タ イ 王 国
東部工業港開発計画調査
コンタクトミッション報告書

昭和57年１月

国際協力事業団

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序　　文

日本国政府は，タイ王国政府の要請に基づき，同国東部工業港開発計画について調査を行うこととし，国際協力事業団がその調査を実施した。

東部工業港は，同国が現在進めている東部臨海工業地帯開発計画の核をなすものであり，地域の発展にとって鍵となるものである。

当事業団は，１９８２年１月１１日から１７日まで運輸省大臣官房審議官　小林哲一氏を団長とする調査団を現地へ派遣した。

調査団は現地において，先方政府関係者，その他と意見交換を行い，要請の背景，内容について確認し，Minutes of Discussionsを作成し合意した。

本報告書は，東部臨海工業地帯および工業港の現状ならびにM／Dの合意に至った経緯，更に今後の協力に対する考え方についてとりまとめたものである。

おわりに，本調査の実施にあたり，ご協力ご指導いただいた関係各位に対して厚く御礼申し上げる次第である。

昭和５７年１月

国際協力事業団
理事　中澤弋仁

タイ王国東部工業港開発計画調査コンタクトミッション報告書　目次

はじめに

タイ王国東部工業港開発計画調査団（以下調査団と略記）は，昭和５７年１月１１日出発，16日間の調査を終え，1月１７日帰国した。

本調査はタイ王国政府の進めている東部沿岸の開発に関し，主として工業立地との関連における港湾開発の方向について，アドバイスを行うための事前調査である。

東部沿岸開発は，最近になって発見されたシャム湾の天然ガスを中心とする工業開発を図ると共にこれを核として新たな人口産業の集積を図ることによって過度に集中しつつあるバンコックの人口産業を分散させることをねらったプロジェクトであり，タイ国の将来にとって極めて大きなインパクトを与える計画であるといえる。

又，本計画は工業開発とそれに伴う工業港湾の開発の他に，バンコック周辺から出入する海上コンテナ取扱の窓口としての新たな商港建設の問題ともからんでおり，それだけにタイ国政府としても，本件を特別に取扱う東部沿岸開発委員会を設立するとともに，世銀をはじめ，オーストラリア，日本など各国の援助を得て数多くの関連調査を実施するなど計画の実現に強い意欲を燃しているものである。しかし，プロジェクトそのものが極めて総合的な性格をもっているうえに，開発のねらいからして，大規模なものに発展する可能性を秘めているため，過去から現在に至る間に種々の調査が行われ，且つ，様々な決定がなされているにもかかわらず，未だに開発の基本的な方向が確定していない状況にある。

本プロジェクトの推進に責任をもつNESDB（National Economic and Social Development Board；国家経済社会開発庁）にしても，工業立地と開発すべき港湾の機能をはじめ，各種の関連インフラストラクチャーの整備方針の決定に際し，混迷の度を深めている様子もうかがわれ，又，タイ国政府内部においても開発の方針に必らずしも完全な意見の一致があるともいえない。

本プロジェクトに当初から強い関心を示し，最終的には相当広い分野までカバーした財政援助を供与する方向にある世銀も，本プロジェクトの基本計画について整理がなされ，タイ国政府が適確な意志決定をすることを望んでおり，我国の有する港湾を中心とする臨海工業開発の経験を十分生かして適確なアドバイスをすることを歓迎している。

このような背景をうけて，タイ国政府の要請に基き本件に対するアドバイスを行うためのミッションの派遣が決定され，それに先立ちこのミッションのS／W及び，今後の協力の方向を議論する目的で，小官を団長とする官ベースの調査団が派遣された。

調査団は，タイ国滞在中に在タイ日本大使館，ＮＥＳＤＢをはじめ，ＭＯＣ（運輸通信省），ＤＴＥＣ（経済技術協力局），在バンコク世銀事務所等関連機関を訪問し，意見の交換を行ったうえ，後述するミニッツを作成，署名した。

本調査団のバンコクにおける活動に際し，種々協力して頂いた在タイ日本大使館，ＪＩＣＡ事務所のスタッフ並びにＥＳＣＡＰの入江氏（Ｊ．ＩＣＡ派遣専門家）に深く御礼申しあげる次第である。

今回の調査団派遣をきっかけにして，タイ国の将来を大きく左右する可能性のある東部臨海工業開発に対し，今後ともわが国がその持てる力を十分発揮して，協力することによって，この大プロジェクトが実現の方向に向けて前進することを願ってやまない。

昭和５７年１月１７日

調査団長　小　林　哲　一

I 調査の概要

1. 調査の目的

タイ国は，昨年１０月スタートした第５次経済社会開発計画の柱の１つとして東部臨海工業地帯の開発を推進するため，世銀等の援助により既に種々の調査検討を開始してきている。しかしながら，本計画の中心をなす工業港の適地選定及び背後の土地利用等については，タイ国内部においても意思統一がなされていないのが現状である。かかる状況に対し，昨年来日したプレム首相一行はわが国の高度な工業発展，就中，港湾開発を中心とする臨海工業地帯の開発技術を高く評価し，東部臨海工業地帯の開発計画の立案に際してわが国の協力が必要であるとして，とりあえず現在までタイ国側において実施した各種調査結果，特にサタヒップ港の改善，あるいはラヨンの掘込港開発等の港湾計画及び土地利用計画につき，検討を加えて欲しい旨要請してきた。

本要請に対し，我国としても昨年の大来ミッションの訪タイ並びに鈴木総理とプレム首相との共同コミュニケに見られるように，東部臨海工業地帯開発計画に対して積極的に援助を実施してゆくとの方針に基づき，とりあえず先方要請のうち，特に緊急を要する工業港等の整備の方向づけのための検討を実施するためのコンサルタントベースの調査団を派遣することとし，同調査団に対するタイ側の要請内容及び意向を確認するとともに，今後の協力の進め方について協議することを目的として，以下に述べる官ベースの調査団が派遣された。

2. 調査団員

団長	小林哲一	（総　括）	運輸省大臣官房審議官
団員	西田幸男	（臨海部開発）	〃　港湾局国際協力室長
〃	黒田秀彦	（港湾計画）	〃　第三港湾建設局海域整備課長
〃	鬼頭平三	（協力政策）	外務省経済協力局開発協力課
〃	勝田穂積	（業務調整）	ＪＩＣＡ社会開発協力部

3. 調査日程

日　順	月　日(曜日)	調 査 日 程	調 査 内 容
1	1. 11(月)	東京→バンコク	往　路
2	1. 12(火)		AM：大使館JICAにて説明会,討議
			PM：NESDBにて説明，討議
3	1. 13(水)		AM：MOCにて説明，討議
			PM：DTEC表敬，NESDBにて
			Minutesの打合せ
4	1. 14(木)		・Minutesの作成
5	1. 15(金)	(アドバイザリーミッション) (東京→バンコク)	AM：世銀現地事務所にて討議
			PM：NESDBにてMinutes署名
6	1. 16(土)		AM：アドバイザリーミッションと引継ぎ
			バンコク港視察
7	1. 17(日)	バンコク→東京	帰　路

注) 1. アドバイザリーチームの構成

団長　竹　内　良　夫　(財)国際臨海開発研究センター理事長
　　森　平　倫　生　〃　部長
　　柏　原　英　郎　〃　主任研究員

注) 2. なお，アドバイザリーミッションは1/30迄の日程となっている。

Ⅱ　タイ東部臨海工業地帯開発の経緯と問題点

1. 経　緯

１９８０年１２月２６日，タイ王国首相は，タイ東部沿岸（Eastern Seaboard）に基幹産業開発計画検討の為，委員会（The Committee for the Development of Basic Industries on the Eastern Seaboard）の設立を勧告した。この委員会は，種々考えられている工業立地の適地選定及びその適性の検討を行う為の意志決定機関である。当委員会の議長は更に，東部沿岸地帯における基幹産業の開発研究，諸調査を推進する為，小委員会の設立を勧告すると共に首相官房の統括の下に小委員会の事務局を設立した。小委員会の議長であるMr.Arnat Arbahabironは当プロジェクトに関する環境，大水深港，社会・政治的側面，インフラストラクチャー，工業・都市計画，水資源及び塩化アンモニウムの利用に関する政策を検討する為，８つのワーキング・グループを作り検討を行った。その結果，１９８１年４月１５日に前述，東部沿岸工業開発委員会に最終報告書が認められ，更に１９８１年４月２１日の閣議により決定されるに至った。（註１）

その後１９８１年６月２日，東部沿岸開発を総合的に検討する為，東部沿岸開発委員会（The Committee for the Development of the Eastern Seaboard）と同小委員会が前述東部沿岸工業開発委員会の後継委員会として設立され，その下に，以下のような内容を検討する為４つのad-hocワーキング・グループが設立された。（註２）

(1) 東部沿岸地帯の基幹産業立地及び都市化の為の実施計画の作成
(2) 東部沿岸地帯鉄道
(3) 財　政
(4) サタヒップ（Sattahip）商港の開発
(5) ドックライ（Dok-Krai）－マブタプト（Mab Ta Pud）－サタヒップ（Sattahip）間の水供給パイプライン

更に１９８１年７月２７日，肥料工場立地プロジェクトの為の民間投資家の選択も含め，投資に必要な諸規程作成の為，ad-hoc小委員会の設立を勧告した。更に１９８１年７月２８日には，ＮＥＳＤＢ（国家経済社会開発庁）の中に，その１部局としてのＣＩＰＯ（Center for Integrated Plan of Operations）の設立が閣議決定され，１９８１年８月２４日付勅令により，法制化された。以後，このＣＩＰＯが東部沿岸開発に係る計画・実施の調整・企画について全ての政府機関，国際機関，民間投資機関に対する情報センターとしての中心的機能を果している。

（註１）　１９８１年４月２１日の閣議決定概要

(1) 基幹産業はNong Fab－Marb Taput又はその近隣に立地させる。

i) ソーダ灰工場はスクムビット道路（Sukumvit Road）北側谷合にあるBan Nong YaiとBan Kanam Yaiにあるサタヒップ海岸基地の近くのMilitary Security zoneの中に立地させるか，又は，Ban Marb Chaloodの地域，又はRayong州Marb Taputの天然ガスプラントの近くに立地させる。

ii) 化学肥料工場はRayong州Marb Chaloood又はその近隣に立地させる。

iii) 還元鉄工場はRayong州Marb Chaloood又はその近隣に立地させる。

iv) 鉄鋼工場（一貫製鉄所）は，その規模が巨大である為，更に研究を続ける。

(2) サタヒップ港の開発については勅令により特定された地域内の拡張，改良を直ちに実施し，初期の撒貨物およびコンテナ貨物に対処すべく大水深港化する。

(3) ラムチャバン（Laem Chabang）港については，一般雑貨及び将来第２段階としてのコンテナ貨物に対処すべく，サタヒップ港の開発と調整しつつ，大水深港化する。

(4) ＮＥＳＤＢは関係する政府機関全てに対し，詳細な実行計画を準備する直接的責任を有する。第５次５ケ年計画についても同様とする。更に，実施計画に従った実施状況のフォローアップ結果，及び意見を内閣に上程する。

(5) ＮＥＳＤＢは東部沿岸開発のマスタープラン作りの為，約３０００万バーツ（当初内務省にバンコック首都圏交通改良計画の為つけられた世銀ローンを流用する）でもってコンサルタントCooper & Lybrands Associatesを雇うことができる。重工業立地及び住宅地の為の地域の住区計画には，英国政府又は他の援助機関の協力もありうる。

（註２）　東部沿岸開発委員会及び各部局担当課題

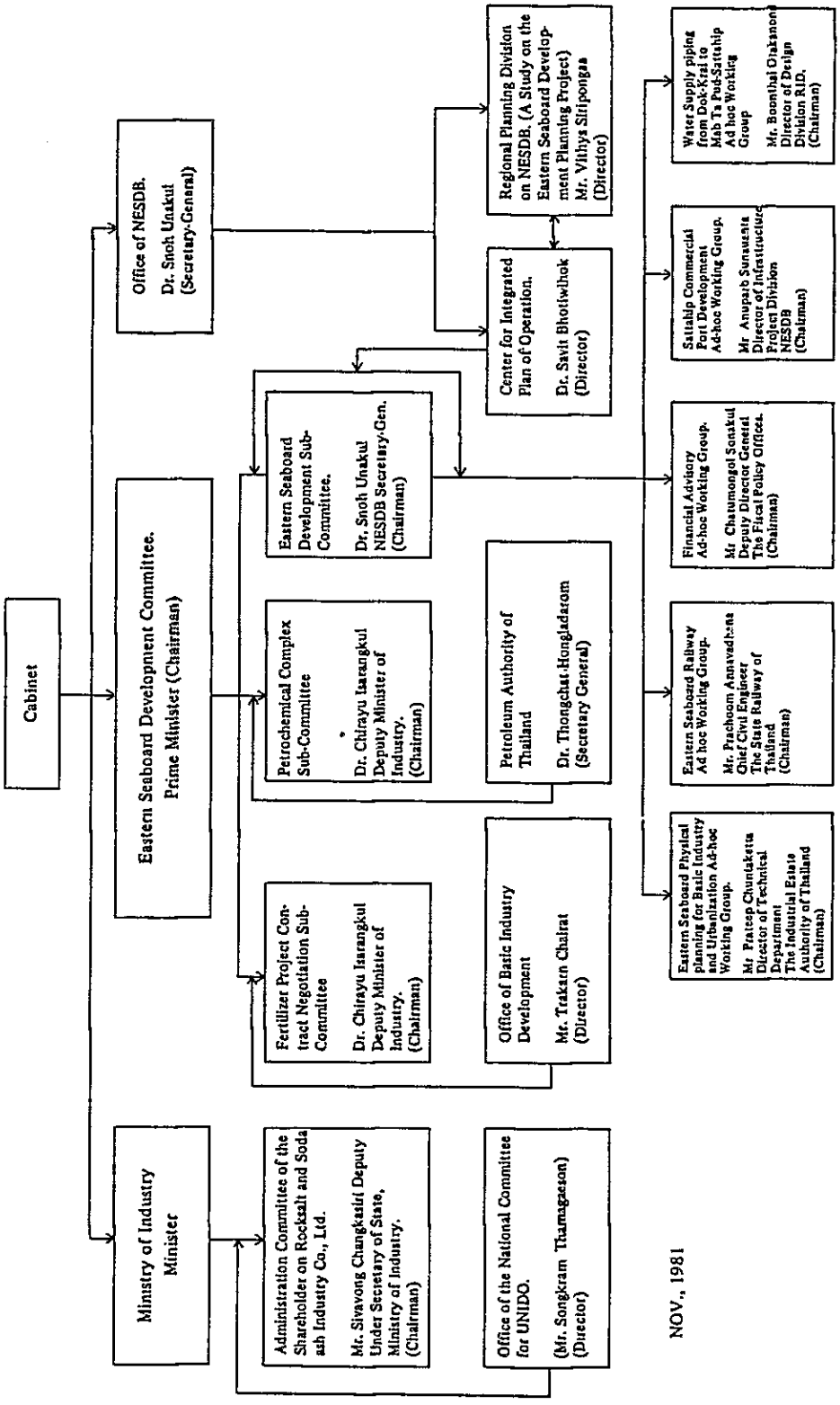


図　東部沿岸開発委員会及び関係機関機構

表　担当部局及び担当課題

Port Authority of Thailand (PAT)	サタヒップの拡張計画調査の実施(1982年中) 拡張工事の実施(1986年以内)他。
State Railway of Thailand (SRT)	サタヒップーマブタプト間鉄道の建設(1984年中)他。
Department of Highways	サタヒップーラヨン地域の交通量調査の実施
Telephone Organization of Thailand	サタヒップーラヨン地域をカバーする電話交換局の建設実行計画の策定
Communication Authority of Thailand	テレックス交換局の建設実行計画の策定
Royal Irrigation of Thailand	ドックライダムからのパイプラインの実施設計(1985年迄。たゞしマブタプトまでは1983年中)ノンプラライダムの開発建設，ドックライダムへのパイプライン敷設(1985年中)
Ministry of Agriculture & Cooperatives	工業者と協力し，化学肥料利用促進計画を策定
Ministry of Industry	ソーダ灰工場プロジェクトの見直し，還元鉄，化学肥料工業計画の見直し，他
Industrial Estate Authority of Thailand	ラムチャバンの用地買収，他
Town Planning Office	サタヒップーラヨン地域の住居地区の案の確定(1981. 5. 15迄)他。
Electricity Generating Authority of Thailand	送電線建設計画策定
Environment Protection Board	工業・大水深港開発からの公害防除
Board of Trade & Investment Promotions	都市計画室と協力し，工業投資の促進を図る
NESDB Exective Office	コンサルタントを雇いマスタープランを策定，他。
Bureau of the Budget	年間予算の策定
Ministry of Finance	ローンの獲得

2. 東部臨海工業開発計画の現況

2－1　概　　況

東部臨海工業開発計画の主要なものの概況は以下のとうりである。

(1) サタヒップ商港

最終的な建設の詳細計画を作成するに先立ち，サタヒップ港の開発・改良のマスタープランが検討されている。これに関する援助は既にオーストラリア政府による実施が決定されている。

(2) ドックライーマプタプトーサタヒップ水供給パイプライン

詳細設計が日本政府の援助の下に検討されている。水供給は重要な制約条件となるため，第１段階の建設は，ガス分離プラントの完成に合わせ，１９８３年以内に完成される計画である。

(3) 工業地帯及び都市計画

これらの計画は開発の為の最も重要な鍵である。現在，土地利用計画の策定が緊急を要している。サタヒップ－ラヨン間の鉄道ルートについて現在Ｓ／Ｗ作成作業中である。道路および電力については，現有容量で充分であると考えられている。

(4) 東部沿岸開発のマスタープラン

ＮＥＳＤＢは閣議決定に従い，１９８１年７月３１日　Cooper & Lybrands Associates と契約し，Chacheongsao，Chonburi，Rayong　３州を含むマスタープラン調査を実施している。（15ケ月・2,988万バーツ）

(5) 海外からの協力

i) 世銀 (World Bank)

世銀は原則として，東部沿岸開発の為の研究及びＤ／Ｄ作成の為の資金援助（E・S.Loan）を認めており，１９８１年９月にミッションが来タイし，内容の検討及び種々の recommendation を残している。１９８２年２月に再度ミッションが来タイし，現状レビューと共に，上記E.S.Loanの確実なものについてはT.O.Rを指示する予定となっている。

ii) 国際金融公社（ＩＦＣ）

ＩＦＣは種々のプロジェクト－特にエチレン・プロジェクトとエチレン派生物に関するＦ／Ｓを行う予定である。

iii) 他の政府機関

サタヒップ港の開発・改良のマスタープラン作成がオーストラリア政府に要請され，オーストラリア政府の援助により，同国のMaunsell 社が実施する予定である。

2－2　東部沿岸（Sattahip－Rayong）工業，都市開発計画に関するタイ政府の考え方

(1) 政策の方針

東部沿岸工業・都市開発は次のような目的を有している。

i) 人口，産業の過密が，既に集積の不利益となって現われている首都バンコックの成長を鈍化すること。

ii) 均衡ある地域開発を行う為，北東地域でも特に開発の遅れている南よりの地区，及びその背後を開発する為の門戸を供給すること。

iii) 地域の天然資源，特に天然ガスを十分利用し，基幹産業の立地基盤を作ると共に2次，3次産業の立地を促進し，総合的なインダストリアル・コンプレックスを構成する。

iv) バンコックの代替として，長期に亘る開発の核となり，良好な環境を有する総合コミュニティーを建設する。

(2) 立地の選定

バンコックより約１５０ km の位置にあるサタヒップ－ラヨン地域が工業都市開発の場として選定された。この地域は最終的には約５０万人の人口を支えるものであり，北部を丘陵で囲まれ，南部をシャム湾，東部をラヨン市，西部をサタヒップ海軍基地に囲まれた約15,000ha の地域であり，この地域が選定された理由は次のとおりである。

