THE MANAGEMENT OF AN INTERNATIONAL JOINT VENTURE

THE CASE OF THE LONG BEACH COAL TERMINAL

By

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ABSTRACT

This paper examines the organizational structure of a multi-participant joint venture established to develop a coal terminal at Long Beach, California. The analysis focuses on the effect of the organization structure upon decision-making and management during the development process. The effectiveness of the decision-making framework in resolving many of the institutional and operational problems is described. The multi-dimensional aspects of the transportation problem are also highlighted.

The project was initiated to plan, develop, and construct a modern coal export terminal at Long Beach Port. Such a terminal would provide a cost efficient transfer of steam (or thermal) coal from rail to seaborne shipping modes. The coal would originate primarily in the States of Utah, Colorado, Wyoming and New Mexico. New electric generating plants in Japan, Taiwan and South Korea would be the destination for the coal.

A number of factors make this coal terminal project an excellent opportunity to investigate features of organizational structures and consequent decision-making in a multi-owner system. These are:

a) Steam coal had a relatively new and fast growing market according to Far Eastern demand projections.

b) The project involved a joint venture with five partners representing diverse interests.

c) A major organizational structure had to be developed in a short time period.

d) The proposed Long Beach terminal location would be subject to many institutional obstacles.
e) The coal terminal represented the last "link" in the coal "chain" as other transport components in the logistics system were already in place.

f) There existed a critical planning and development horizon for this very capital intensive project.

The development of the organization and the expected basis for the project's viability are outlined. The relative advantages and disadvantages of competitive terminal locations on the U.S. west coast and in Canada and Australia are described.

Ironically, the transportation of the coal is the least constraining aspect of the project. The real problems in the project are not related to the physical transportation systems. They reflect a large number of institutional problems which must be resolved through a decision-making framework complicated by a multi-owner organization structure. The roles of various owners, contractors, and individuals are considered in relation to the major problems of environmental permitting, project finance, technology, and energy market risks.

The literature on international joint ventures, distribution channels, and the theory of channel structures is reviewed and compared to various frameworks involved in the Long Beach project. It is concluded that there are a number of similarities between the participants in a distribution channel and the members in a multi-participant joint venture.

An analysis is made of other possible operating formats which may have permitted a less cumbersome decision-making process and still allow for the diverse interests of the partners.
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CHAPTER I

INTRODUCTION

A. PURPOSE

The purpose of this thesis is to examine the organizational structure of a multi-participant joint venture established to develop a coal terminal at Long Beach, California. The analysis focuses on the effect of the organization structure upon decision making and management during the development process. The effectiveness of the decision making framework in resolving many of the institutional and operational problems is described. The multi-dimensional aspects of the transportation problem are also highlighted. The "transportation" involves unloading coal from rail cars, storing the coal in open piles, reclaiming the coal, and loading it aboard ocean going vessels. The total transport distance at the terminal will be less than one mile of conveyors.

The paper demonstrates that the transport of the coal from the trains to the ship is the least technically, operationally, or financially constraining problem. In resolving the transportation problem (so that terminal development and construction can proceed), organizational and institutional boundaries represent the major barriers to completion. These boundaries relate to the interface between various governmental, institutional, financial, legal, social, corporate, private, and other bodies politic. After specifying the organizational and institutional
boundaries, the thesis identifies the effects of these boundaries on the
decision making process during the planning, evaluation, and
implementation of the project. The organizational structure is discussed
as it relates to the framework for the decision making process.

The number of participants (5) involved in the Long Beach project present
some interesting organizational problems. The multi-organizational
decision making framework will be discussed and related to some examples
of international joint venture management and distribution channel theory.

B. BACKGROUND TO U.S. STEAM COAL TRADE WITH PACIFIC RIM COUNTRIES

Coal presently supplies more than 25% of the world's energy requirements.
Indications are that this resource will need to provide between 50% and
60% of the energy required by the world in the next 20 years if the growth
of the world economy is to be sustained. By accommodating these
incremental energy needs coal will "act both as a bridge to the energy
systems of the future and as a foundation for the continued part that coal
will play in the next century".

In the United States, coal is emerging as a strategic national energy
resource. In particular, the Western States are preparing for the
prospect of a major steam coal trade development with the Pacific Rim
allies in Japan, Taiwan and South Korea. Interest in the export potential
of steam coal to the Pacific Rim has been stimulated by a number of
forecasts which indicate an increased general level of demand plus an
increased U.S. market share in this trade. See Table 1.1 for Pacific Rim demand forecast.

