRECT OPERATING COST	0.6198	0.6044	0.5802	0.5592	0.5410	0.5664	0.5134	0.5109	0.5039	0.5038	0.4647
HEAD OFFICE EXP.	1017.	2146.	2325.	2518.	2730.	2988.	3155.	3334.	3526.	3527.	3253.
INTEREST ON LOAN NO.1	2027.	3791.	3345.	2940.	2534.	2129.	1723.	1318.	912.	507.	101.
INTEREST ON LOAN NO.2	4751.	9225.	8279.	7333.	6387.	5440.	4494.	3548.	2602.	1656.	710.
INTEREST ON LOAN NO.3	4751.	9462.	9225.	8279.	7333.	6387.	5440.	4494.	3548.	2602.	1656.
INTEREST ON LOAN NO.4	2027.	4055.	4055.	3954.	3548.	3143.	2737.	2332.	1926.	1521.	1115.
INTEREST ON LOAN NO.5	304.	608.	608.	593.	532.	471.	410.	350.	289.	228.	167.
INTEREST ON LONG-TERM DEBT	13821.	27100.	25512.	23098.	20334.	17570.	14806.	12041.	9277.	6513.	3749.
INTEREST ON SHORT-TERM DEBT	0.	197.	1027.	2539.	2466.	485.	0.	0.	0.	0.	0.
TOTAL PRODUCTION COST	65764.	136731.	145910.	154030.	162208.	170436.	175700.	182073.	189110.	186387.	169660.
UNIT PRODUCTION COST	0.8001	0.7705	0.7289	0.6843	0.6420	0.6005	0.5774	0.5580	0.5405	0.5325	0.4847

*** FINANCIAL ANALYSIS OF PTT ETHYLENE PLANT PROJECT ***

PRODUCTION COST STATEMENTS

- ALTERNATIVE ETHYLENE 350000 MT/Y -

	1996	1997	1998	1999
PRODUCTION	350000.	350000.	350000.	350000.
ETHANE	131005.	131005.	131005.	131005.
CATALYSTS & CHEMICALS	2450.	2450.	2450.	2450.
RAW MATERIAL COST	133455.	133455.	133455.	133455.
FUEL GAS (1)	8750.	8750.	8750.	8750.
FUEL GAS (2)	2245.	2245.	2245.	2245.
RAW WATER (1)	301.	301.	301.	301.
RAW WATER (2)	156.	156.	156.	156.
UTILITIES SALE (TO VCM/HCFC)	-7871.	-7871.	-7871.	-7871.
UTILITIES COST	3581.	3581.	3581.	3581.
VARIABLE COST	137036.	137036.	137036.	137036.
DEPRECIATION (PROCESS PLANT)	0.	0.	0.	0.
DEPRECIATION (PRE-INVEST)	0.	0.	0.	0.
DEPRECIATION (INTEREST DURING)	0.	0.	0.	0.
DEPRECIATION	0.	0.	0.	0.
AMORTIZATION	0.	0.	0.	0.
DEPRECIATION & AMORTIZATION	0.	0.	0.	0.
LABOR COST	929.	929.	929.	929.
OVERHEAD	929.	929.	929.	929.
EMPLOYMENT COST	1858.	1858.	1858.	1858.
MAINTENANCE COST	6716.	6716.	6716.	6716.
TAX & INSURANCE	3358.	3358.	3358.	3358.
OTHER FIXED COST	0.	0.	0.	0.
DIRECT FIXED COST	11932.	11932.	11932.	11932.
EX-FACTORY PRODUCTION COST	148968.	148968.	148968.	148968.
UNIT DIRECT OPERATING COST	0.4256	0.4256	0.4256	0.4256
HEAD OFFICE EXP.	2979.	2979.	2979.	2979.
INTEREST ON LOAN NO.1	0.	0.	0.	0.
INTEREST ON LOAN NO.2	0.	0.	0.	0.
INTEREST ON LOAN NO.3	710.	0.	0.	0.
INTEREST ON LOAN NO.4	710.	304.	0.	0.
INTEREST ON LOAN NO.5	166.	46.	0.	0.
INTEREST ON LONG-TERM DEBT	1526.	350.	0.	0.
INTEREST ON SHORT-TERM DEBT	0.	0.	0.	0.
TOTAL PRODUCTION COST	152147.	152147.	151947.	151947.
UNIT PRODUCT COST	0.4347	0.4341	0.4341	0.4341

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
IRR CALCULATION ON TOTAL INVESTMENT
- ALTERNATIVE ETHYLENE 350000 MT/Y -