(イ) Ban Mabtapud の中心地域は天然ガスの上陸地点であり，ガス分離プラントの建設地点である。

(ロ) 低人口密度　低農業生産性の広大な地域である為工業開発に対する大きな潜在力を有している。

(ハ) 100,000トン級の船舶を入港可能にするよう拡張余地のある Sattahip 港及び，最大級の航空機の発着可能なU－tapao 空港に近い。

(ニ) 優れた道路網等，所要の基本的インフラが整備されている。

(ホ) 衛星都市としてよりも独立した都市として，開発されるに十分な距離をバンコクから保っている。

(3) 計　画

計画全体は3つの主要部分に分類できる。

Part I　基本インフラストラクチュアー

- Sattahip 港の拡張
- 水供給パイプラインの建設と配分ネットワークの建設
- Chacheonsa－Sattahip－Mab. taput 間鉄道の建設
- 道路網の改良

・ 電力供給

・ 通信システムの設置

Part Ⅱ 工 業

・ 天然ガス利用に関連する基幹産業の推進

・ 肥 料

・ ソーダ灰

・ 石油化学

・ ガ ラ ス

・ そ の 他

・ インダストリアルコンプレックス形成の為の２次，３次産業等の立地推進

Part Ⅲ 支援プログラム

・ 都市計画

・ 工業地帯の土地利用計画

・ 工業推進の戦略

・ 環境制御

(4) 関係行政機関

・ 計画全体の調整に国家経済社会開発庁（前述ＮＥＳＤＢ）があたり，ＮＥＳＤＢは各機関の計画調整の為の特別機関としてThe Center for integrated Plan of Operations（ＣＩＰＯ）を設立した。

・ 全ての政策を速やかに決定する為，首相を議長とする最高決定機関として，東部沿岸開発委員会（A Eastern Seaboard Development Committee）を設立した。

・ 立案された政策に基づく日々の意志決定はＮＥＳＤＢの長官（Secretary General）を筆頭とする小委員会によってなされる。

・ 全体計画の中の個々のプロジェクトは，ＮＥＳＤＢの横割連絡調整の下，担当の政府機関により直接行われる。

3. 関連調査の推移と概要

1. 大水深港湾

１９７２年にオランダのコンサルタントであるNedeco 社がタイ東部沿岸におけるラムチャバンに大水深港開発をする勧告案を提出した。その後，１９７３年１０月に政府は，オランダ政府の資金援助の下にラムチャバンに大水深港を開発する方針を決定した。従って，その年に政府は約3,200エーカーの土地を収用するための勅令を出した。用地調査がなされ，１９７７年５月に調査が完了した。用地収用は，１９７８年4月２１日

に官報告示に出された収用法の下に実施されてきている。その間オランダのNedeco社は前述調査を補足し，1978年にとりまとめ報告書を作成した。（註１）その後，１９８０年１０月７日内閣はラムチャバンに大水深港を建設する基本方針を閣議決定した。そこで政府はＮＥＳＤＢに対し，ラムチャバン港開発について世銀に協力要請することを指示した。

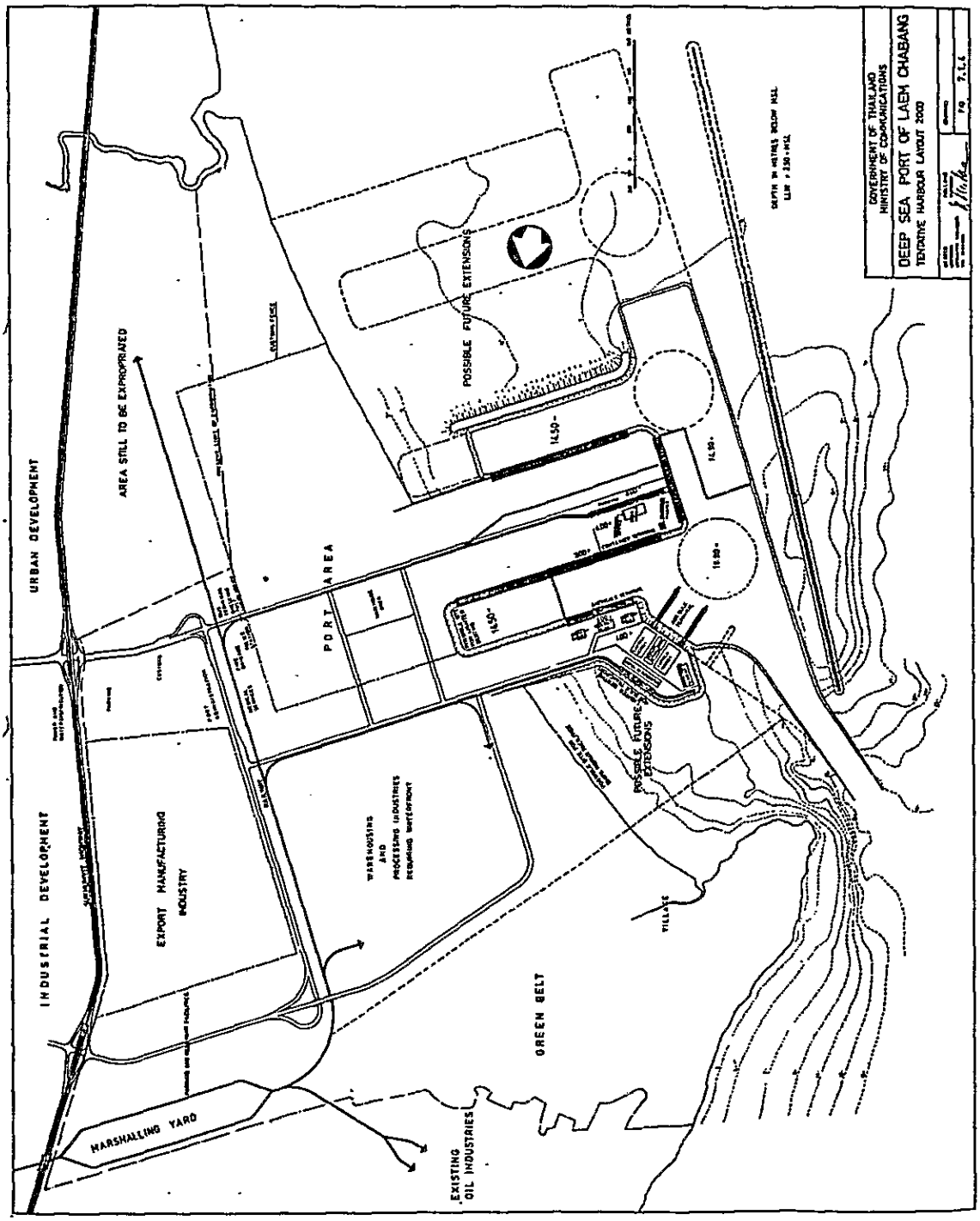
一方，サタヒップ港は従来Chuk Samet 軍港であったが，１９７８年９月１２日の政府決定により商港化が決定され，１ケ月後の１０月１０日タイ海軍の司令長官を議長とするサタヒップ商港開発委員会（Sattahip Commercial Port Development Committee）が設立され，商港化の検討が始った。１９８０年オーストラリア政府の援助により調査を行った結果，Sindhus Maunsell Consultants はサタヒップ軍港を商港に転換すべき報告をした。その時のＴＯＲは大水深港の建設に先がけ，単にクロントイ（Klong Toe）（バンコク港）の混雑緩和の為の暫定施設の建設計画に関するものであったが，１９８３年までにクロントイからの貨物の転換が望ましいことを指摘している。

その後，東部沿岸地帯の開発に関する研究が急がれている為，工業開発に決定的影響を及ぼす大水深港の開発に関する調査が同じSindhu Mouncell Consultants に依頼され，同社は，１９８１年３月１６日に最終報告書をＮＥＳＤＢに提出した。（同調査の為のコンサルタントは運輸通信省（Ministry of Communication）の中で働き，同省のメンバーと近密な接触を持ちつつ行った。）（註２）

今後引続き，１９８２年２月より同じくオーストラリア政府援助により，同じMauncell社がサタヒップ港拡張計画のマスタープラン作りの調査を行うことになっている。

（註３）

（註１） 本調査の目的は，Chao Praya River に入港可能な船舶より大型船を入港可能とすること，及びバンコク港の現有施設の混雑緩和を目的としており，1978年のNedeco による想定によれば総投資額約6,930．7百万バーツ（現在では10,000百万バーツを上回ると考えられている。）全体計画の完成に１５～２０年，第１段階としての約1／4の完成に３～４年かかるとみつもられている。計画全体が完成した暁には，取扱能力10.5百万トン／年，ふ頭延長2,800ｍで同時に２１隻に供用しうるとしている。計画の概要は次図のとうりである。


GOVERNMENT OF THAILAND
MINISTRY OF COMMUNICATIONS
DEEP SEA PORT OF LAEM CHABANG
TENTATIVE HARBOUR LAYOUT 2000
URBAN DEVELOPMENT
AREA STILL TO BE EXPROPRIATED
POSSIBLE FUTURE EXTENSIONS
INDUSTRIAL DEVELOPMENT
EXPORT MANUFACTURING INDUSTRY
PORT AREA
WAREHOUSING AND PROCESSING INDUSTRIES REQUIRING WATERFRONT
POSSIBLE FUTURE EXTENSIONS
GREEN BELT
MARSHALLING YARD
EXISTING OIL INDUSTRIES
VILLAGE
14.50-
16.00-

（註２） 調査結果の概要は以下に示すとうりである。

概　　要

1 Projections for import plus export general cargo indicate a total of 6.5 million tonnes per annum (mtpa) to be handled through the deep water port by the year 2000, 90% of which will be containerised. Projections for bulk cargo indicate 2.4 mtpa of imports and 5.2 mtpa of exports through the deep water port by the year 2000. Bulk cargo projections are somewhat uncertain so far ahead.

2 A total of three general cargo berths are required at the new port up to 1990 and eight after 2000. Initial construction should be aimed to meet the 1985/90 demand by the provision of two high capacity container berths and one multi-purpose berth.

3 Depending upon more detailed confirmation of bulk cargo projections, a total of nine bulk cargo berths are required after 2000. These berths will be grouped in order to handle compatible commodities. Provision is required for vessels of up to 120,000 dwt. Initial construction will be aimed to meet the 1985/90 demand by the provision of six berths together with associated handling and storage facilities.

4 Development options examined are as follows:

Option 1. Development of Sattahip port within present Navy boundary restrictions primarily for bulk cargoes, with development at Laem Chabang for general cargo only.

Option 2. Development of Sattahip port with some easing of the Navy boundary over water and development at Laem Chabang after Sattahip has reached capacity.

Option 3. Development of Sattahip port to its optimum potential assuming no boundary restrictions on land or over water.

Option 4. Immediate development at Laem Chabang for both bulk and general cargoes with minimal development at Sattahip to cater for port demands until Laem Chabang is commissioned.

5 Port layouts have been developed to meet the berth requirements for the various options. The layouts at Laem Chabang follow closely the original Nedeco proposals. The layouts indicate that, by adopting Option 1, it is possible to defer the need for Laem Chabang until about 1995 and, by adopting Option 2, until about 2010. Option 2 and 3 are a direct extension of Option 1. If Option 4 is adopted it will still be necessary to provide minimal facilities at Sattahip.

6 Capital cost estimates are at fixed 1981 costs without allowance for inflation. They include engineering costs but exclude the cost of financing. By 2000 the cumulative total cost of all four options is of the same order, approximately Bt. 8,000 million. However the high initial cost of Laem Chabang makes Option 4 approximately Bt. 1,500 million more expensive in cash flow terms from 1987 to 1995. Financing this early cash flow will cost in the order of Bt. 2,500 million.

7 There is no significant difference between the facilities than can be accommodated at the two sites and thus between Options 1 and 4. However it would be much more satisfactory if the present northern boundary with the Navy at Sattahip was slightly realigned (Option 1 B). Due to the longer period for construction at Laem Chabang facilities in Option 4 cannot be complete until 1987, a year later than for Option 1.

8 It has not been possible to undertake an overall economic analysis of the four options within the time available.

9 If Option 1 is to be adopted, the present lease with the Navy for Sattahip should be reviewed in order to give the Port Authority full autonomy within the port area.

10 An early decision is required regarding funding of the project so that consultants may be appointed for detailed planning and design.

11 A total period of 16 months is envisaged for detailed planning, full design and the calling of all tenders. The works should be subdivided into at least three contracts.

12 Competitive tenders should preferably be called, based on internationally accepted conditions of contract.

13 Assuming consultants are appointed by mid 1981 it should be possible to complete the works at Sattahip for Option 1 by mid 1986 and at Laem Chabang for Option 4 by mid 1987.

14 It will be necessary to stage the construction works carefully to ensure continued operation of the existing facilities at Sattahip and early staged release of the new works.

15 The current works being undertaken at Sattahip are not compatible with the proposals for Option 1. This work should be reviewed as soon as possible to avoid wasted expenditure.

16 In the Ko Si Chang area single user special purpose jetties should be permitted for bulk cargoes subject to Government regulation. It may be prudent for Government to reserve land on the western side of Ko Si Chang for a deep water oil tanker jetty and tank farm.

17 There appears to be little opportunity to develop economically feasible port sites in the Rayong area.

（註３） 本調査のTerms of Refference は付録に示すとおりであり，今回わが国の協力の結果，タイ国政府部内でこのＴＯＲにつき再検討されることとなろう。

2. 天然ガス

１９７１年以来のシャム湾での石油及び天然ガス試掘作業の結果，現在８地点で合計約１７兆立方フィートの天然ガス埋蔵量が確認されている。その為，天然ガス利用関連プロジェクトが次のように考えられており，これらプロジェクトの開発状況及び計画は表２・１に示すとうりである。

(イ) 天然ガス輸送の為のメインパイプラインシステム

(ロ) ガスパイプライン配分ネットワーク

(ハ) １次プロセスと分離

(ニ) 石油化学コンプレックス

(ホ) 石油開発関連プロジェクト

2-1 NATURAL GAS DEVELOPMENT AND UTILIZATION PROJECTS OF THAILAND

PROJECT	INVESTMENT 10^6US$			STATUS OF PROJECT	COMPLETION DATE
	F.C.	L.C.	TOTAL		
1. MAIN PIPELINE SYSTEM					
1-1 UNION OIL BLOCK12-SOUTH BANGKOK	300.0	205.0	505.0	UNDER CONSTRUCTION	SEPT. 1981
1-2 UNION OIL BLOCK10/11 TIE IN & ONSHORE COMPRESSION	98.0	29.0	127.0	FEASIBILITY STUDY	SEPT. 1984
1-3 TEXAS PACIFIC-UNION OIL AND OFF-SHORE COMPRESSION ( )	276.0	99.0	377.0	PREFEASIBILITY STUDY	SEPT. 1985
1-4 UNION OIL (BLOCK 12) TO SOUTHERN SHORE	165.0	74.0	239.0	PRELIMINARY STUDY	MAR. 1980
SUB-TOTAL	839.0	407.0	1,248.0		
2. GAS PIPELINE DISTRIBUTION NET WORK					
2-1 INDUSTRIAL CENTER #1 (POOCHAOSMING PRAI & BANG PLEE)	18.0	18.0	36.0	FEASIBILITY STUDY	SEPT. 1983
2-2 INDUSTRIAL CENTER #2 * (MAIMLINE-SARABURI)	25.0	20.0	45.0*	DETAIL SURVEY & ENGINEERING	JAN. 1983
SUB-TOTAL	43.0	38.0	81.0		

PROJECT	INVESTMENT 10^6U.S.$			STATUS OF PROJECT	COMPLETION DATE
	F.C.	L.C.	TOTAL		
3. GAS PROCESSING PLANT					
3-1 FIRST 350 MMSCFD PLANT & OFF-SITE FACILITIES	186.0	134.0	320.0	PROCESS DESIGN ENGINEERING AND CONTRACTOR PREQUALIFICATION	APR. 1984
3-2 SECOND UNIT OF 350 MMSCFD PLANT	159.0	83.0	242.0	FEASIBILITY STUDY	JAN. 1987
3-3 LPG DISTRIBUTION AND MARKETING	44.0	50.0	94.0	FEASIBILITY STUDY	1982 - 1985
SUB-TOTAL	389.0	267.0	656.0		
4. BASIC PETROCHEMICAL					
4-1 OLEFIN PLANT	230.0	140.0	370.0	FEASIBILITY STUDY	JUNE 1987

	INVESTMENT 10^6U.S.$			STATUS OF PROJECT	COMPLETION DATE
	F.C.	L.C.	TOTAL		
5. ASSOCIATED PETROLEUM DEVELOPMENT PROJECTS					
6-1 CRUDE HANDLING AND STORAGE	167.0	203.0	370.0	PREFEASIBILITY STUDY	END 1985
6-2 TORC REFINERY EXPANSION	455.0	245.0	700.0*	ENGINEERING	END 1985
6-3 PETROLEUM PRODUCT DISTRIBUTION AND RESERVE	24.0	36.0	60.0	PRELIMINARY STUDY	END 1986
SUB-TOTAL	646.0	484.0	1,130.0		
GRAND TOTAL	2,147.0	1,336.0	3,485.0		

REMARK INVESTMENT COST OF EACH PROJECT IS BASED ON THE COMPLETION OF THE PROJECT.
*INVESTED BY JOINT VENTURES BETWEEN PTT. AND PRIVATE COMPANIES.

3. 天然ガスプロセスと分離プラント

第1段階のプロジェクトとしてのガスプロセスと分離プラントは，①ガスからCO_2を抽出するためのベンフィールドユニット，②主要ガスであるメタンから重炭水化物(C_2^+)を分離するための脱メタン設備，③石油化学物質を生産する際の(C_3^+)より重い炭水化物分からエタンを分離する脱エタン設備，④プロパン，ＬＰＧ，天然ガソリンからなる重炭水化物の分離の為の脱プロピレン設備から成り立っており，第1プラントからの期待生産量は次のとうりである。

・メタン　　246MMSCFD (Million Standard Cubic Feet per Day)

・エタン　　340,000トン/年

・家庭用ガス及びプロパン　463,000トン/年

・天然ガソリン　　63,000トン/年

第2ガス分離プラントは1986～1987に操業開始の予定となっている。ガス分離プラントの建設は1984年の第1四半期に完成される計画であり，現在，突堤の建設も含め入札中である。建設までの手続は次のとうりである。表3－1に生産計画を示す。

Issue Prequalification	（PQ公示）	Aug.	21, 1981
Submission of PQ	（PQ提出）	Sept.	14, 1981
Shortlist of Contractor	（ショートリスト作成）	Oct.	15, 1981
Issue of Bid Document	（入札公示）	Nov.	2, 1981
Submission of Bid	（応　札）	Jan.	31, 1982
Award of Contract	（契　約）	May.	1, 1982
Completion of Construction	（完　成）	March.	, 1984

表3－1　Gas production schedule from the sources.

Fiscal Year	Gas Quantity (MMSCFD)	Gas equivalent to Fuel Oil (BPCD)	% of total imported Petroleum
1982	200	34,000	13.8
1983	250	43,000	15.8
1984	250	43,000	15.0
1985	400	65,000	21.1
1986	700*	114,000	34.2
1987	875*	142,000	40.9
1988	950*	154,000	42.9
1989	1,000*	163,000	43.0
1990	1,000*	163,000	39.6

* Collected from TP Source.