The steam coal trade from the U.S. West Coast to the Pacific Rim countries represents a new market. To facilitate the development of this export trade a logistics system is required which is capable of moving the coal from the originating mine in the Western United States to the inventory location of the ultimate user. As with most low valued bulk commodities, the logistics system and related transportation costs form an important part of the product's ability to compete for a market share. In the case of the U.S. west coast coal, the transportation costs represent from 40% to 60% of the delivered price of the product. Improvements in the transportation system resulting in lower costs can significantly affect the competitiveness of particular sources of coal. See table 1.2 for recent CIF prices compared to net mine cost.

It is important to distinguish between thermal and metallurgical coal. Thermal or steam coal is used almost exclusively as a boiler-firing fuel for electricity generation purposes. It consists of both subbituminous and bituminous varieties with a heating range between 7,500 and 13,000 BTU's per pound. Metallurgical coal is used primarily for the production of steel and is derived from high volatile bituminous coal with an excess of 13,000 BTU's per pound. This thesis concentrates on thermal coal as a new export market segment to the Pacific Rim.

The Western United States presently has several logistical systems consisting of producing coal mines, railroads, port facilities, trading
mechanisms, and purchasers. These systems are capable of handling export trade to a maximum level of approximately five million metric tons of steam coal per year. For the trade in steam coal to grow beyond this five million metric ton per year level it is necessary that a large United States West Coast coal port be constructed. The need for such a facility has been a matter of continuing concern for both the public and private sector in the United States over the past several years. To assess this market development and possible impacts on the United States' economy, Federal and State Governments have participated in several major studies which examine the world energy needs during the next twenty years, the emerging steam coal export trade, and the possibilities for U.S. participation. The most notable of these reports are:

(1) The MIT World Coal Study (WOCOL) — involved a large number of organizations from 16 major coal using and producing countries. These groups spent one and one-half years assessing the use of coal as an energy source during the next two decades; 4

(2) The Inter-Agency Coal Export Task Force — established by President Carter and headed by the Department of Energy for the purpose of identifying courses of action which could be followed by various Government and private organizations as a means of increasing U.S. coal exports; 5

(3) The Westpo study — prepared on behalf of the Western Coal Export Task Force under the auspices of the Western Governors Policy Office. This study included participation by users, producers, transport industry, and State Governments in an attempt to provide a comprehensive assessment of demand in Pacific Basin Countries and expand the long term large volume coal trade between the United States and the Pacific Rim users. 6
Following the publication of these reports, there has been a proliferation of articles and interviews in support of the West Coast steam coal export expansion. Concurrent with these major studies, preliminary investigations were also being made by railroads, coal producers, Pacific Rim trading companies, and a large number of public ports. These investigations involved technical, contractual, permitting, financial, and other issues which would need to be resolved prior to construction of a coal export terminal on the West Coast. The general conclusion has been that the major constraint against expanding the trade to a level above five million metric tons per year is the lack of a modern port facility. The producers, railroads, and ship owners presently have excess capacity and are extremely interested in promoting the development of a port to facilitate the expansion of the trade to the forecast levels.

This situation presents an interesting opportunity to investigate the development of the port component. The terminal has become a focal point far exceeding its importance in the logistics system as measured by the unit price of this function compared to either the delivered coal price or the price of the other components in the system.

Any proposed port facility designed to handle a throughput of between fifteen and thirty million tons per year represents a very capital intensive project. Of necessity there will be number of developers involved. Their diverse objectives regarding participation in the terminal project must be reconciled within the constraints of a multi-organizational decision making environment.
In spite of the optimistic forecasts, uncertainties remain about the role of United States western steam coal in the Pacific Rim Markets. The influences of coal price increases on demand, declining economic growth, and a temporary oil glut tend to discourage development of this trade. The anticipated bonanza in west coast steam coal has not materialized. Instead trade levels and prices have fluctuated considerably in a volatile market over the past three years. Presently there is an over-supply situation. The future trade will remain indeterminant until there is a clear perception of the potential market evidenced by available long term contracts. This will require a more precise statement of supporting government policies and programmes in both the U.S. and Pacific Rim user countries. Although the main issue appears to be a trade-off between price competitiveness and diversity of supply, it is generally believed that the principal Pacific Rim users will not begin to import large quantities of U.S. steam coal until the range of CIF price differences narrows between U.S. and Australian supplies (presently $10.00 per Mtce difference in CIF price).^7