YEAR	TOTAL INVESTMENT	PROFIT BEFORE TAX	DEPRECIATION	INTEREST ON L-T DEBT	RETURN BEFORE TAX	DISCOUNT FACTOR	(BEFORE TAX) PRESENT VALUE INVEST.	(BEFORE TAX) PRESENT VALUE RETURN	(LESS) INCOME TAX	RETURN AFTER TAX	DISCOUNT FACTOR	(AFTER TAX) PRESENT VALUE INVEST.	(AFTER TAX) PRESENT VALUE RETURN
1982	35294.	0.	0.	0.	0.	1.0000	35294.	0.	0.	0.	1.0000	35294.	0.
1983	79693.	0.	0.	0.	0.	0.8330	66385.	0.	0.	0.	0.8330	66385.	0.
1984	82376.	0.	0.	0.	0.	0.6939	57161.	0.	0.	0.	0.6939	57161.	0.
1985	46454.	-8506.	13690.	13821.	19004.	0.5780	26852.	10985.	0.	19004.	0.5780	26852.	10985.
1986	0.	-12481.	27380.	27100.	41999.	0.4815	0.	20222.	0.	41999.	0.4815	0.	20222.
1987	0.	-5670.	27380.	25512.	47222.	0.4011	0.	18940.	0.	47222.	0.4011	0.	18940.
1988	0.	3540.	27380.	23098.	54017.	0.3341	0.	18048.	0.	54017.	0.3341	0.	18048.
1989	0.	14662.	27380.	20334.	62376.	0.2783	0.	17360.	0.	62376.	0.2783	0.	17360.
1990	0.	28224.	27380.	17570.	73174.	0.2318	0.	16965.	0.	73174.	0.2318	0.	16965.
1991	0.	37310.	27380.	14806.	79495.	0.1931	0.	15353.	0.	79495.	0.1931	0.	15353.
1992	0.	46337.	27380.	12041.	85758.	0.1609	0.	13796.	0.	85758.	0.1609	0.	13796.
1993	0.	55820.	27380.	9277.	92477.	0.1340	0.	12393.	0.	92477.	0.1340	0.	12393.
1994	0.	58613.	27380.	6513.	92505.	0.1116	0.	10327.	0.	92505.	0.1116	0.	10327.
1995	0.	75340.	13690.	3749.	92779.	0.0930	0.	8628.	0.	92779.	0.0930	0.	8628.
1996	0.	91527.	0.	1526.	93053.	0.0775	0.	7208.	0.	93053.	0.0775	0.	7208.
1997	0.	92703.	0.	350.	93053.	0.0645	0.	6004.	0.	93053.	0.0645	0.	6004.
1998	0.	93053.	0.	0.	93053.	0.0538	0.	5002.	0.	93053.	0.0538	0.	5002.
1999	-6543.	93053.	0.	0.	93053.	0.0448	-293.	4166.	0.	93053.	0.0448	-293.	4166.
TOTAL	237276.				1113018.		185398.	185398.		1113018.		185398.	185398.

***** INTERNAL RATE OF RETURN ***** 20.05 PER CENT (BEFORE TAX) 20.05 PER CENT (AFTER TAX)

***** PAY-OUT PERIOD ***** 5.76 YEAR (BEFORE TAX) 5.76 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 COST	375.	OWN CAPITAL	0.
PLANT COST	225660.	LONG TERM DEBT	280336.
PRE-INVEST AND START-UP EXP.	15416.	SHORT TERM DEBT	0.
INTEREST DURING CONSTRUCTION	36520.	FINANCIAL RESOURCES	280336.
TOTAL FIXED CAPITAL	274169.		
INITIAL WORKING CAPITAL	6167.		
TOTAL CAPITAL COST	280336.		

*** FINANCIAL PROJECTIONS OF PTT ETHYLENE PLANT PROJECT ***
PROFITABILITY AND FINANCIAL INDICATORS
- ALTERNATIVE ETHYLENE 350000 MT/Y -

YEAR	(1) AFT TAX PROFIT -TO- SALES REV (PCT)	(2) AFT TAX PROFIT -TO- S/H EQUITY (PCT)	(3) BFR TAX PROFIT -TO- INVESTMNT (PCT)	(4) AFT TAX PROFIT -TO- S/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	-15.4	100.0	-3.0	*******	0.77	0.61	1.20	103./ -3.	31.1	687.8	20.3
1986	-10.0	55.5	-4.5	*******	0.70	0.61	1.03	110./-10.	62.4	693.3	49.6
1987	-4.0	21.3	-2.0	*******	0.64	0.56	0.97	114./-14.	62.5	708.0	58.7
1988	2.2	-15.3	1.3	*******	0.70	0.62	1.06	114./-14.	61.0	687.2	61.6
1989	8.3	-173.4	5.2	*******	0.95	0.84	1.29	106./ -6.	58.5	644.6	59.1
1990	14.2	142.8	10.1	*******	1.59	1.48	1.60	87./ 13.	54.3	602.9	55.0
1991	17.5	65.4	13.3	*******	2.41	2.29	1.86	64./ 36.	51.5	579.5	52.1
1992	20.3	44.8	16.5	*******	3.38	3.26	2.14	41./ 59.	49.0	560.0	49.6
1993	22.8	35.1	19.9	*******	4.50	4.38	2.48	22./ 78.	46.5	542.3	47.1
1994	23.9	26.9	20.9	*******	6.01	5.89	2.68	8./ 92.	43.9	534.4	44.5
1995	30.8	25.7	26.9	*******	10.06	9.90	3.12	2./ 98.	28.0	519.8	39.8
1996	37.4	23.8	32.6	*******	17.55	17.31	5.87	0./100.	12.8	479.4	26.5
1997	37.8	19.4	33.1	*******	26.75	26.49	18.32	0./100.	11.7	448.6	16.2
1998	38.0	16.3	33.2	*******	31.82	31.52	**********	0./100.	11.4	434.1	11.4
1999	38.0	14.0	33.2	*******	36.65	36.55	**********	0./100.	11.4	434.1	11.4
AVERAGE1	17.4	27.4	15.3	*******	9.65	9.49	**********	51./ 49.	39.7	570.4	40.2
AVERAGE2	22.1	23.2	15.8	*******	6.34	6.21	2.44	33./ 67.			

(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.

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