4. 石油化学コンプレックス

タイ政府は，天然ガス資源を利用した石油化学コンプレックスの立地を検討中でありこの為，種々の政府機関の調整，政策設定，計画を検討する東部石油化学工業検討小委員会（the Eastern Seaboard Sub-Committee for Petrochemical Industry）が設立された。

国際金融公社（ＩＦＣ）はタイ政府より，石油化学コンプレックスのプロポーザルを策定するため，上記小委員会を援助するよう要請され，これに対し，ＩＦＣはＰＴＴ（The Petroleum Authority of Thailand）とプロジェクトチームを構成し，現在検討中である。上記小委員会の事務局はＰＴＴである。ＩＦＣ及びＰＴＴの検討項目及びスケジュールは表４－１のとうりである。

表 4-1　OVERALL SCHEDULE FOR PETROCHEMICAL COMPLEX DEVELOPMENT AND IMPLEMENTATION

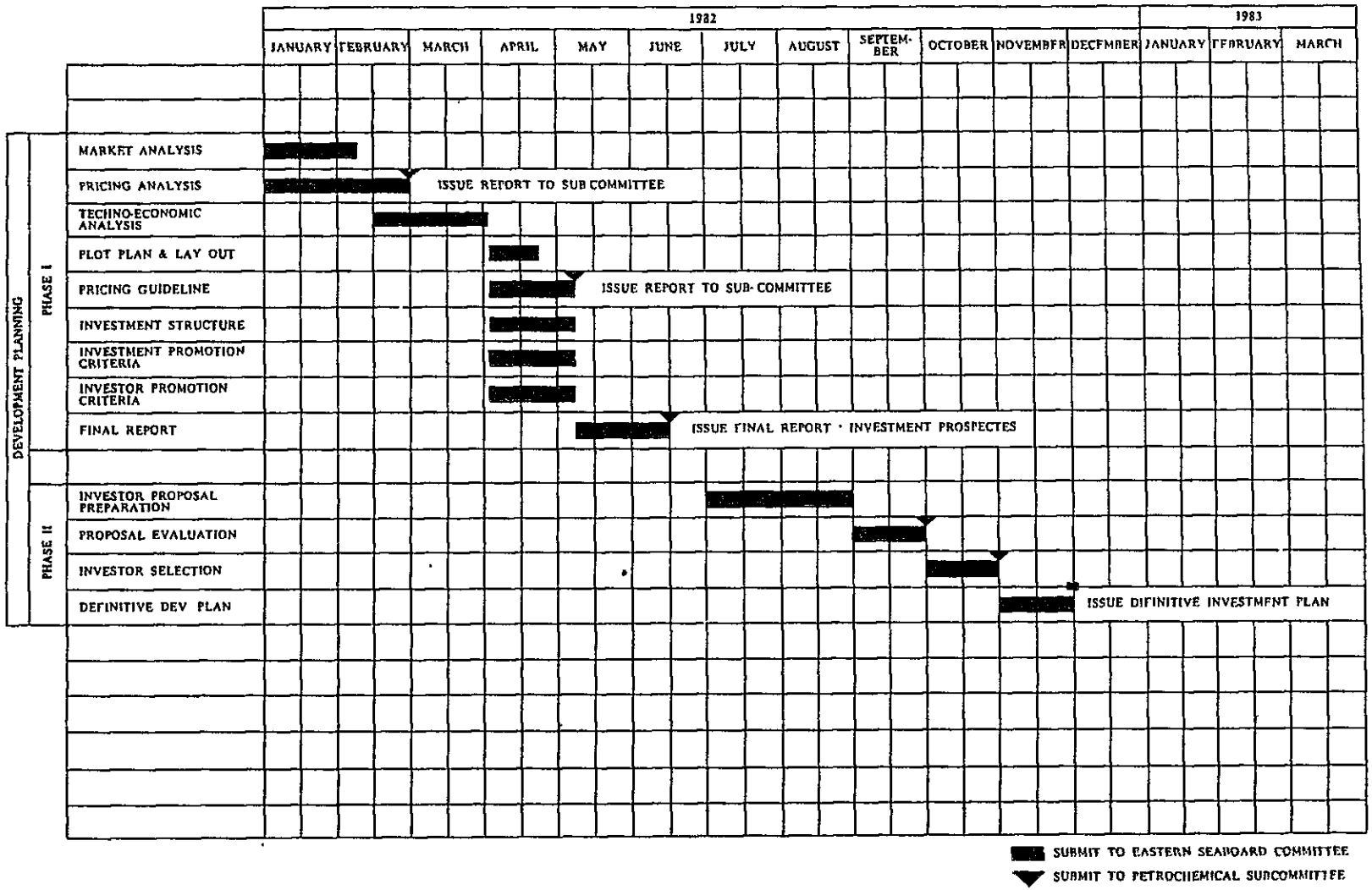


表４－１－１　SCHEDULE FOR PHASE I DEVELOPMENT PLANNING

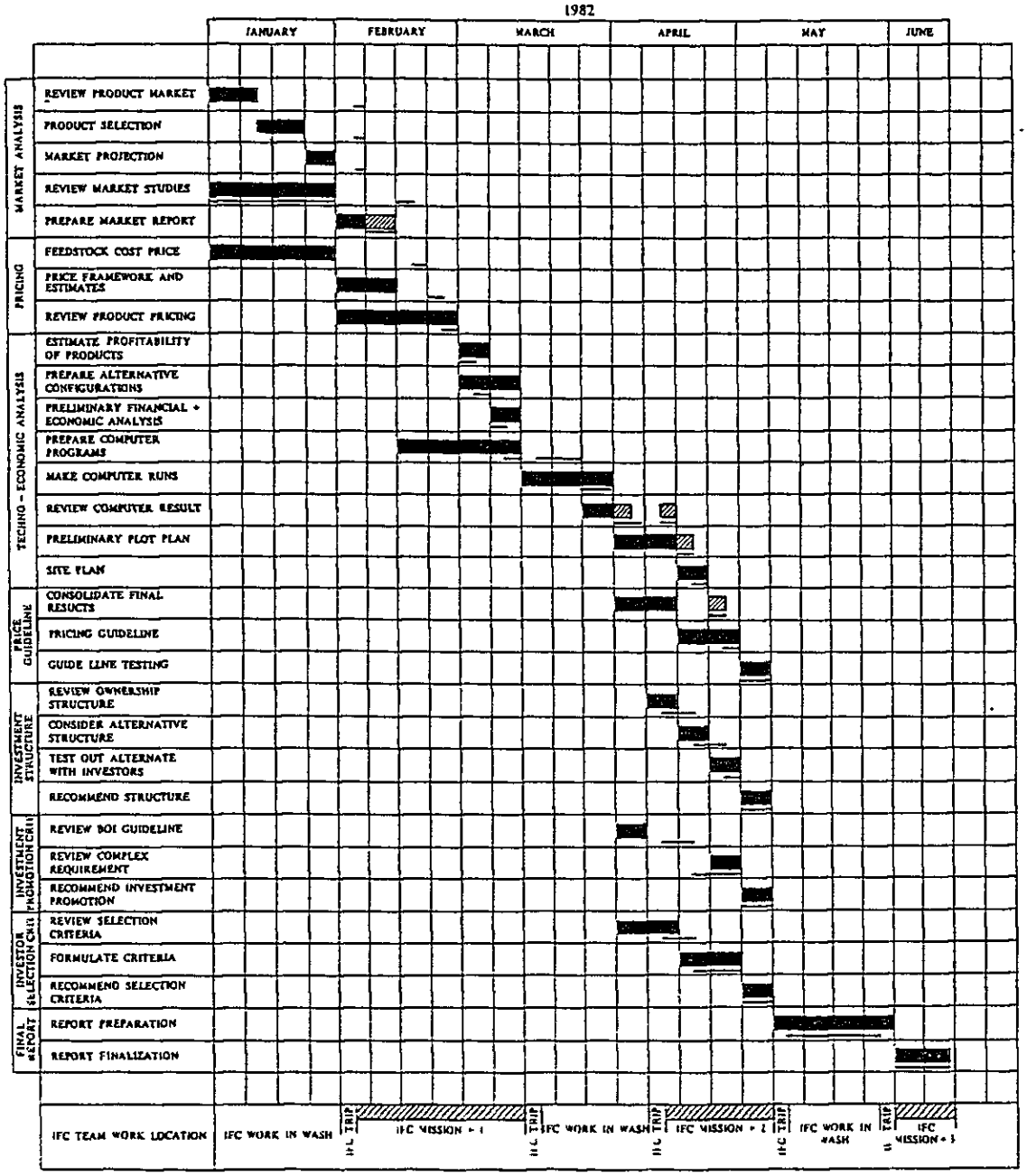
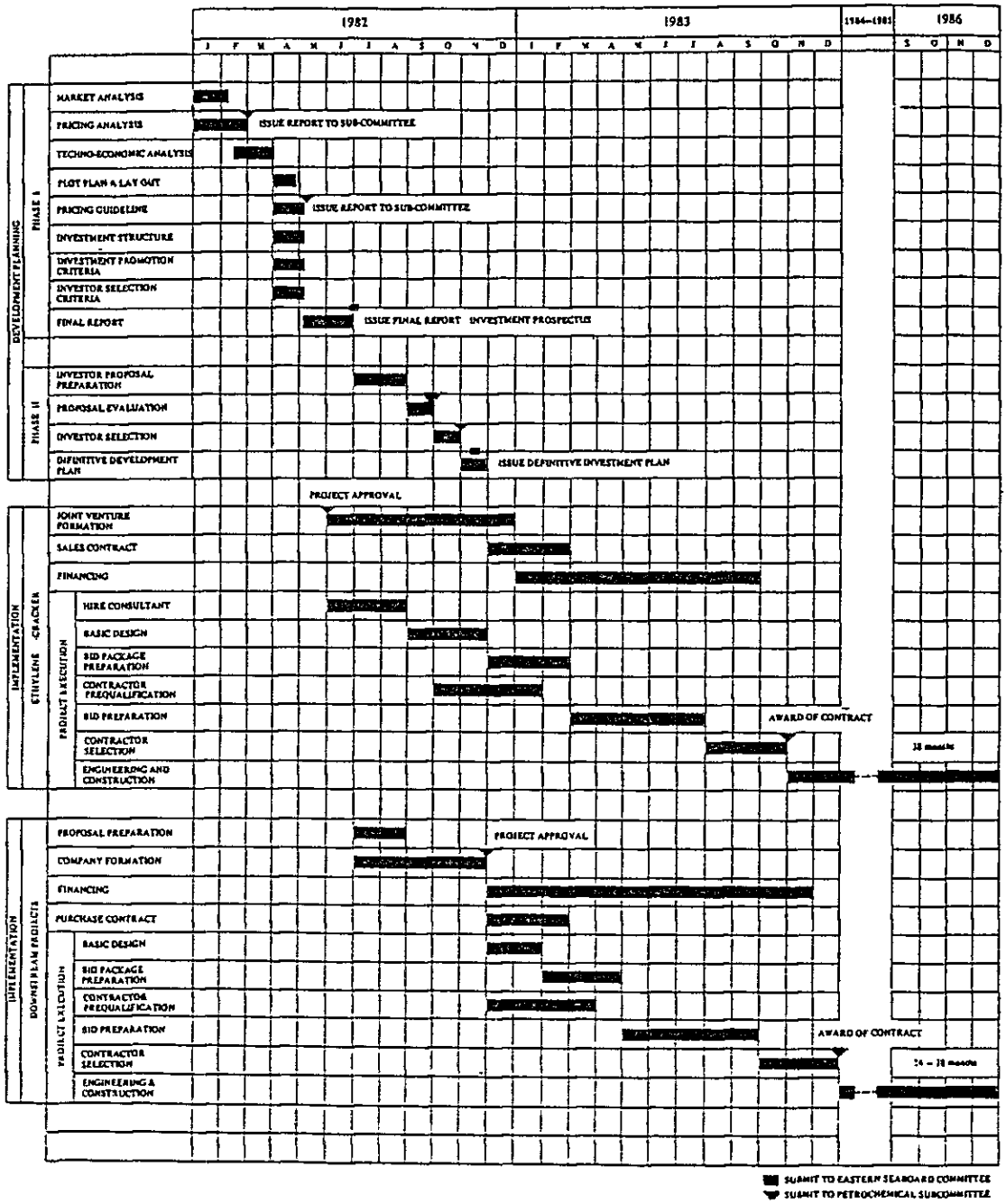


表４－１－２　　OVERALL SCHEDULE FOR PETROCHEMICAL COMPLEX DEVELOPMENT AND IMPLEMENTATION



5. 肥料コンプレックス

スウェーデンのSWEDYARDS DEVELOPMENT CORPが調査を実施し，１９８１年１０月に報告書を作成し，現在，民間投資家の為の案内書（案）を作成している。詳細設計は各企業が実施することとなっている。この案内書によると，立地場所はMarb Chalood の近隣の工業用地の中の海岸線に面した位置で，最小限３００,０００ ㎡であり，将来の拡張用を考慮に入れると約５００,０００㎡が考えられている。

又，雇用人数は約７５０人，所要電力２５MW，水量1,０００㎥／h と想定され，サタヒップ港においては，次のような施設が必要となると想定されている。

Port facilities at Sattahip

The following facilities and services are the preliminary requirements at the port of Sattahip when applied to the optional proposal:

Ammonia storage	15000 ton
Urea bulk storage	25000 ton
Storage for bagged products	25000 ton
Phosphoric acid tanks	20000 m^3
Sulphuric acid tank	1000 m^3
Potash Storage	20000 ton

Ship loading facilities:

Bulk loading capacity,	500 ton/h
suitable for ships up to	20000 dwt size
Bag loading capacity,	150 ton/h
suitable for ships up to	10000 dwt size
Ammonia loading capacity,	500 ton/h
suitable for ships up to	15000 dwt size

Ship unloading facilities:

Bulk unloading capacity,	300 ton/h
suitable for ships up to	20000 dwt
Acid unloading capacity,	1000 ton/h
suitable for ships up to	20000 dwt

Railway connections are assumed to be available at the above mentioned storages.

6. ASEAN 岩塩－ソーダ灰

１９７８年１２月にクアラルンプールで開かれた第７回アセアン経済関係委員会により，アセアン工業プロジェクトとして認められて以来，政府決定の立地点であるLaem Chabangが公害問題の為，住民の反対にあい，遅れてきている。しかし，現在ではソーダ灰プラントはChonburi州Sattahip港近くのBan Nong Yaiということで合意し，めだった反対はない。この立地点は公害に関する限り，最適地と考えられている。立地点が決定されてから，タイ国は２回の出資者会議と１回の輸出国会議を開催し，経済的・商業的可能性，ＡＩＰの基本的合意事項に関する補足事項の合意，ジョイントベンチュアーに関する合意等を検討した。会議においては所要資金，資本回収率等の主要な点については合意をみたが，ソーダ灰，塩化アンモニウムの価格，１９８５年から操業する年間200,000トン生産ソーダ灰プラントをインドネシアに建設するという同国のプロポーザルについては，より高次の鉱工業エネルギー委員会（COIME）又はAEMレベルの合意が必要であるとして保留になっている。

プロジェクトの概要は次のとうりである。

(1) ソーダ灰プラント生産能力

- ソーダ灰　　400,000トン／年
- 塩化アンモン　400,000トン／年

(2) 岩塩産掘量

1.8百万トン／年

(3) 総投資額

- ソーダ灰プラント　327.034百万バーツ
- 岩塩掘削　50.589百万バーツ

計　377.623百万バーツ

(4) 税引後内部収益率

9.42％／年

(5) 操業開始

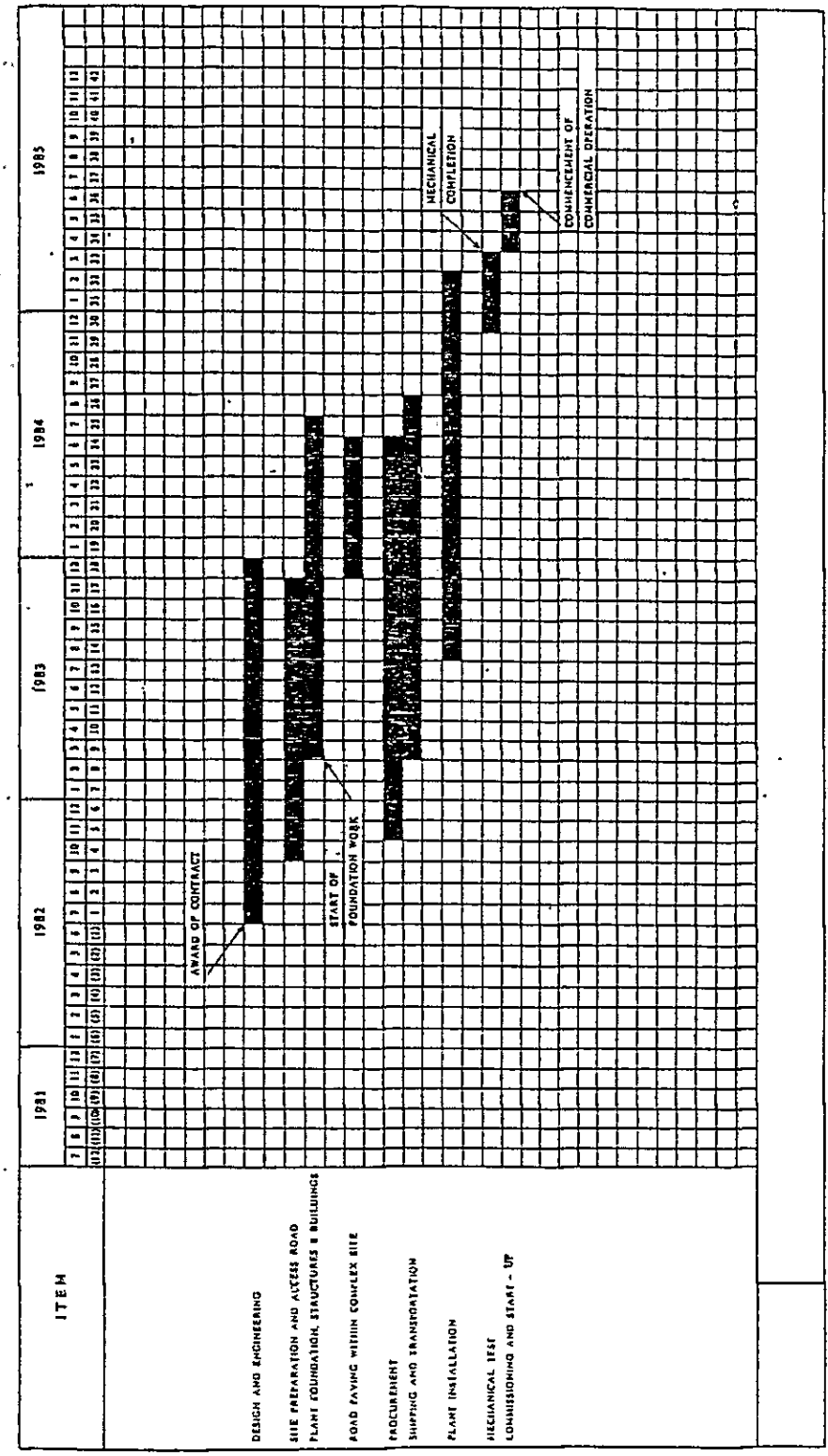
１９８５年６月

以上に加え，タイ政府は日本に対し，Laem ChabangからBan Nong Yaiに立地点が変ったことによる経済的商業的成立可能性，及びBan Nong YaiとラヨンBan Mab Chaloodの立地比較検討につき，技術援助を申し入れ，現在ＪＩＣＡで検討中である。