The capacity of the producers, railroads, and the ocean shipping sector is presently adequate to handle the short term forecast trade levels of steam coal. The last remaining link in an expanded west coast logistics system or "chain" is the port terminal. There are a number of proposals currently under consideration for the construction of a large west coast facility but, as indicated earlier, there are no long term contracts available to support the development of this last capital intensive link. A number of topics related to the development process of the Long Beach, California terminal forms the foundation of this thesis.
The second chapter examines the background to the developing Western United States/Pacific Rim steam coal trade. The reasons for the Pacific Rim interest in U.S. steam coal are discussed. Primarily these countries seek to reduce their energy dependence on imported fossil fuels from OPEC countries. This increases the general level of demand for thermal coal. The specific demand for Western U.S. thermal coal will also be increased by the Pacific Rim objective of diversifying their supply sources through reducing reliance on Australia. Balance of payments issues are briefly discussed in this section as they support expansion of the U.S. export trade.

An examination of this developing export trade would be incomplete without a discussion of the present coal demand in the Pacific Rim countries. The present falling demand is part of the slowed economic growth in these countries. It is hardly indicative of a healthy, long range stable trade pattern necessary to support major capital projects in the United States.

The chapter concludes with an overview of the projected U.S. supply and Pacific Rim demand. A comparison of pricing between the supply countries is made including forecasts of price trends over the next several decades. The terminal price in relation to the delivered price of the steam coal is also discussed.

Chapter 3 presents a brief description of the potential locations for a U.S. west coast coal export facility. The present facilities in
California are described. The planned development programs for potential new sites are outlined including the developing companies. The reasons for choosing Long Beach as the example for this thesis are enumerated, including a description of the participating developers.

The fourth chapter introduces the organizational structure for the project joint venture. The project developers and major sub-contractors are presented according to different responsibilities in the conceptual and developmental phases. The role of each of the joint venture participants is analyzed according to what they can be expected to contribute to the project. This relates primarily to (a) their financial/operational strengths and (b) their mainstream complementary business lines.

The objectives of the project group are described. The structure of the organizations they form to oversee the conceptual/planning and development phases of the project are then examined. The committee management concept is compared to other international joint venture examples in the literature. The functioning of the committee management during the planning conceptual phase is examined and several alternatives are discussed.

The chapter concludes with a section on ownership issues between the joint venture partners. Major problems regarding diversity of objectives between the partners are discussed including resolutions to a number of problems.
The fifth chapter continues with the discussion of joint venture management relating to the external issues involved in the legal and institutional environment. A brief introduction to the principal U.S. policies affecting the development of the west coast steam coal trade is presented. This is followed by an in-depth discussion of a number of external development issues. Although there are a great many external issues facing the developers, it was decided to concentrate on a few of these in detail for the purpose of the thesis. The environmental permitting and financial issues are discussed in the greatest detail. The institutional problems in these areas are presented along with proposed solutions. The external issues regarding a foreign joint venture partner, legal, restraint of trade, socio-economic terminal aspects, and effects of new technology or alternative energy forms are also discussed in detail.

The sixth chapter addresses the key issues of implementation and contracting once a decision to proceed with the project has been reached. After the participant changes during this phase have been outlined, the major implementation problems are discussed. The principal areas of activity will initially be the selection of an engineering management company, the commencement of a marketing program, and the completion of the financing package. The organizational start up and union negotiations are also addressed.

In the contracting section, a detailed examination is made of the terminal throughput contract. Special attention is devoted to the commercial, operational and legal terms of this document as they relate to the terminal performance. The contract can be a method of resolving problems
which form a residual part of the development process. This aspect of the contract is discussed with examples. A description is given of the basic coal sales terms. How these terms affect the negotiations with the terminal operator are presented in relation to the acceptance of risk by the negotiating parties.

The chapter concludes with a section which examines the possibilities of variations of supply and demand over a long term contract period. The risks and responsibilities for these variations are discussed in light of the risks anticipated at the time of contract signature.

The seventh and concluding chapter returns to the concept of the effect of the organizational structure on the decision making processes. The organizational and institutional boundaries will be generally reviewed as complicating issues to the transportation problem.

A synthesis of the management structure for the project and its effectiveness is presented. This includes comments regarding how the developers can assist in finalizing an efficient western coal logistics system. This discussion also includes the fragmentation of the present U.S. system and what the possible formation of U.S. trading companies can do to increase the communication and efficiency within this system.

In closing, a number of projections are made regarding the progression of the terminal development in the near term. A number of conceptual issues are highlighted concerning what support any terminal will require prior to final construction decisions.

2. Ibid., p. xvii.

3. B.T.U. - British Thermal Unit, an energy unit defined as the amount of heat required to raise the temperature of one pound of water from 62 degrees Fahrenheit to 63 degrees Fahrenheit.