スケジュールは表６－１のとうりである。

表 6-1 SCHEDULE

PROJECT IMPLEMENTATION SCHEDULE



7. 還元鉄工場

現在のところ，還元鉄のタイ国での生産は輸入スクラップ鉄に対し，商業的に競争し得なしとの判断から検討を中止している。

8. 世銀借款による調査

東部沿岸開発にかかわるマスタープラン調査はCooper & Lybrand 社が１９８１年９月から実施し，１９８２年３月に完了の予定である。

この調査では，東部３州全域にわたる資源調査，基幹産業の経済性開発の基本方針等いわば全体計画のフレーム作りの為の調査を行っている。

同社は１９８２年２月より，同借款により引続き東部臨海工業基地（Rayong 地区）に焦点を合せたマスタープラン調査を行う予定となっている。世銀は，当初１９８２年４月に appraisal を行う予定のEastern Seaboard Engineering loanの可能性を検討する為のミッションを１９８１年９月にタイ国へ派遣し，基本的に当 Engineering loan の貸付に合意した。しかしながら，それに先立ち，タイ国の本プロジェクトに対する準備不足があるので，上記借款に対するＴＯＲを作成する為の事前調査が必要であるとし，技術援助を供与することに合意した。技術援助の内容は以下のとうりであり，これに要する必要額，約＄408,000～＄472,000 は，当初港湾開発調査に振り当てられていた＄472,000 のLoan が，オーストラリア政府のグラントにより，港湾調査がなされた為この技術援助に使うよう勧告した。以下の調査のうち，工業立地調査については，借款供与の手続が簡単であるとの理由から バンコク首都圏交通管理計画（既に借款借用済み）から流用することとしている。これらの内容は，前述世銀から派遣されたミッションがタイ政府に当てた１９８１年９月１６日付ＡＩＤＥ MEMOＩRE（註１）に基づいている。世銀は，これら第１段階の技術援助が終った後，１９８２年２月に再度ミッションを派遣し，４月以降の東部沿岸開発にかかるエンジニアリングローンについての話し合いがなされる予定である。（註１）

（註１） これらの内容については，別添資料Eastern Seaboard Engineering Loan Identification Mission ＡＩＤＥ MEMOＩREを参照の事。

4. 現状における問題点

東部沿岸工業開発計画及び同関連調査に係る問題は，これを構成する個々のプロジェクトが，統一された総合開発計画の下に検討されたものでは無く，第５次５ケ年経済・社会発展計画で初めて東部総合開発計画として位置付けられたところに端を発すると考えられる。例えば，大水深港湾の開発については，当初，増大するバンコク港の需要に対処する為にLaem Chabang，Sattahip 港が検討されてきたが，その後，ASEAN Projectであるソーダ灰計画の出現と，更にシャム湾における天然ガスの開発成功，ガス関連工業の立地に伴い，上記商業港機能に工業港の整備という目的が付加されてきた。しかし，これらの事態が十分整理されないまま，種々の調査が個別に実施され，全体としての構想がまとめられるに至っていない。又，近々，北部地域において，岩塩の産出が実現化し，石油，天然ガスの試掘成功の見込みが浮び上がる等，港湾整備の要因が時々刻々と動く周辺情勢にタイ国政府が十分対応しきれていないと思われる点が多々見られる。従って，現在必要と思われることは，かかる大型工業及び工業港開発に多くの経験を有する我国の総合的な技術アドバイスであろうと思われる。かかるアドバイスの下に，タイ国政府が長期に亘る東部開発の政策を打ち立て，その中でうつべき戦略を総合的観点から組みたてることが必要と思われる。

Ⅲ 今後の協力に対する考え方

1. Minutes of Discussionsの概要

東部工業港開発計画調査団は，１９８２年１月１２日よりＮＥＳＤＢ（国家経済社会開発庁），ＭＯＣ（運輸通信省），ＰＡＴ（タイ国港湾庁）等のタイ国関係機関との協議，また在バンコク世銀事務所との意見交換を行った上で，１月１５日に小林団長とＮＥＳＤＢのサビット部長（スノー長官は不在）との間でMinutesの署名が行われた。

以下，その内容を詳述する。

タイ王国政府からの東部臨海工業開発に関連する工業港開発計画に対する技術協力（以下"協力"と記す）要請に応じ，日本国政府は，国際協力事業団を通じ，運輸省大臣官房審議官小林哲一を団長とする調査団を１９８２年１月１１日から１７日迄の７日間派遣した。

調査団は"協力"に関し，タイ国関係機関と累次の討議，意見交換を行った。討議結果は以下の通りである。

1. タイ王国政府の要請に基づき日本国政府は，本調査団に引き続き，アドバイザリーチームを派遣することを決定した。
2. アドバイザリーチームの目的は，主として東部沿岸工業開発計画に関連した港湾開発のための基本的政策について検討し，タイ王国関係諸機関に対して必要な助言を与えることである。
3. アドバイザリーチームは，現地踏査結果並びに関係機関の情報に基づき，助言メモをタイ国滞在中にとりまとめるとともに，１９８２年３月末迄に最終報告書を作成することとする。上記最終報告書に関して，タイ側より関係諸機関に対する報告書の内容説明が必要となる場合におけるアドバイザリーチームのメンバーの再訪が要請された。ミッションは日本国政府がその要請に対して最大限の努力を払う旨述べた。
4. タイ国政府は，アドバイザリーチームが調査を円滑に実施し得るよう次の項目について必要な措置を行うものとする。
   (1) 調査の実施にあたって必要となる関連データや情報をアドバイザリーチームに提供すること。
   (2) 関係機関訪問のためのアレンジを行うこと。
   (3) アドバイザリーチームに協力するカウンターパートを指名すること。
5. 東部沿岸地域開発のための商・工業港の整備ならびに港湾及び背後地の開発に伴う種々のインフラストラクチャーに関し，タイ国政府への助言・指導を行う協力を引き続き実施して欲しい旨の要請がなされた。
6. 調査団は，要請された助言の継続は日本国政府に受諾されようと述べた。

7. 更に，タイ側はタイ国政府の次期会計年度において，東部沿岸開発計画に関連する次段階の調査について日本政府に対し，要請する可能性があるとの考えを明らかにした。

2. 今後の協力に対する考え方

東部臨海工業地帯の開発計画における最も重要なインフラストラクチャーの1つである工業港の開発計画については，既に昨年4月の閣議において決定された方針に従って，既存のサタヒップ港を拡張することにより対応する方向で検討が進められており，現在は，2月より開始される予定の同港の将来計画についてのM／P調査（豪の援助により同国のコンサルタント Maunsell 社が実施）に対するT／Rの内容につき，タイ国政府部内において検討がなされている状況である。タイ側の計画によれば，上記調査は概ね6ケ月間程度で完了し，引き続き世銀の Engineering Loan により詳細設計が実施される予定となっている。

しかしながら，上記サタヒップ港を東部工業開発のための工業港として整備する計画は，(1)同港は，INDUSTRIAL COMPLEX が立地する予定のラヨン地区と約30KM の距離にあり，工業原材料の搬入あるいは工業製品の搬出時の輸送に関して問題が生ずる可能性があること，(2)同港の地形的条件並びにタイ海軍基地の存在等により，おのずから拡張の余地に制限があること，(3)同港の計画では，既に容量的に限界に達しているものとも言われているバンコック港のセカンダリーポートとしての商港的機能を一部有することとされており，上記の工業港としての機能，あるいはラムチャバン港等他の港湾の機能との調整を図る必要があること等，長期的な視点にたった港湾整備の方向づけという観点から検討すべき点も多い。また，ほぼ同時期に，世銀の借款により開始される予定となっている鉄道・道路・住宅・送配電等のインフラストラクチャーの整備を含む東部臨海工業地帯の開発計画のマスタープランの作成，及びそれに引き続き行われる個別のプロジェクトに対するEngineering Loanの決定にあたっても，この地域における港湾整備の方向付けが極めて重要な要素の1つとなると考えられる。従ってタイ側としては，この地域における商港機能の適切な配分を勘案した工業港開発の将来的展望につき，客観的にアドバイスして欲しいというのが今回の要請の背景である。

タイ側としては，上述した背景から今回は特に緊急に解決すべき問題として，工業港について協力を要請して来たものであるが，今後，更に，東部臨海工業地帯開発計画において，工業港あるいは工業地帯の開発とリンクした形で計画の策定が進められている鉄道，土地利用，都市開発等の各種インフラストラクチャーの整備計画についても，今回と同様な形でのわが国の技術協力を望むとともに，同計画自体の調査についても可能であれば，来年度以降開発調査ベースによるわが国の協力を要請したいとの意向を有していることが明らかになっ

た。これらのタイ側より表明された要請に対し，東部臨海工業地帯の開発が現在タイにとって最も重要な政策課題の１つであり，同計画に対するタイ側の真剣な取り組み方については評価に値すると考えられるが，同計画がタイにとって未経験といっても良い程大規模なものであること，また，東北部の天然ガス，北部の石油開発等の可能性を含めて，現時点では，ラヨン地区のINDUSTRIAL COMPLEX に誘致されるべき工業の種類等につき，未確定な要素も少くないことから，本件に対するわが国の今後の協力の進め方としては，当面，今回のミッションと同様な形式で，本計画のタイ側関係者との開発の基本的方向に関する議題，タイ側による各種調査の進め方，調査結果のレヴュー等を通じてタイ側の政策決定にアドヴァイスを与えるという形の協力が適当であると考えられ，個々のプロジェクトに対する開発調査ベースによる対応については，上記の協力を通じて東部臨海工業地帯開発計画全体のなりゆきを見定めつつ，わが方の協力の必要性等を勘案して検討してゆくことが妥当であると思われる。

なお，今回の調査団の派遣については，タイ側の要請に対してわが国が極めて迅速な対応を行ったことが先方より大きな評価を受けたと考えられることから，今後かかる緊急度の高いプロジェクトに対する協力の実施にあたっては，先方の要請に応じて適切なタイミングで実施することが協力の効果を高らしめることになると思われる。

付　　録

1. Minutes of Discussions

2. 討議メモ

3. 主要面会者リスト

4. 参考資料

(1) Terms of Reference

Master Plan Study of Deep Water Commercial Port Facilities at Sattahip

(2) Eastern Seaboard Engineering Loan Identification Aide Momorie

1. Minutes of Discussions

Minutes of Discussions

on

The Technical Cooperation for the Eastern Seaboard Industrial Ports Development Project

in

The Kingdom of Thailand

In response to the request made by the Royal Thai Government on the Technical Cooperation for Industrial Ports Development Project related to the Development of Basic Industries on the Eastern Seaboard (here-in-after refered to as "Cooperation"), the Government of Japan has dispatched, through the Japan International Cooperation Agency (JICA), the Governmental Mission headed by Mr. Tetsuichi Kobayashi, Assistant Vice-Minister for Transport, for 7 days from 11th to 17th of January, 1982.

The mission had a series of discussion and exchanged views with the authorities concerned of Thailand on the Cooperation. The results of discussions are as follows.

1. On the request made by the Royal Thai Government the Government of Japan has decided to dispatch an advisory team in succession to this mission.

2. The purpose of the advisory team is to study mainly on the basic policy for the ports development related to the Eastern Seaboard Basic Industries Development Project and to give necessary advice to the authorities concerned of the Royal Thai Government.

3. The team will prepare the advisory memoire during its stay in Thailand on the basis of the result of on-the-spot survey and information given by the authorities concerned. The final report will be formulated by the end of March of 1982.

On the report of the study, it is requested by Thai side that if necessary, some members of the advisory team should come back to explain the contents of the report to the authorities concerned of the Royal Thai Government. The mission stated that the Government of Japan would like to make the best effort to respond it.

4. The Royal Thai Government takes necessary measures for the following items in order that the team could conduct its study smoothly:

(1) to provide the team with the available relevant data and information necessary for the study.

(2) to make arrangements for visiting the authorities concerned.

(3) to assign counterpart personnel to cooperate with the team.

5. It is requested that an advisory assistance to the Royal Thai Government should be continued on the development of the industrial/commercial ports as well as various infrastructures involved in the development of the ports and its peripheries for the Eastern Seaboard Development.

6. The mission stated that the continuous advisory assistance requested above should be accepted by the Government of Japan.

7. In addition, the Thai side expressed its view that the probable request would be made on the further study related to the Eastern Seaboard Development Project to the Government of Japan for the next fiscal year of the Royal Thai Government.

Date : 15th of January, 1982

Issued at Bangkok

Dr. Savit Bhotiwihok	Mr. Tetsuichi Kobayashi
Director	Leader
Secretariat Office:	The Mission for the
Eastern Seaboard	Eastern Seaboard Industrial
Development Committee	Ports Development Project

2. 討議メモ

Ⅰ　1月12日

Ⅰ－1　大使館にて状況説明，討議

(10:30～12:30)

Ⅰ－2　ＮＥＳＤＢにてタイ側より東部臨海工業地帯開発に対する説明並びに討議

(15:00～17:00)　　（スノー長官表敬）

Ⅱ　1月13日

Ⅱ－1　ＭＯＣにて討議

(9:00～12:00)（運輸大臣表敬）

Ⅱ－2　ＤＴＥＣにて意見交換

(14:00～14:30)

Ⅱ－3　ＮＥＳＤＢにて討議

(14:30～16:00)

I　1月12日

I－1　大使館

1. 冒頭，久保田参事官より東部臨海工業地帯開発計画の経緯現況等につき概略の説明

(1) タイ国第5次経済社会開発5ケ年計画における柱の1つとしての本件計画の位置づけ

その主要テーマは，

イ．首都バンコックの過密解消

ロ．農業依存型産業構造からの脱却

ハ．輸出振興による外貨獲得

である。

(2) わが国の援助の重要性

イ．大幅な入超に対する補完の意味

ロ．良好な日・タイ関係の維持増進

(3) 東部臨海工業地帯開発計画における当面の課題

工業港として最近脚光を浴びて来たSattahip 港に関して策定中の開発計画，あるいは現在検討中の世銀のエンジニアリングローン（20億円ともいわれる）との関係等において，

イ．タイ側の各種政策が真に信頼のおける調査結果に基づいているか否かの確認

ロ．工業港の立地地点としての他の代替案，例えばラヨン地区における新港建設，あるいは，その他についての比較検討

が必要とされている。かかる問題意識から今回の協力要請が行われたものであり，今後も引き続き協力を得たい旨のスノーNESDB長官の発言もある。

2. 近藤書記官より世銀のM／P等の関連について説明

(1) 現在実施されている英コンサルによるM／P調査（世銀 loan）は，臨海工業地帯に限定されたものではなく，東部地域全体（一部東北地域も含む）を対象とした広域M／P調査であり，内容も都市計画等を中心としたものである。3月にアプレーザルのためのミッションが来ることとなっているM／Pは，東部臨海工業地帯のみに限定されたインフラ関係（当然工業港も含むものと思われる）を含む調査である。全体の調査費は20億円とも言われているが，この一部分につき日本が協力をする意向であれば，上記調査の中からその分を除くことも考えられると思われる。

(2) アドバイザリーミッションの業務の内容としてタイ側が希望しているものは，事実の確認とそれに基づく適切な助言である。また，今後も小型かつ短期のミッションをタイ側が要望するタイミングで派遣する方向で考えることが本件協力をより効果的なものとするために必要である。

3. ＥＳＣＡＰ入江専門家より別添資料１に基づき，関連港湾に対するこれまでの検討経緯等につき説明

(1) 東部沿岸開発計画の経緯

(2) 従来の港湾計画立案におけるタイ側の体制

(3) ＮＥＳＤＢの発足と，それ以後の計画検討における運輸省（ＭＯＣ）との意見の対立

別添１

東部タイ開発と大水深港湾問題

政治・経済	港湾
1782 チャクリ王朝 バンコクに首都	1782 バンコク港が港として歩み出す
① バンコク港の代替港位置決定問題の発生	
	1951 Port Authority of Thailand (P.A.T.)の設立
	1954 バンコク港の航路泊地拡張，8,000～10,000 DWT MWL.下.28feet(8.5m)
1959 世銀勧告により，国家経済社会開発庁（NESDB）発足	1955～1960 バンコク港航路維持浚渫 6.7百万立米／年
1961 第１次経済開発計画 (1961～1965)	1961 NEDECO（オランダコンサルタント）にバンコク港拡張計画調査委託
	1965 NEDECO，バンコク港東岸（現在のコンテナターミナル）拡張を勧告
1966 第２次経済開発計画 (1966～1970)	

政治・経済	港湾
⑪ ラムチャバン港・サタヒップ港案の登場	
1971 第3次経済開発計画 (1971～1976.9)	
	1972 NEDECO ランチャバン(Laem Chabang)港開発を勧告 (サタヒップ港案と対比) (運輸省下)
1976 インドネシア・バリ島にてアセアン経済閣僚会議 ソーダ灰大規模プロジェクト，タイに割当てられる	
1977 第4次経済社会開発計画 (1977～1981)	
1977 クレアンサク内閣成立	
	1978 NEDECO．ラムチャバン港開発計画を作成提出 総工費6930.7百万バーツ (運輸省下) そこで政府はNESDBに対して，ラムチャバン港開発について世銀に協力要請することを指示 世銀，ラムチャバンを棚上げ，サタヒップ港開発を勧告
	1978 バンコク港東岸壁(コンテナターミナル)供用開始
	1978.9 サタヒップ港の商港化決定
	1979.3 PATの下にサタヒップ，バンコク港管理決定
	1979.6 サタヒップ港開発調査 世銀ローンの下 オーストラリアのMaunsell C.がスタート

政　治　・　経　済	港　　湾
⑪ 工業開発と公害問題に関する社会問題発生	
1980.3　第1次プレム内閣成立 パタヤ住民を中心に，ラムチャバンにソーダ灰工場開発することによる公害反対運動が展開	1980.10 内閣，ラムチャバン港建設を承認，運輸省に対し，さらに作業を進めることを指示
1980.12 プレム首相　CDBIES（The Committee to Develop Basic Industries on the Eastern Seaboard）を発足させる 同時にESBID(The Eastern Sea Board Basic Industry Development Study Sub－Committee）を発足さす	
⑫ サタヒップ港を中心としたラヨン地区工業開発指向	
1981.3　プレム首相指示のCDBIESはNESDB監督下作業の末，レポートを提出 農業大臣，ラムチャバン候補にあったソーダ灰工場のサタヒップ側建設示唆	
	1981.4　Amorn運輸大臣，サタヒップ港をバルク，コンテナ扱い港として10,000百万バーツ投資，12万トンの船舶収容可， ラムチャバンは1995年目標
1981.8　関係省庁，ラヨン地区地価凍結に早急に手を打つよう指示受ける	
	1981.7　東部タイ開発マスタープラン作成のためNESDB　Dr.Snohと Coopers & Lybrand of Eng. サインをとりかわす
1981.9　タイ湾天然ガスパイプライン ラヨン海岸まで布設完	
1981.10 第5次経済社会開発計画発足	
1981.12 第3次プレム内閣発足	1981.12 Royal Thai Navy ラヨンの military safety zone の工業開発用地としての使用不可と発表

I－2　NESDB

1. Dr.Snoh への表敬

(1) バンコックの現状と問題点（水の不足とそれに基づく地盤沈下）

(2) 東部沿岸は，バンコック外の開発拠点構想の１つであり，就中シンボルとしての位置づけ

(3) 日本の持つ港湾開発の経験にもとづくアドバイスの要請

(4) Dr.Savit の日本への招へい

2. 東部臨海工業地帯開発の現状についての説明

（タイ側）　Dr.Savit 以下NESDB, MOC, PAT, PDT の担当者

(1) Dr.Savit より説明

イ. Bankok の人口密度（現在５００万）と工業集中（タイ全体の８０％のシェア）とそれに基づく交通，公害，地盤沈下等の緩和のため衛星都市就中，工業中枢都市の心要性から東部海岸地帯に一大新規工業地帯開発が着想された。

ロ. Laem Chabang 港

商港としての位置づけであり，コンテナーを含む一般貨物を取り扱う。本港の計画については現在見直し中である。

ハ. 鉄　　道

Sattahip までについては，現在建設中であり，Sattahip より東へ行く路線については，計画中であり最終調整が残っている。

ニ. Sattahip 港

オーストラリア政府の援助でMaunsell 社（豪のコンサル）が調査実施中であり，第１段階については来月Ｆ／Ｒが提出される。本港では１ phase において４ berth 整備する計画であり，将来の拡張の余地としては９ berth である。（この１ phase については世銀とも合意済）

１ phase の４ berth については，一般貨物の割当てを２ berth，残りは工業貨物をはりつけることとなろう。本港の制約要因として，海軍基地の存在が考えられるが，基地内の土地にはNavy Security Zone とNavy Protected Zone の２種類がある。前者については，その内部において一切の開発行為は許されていないが，後者については開発の許可をとることによって可能である。

ただし，問題点は以下に述べる工業地帯との連結が必ずしも十分でなく，当面の比較的小規模な工業開発に対してはともかく，将来，工業地帯に輸出志向型産業が立地した場合，問題が顕在化する可能性がある。

ホ. ラヨン地区における新港建設の可能性

a. ラヨン地区はモンスーン季節の風浪の条件が厳しいこと,

b. 従ってかなりの規模の防波提が必要となり，港湾建設の工費が膨大になると予想されること

c. 現在進行中の各種プラント建設時期との整合が得られにくいこと

d. 既にSattahipに既存の施設があること

等の理由から現在では，ラヨン地区への新港建設の可能性は低い。しかしながら，輸出志向型産業が立地し，将来的に新港が必要となった場合，Sattahip 港と併行して貨物を取扱う余地は残している。

ヘ. ラヨン地区工業地帯

- 現在，Cooper & Lybrand社（英コンサル）により，東部地域全体にわたるMacro的な調査が実施中であり，更に詳細な調査が引き続きに行われることとなっている。
- この地帯には，最終的に５０万人の居住を考えている。
- ＩＦＣのローンで石油化学工業のプラントの建設に関する調査を実施中である。
- 肥料工場については，スカンジナビアグループの協力で，1984年完成を目途に調査中である。

ト. 水供給パイプライン

ＪＩＣＡによりＦ／Ｓが終了し，現在詳細設計を実施中である。

チ. 天然ガス関係

- パイプラインは既に，バンコックまで行っており，発電用として使われている。
- 天然ガス分離工場は，８４年完成を目途に現在入札中である。
- ＬＰＧの輸出用突堤はLaem Chabangに完成。
- 今後，新たに発見された天然ガスについては，パイプラインで南タイ（ソンクラあるいはスラタニ）に上陸させ，全体として循環システムを作っていくとの構想もある。
- パイプラインの上陸地点の選定については，３年前にＰＴＴがフロアコンサルタント社の調査結果に基づいて，NESDBを含め他の関係機関とは特に調整せずに決定されている。

(2) アドバイザリーミッションに期待する成果

- 対象は主として港湾についてであり，特に，サタヒップ港の開発計画に関するＴＯＲについてreviewしたうえ内容的な問題の指摘を行う。
- 港湾の開発と工業地帯との関係についてSattahipと３０km 離れていることに

ついての問題の有無。

- 長期的な視点にたって，ラヨン地区に新港を建設することの可能性。
- 今後の協力については，今回の成果をもとに，関係各省とも相談のうえ，決定されることとなると思われるが，港湾の詳細設計等について世銀のエンジニアリングローンで実施するかどうかも含め，将来のことは未だ決定されていない。ただ，少くとも日本に対しては専門的な技術を長期的に得たいと考えている。

(3) 本件計画は，今後８－１０年間の間に５０億ドルの事業費を要する大事業である。

Ⅱ　1月１３日

Ⅱ－1　運輸省（ＭＯＣ）にて

Dr CHITTI（Deputy Under Secretary of State，MOC）より，今回の要請の背景等について概略以下のとおり説明あり，

1. バンコク港の混雑もあり，新港を考えていた。
2. また人口の分散ということから衛星都市開発の必要性も起きていた。
3. 港の開発だけに留らず工業開発も行うものである。
4. このような巾広い計画，その実施についてタイ国では経験をもっていない。
5. 多くのコンサルタントが既に調査を実施したが，それらはあくまでその分野に限ったもので全体的に見ているものではない。

更に，竹内ミッションへの要請事項は以下のとおり考えている旨発言あり。

1. ラムチャバンやサタヒップにおける港湾立地の観点からラヨンへの工業地帯形成の適性はどうか。
2. ラヨン立地が変らないとすると，３地域（ラムチャバン，サタヒップ，ラヨン）のうちで最も適切な港湾立地点はどれか。

引き続き行われた討議のうち主要な点は以下のとおりである。

1. 豪州で行っている調査の現況，並びにそのＴ／Ｒは現時点で変更可能であるか。

82／2月から実施を開始し，期間として６カ月かかる予定である。このＴ／Ｒ自体は，ＮＥＳＤＢが決定するものであり，ＭＯＣに直接決定権があるわけではないが，Ｔ／Ｒを変える必要があるのであればＭＯＣとして意見を述べることは可能である。

2. 商港（主としてコンテナーの取扱い）機能と工業港機能を同時に同じ場所に建設するという考えは持っているか。

商港の要請はバンコクの混雑からも大変重要な問題である。この問題はまさにアドバイスを得たい問題である。

3. 貨物の流動について，これまで調査は実施されているか。

コマーシャルな貨物の動きについては，Port Authority of Thailand が実施してお

り，また工業貨物については工業省（ＭＯＩ）においてなされており，それぞれから情報は得られる。

4. 自然条件データの所在はどうか。

ＰＡＴ，港湾局（Harbour Dept,MOC）の他，必要であればNavy またWeather Bureau Office から入手できる。

5. シンガポールポートオーソリティーから人材が派遣されているときいているがどうか。

サタヒップ港の調査開始時点に，雇ったことはあるが，現在は involve されていない。

6. 現時点でのサタヒップ港開発の考え方はどうなっているか。

まずサタヒップ港に，コンテナ取扱能力を付与するため，コンテナ施設をサタヒップに設置し，将来，東部海岸の工業開発が進んでサタヒップ港にそのための施設が必要となった場合には，コンテナはLaem Chabang に移すこととなろう。

7. サタヒップ港開発に関するスケジュールはどうなっているか。

１９８４年に工業地帯で操業が開始されることとなり，それに合せることが基本である。基本的には８２／２から６カ月Ｍ／Ｐを実施し，その後３カ月間にEngineering のためのＴ／Ｒをきめ，その後１０カ月～１年間に詳細設計を行い，１９８３年末か１９８４年初めに建設着工となる予定である。

8. 世銀のEngineering Loan との関係はどうか。

それぞれのプロジェクトごとに考えていくことであり，現在，世銀の資金だけで行うことが決定しているわけではない。また，決定の時期も３月以降となろう。

9. このプロジェクトを進めていくに当って，日本からの今後の協力についてどのような形態があるか。

技術的なり，財政的なり，いろいろな形態があり得るが，現在，いろいろな面から考えるべきことが多くあって，どういう形態が適切とはいえない。

ＰＡＴとしては，商港，工業港両方の機能を加味した計画を策定したことがなく，その点での協力，並びに工業港関連で技術者を日本で教育してもらいたい。

Ⅱ－２　ＤＴＥＣにて

アティラ局長より，ＤＴＥＣとしての見解他について以下のとおり説明があった。

1. 本開発プロジェクトは，タイにとって極めて野心的な計画である。

2. ＤＴＥＣの本計画における役割は大きくないが，日本の参加を歓迎するし，技術的，財政的な援助を期待する。

3. 滞在期間が短いことから，多くの情報を得ることは困難であると思われるが，必要な情報はＮＥＳＤＢ，ＭＯＣをはじめとしてＭＯＩや民間部門からも得られる。さらに，

ＩＥＡＴからも別の観点からの意見が聞けると思われる。

4. 今後の協力については，本プロジェクトが巾広く，考慮されるべき事項も多岐に亘っていることから必要と考えており，ＮＥＳＤＢでその決定がなされれば我々はそれをサポートするのにやぶさかでない。

Ⅱ－3　ＮＥＳＤＢにて

Minutes（Draft）について協議

1. Final Report の提出時期等について

「２月にマンセルが調査を開始する以前にディスカッションをしコメントを得ることが，タイ側としては肝要である。Final レポートの内容とアドバイザリーミッションのタイ滞在中に提出されるメモアールの内容とに基本的に変化がないのであれば問題はない。但し，Final レポートについては，提出されるメモアールの内容にもよるが，必要に応じて説明ミッションが派遣されることを希望したい」との意志表示があり，前向きに対応することとした。

2. 今後の協力について

「現在は，余り待てないという時間的制約があり，はっきりした考え方はないが，港の他，土地利用や都市計画といった分野においてアドバイザリーミッションが来タイしコメントやサジェスチョンを行うことを希望したい。来年度（８２／１０～）になれば，これらの内容が固ってくるので，それらについてさらに進んだ調査を日本に要請することもあり得る（その場合，その調査の部分は，世銀からのEngineering Loan からは省かれる）。」との意見が述べられた。いずれの場合も協力を要請してから，実際に協力が行われるまでに時間がかかりすぎるのでは役に立たない。

3. 竹内ミッションのＳ／Ｗ

日本側より，詳細に書くことは問題の内容からなかなか困難であり，従って，いままでに聞いた要請内容やこちらの状況を十分竹内ミッションに説明することとする旨説明。これに関して，タイ側より，基本的に了解した上，「サタヒップ港は貯蔵用地が不足しているので，肥料や化学物資の輸出入については突堤をラヨン地区にして建設することだけでも対応できるのかどうかコメントをして欲しい」旨の意見があった。

3. 主たる面会者リスト

NESDB; (National Economic & Social Development Board)	Dr.	SNOH UNAKUL SECRETARY GENERAL
	Dr.	SAVIT BHOTIWIHOK DIRECTOR SECRETARIAT OFFICE
	Mr.	SOMCHET TAERACOOP
MOC; (Ministry of Communication)	Adm.	AMORN SIRIGAYA MINISTER
	Dr.	CHITTI WACHARASINDHU DEPUTY UNDERSECRETARY OF STATE
	Miss	SACHEE SIRISON INSPECTOR GENERAL
	Mr.	KOVIT KUVANONDA DIRECTOR OF PLANNING DIVISION
	Sen. Lt	PONESAK VONESAMOOT HARBOUR DEPARTMENT
PAT; (Port Authority of Thailand)	Mr.	THARA ROJTHANA GENERAL ADVISOR
DTEC; (Department of Technical and Economic Cooperation)	Mr.	APILAS OSTANADNA DIRECTOR GENERAL
	Mr.	KASEM UNAHASUVAN DUPUTY DIRECTOR GENERAL
IBRD; (International Bank for Reconstruction and Development)	Mr.	JASDIP SINGH DEPUTY CHIEF OF MISSION

4. 主要資料

THAILAND

TERMS OF REFERENCE

MASTER PLAN STUDY

OF

DEEP WATER COMMERCIAL PORT FACILITIES AT SATTAHIP

1. INTRODUCTION

1.01 The Royal Thai Government (RTG) is giving high priority to the development of the Eastern Seaboard as a matter of national policy. The region consists of the three changwats of Chonburi, Chachoengsao and Rayong and covers an area of 13,280 sq km. This region was selected because it is scheduled for substantial investments to follow the development of the offshore gas pipeline which is now onstream and a gas separation plant which is currently being designed. The initial investment focus will concentrate on gas-related industies; proposals have been sought for a fertilizer plant, and a soda ash plant is at an advanced stage of consideration, both plants to be located at sites between Sattahip and Rayong. This region will therefore become a national heavy industries base and an urban-industrial centre which will eventually be able to compete with Bangkok in attracting new development. Heavy industries will be sited in a zone in Rayong near the natural gas pipeline and Sattahip Commercial Port. Several industrial projects which would rely on natural gas are at an advanced stage of preparation and negotiation, and a broader study of the sub-region's development prospects was initiated in August 1981

1.02 The present port facilities at Sattahip are in the process of being expanded on a limited scale, primarily to handle general cargo, with financial assistance from the World bank. In order to ensure a consistent development program, the present planning and construction works

need to be reviewed and revised where necessary to suit the RTG's policy of fully developing the port facilities at Sattahip Commercial Port to meet industrial needs, especially bulk cargo handling. The Port will also provide for general cargo needs on a temporary basis (see para. 1.03 below).

1.03 RTG also intends to develop a new port at Laem Chabang in the future. Construction of facilities at Laem Chabang would be undertaken when sufficient traffic exists to justify them. These facilities would cater for general cargo traffic only since the strategy being pursued by RTG over the long term is to use Sattahip Commercial Port primarily for handling bulk materials and to service the planned Eastern Seaboard Industrial Zone while general cargo would be handled through the Port of Laem Chabang when it is built.

1.04 The intention, therefore, is to further develop Sattahip Commercial Port as a deep water port to handle both bulk and general cargo and, at a later stage, to handle only bulk cargo. Planning for the development of Sattahip Commercial Port must therefore take into consideration the future phased development of Laem Chabang Port for general cargo. The existing Sattahip Commercial Port is to be developed and expanded within the boundary fixed by the Royal Decree (B.E. 2522, A.D. 1979) authorising the Port Authority of Thailand (PAT) to operate Sattahip Commercial Port for commercial purposes.

1.05 The detailed planning of the Port would take into account all previous relevant studies and reports and should be consistent with RTG's established policy for the industrial development of the Eastern Seaboard.

1.06 RTG therefore intends to engage the services of a firm of consulting engineers to investigate the area in the vicinity of the existing Sattahip Commercial Port, to determine the needs and to recommend a phased development plan that will provide adequate, efficient and economically viable port and harbour facilities for a 20 year period.

2. OBJECTIVES

2.01 The objectives of the study are to:

(a) determine the required capacity and necessary operations to be undertaken within the future port area and determine the technical and economic feasibility of the proposed facilities, taking into account both present use and planned development within the port's influence area;

(b) prepare a detailed Interim Master Plan (IMP) up to the year 1990 for the development of commercial port facilities at Sattahip within the boundary fixed by the Royal Decree (B.E.2522, AD 1979);

(c) prepare a schematic Overall Master Plan for the long-term development of Sattahip Commercial Port considering the physical constraints (topographic, hydrographic, oceanographic, etc.) and the existing and planned long-term development of the hinterland surrounding the port. A time horizon of 20 years is to be used. The Overall Master Plan for the full development of Sattahip up to the year 2000 should also be considered as a phased development undertaken in conjunction with the long-term development of Laem Chabang Port (which will be developed for general cargo only);

(d) establish relevant up-to-date background information and make recommendations which will assist in establishing the extent and timing of the 1981-90 port development covered by the IMP; and

(e) present a proposed investment plan showing the financial and economic justification of each major operating component included in the IMP.

(e) present a proposed investment plan showing the financial and economic justification of each major operating component included in the IMP.

3. SCOPE OF CONSULTING SERVICES

3.01 To achieve the objectives outlined above, the consultants shall provide the services and functions given in the paragraphs below.

3.02 Review all existing studies, supplementary information and published government policies related to the proposed development of Sattahip Commercial Port.

3.03 Update and/or provide all necessary data required for the preparation of the Interim and Overall Master Plans including projections for cargo to be handled through Sattahip Commercial Port to the Year 2000, with particular reference to the period up to 1990

3.04 Assess the type and size of vessels likely to use the ports of Sattahip and Laem Chabang to the Year 2000 considering both export, import, transhipment and domestic cargo.

3.05 Determine the most appropriate and economic layout for Sattahip Commercial Port to meet the anticipated demand for port facilities and prepare Interim and Overall Master Plans to cover development up to the Year 2000 by stages in the provision of all these facilities.

3.06 Propose a staged development plan for Sattahip Commercial Port in detail for the period up to 1990, and in outline for the period from 1990 to 2000, and recommend what should be included in the first stage works (to 1990) so that any required development shall be achieved at least economic cost to Thailand, taking into account the anticipated traffic growth over these time periods, likely developments and the economic costs and benefits involved.

3.07 Undertake all necessary topographic, oceanographic, and hydrographic surveys. Recommend any additional geotechnical and soils investigation work and further surveys that may be required prior to the detailed design of the first stage works.

3.08 Analyse the timing and need for necessary facilities and equipment including, inter-alia, sheds, berths, dry and liquid bulk handling requirements (including possible offshore moorings), customs facilities, unitized cargo developments[1] and handling facilities, including all related equipment, administrative and structural requirements. The plans or requirements for major proposed new processing, assembly or manufacturing developments within the port or the port's economic transportation hinterland shall be given full consideration, with particular reference to the proposed Eastern Seaboard Industrial Zone.

3.09 Prepare cost estimates to an accuracy of ± 20 % for all facilities and equipment required in the first stage works. Prepare notional cost estimates for the balance of future works recommended.

3.10 Identify environmental problems that may occur during construction and operation of the port and recommended environmental impact studies and control measures as may be necessary.

3.11 Evaluate the physical environment at the port site and surrounding area and determine whether model testing is necessary. If so, recommend the overall parameters to be used, and the type and duration of modelling required.

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[1] United Nations Conference of Trade and Development, Unitization of Cargo Report by the Secretariat of UNCTAD, United Nations, New York, 1970 Sales No. E71, IID.2 Publication No.. TD/B/C4/75, Unitized Cargo is defined as cargo containerized, palletized, or pre-slung, banded or otherwise grouped so as to reduce the complexity of handling operations of the contents of the unit compared to non-unitized cargo.

3.12 Review all ongoing improvements and planned works at Sattahip Commercial Port. Recommended curtailment or modification of current works and plans which may not be compatible with the probable Master Plan. In order to avoid unnecessary expenditure it will be necessary to report on this aspect as soon as possible after commencement of the study investigations. In consequence, the conclusions of this early report (due within three months of the Starting Date) will require to be based on an initial outline plan of development related to a quick appraisal of the available data.

3.13 Investigate in outline appropriate locations in, near, or offshore from the port area of any existing or planned operation for ship repair or ship-building activities and oil or chemical processing that may be proposed by the Eastern Seaboard Study.

3.14 Prepare outline engineering designs for port structures, civil works, and supporting services required for the first stage works.

3.15 Prepare outline designs and specifications for all general cargo, container and bulk materials handling equipment required for the first stage works. Bulk materials should cover but not limited to cereal products, agricultural products, mineral, chemical and industrial products.

3.16 Provide a financial analysis of future operations as envisaged in the first stage development including cash flow analysis.

3.17 Make recommendations for the first stage of implementation by an appropriate administrative organisation to supervise construction of any proposed works including training, technical assistance, and the use of consultants, as well as for any computing services which may be required to continue the effective use of any models developed and used for determining the proposed developments.

3.18 Provide recommendations, in the form of position papers, regarding measures or policies which should be adopted prior to 1985 with a view to improving existing and anticipated port operations at Sattahip.

3.19 Determine the best use of the available berths, sheds, open areas and other facilities available at the existing Sattahip Commercial Port to handle projected traffic and provide a layout of the available port area which will give the optimum use of the existing facilities. Improvements to the layout of the existing facilities and to surfacing, water supply, electricity, port access and other services should be considered where appropriate.

3.20 Determine the maximum size ship which can enter or leave the port and the limitations of the existing and proposed entrance channel and basin, and recommended any required works to ensure that such vessels can be safely manoeuvered in the port.

3.21 Review prior traffic forecasts and prepare updated traffic forecasts considering the impact of current and future trends in various commodity groups. The traffic forecasts to at least 1990 are to be presented in detail, approximate figures given between 1991 and 2000 and expected trends beyond that date noted.

3.22 Review the impact of current RTG directives associated with cargo movements into and out of the port area. Investigate the effect on net port income of a variation of the current regulations that would allow use of direct delivery systems.

3.23 Evaluate the need for and propose suitable locations for roll on/roll off berths. Consideration is to be given to the accommodation of roll on/roll off vessels with various types of access ramp requirements.

3.24 Review the need and capacity for oil facilities within the port boundary, taking into account the existing oil jetty.

3.25 Consideration is to be given to the necessity for, and possible development of barge and tug mooring facilities and small craft berthing.

3.26 Develop schedules for the implementation of the facilities recommended as part of the 1981-90 development.

3.27 Evaluate the need for and propose suitable locations for bulk storage facilities for, among others, cement, rice, tapioca, fertilizer, sulphur, rock salt, soda ash and rock phosphate, and for other chemical and liquid cargoes.

3.28 In the light of maintenance dredging requirements at Sattahip consider the need for and propose a suitable site for the location of a dredging division of PAT at Sattahip Commercial Port.

3.29 Investigate the necessity for increasing the operational depth and width of the approach channel.

3.30 In consultation with urban planners, review the land access plans developed by others for NESDB in light of present and anticipated vehicle traffic patterns and planned area development.

3.31 Advise on the size and requirement for an additional container freight station, if any, including modifications to any existing facilities.

3.32 Based upon available date, assess the maximum allowable depth of water alongside the existing berths at Sattahip, Commercial Port, determine if this is consistent with the current depth of water in the entrance channel and advise the maximum size of bulk and container ships which can be handled. Recommend any improvement required for the existing water area to handle such ships.

3.33 Review the existing water supply, electricity, communication, port access (road/rail) and other services available to Sattahip Commercial Port and recommend appropriate improvements, if any, required.

3.34 Determine the economic feasibility of the proposed improvements for the project as a whole and separately for the various stages proposed. The sensitivity of the rates of return will be tested for variations in the key parameters.

3.35 Advise on the overall structure for tariffs and port charges and determine the annual financial position for Sattahip for the next five years. In addition provide projections for revenue and expenses, balance sheets and cash flow to 1990.

3.36 Recommend any additional borings that may be required in the area to determine if rock exists which would prevent dredging of a future further extension of Sattahip Commercial Port to the depth required by anticipated shipping.

3.37 Recommend measures to assure the safety of the existing structure with respect to any recommendations concerning the deepening and widening of the entrance channel and basin.

3.38 Prepare Terms of Reference for inviting proposals from consultants for the duties involved in the implementation of the first stage works, namely detailed engineering design, preparation of contract documents and supervision of construction.

4. CONSULTANT'S REPONSIBILITIES

4.01 The consultant shall perform all necessary technical, economic and financial studies and shall carry out or direct the required field investigations as well as the analyses resulting therefrom, as required to achieve the objectives set forth in Section 2 above. The consultant shall perform these studies, investigations and analyses in close cooperation with the Port Authority of Thailand (PAT) which will provide the data and services outlined below. The consultant shall be solely responsible, however, for the analyses and interpretation of all data received and for the conclusions and recommendations contained in their reports.

4.02 Topographic, hydrographic and oceanographic surveys may be performed under subcontracts with specialist firms working under the supervision of the consultants.

The definition of the scope of these surveys, the selection of the specialist firm or firms and contractual arrangements will be the responsibility of the consultant, subject to prior approval by RTG.

4.03 The study will consist of two phases, based on a 20 year traffic forecast. The first phase will be the preparation of an overall development plan for the port, with time horizon extending to the year 2000. The second phase will address itself to the more immediate needs of shippers based on a ten year traffic projection (1981-90), and will include economic and financial analyses as well as a master plan for port improvement up to 1990.

4.04 The consultant shall conduct the studies in close cooperation with PAT, the Ministry of Communications, the State Railway of Thailand (SRT), and the Harbour Department and co-ordinate their work with other relevant studies of potential development in the area. In particular, the studies carried out by or on behalf of RTG, such as the Eastern Seaboard Industrial Development Study, will receive special attention.

5. DETAILED DESCRIPTION OF CONSULTANT'S SERVICES

5.01 The consultant shall review existing traffic data and forecasts and collect additional data, make assumptions necessary to forecast the future development of the economic region to be served by Sattahip Commercial Port and the foreign and domestic seaborne trade served by the port. Attention and consideration will also be given to the impact on Sattahip Commercial Port arising from the development of a possible second general cargo port (i.e. at Laem Chabang) suitable for exports and imports in large, modern, general cargo ships of the type currently operating in the South East Asia region.

5.02 The forecasts of foreign and domestic seaborne trade shall be given by commodity groups using the Brussels Tariff Nomenclature (BTN) separated into incoming and outgoing for each of the years 1981 to 1990, and by broader groupings for the succeeding years 1991 to 2000. The prospects for the use and growth of unitized cargoes and specialized ships shall be considered and included in forecasts of volume and types of commodities to be unitized.

5.03 On the basis of the traffic forecasts prepared and taking into account the cargo handling capacity of the facilities now in existence or planned to 1985 in the present navigable basin, the consultant shall define the need for additional general and bulk cargo transfer and storage facilities. In determining cargo handling capacity, the consultant shall analyse the operational procedure to be employed at the port and consider the improvements that might be introduced to expedite cargo handling. The consultant shall determine the types of commodities (including unitized cargo) to be handled at the new facilities and analyse the requirements for berths, transit sheds, open storage and parking areas, warehouses, access by road and rail , cargo handling equipment, all required services (water, fuel, gas telecommunications, electric power, etc.) and auxiliary shore facilities, such as offices and maintenance shops.

5.04 The consultant shall prepare and evaluate alternative layouts for new port facilities by stages (1981 to 1990 and for a ten year period thereafter) taking into account the hydraulic a d foundation conditions at the site, road and rail connections, services and navigational access. This shall result in a recommended long-range plan for the development of port facilities defining the overall port facility layout, including road and railway connections and the land and water areas required for functional and jurisdictional purposes. The plan shall indicate the general dimension and locations of all major facilities and the proposed

sequence of construction by stages.

5.05 The consultant shall investigate the extent to which future port operations might lead to pollution of air and water and, if necessary, recommend ways to prevent such pollution, considering the draining needs of the area and the proposed methods of dealing with sewage disposal and drainage.

5.06 The port facilities needed to handle the level of traffic anticipated by the year 1990 shall be studied in detail. For the stages of construction recommended to accommodate this traffic, the consultant shall prepare alterative, low cost, preliminary engineering designs suitable for the climate, defining the type of structure and the construction methods and select the optimum desigh. The drawings to be included in the consultant's final report shall given the plan dimensions of all major structures and typical cross sections, indicating clearance dimensions and major features of the proposed design in sufficient detail to calculate and compute construction quantities and cost estimates, which the consultants will also provide. A report on unit costs of the various types of materials, construction and equipment selected will be included. The preliminary designs shall specifically include the rail and road access system, including any quay and transit tracks, reception, sorting, marshalling and departure areas and yards, weigh-bridge lines, side lines, signalling systems, truck access and parking facilities, insofar as they are located within the area within jurisdiction of the port. These designs shall be based on an operational analysis of capacity requirements and traffic flows, including the effect of road and rail traffic generated by activities at the Eastern Seaboard Industrial Zone.

5.07 Specific attention shall be given in the preliminary designs to the clear definition of all services required, such as administrative and security services, equipment maintenance, fencing, fresh and salt water systems (including sprinkler and other fire-fighting systems) oil lines, regular and emergency electrical services, lighting, communication systems, and cargo handling systems, whether for general cargo, bulk cargo, or for

special liquid bulk cargoes. The preparation of the preliminary designs shall be based on design criteria recommended by the consultants. These design criteria shall be explicitly stated and the consultants shall provide a justification for their adoption.[1]

5.08 The consultant shall consider alternative ways of transfer and storage commodities expected to be handled at the new port facilities, including bulk and unitized cargo. The analysis shall take due account of local operating conditions and government policy for development of unitized cargo. The consultant shall outline the various considerations involved in handling unitized cargo in the port on a temporary basis and propose a ploicy for adoption in a separate position paper. The study shall result in recommendations that clearly define the optimum (in terms of costs, maintenance, and quantity and type) proposed handling system for each major commodity to be handled, as well as the number, type and outline specifications of cargo handling equipment required for the traffic anticipated through the year 1990. Global estimates for replacement costs, maintenance and new equipment costs will be provided for the post-1990 period.

5.09 In considering cargo handling equipment and costs, due weight shall be given to economic costs (using shadow prices for labour), to the policy of the government to promote the use of containers at Sattahip Commercial Port, to the possibility that a highly automated cargo handling system will be required and to the impact that labour intensive methods in a part of the port's operations will have on the pricing of all of the port's services and on the speed of those services.

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1 Attention and consideration will be given to the possibility of using wholly or partly prefabricated transit sheds, to modular construction and to construction using local materials.

5.10 The consultant shall study the requirement for dredging and land reclamation and make recommendations regarding the type of dredging equipment most suited for the work. They shall determine the quantities of fill, if any, required for the creation of required new or extended port facilities and the stages and time periods in which the reclamation work should be done, indicating the most suitable sources of fill and sites for disposal of unsuitable material. The stabilization of banks and of the newly created areas will be specifically considered as required by the proposed usage. They shall prepare preliminary drawings indicating the manner and sequence in which the work is to be carried out including design of dredged slopes, retaining levees or construction, etc. as required. The consultants shall make estimates of the yearly maintenace dredging requirements and develop a channel maintenace dredging requirements and develop a channel maintenance program if required.

5.11 The consultant shall study the optimum configuration of navigation channels, turning basins and other works taking into account the regime of the harbour and the projected volumes and movements of ship traffic. The harbour entrance channel shall be studied to determine the technical feasibility and cost of deepening and widening this channel to allow the entry of vessels that are likely to use the port during the next twenty years.

5.12 The consultant shall determine the location, geometry and alignment of any training and protection works required, including preliminary designs. The consultant shall also consider the effect of weather, wind, waves, current and siltation on the safety of navigation through the entrance channel and in the harbour basin and determine the requirements for navigational aids, pilotage and tug assistance.

5.13 The consultant shall consider the prospective flow of traffic by road and rail to and from the new port area and make proposals for linking the new facilities to other parts of the port, and to the

hinterland, taking into account the proposed Eastern Seaboard Industrial Zone. Detailed requirements for the transportation interface at the port boundary shall be co-ordinated with the Eastern Seaboard Study.

5.14 The consultants shall prepare estimates to within $\pm$ 20 % of the cost of final engineering, construction and equipment acquisition for each of the stages of construction recommended to accommodate the level of traffic expected by the year 1990. Due allowance shall be made for cost increases, separated into local and foreign elements, for this period. The estimates shall specifically include the estimated cost of all project related works within the area under the jurisdiction of the port, such as road and rail access and navigation channels. The estimates shall be in the form of tabulation of quantified and unit prices for all major items of work and all equipment and construction materials of which Thailand is a net importer, equipment and supplies of foreign contractors and the estimated profit and overheads of foreign firms involved in design, supervision and construction for the first phase and also for the recommended project design solution as well as for each major alternative project design solution considered. In addition estimates shall be made of the cost of annual maintenace of facilities such as channels, berths, transit sheds, equipment, etc. Indicating the foreign exchange and local cost components.

6. ECONOMIC EVALUATION

6.01 The consultant shall carry out an economic evaluation of alternative development plans with a view to determining, by means of either a benefit cost comparison, or internal rate of return calculations, or a net present value study: (a) the optimum size; and (b) the optimum timing of investments. For this purpose, the consultant's analyses should include:

(a) Estimates of economic benefits by comparing future transport costs with and without the proposed investment. The transport costs include, but are not limited to, costs of ship turn-around

time, and cargo handling and on-shore transport costs. The consultants should assess the extent to which and the manner in which all or part of the benefits through transport cost reduction would accrue to the economy of Thailand and suggest ways in which these benefits may be optimized; and

(b) Estimates of other economic benefits, such as reductions in port maintenance costs and in equipment operating costs, resulting from the proposed investment (taking due care to avoid double counting benefits under this category in relations to these in (a) above.)

6.02 Where possible, a comparison of the economic cost of each major operating component of the project should be carried out, with benefits estimated in(a) and (b) above, for a 20 year life of the investment by making the calculations noted above. The costs of the project include those of engineering, construction supervision and contingencies, including appropriate allocations to the project of the cost of providing access to the port by land and water. Interest during construction will be shown separately.

7. FINANCIAL STUDIES

7.01 The consultants shall make a financial forecast, on a commercial basis, of the financial situation of Sattahip Commercial Port as a whole for each of the five years following the start of construction of the various projects and of the trend thereafter for five additional years. The analysis shall be sufficiently detailed to take explicitly into account the expected distribution of traffic over the various port facilities and the shifts in this distribution as new facilities become operational, thus forecasting and noting the incremental costs and income arising from the implementation of the project.

7.02 The consultant shall make such recommendations as to changes in the structure of port charges as they may deem justified to achieve sound financial results, taking into account work being done by other consultants (for the Port of Bangkok).

7.03 The forecasts shall include revenue and expenditure accounts, commercial cash flow statements, [1] pro forma balance sheet and debt service statements. The following ratios shall be calculated for each year assuming that the port is operating on a commercial basis:

(a) operating ratio;

(b) percentage interest covered;

(c) percentage total debt service covered;

(d) liquidity ratio; and

(e) financial rate of return on:

(i) average net fixed assets in use

(ii) capital employed; and

(iii) equity capital to be established before charging interest and income tax but after charging local or municipal levies or taxes so far as can be estimated but excluding those items if they cannot be ascertained.

Adequate provision shall be made for depreciation, maintenace (including maintenance dredging), and for insurance. Taxes paid to the RTG will be excluded in calculating ratios but municipal taxes will be included.

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[1] Forecast current incomes will be used.

7.04 To provide a consistent basis for evaluating the financial results, the consultants shall review the basis of valuation of fixed assets used by PAT and the economic lives assigned thereto and make such adjustments as they may deem necessary for this purpose. Provision shall be made for necessary replacement of fixed assets during the period under review.

7.05 Cash flow statements shall show the annual and cumulative surplus or deficit of cash available for capital purposes and shall take into account borrowing that may be necessary to finance the cost of development and debt services thereon, distinguishing between foreign exchange and local currency.

8. CARGO FORECASTS

8.01 The Sattahip Commercial Port Study, May 1980, included cargo projections for the period 1980-85 and the long term outlook for 1990. To determine the extent of the 1981-90 development, the cargo forecasts contained in the Report are to be updated. The update exercise will include three subtasks:

(a) Compare cargo volumes reported by the Port Authority of Thailand and the Central Bureau of Statistics for 1980 with the original volumes forecast in the Report;

(b) Based on the NESDB projections for 1980-90 and other applicable data sources, prepare an overview of the expected economic development of the Port's hinterland up to the year 1990 and the long-term outlook to 2000; and

(c) Using the data on recent cargo trends and the economic overview from (a) and (b) above, prepare projections for the period to 1990 and the outlook for cargo volumes in the year 2000.

8.02 The review will concentrate on the facilities required for the 1981-90 development of the Port. The components of port traffic, among others, to be considered in the update include: foreign trade general cargo imports and exports; inbound and outbound coastal general cargoes; homogeneous dry cargoes; and inbound petroleum products. Growth rate assumptions for each cargo component will be compared to NESDB economic projections and other data on supply and demand for commodities.

8.03 The split between containerized, roll on/roll off and other general cargo shipping methods will be reviewed.

Estimates for the 1990 study should be made in the light of reported movements of containers over present and planned facilities and the plans of principal shipping companies.

8.04 The traffic update will take into account the plans for developing an industrial zone in Rayong and will adjust cargo forecasts to reflect probable volumes associated with those developments.

9. PORT OPERATIONS

9.01 Present handling productivities for important types of cargo will be reviewed based on observation and interviews with stevedoring companies. Future productivity rates will be projected and will reflect presently foreseeable increases in productivity.

9.02 Potential roll on/roll off cargo volumes will be identified during the cargo forecast portion of the study. Interviews with agents for shipowners are expected to yield valuable information related to the type of cargo expected, the type of vessels, the ramp configurations, the system of stowage on board and the probable date of implementation of specific services. More specifically, the need to provide shore mounted ramps will be reviewed in detail and, should this equipment be required, recommendations will be presented as to suitable types of ramps.

9.03 A review will be made of relevant data to establish the present productivity rates for the existing port facilities. Based on this review and on discussion with appropriate officials, planned operating and facility improvements will be evaluated to establish the ultimate capacity of the port facilities which will then be compared to revised forecasts to determine when cargo volumes are likely to exceed reasonable berth capacities.

9.04 To establish the magnitude of a possible service area development, interviews will be conducted with potential users including shipyards, marine construction companies, the oil service industry, customs department and various divisions of PAT and Sattahip Commercial Port. Based on the requirements of each potential user, a concept of the service area design criteria, such as land and water areas, water depths and site service requirements will be established. In addition to the interviews, other port developments will be considered in order to establish if and when a service area (a section of the harbour dedicated to these activities) is required and if staging of the development is possible.

9.05 The consultant will investigate the need for model studies (both physical and analytical) to allow proper determination of the design criteria and parameters needed for the detailed design of the required facilities and recommend appropriate studies and study procedures.

9.06 If such studies are required and if RTG should so request, the consultant will carry out, or arrange for the execution, of such studies, incorporating the results in the required reports. The cost of such additional studies shall be subject to negotiation between the consultant and the Government.

10. TIME SCHEDULE AND REPORTS

10.01 The study is expected to result in the proposed layout of the port, preliminary engineering and estimated costs in the form of a draft final report within 6 months after the instruction to commence work

(starting date) in the field and to require about 80 man-months of consultant services to this stage, The consultant shall commence the work within 14 calendar days after receiving "Notice to Proceed". The consultant shall complete the Master Plan Study to the extent defined in the Scope of Consulting Services. The Final Report will be submitted within 60 days after receipt of comments on the draft Final Report.

10.02 Recommendations on the scope of survey work to be undertaken by the consultant and/or specialist firms under subcontract including cost estimate and time schedule shall be submitted by the consultant to RTG within two months of the starting date.

10.03 The consultant shall prepare and submit to RTG the following reports within the time periods indicated:

(a) Inception report (100 copies), within one month after the starting date. The report shall summarise the consultant's findings regarding availability of data, organisation of work, use of counterpart personnel and local services, and the proposed programme of field and laboratory investigations, including schedules;

(b) Progress reports (30 copies), at one-month intervals following submittal of the Inception report, giving a statement of all work performed during the report period, indicating the percentage of work completed, a summary of interim findings and an outline of the work scheduled for the next reporting period;

(c) An Interim Report (100 copies), within three months after the starting date, presenting an evaluation of all alternative solutions studied and containing recommendations for the solution or solutions to be studied in greater details

Recommendations concerning the need for model studies will also be included. The report should summarise the work performed and include sufficient data, including graphics, drawings, and plans to enable RTG to review the recommendations;

(d) A draft final report (100 copies), within 6 months after the starting date, summarising all work performed and the findings and recommendations of the consultant, including maps, plans, drawings and diagrams; and

(e) A final report (200 copies), within two months after the receipt of all comments on the draft final report by RTG incorporating all revisions deemed appropriate by the consultant in consideration of the comments received.

10.04 All reports shall be in the English language. Design calculations, input data, parameters, and final results shall be in the metric system.

11. DATA, LOCAL SERVICE AND FACILITIES TO BE PROVIDED BY

11.01 RTG will provide the consultant with all available data and reports relevant to the study including hydrographic charts, plans and as built drawings. RTG will also furnish the consultant with: (a) the economic development plan of the region; (b) all available statistics on past and present traffic through the port; (c) drawings of existing port facilities, technical data relevant to the study, and any previous studies of the port; (d) financial data on present port operations and cost data on recent construction projects; and (e) report and recommendations concerning planned administrative and financial systems to be introduced into the port.

11.02 In connection with work by the Consultant which requires the co-operation of RTG or other public agencies, RTG will

provide liaison and will ensure that the consultant shall have access to all information required for the completion of the services. In connection with work by the consultant that requires the co-operation of other government agencies, RTG will provide liaison and ensure that the consultant obtains access to all information required for the completion of the project. RTG will assign full-time, technically qualified, counterparts to work with key personnel of the consultant. The counterparts will be assigned for liaison, training and for review of the findings and recommendations of the consultant.

11.03 RTG will assign a qualified counterpart to be responsible for liaison between the consultant and RTG during the whole period of the services.

11.04 The Port Authority of Thailand (PAT) shall provide free of cost to the consultant all available maps, plans, charts, information and data relevant to the works to be undertaken by the consultant and shall also assist in obtaining such information and data from other government agencies and enterprises. However, PAT shall not be responsible for accuracy of such information or data given to the consultant. PAT will also assist the consultant in obtaining any necessary permits, visas, wayleaves, right of way and access, etc., for proper execution of the work assigned to the consultant.

12. PROPOSAL FOR CONSULTING SERVICES

12.01 The consultant shall include at least the details of the following information in the proposal to be submitted: (a) working programme and work schedule; (b) professional requirements; (c) consultant organisation and staffing; and (d) vehicles, commodities, etc.

12.02 The consultant should also include in their proposal their requirements for office space, vehicles, furniture, laboratory facilities, equipment and other things required in carrying out the consultant's responsibilities to provide the services.

AIDE MEMOIRE

Mission Members

Fred Temple
David Cook
Leon Miller
Glenn Mortimer

Bangkok
September 16, 1981

Eastern Seaboard Engineering Loan Identification Mission

Aide Memoire

I. INTRODUCTION AND OVERVIEW OF FINDINGS

A. Background

A World Bank mission consisting of Fred Temple, David Cook, Leon Miller and Glenn Mortimer visited Thailand during September 7-16 to discuss a proposal prepared by NESDB for an engineering loan to study and design transport, industrial and urban infrastructure in the Eastern Seaboard. The mission's work was organized by NESDB's Center for Integrated Plan of Operations (CIPO). The mission met officials from NESDB and several operational agencies in Bangkok and visited the Eastern Seaboard. The background materials and proposal prepared by CIPO provided an excellent framework for the mission and our work program was very efficiently organized. We would like to thank all of the officials whom met, particularly Dr. Savit Bhotiwihok and the staff of CIPO, for their assistance and hospitality.

This Aide Memoire presents an overview of our principal findings and recommendations. It is subject to review and confirmation by the Bank's management in Washington.

B. Overview of Findings and Recommendations

The Cabinet's endorsement in April 1981 of the recommendations of the Committee for the development of Basic Industries on the Eastern Seaboard has provided a framework for the planning and implementation of a development program for the Eastern Seaboard. In July 1981, the Cabinet also approved the creation of CIPO as a section with NESDB to plan, coordinate and monitor the development program. A number of inter-locking committees and working groups have been established, and considerable progress has been made in preparing plans and identifying issues. Furthermore, the Eastern Seaboard Study being conducted by Coopers and Lybrand and associated firms began in August 1981.

The mission recommends that the Bank support the Eastern Seaboard planning effort in two stages. The first stage would consist of technical assistance to be mobilized as soon as possible to provide advisory assistance to strengthen the technical aspects of planning and project review

during the next six months. This assistance would strengthen CIPO and enable it to make technical support available to various operational agencies. This technical assistance has been identified primarily to strengthen the technical input into the following critical activities during the next six months:

(1) Preparation of an integrated program for the development of the Eastern Seaboard: The scope, interrelationships and phasing of the various planning exercises and projects need to be integrated in a comprehensive program which will identify key decisions and constraints and provide a framework for monitoring the preparation and implementation of the development program. CIPO will prepare this program

(2) Site analyses for major industrial projects: Proposals will be submitted for the fertilizer project in early October, and alternate site proposals for the soda ash project will need to be reviewed prior to the meeting of ASEAN economic ministers in December.

(3) Land use and infrastructure corridor analysis for the industrial and urban development zone: The sites chosen for heavy industry projects will partially determine the alignment of major trunk infrastructure, especially a railway spur; these alignments need to be studied in conjunction with the industrial site analysis. More work also needs to be done on strategies for the phasing, interrelationships and land acquisition requirements for industrial and urban development.

(4) Assessment of industrial development potential and promotion strategy: Primary attention has been paid to heavy industries. However, these industries will generate relatively little employment, and small and medium-sized industries will have to be attracted to the area if it is to become a major urban-industrial center. The Eastern Seaboard Study includes an assessment of the area's industrial potential and the conditions necessary to attract industries, but additional input is required to investigate these issues more thoroughly and to disaggregate the results by industrial subsector, firm size and location.

The technical assistance to support these activities includes advisory assistance in project management and analysis and in planning and engineering,

additional manmonths for the industrial analysis in the Eastern Seaboard Study, the development of CIPO's management information system and technical analysis capabilities, and some equipment for CIPO. It is envisaged that this assistance would be initiated in the next few months and be financed from the on-going Bangkok and Sattahip Ports Project. The total cost of this assistance is estimated to be $408-472,000. The assistance is discussed in detail in Part II, and draft terms of reference are attached as annexes.

The second phase of Bank support would be provided through an Eastern Seaboard Engineering loan. The engineering loan would finance studies of transport, industrial and urban infrastructure in the Eastern Seaboard and the detailed design/contract document preparation for projects which would be constructed during the first phase of the development program (approximately 1983-85). The specific components are likely to include detailed design of the expansion of Sattahip port; industrial estates or zones; housing, social facilities, commercial areas, and infrastructure for urbanization; rail and road transport; environmental studies; and management support.

The exact definition of an engineering loan will depend on several studies and activities which are expected to be completed by March 1982. These include the preparation of phased projections of the likely scale and location of industrial and urban development (primarily through the Eastern Seaboard Study); the CIPO programming exercise referred to above; preparation of a more detailed land acquisition program for infrastructure, industrial land and urban development; further progress on the commitment, financing and schedule for the fertilizer project; preparation of a financial policy framework, projections and indicative financing plan for the industrial and infrastructure projects; and the preparation of terms of reference and an organizational plan for the conduct of the studies to be included in an engineering loan.

Assuming these tasks are completed as anticipated, the engineering loan could be appraised in March 1982. It is currently anticipated that the engineering loan would be for approximately $10-12 million. In order to expedite the studies, the Government could initiate recruitment of consultants to conduct the studies immediately after the appraisal while the loan was being processed within the Bank. If necessary, the Bank could consider financing work on studies initiated before loan effectiveness on a retroactive basis. The engineering loan is discussed in more detail in Part III.

II. STAGE ONE: IMMEDIATE TECHNICAL ASSISTANCE PROGRAM

As indicated in Part I, the rationale for the immediate technical assistance program is to provide technical support for specific planning activities during the next six months. This part is divided into two sections which (a) describe the components of the program and (b) discuss its financing and the procedures for recruiting advisors and procuring equipment.

A. Composition of the Program

Project Management/Analysis Advisory Assistance

Project Management/Analysis Advisory Assistance from a recognized consulting or engineering firm is required during an initial period of 10 months. The advisor(s) would provide the technical and project management skills required for coordinating the projects and related infrastructure developments during the period prior the start of the studies to be financed through the engineering loan. The advisor(s) would be a generalist having specific experience in the formulation and execution of such projects. The advisor(s) would provide technical assistance to the Director of CIPO, develop a project monitoring system in conjunction with the management information specialist, and interact with the implementing and other agencies in the formulation of the projects and their related infrastructure requirements. The advisor(s) would be associated with a recognized consulting or engineering firm which could be called upon to provide specific technical information and analyses as required. Draft terms of reference for these services are provided in Annex 1.

Planning and Engineering Advisory Assistance

One planning advisor and one engineering advisor are needed for 4-5 months each to CIPO to assist in industrial project site analysis, land use planning, infrastructure assessments, land acquisition programming, and the preparation of strategies for the development of land identified for initial industrial and urban development. It is anticipated that CIPO would assign these advisors to provide direct technical support to the Physical Planning Working Group, and they would contribute the preparation of an integrated Eastern Seaboard development program by CIPO. They would also work with municipal officials in Pattaya to review existing conditions, update information in the JICA study, and prepare proposals for a component of the engineering loan to improve basic urban infrastructure and strengthen

municipal financial management in Pattaya. The advisors' services would be required from approximately mid-November 1981 until late March 1982, by which time the terms of reference for the urban-industrial planning and design study and the Pattaya study to be financed through the engineering loan should be prepared. Draft terms of reference for these advisory services are provided in Annex 2.

Industrial Development Assessment

Until now most of the industrial planning for the Eastern Seaboard has focussed on heavy industries. However, these projects will generate relatively little employment, and if the broader urban-industrial objectives of the development of the Eastern Seaboard are to be achieved, a wider range of industries will have to be promoted and attracted to the area. The Eastern Seaboard Study includes an analysis of the scale and mix of industries which can be expected and the measures necessary to promote industrialization. However, in order to intensify this analysis and enable it to be disaggregated further in terms of specific locations, industrial sub-sections and firm sizes, the Bank would be willing to consider a request to increase the manpower input for this task by an additional four and a half months. The Project Management/Analysis Advisor could also contribute technical information for this analysis. The terms of reference in chapter 13.1 of CIPO's background documentation for the mission provide a satisfactory general framework for this analysis, but CIPO will provide additional, more detailed specifications of the output to be provided. The analysis would lead to a separate, free-standing report which would be ready in draft form by early February 1982.

Management Information Systems (MIS) and Technical Support to CIPO

Because of the large investments anticipated in the Eastern Seaboard and the interdependence among the projects, it is important that management information systems to analyze, program and monitor the overall program be developed. CIPO intends to contract the Asian Institute of Technology (AIT) develop a management information system and provide specialist technical services to CIPO.

AIT would be expected to provide support in reviewing the economic, financing and scheduling of proposed projects and their alternatives, and to help prepare financial projections and scheduling required for the Eastern Seaboard development program as a whole. This support would facilitate the processing of the diverse sources of information required for a program of

this magnitude and help make relevant information available to the decision-makers in a timely manner.

The first task would be of about nine months duration (October 1981-July 1982) with funds to be provided through the immediate technical assistance component. During this period the consultants would be expected to: 1) review existing systems available to accomplish economic, financial and scheduling analyses and advise CIPO on the most appropriate systems for its needs; 2) provide short-term technical support to conduct specific analyses as requested by CIPO; and 3) prepare a longer-term program for providing technical assistance and MIS capabilities to CIPO.

Equipment

CIPO has only been established recently, and it lacks equipment to carry out its functions. CIPO particularly needs typewriters and reproduction machines to prepare and copy correspondence and reports, projection equipment for presentations, and vehicles. The Bank would be prepared to consider a request for such equipment as part of an immediate technical assistance package. Items of equipment are listed in Annex 4.

Cost Summary

The cost of the immediate technical assistance program is estimated as follows:

	US$ '000
1. Project Management/Analysis Advisory Assistance: 10 man-months, lump sum provision, secretarial support	170-200
2. Planning and Engineering Advisory Assistance	100-110
3. Eastern Seaboard Study Industrial Analysis Add-on: 4.5 man-months	45-55
4. MIS and Technical Services	50-60
5. Equipment	43-47
	408-472

B. Financing and Procedures

The Bangkok and Sattahip Ports Project includes a study of port development on the Eastern Seaboard. The mission has been advised that the Australian Government has agreed to finance this study on a grant basis. The Bank should be advised of this formally after the Australian Government has made a formal commitment. The Bank would be willing to consider a

request from the Thai Government to use up to $472,000 of the funds originally earmarked for the port development study for the immediate technical assistance program outlined above. However, for reasons indicated below, it may be advisable to finance some of the assistance through the Bangkok Traffic Management Project. The request should be submitted in writing through the Regional Mission in Bangkok. After the use of funds up to the ceiling of $472,000 has been approved, the Bank would be advised if NESDB anticipates spending an amount outside of the ranges specified above for any of the specific items.

Bank approval will be required at three stages in the recruitment of the advisors: 1) terms of reference, 2) qualifications of the individuals or shortlist proposed to provide the services, and 3) review of the contract. If the terms of reference attached are employed without substantial modification, no further Bank review will be required. The Bank should be advised through the Regional Mission in Bangkok of the personnel proposed, and comments/approval will be telexed from Washington. The Regional Mission in Bangkok can review the draft contracts; it would be advisable to use a form of contract previously employed for other Bank-financed consultancy services.

The Bank would be willing to consider the use of any consultant recruitment procedures consistent with the Government's laws and regulations. Possible approaches for the various services were discussed, and the following possible options were identified:

Project Management/Analysis Advisory Assistance. NESDB could identify one or a few firms capable of supplying the services without a formal prequalification process. Bank approval of the firm or firms would be required. NESDB could then solicit one or more proposals and negotiate with the firm selected. The Bank would review the proposed advisor's qualifications and the draft contract.

Planning and Engineering Advisory Assistance. In order to expedite the recruitment of the advisors, the terms of reference for these services could be added to the scope of work for the Eastern Seaboard Study. The consultants would be asked to nominate candidates for review by the Government and the Bank. The advisors would report to CIPO in accord with their terms of reference. The services would be paid for through an amendment to the existing contract.

Industrial Analysis. This work would be treated as an adjustment to the existing Eastern Seaboard Study contract.

Because two items may be financed as additions to the existing contract for the Eastern Seaboard Study, it may be administratively easier to finance these items through the Bangkok Traffic Management Project (from which the existing contract is being financed). The Government should indicate its preference for funding arrangements in the formal request.

MIS and Technical Services. It is envisaged that AIT would be asked to submit a proposal to provide services in accord with the terms of reference attached as Annex 3. The Bank would review and comment on the proposal.

Equipment could be procured through prudent shopping procedures, with three price quotations for any items supplied by more than one distributor.

III. EASTERN SEABOARD ENGINEERING LOAN

A. Overview

The mission reviewed CIPO's proposals for the composition of the engineering loan and agreed in general terms that it should include studies of industrial zones and estates urban development associated with the industrial development; highway and rail links associated with the Sattahip port, industrial zone and possible rail traffic to the North and Northeast; a regional transport study; detailed design of the expansion of Sattahip port; and an environmental study. In addition to these components, the mission recommended that the Government should include studies of urban infrastructure in Pattaya (see below) and technical assistance for project management in the engineering loan. Until the additional work outlined in Section C below is completed, it will be difficult to estimate the exact scope of the studies. However, preliminary estimates suggest that the studies identified for the engineering loan would have total costs on the order of $11-14 million.

As indicated in Part I, the mission believes that sufficient information should be available in March 1982 to enable subsequent mission to appraise an engineering loan. A list of the prerequisites and inputs necessary for Bank appraisal is presented in Section C below. The appraisal mission would review the terms of reference for studies which would need to be initiated quickly in order to provide infrastructure for committed industries. The Government would be able to begin recruiting consultants for these studies immediately after the appraisal. Although it would take 4-6 months to process the engineering loan within the Bank, it is unlikely that consultants could be recruited much more quickly. If the recruitment

were to proceed quickly, arrangements could be made for retroactive financing for payments made before loan effectiveness provided that the terms of reference and short list(s) had been approved by the Bank.

B. Comments on the Scope and Composition of the Studies

The mission discussed the materials presented in Chapter 13 of the engineering loan proposal with CIPO and made comments on the specific studies. It was agreed that revised terms of reference incorporating the results of the work outlined in Section C below will need to be prepared as a basis for Bank appraisal. This section offers some recommendations regarding the scope and composition of the studies.

Scope and Packaging of the Studies

The study proposals presented to the mission did not include provision for any detailed design. On the basis of the work to be carried out during the next six months, it should be possible to anticipate the approximate scale of the urban and industrial site development to be implemented during the first phase of the overall development program. Consideration should therefore be given to including funds for the detailed design of the first phase in the engineering loan and incorporating some detailed design in the industrial and urban site development studies. This would expedite implementation by reducing the time needed to secure design funds and to initiate additional studies.

The proposals presented to the mission included seven separate studies (excluding the industrial incentives study now included in the immediate assistance program). However, the industrial zone and estate study, urban development study, railway study, and highway study all include infrastructure within or connected to the area east of Sattahip identified for industrial and urban development. The mission believes that it would be advantageous to package these studies together in a single study for two reasons. First, substantively, the area's development should be planned in an integrated, comprehensive manner, and economies could probably be achieved by having a single team examine the interrelated elements of the development program. Second, procedurely, consultant recruitment can be time-consuming and administratively burdensome, and there may be advantages in reducing the number of studies for which consultants have to be recruited.

The perceived drawback of combining the studies is that projects which will be implemented by several different agencies may be included in a

single study. However, it may be possible to minimize this problem by establishing an interagency project management/technical counterpart team and/or by dividing the consultants into a core team and units located within each relevant agency.

Possible Additional Components: Pattaya Urban Development and Project Management

In addition to the studies included in the proposal, the mission recommended that provision be made in the engineering loan for the design of improvements to urban infrastructure in Pattaya and for project management. In addition to its role as an international tourist center, Pattaya is expected to play an important role in the development of the Eastern Seaboard by providing social facilities and eventually a locus for commercial activities in the region. The city currently experiences severe problems due to inadequate water distribution, water-borne pollution and poor traffic circulation. These problems were reviewed in studies completed by JICA in 1978. These studies identified possible improvements in water distribution, sanitation and traffic management. The possibility of including design studies for these improvements as well as technical assistance to strengthen urban management in Pattaya should be considered in the context of the role envisioned for Pattaya in the regional strategy being developed through the Eastern Seaboard Study. Since a Pattaya Urban Development Study was not included in the list of possible components attached to Mr. Singh's letter of August 14 to Dr. Savit (chapter 12 of the documentation), its inclusion will need to be reviewed within the Bank.

Technical assistance in project management/analysis is included in the short-term assistance defined above. The need for such assistance is likely to continue during the period when the studies in the engineering loan are carried out, and provision should be made for it in the engineering loan.

Transport Studies

The Bank's Transport Division will be responsible for the transportation components of the engineering loan and will participate in the appraisal mission to review the proposals for transport studies.

The timing of the Sattahip port expansion and the railway projects is critical because of the long periods required for construction and design. The Sattahip port expansion masterplan study is expected to start in a 2-3 months, and provision for detailed design will be made in the engineering loan. Due to the urgency of the railway components, it may be appropriate

to finance studies of them through the proposed Sixth Railway Project, which is scheduled to be appraised in October. The staff from the Transport Division will be prepared to discuss this possibility as well as review the other proposed transport components presented in chapters 13.3, 13.5, 13.6 and 13.8 of the documentation.

C. Prerequisites and Inputs for Bank Appraisal of an Engineering Loan

The section lists tasks which need to be carried out to provide a basis for the definition and appraisal of an engineering. An appraisal mission would expect to review information about each task as part of its assessment of the proposed loan.

Review of Strategy Options Presented in Eastern Seaboard Study Inception Report

The consultants' Inception Report in October will outline broad spatial strategy options for the Eastern Seaboard. The report should provide a preliminary assessment of the scale of development which can be expected in the study region and identify broad spatial options for its distribution. In particular, the analysis should help to clarify the extent to which growth can or should be accommodated in existing centers compared to new settlements and provide a framework to help to evaluate whether IEAT should develop an industrial estate at Laem Chabang before the area between Rayong and Sattahip is developed.

Industrial Development Assessment

The expanded industrial development assessment discussed as part of the short-term assistance program will provide an indication of the scale of industrial development likely under different promotional programs. This is a critical input into the definition of an engineering loan because it will define how much industrial site development will be appropriate during the first phase of the development program. The report will identify the impact of policy options for governmental promotion of industrial development in the area, and decisions on these options will be needed to estimate the likely scale of development.

Employment and Demographic Projections in Eastern Seaboard Study Interim Report

Just as the industrial projections are necessary to quantify the requirements for industrial site development, employment and demographic

projections are needed to estimate the requirements for accommodating population in existing and new settlements. These projections will be prepared by late February or early March for inclusion in the Interim Report to be submitted at the end of March. They will provide a basis for determining the amount and types of housing, social facilities and commercial facilities which should be planned and designed as a component of the studies to be included in the engineering loan.

CIPO Development Programming Exercise

CIPO has accumulated a great deal of information about the various proposed heavy industries projects and their infrastructure requirements and about the operational agencies' infrastructure programs. However, this information needs to be analyzed and integrated into an overall development program. The program should identify the expected phasing of the industrial projects and their infrastructure requirements and relate them to the sequence of planning, design, tendering and construction activities necessary to meet them. At a minimum, the exercise should involve extensive bar charting with vertical interdependencies among the activities identified. The objectives of the exercise should be to provide a more detailed indication of critical decisions and bottlenecks, to clarify the planning and design activities necessary prior to the studies to be included in the engineering loan, to refine the definition of the studies in the engineering loan, to provide a basis for monitoring progress. The exercise should be integrated with the preparation of the land acquisition program discussed below. The exercise should also identify the amount of construction and operational labor associated with each project on a periodic basis (e.g., quarterly).

Fertilizer Project Status

Proposals for the fertilizer project are due in early October. This project is particularly important because its location and timing will partially determine the location and requirements for major trunk infrastructure implications of this project, the mission believes that it would be inappropriate to define and appraise an engineering loan until the project has been substantially committed. The process of commitment will include completion of negotiations with the bidder selected by the Government, arrangement of financing, and identification and acquisition of the project site.

Land Acquisition Program

The Government has recognized the importance of early land acquisition and is in the process of making funds available to IEAT to start buying land. However, thus far consideration has only been given to acquiring land for industrial purposes. Land will also be required for urban development, particularly housing, and provision should also be made for its acquisition. A detailed land acquisition program should be prepared which takes account of the likely spatial phasing of development, the land requirements for infrastructure and urban development as well as industrial sites, and the legal mechanisms available for acquiring land for different purposes.

Financial Policies and Projections

The total development program envisaged for the Eastern Seaboard will require a multi-billion dollar public and private investment program during the 1980's. A Financial Advisory Ad-hoc Working Group with both public and private membership has been established to assess these investment requirements and make recommendations regarding financial policies for the development. The output of this group will be an important prerequisite for the appraisal of an engineering loan. The group will need to quantify the total investment requirements for industries and infrastructure, make recommendations about the desired levels and forms of public participation in the industrial projects, and identify public and private domestic and foreign sources of investment. The output should include an indicative financing plan which shows the likely sources and applications of different kinds of funds for the various industrial projects as well as the infrastructure to be designed through the engineering loan. The group should assess the feasibility of mobilizing funds on the scale required and evaluate the impact of the projected investments on Thailand's total foreign borrowing needs, debt servicing burden, balance of payments and public expenditure program. These assessments should be related to the relevant objectives, policies and projections in the Fifth Five-Year Plan.

Preparation of Draft Terms of Reference, Cost Estimates and Organizational Proposals

Revised proposals will need to be prepared for each component of the engineering loan and for the organization of the project as a whole. The proposal for each study should include the following elements:

1. draft terms of reference;
2. a preliminary estimate of the cost of the works to be designed in

the study, the anticipated source of funds for construction, possible cost recovery arrangements during the period of operation, and the expected organizational arrangements for construction and operation;

3. an estimate of the manmonths of Thai and foreign consultancy services required for the study and the costs of these services;
4. an estimate of the government counterpart manmonths and other support services and facilities required for the study and an indication of which agencies will supply the manpower, services and facilities (these requirements will need to be incorporated in the agencies' budgets for FY83 and subsequent years);
5. a schedule for the recruitment of consultants and the conduct of the study; and
6. a proposed shortlist of firms to be invited to submit proposals for the study.

In addition to the proposals for each study, a proposal for the overall organization and management of the engineering loan project should be prepared.

ANNEX 1

Draft Terms of Reference
PROJECT MANAGEMENT/ANALYSIS ADVISOR FOR CIPO

Background

The Kingdom of Thailand is proposing a number of heavy industrial projects as part of the Eastern Seaboard project. These projects would utilize part of the natural gas which has been brought ashore by the Petroleum Authority of Thailand (PTT) at Rayong. The Center for Integrated Plan of Operation (CIPO) of the National Economic and Social Development Board (NESDB) has been charged with the responsibility for coordinating the activities of the industrial zone at Mab Ta Pud including land use, water, power, transport, waste treatment, housing estates and city planning. The core industries in the industrial zone involves a gas separation plant and a number of petrochemical/chemical projects having a total cost of about US$2 billion. At present, CIPO does not have any personnel with experience in the planning, engineering, and project management of such endeavors which is vital if the Eastern Seaboard project is to reach fruition in an efficient manner.

Objective

The objective of these Terms of Reference is to provide CIPO with Project Management/Analysis Advisory Assistance which will provide technical assistance to the Director of CIPO in the planning, analysis and project management of the heavy industrial for the Eastern Seaboard Project and their interrelationship with all associated infrastructure development. The advisory assistance would commence in late-1981 and extend for a period of about 10 months.

Scope of Services

The following advisory services would be provided to CIPO;

1. Act as a staff advisor to the Director of CIPO pertaining to technical matters related to the development of heavy industry for the Eastern Seaboard Project
2. Coordination of projects and infrastructure development in the Eastern Seaboard Project for CIPO
3. Assess and make recommendation on the size and location of infrastructure requirements pertaining to the heavy industries

including water, power, roads, rail, jetty, Sattahip port, and housing estates

4. Interact with the various project implementing agencies; utilities suppliers; road, rail and port agencies; government agencies, consultants, etc. with the aim of providing a coordinated approach to project and infrastructure development
5. Develop the nature, timing, and sequencing of the various projects and activities
6. Provide technical experience related to each of the projects and their infrastructure requirements through direct knowledge and through the back-up a firm with considerable detailed knowledge of the requirements for and implementation of such projects
7. Develop requirements for the Management Information Specialist on the project and activity monitoring relating to the project management activities of the Project
8. Work with the implementing agencies towards the development of common facilities such as a jetty and environmental control facilities
9. Assist in preparation of the engineering loan
10. Make independent assessment of various project economics, viability, financial requirements, etc. for Director of CIPO.

Qualification

The firm providing the assistance may propose to supply a single resident advisor for the 10-month period or the services of two advisors totaling 10 man-months during the period. The Admisor(s) would have the following qualifications;

1. Degree from a recognized university in engineering (preferably chemical engineering, mechanical engineering, or civil engineering). A professional engineers license would be desirable.
2. At least 10 years experience including direct experience in the development and execution or petrochemical/chemical projects and related infrastructure development on a greenfield site. Relevant experience in a developing country would be desirable. Experience with the specific products envisioned for this project also would be desirable.

3. Person should be associated with a recognized consulting or engineering firm with detailed technical expertise in all phases of project management relating to proposed projects.
4. Firm would provide answers to inquiries relating specific details beyond the capabilities of the Advisor.
5. Knowledge of project scheduling and the ability to interact with management information system personnel in the development of the information system.
6. Good verbal and written communications skills and the ability to interact with personnel from diverse agencies.

Scope of Contract

1. 10 man-months of advisory services.
2. A lump sum provision equivalent to 3 additional man-months for support services from the firm to provide specific technical information as required by CIPO. This support could be provided by short-term visits by technical specialists, home office services and/or telecommunication consultations. Expenditures against this provision could only be made with the prior consent of the Director of CIPO.
3. Full-time bi-lingual secretarial services for the advisor.

Government obligations

The Government will provide:

1. furnished office accommodation and supplies;
2. transportation as necessary for the performance of official duties (but not to and from work); and
3. Thai counterparts with technical backgrounds who can assist the Advisor in carrying out his functions and who are expected to assume senior responsibilities in CIPO.

Draft Terms of Reference
PLANNING/ENGINEERING ADVISORY ASSISTANCE

Introduction and Background

The Royal Thai Government is giving high priority to the development of the Eastern Seaboard as a matter of national policy. The region consists of the three changwats of Chonburi, Chachoengsao and Rayong and covers an area of 13,280 sq.km. This region was selected because it is scheduled for substantial investments to follow the development of the offshore gas pipe line which is now on-stream and a gas separation plant which is currently under construction. The initial investment focus will concentrate on gas-related industries; proposals have been sought for a fertilizer plant, and a soda ash plant is at an advanced stage of consideration, both plants to be located at sites between Sattahip and Rayong.

A study of the Eastern Seaboard region was initiated in August 1981 which will, inter alia, analyze and make recommendations concerning industries which are appropriate and feasible and which could complement the proposed large, capital-intensive projects. One task of the study is to assess the prospects for light labor-intensive and agro-industries and the preliminary feasiblity of developing an export processing zone in the sub-region. The consultants will present an Inception Report in October which will review the broad strategic development options and follow this with an Interim Report in March, 1982 giving more detailed industrial, employment and demographic projections.

A Government Working Group with the task of developing land use plans for the Sattahip/Rayong industrial area has recommended that the heavy industries and related new communities and light industry should be located within the vicinity of Mab Ta Pud and Mab Cha Lood between Sattahip and Rayong at a site about 22 km of Sattahip Port and 15 km west of Rayong. This location is considered suitable after consideration of the following:

(i) water availability from Dokkrai Reservoir 20 km to the north;
(ii) the location of the gas separation plant within this site;
(iii) the proximity 115 kv and 230 kv electrical power lines;
(iv) the proximity of the Utapao airport;
(v) the existence of a good highway network and the ongoing construction of the railway between Chonburi and Sattahip;

(vi) the site enjoys approx 10 km of sea frontage and slopes gently from an elevation of 40 m to the sea over a distance of about 9 kms.

(vii) negative environmental effects will be reduced to the location of the site adjacent to the open sea and the distance from Pattaya;

(viii) the proximity of existing port facilities at Sattahip;

(ix) the sparse settlement and use of the land, facilities acquisition of large parcels at reasonable prices; and

(x) the possibility of generating an urban development zone independent from corridor growth of the Bangkok metropolitan area.

There is need to develop alternative land use concepts for this area, explore phasing requirements and possibilities, prepare a land acquisition strategy, assess expected relationships between industrial and urban development, review the legal framework, the relative roles of public initiative and controls and assess construction and industrial workers housing and their service requirements. In March 1982 information will be drawn together in terms of reference for an urban-industrial development study and detailed engineering leading to the preparation of bidding documents; the Government intends to seek an engineering loan from the World Bank to finance these studies.

In addition to the development of the designated heavy industries zone, the Government intends to improve urban infrastructure in Pattaya as part of the overall Eastern Seaboard regional development program. Pattaya is already a major international tourist center, and it could play an important role as a regional entertainment center and eventual locus for office development. Pattaya suffers currently from inadequate water distribution, severe water-borne pollutions, poor drainage, and traffic congestion. These problems were studied by consultants who prepared 2 masterplan and preliminary designs for infrastructure improvements in 1978. The Government now wishes to up-date these studies in order to prepare terms of reference for a Pattaya Urban Development Study as a component of the engineering loan to be sought from the World Bank.

Organization aspects and need for Advisory Assistance

An Eastern Seaboard Development Committee chaired by the Prime Minister has been set up to deal with policy and funding decisions. The Committee is

supported by a working level Subcommittee chaired by the Secretary General of the National Economic and Social Development Board (NESDB).
The Sub-committee would be responsible for day-to-day decisions and would be serviced by the Center for Integrated Plan of Operations (CIPO) in NESDB which would serve as the Secretariat to the Eastern Development Committee and the NESDB chaired Sub-committee.

In order to sustain the momentum of the planning effort and administrative thrust of the last six months it is necessary to reinforce the technical staff of CIPO and the land use planning agencies.
Accordingly the Government has decided to seek and procure advisory and consulting services, all of which will be contracted through CIPO.

The consultancy and advisory services envisaged are:

(i) project analysis and management to CIPO;

(ii) planning/engineering advisory assistance (to CIPO and land use planning agencies);

(iii) industrial analysis with emphasis on the needs and incentives required to support secondary industries (to NESDB and CIPO); and

(iv) management information systems and technical support (to CIPO).

These terms of reference cover the services required under (ii) above i,e. planning/engineering advisory assistance.

Objectives

The objective is to provide direct assistance to CIPO and working groups as directed by CIPO, and to address the tasks listed in the scope of work.

Output

No direct output is envisaged as this is an advisory assignment; in lieu of this however the advisors would:

(i) advise CIPO as required;

(ii) provide technical input to CIPO and working groups on matters listed under scope of work; and

(iii) draft technical materials and papers as directed by CIPO on matters related to the scope of work.

Scope of Work

Offer advice and assistance to CIPO, working groups, and Pattaya Municipality to do the following:

A. Land Use Planning

(i) site analysis for industries, especially fertilizer and soda ash industry;

(ii) corridor analyses, especially for railway spur, main roads and water supply;

(iii) phasing analysis, including advising on what does and does not need to be decided prior to the studies to be included in the engineering loan;

(iv) review of urban development strategy, phasing, and town and country plans; role of housing social facilities and commercial developments; construction workers housing and needs, industry supplied housing, likely private housing initiatives including slum type squatter developments;

(v) preparation of alternative concept/phasing plans; identify "areas of opportunity" where strategic public projects could help guide future patterns of development and potential initial development areas;

(vi) preparation a land use acquisition stragegy and detailed action plan; and

(vii) preparation of terms of reference for urban-industrial development study and detailed engineering (including bidding documents) for engineering loan.

B. Preparation of Comprehensive Eastern Seaboard Development Program

(i) identification of infrastructure requirements for industrial and urban developments;

(ii) preparation of phased programs for the planning design, tendering, construction and operation of components of the program;

(iii) identification of interrelationships among components of the program; and

(iv) preparation of cost estimates for infrastructure.

C. Pattaya Development

(i) Assist in the review of the Pattaya Development Report published in December 1977, by noting and plotting the major development and infrastructural development which has subsequently taken place since the report was drafted.

(ii) broadly assess and tabulate the degree and extent of urban infrastructure needed at the Primary; Secondary; and tertiary levels to cover the period up to 1987, paying particular attention to Water supplies; sewerage; drainage; roads and solid waste collection.

(iii) make rough estimates of cost of the infrastructure needs (including house and property connections where recommended).

(iv) calculate the financial impact (including operational and maintenance costs) of the infrastructure proposals made in C(ii) above and assess thé possibility of effecting cost recovery either directly or through municipal taxes or fees.

(v) assess the capacity of the responsible institutions to undertake the program identified in (ii) above and the land acquisition implications.

(vi) prepare terms of reference for detailed engineering (including bidding documents) for a package of feasible and appropriate programs where there are good prospects for implementation (with a five year horizon) and for cost recovery.

Qualifications of Personnel and envisaged timing and level ofeffort

Two urban specialists with basic qualifications in engineering and planning and/or architecture are required. A masters degree in urban development planning (or the equivalent) or extensive experience in developing, preparing and presenting land use development and phasing plans will be an advantage.

Specifically

One candidate should have experience in industrial and urban layout planning and design. He should be sensitive to the needs of people and the environment and be capable of developing an appropriate spatial and built form response related to indigenous cultures, technologies and aspirations.

The other candidate should be an experienced municipal or infrastructural engineer with construction and urban planning experience. He should be capable of developing cost estimates from raw data and undertaking engineering economy studies and analyses.

Generally, the candidates should be aware of the conditions opportunities and constraints of working in developing countries. They should be accustomed

to working in multidisciplinary teams, be personable and relate well to seniors, and subordinates. The advisors will be required for a period of 4-5 manmonths each making 9 manmonths in total, covering the period mid-November 1981 to end March 1982.

Government Input and Logistical Support

The Government will provide:

1. furnished office accommodation and secretarial support;
2. transportation as necessary for the performance of duties (but not to and from work); and
3. Thai counterparts with technical backgrounds who can work with and assist the advisors and who are expected to continue to be involved in the Eastern Seaboard Development program.

Draft Terms of Reference

MANAGEMENT INFORMATION AND TECHNICAL SUPPORT SERVICES

Background

The Royal Thai Government intends to develop the Eastern Seaboard (including the provinces of Rayong, Chonburi and Chachorngsau) as a national heavy industries base and as an urban-industrial center which will eventually ba able to compete with Bangkok in attracting new development. Heavy industries will be sited in a zone in Rayong near the natural gas pipeline and Sattahip port. Several industrial projects which would rely on natural gas are at an advanced stage of preparation and negotiations, and a broader study of the sub-region's development prospects was initiated in August 1981.

In July 1981, the Cabinet approved the creation of a Center for Integrated Plan of Operations (CIPO) to plan, coordinate and monitor an integrated development program for the Eastern Seaboard. CIPO has the status of a section in the National Economic and Social Development Board (NESDB), and it liaises with and supports the various committees, working groups and operational agencies involved in the specific projects which are components of the overall development program.

CIPO is a new organization, and it requires support to develop management information systems and technical capabilities to fulfil its responsibilities. The World Bank has made technical assistance loan funds available to NESDB to strengthen CIPO. Part of these funds will be used to secure the services of a Project Management/Analysis Advisor during approximately November 1981 through August 1982 and of 9 man-months of planning and engineering advisory assistance from November 1981 through March 1982.

NESDB is also requesting the Asian Institute of Technology (AIT) to prepare a proposal to provide management information and technical support services to CIPO beginning in approximately November 1981.

Objectives and Scope of Services

CIPO is responsible for reviewing a large number of industrial and infrastructure studies and project proposals, integrating them into an overall development program, and monitoring the implementation of the program.

The reviews of specific projects proposed by government agencies and private industrialists will need to take account of their financial, economic, technical, environmental and management aspects. The preparation of an overall development program will require detailed analyses of the requirements and phasing of each separate project and identification of the interdependencies among them. CIPO will need to monitor a diverse range of activities including political and administrative decision-making and budgetary planning as well as the planning-design-tendering-construction-operations sequences for different projects. It is anticipated that the performance of many of these activities could be facilitated by the use of computer analyses, primarily relying on already developed programs and packages.

NESDB is requesting AIT to submit a proposal to support CIPO in the performance of these responsibilities by supplying services to achieve the following objectives:

1. to identify CIPO's immediate and future needs for management information systems and to aid CIPO in the development of such systems including the types, organization, storage and retrieval of information and the design of a periodic reporting system; CIPO's requirements for different types of computational facilities and software should be identified;
2. to help CIPO implement such systems, especially in the preparation, monitoring and periodic revisionof an integrated Eastern Seaboard development program; this would include the provision of training to CIPO staff in the use of the systems; and
3. to make short-term technical expertise available to CIPO: a) to carry out economic and financial reviews of individual projects and the development program as a whole; b) to develop realistic schedules for specific projects and network analyses for the overall program; and C) to monitor implementation.

It is envisaged that the contract would provide for approximately 20 man-months of professional services from AIT during an 8-month period biginning in approximately November 1981. The proposal should distinguish among four types of components:

1. Core team member, including a management information/systems analysis specialist who would work directly with CIPO and liaise with other AIT staff involved in the project;

2. identification of additional staff who could provide the short-term technical expertise specified in item (3) above; a lump sum provision would be made for these services in the contract, and CIPO would specify the tasks to be performed using this provision as required and review the individuals nominated to provide the services;
3. junior technical and non-professional support staff at AIT: and
4. computerized data processing services.

It is expected that this contract would enable CIPO and AIT to develop a working relationship. CIPO will review the need for additional future support services during the term of the contract.

The Proposal

Ten copies of a proposal in English should be submitted to NESDB. The proposal should (1) describe AIT's proposed approach to the provision of the services, (2) present the qualifications and experience of the individual proposed for the position of management information/systems analyst specialist and of the other principal individuals who would be available to participate in the project as requested, and (3) estimate the cost of the services to be provided.

CIPO Equipment Requirements

	Number	Estimated Cost (Baht)
IBM Typewriters (English-Thai)	4	126,400.-
Xerox Machine: Model 4,600	1	300,000.-
Scanner Model 110	1	48,000.-
Mimeograph Printing Set: Model 1566	1	96,000.-
Offset Printing Set:		
Model - Ricoh Offset 1010	1	68,000.-
- Electronic Printer S-1 & Fuser	1	71,000.-
Slide Projector	1	9,700.-
Overhead Projector: Wide Angle lens	1	12,000.-
Screen: 70" x 70"	1	3,200.-
Mini Bus with Air Conditioning	1	295,000.-
Total	Baht	1,029,300.-
	US$ 1/	44,752

1/ US$ 1 = 23 Baht

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