7. MTCE -- Metric ton of coal equivalent is defined as metric ton of coal with a specific heating value of 12,600 BTU per pound.
### TABLE 1.1

Forecast of Pacific Rim Demand for Steam Quality coal to 1990 and Estimates of Market Share for U.S. Western Case.

(in million metric tons)

<table>
<thead>
<tr>
<th>PACIFIC RIM TOTALS</th>
<th>(a) 1981</th>
<th>(b) 1985</th>
<th>(c) 1985</th>
<th>(d) 1990</th>
<th>(e) 1990</th>
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<td>34.3-37.7</td>
<td>3.6</td>
<td>77.5-92.5</td>
<td>13.3-16.3</td>
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<tr>
<td>Cement</td>
<td>11.1</td>
<td>17.4-19.1</td>
<td>2.3-2.6</td>
<td>20.8-22.5</td>
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<tr>
<td>Iron &amp; Steel</td>
<td>4.0</td>
<td>5.5</td>
<td>1.0-3.0</td>
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<td>65.6-70.7</td>
<td>8.5-10.8</td>
<td>117.7-134.4</td>
<td>18.7-25.5</td>
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TABLE 1.2

Delivered Western Coal Prices To Japan - 12/81

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<th>NET TON MINE</th>
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<tr>
<td></td>
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<tr>
<td>$20.00</td>
<td>$62.30</td>
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<td>$22.00</td>
<td>$64.50</td>
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<td>$24.00</td>
<td>$66.70</td>
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<td>$26.00</td>
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<tr>
<td>$28.00</td>
<td>$71.10</td>
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Source: Presentation of Thomas E. Boettger, President, Western Associated Coal Corp. 
CHAPTER 2

PACIFIC RIM MARKET FOR STEAMING COAL

PART I "EMERGENCE OF THE TRADE

A. DECREASING ENERGY DEPENDENCE ON OIL

The Organization of Petroleum Exporting Countries (OPEC) was created in 1960 by a small number of petroleum exporting countries which were dissatisfied with the way the major oil conglomerates were controlling the industry pricing structure. From this meager beginning OPEC has expanded to include 13 oil producing countries. Commencing with its "declaratory statement of policy" made in 1968, OPEC has effectively gained control of the oil from the major companies. It has then used cartel economics to build huge foreign currency reserves at the expense of Western industrial powers and effectively reallocated a sizeable portion of the world's product. The continuing rapid escalation of oil prices combined with the Arab oil embargo during the autumn and winter of 1973/74, plus the rapid one hundred and thirty percent escalation of oil prices in 1978 and 1979, opened the eyes of Western industrialized nations to their energy vulnerability.

This perceived vulnerability has been the prime factor behind the re-emergence of coal use for energy purposes. Many expect continuing oil price escalation combined with an almost certain scarcity of oil and other
conventional fossil fuels (naturally or politically) within the next several decades. The industrialized nations are re-assessing their energy requirements and potential sources of supply. Their concerns are justified as the stakes are very high; an overdependence on foreign supplied energy resources can materially affect a country's standard of living, its industrial base, and its general economic health. The energy crisis is a reality, to believe otherwise could lead to a national energy catastrophe in less than a generation.

With these serious circumstances surrounding energy planning, coal has become a critical item in most long range energy budgets. As many as ten years ago industry spokesmen could foresee an impending fuel crisis but were confident that conservation measures could resolve the problem. They did not forecast the rapid growth of energy requirements in all sectors of the world economy. At that time, there were few forecasts regarding coal as a major energy source. Instead there were predictions of a "sick coal industry" characterized by the incompatibility of the energy requirements and the environmental goals.2

The use of coal as an energy source in the medium and long term is now a virtual certainty. Nowhere has the need for greater coal use become more apparent than in the Far Eastern nations of the Pacific Rim. These countries (principally Japan, Taiwan and South Korea) are not endowed with an adequate natural resource energy base and must look to external markets to secure their fuels. Japan, Taiwan and Korea were forecast to import 86%, 82%, and 63% respectively of their total primary energy in 1980.
70%, 71%, and 61% of this total primary energy respectively would be supplied by imported oil. H. P. Drewry reports that for electricity generation in Japan during 1978, oil constituted 59% of the fuel, hydroelectric 13%, nuclear 11%, natural gas 11%, and coal 6%.

Japan, Taiwan, and South Korea are presently embarking on a major fuel source diversification program which will result in the increased use of coal as well as liquified natural gas, hydroelectric power and nuclear energy. As alternatives to oil, these sources are being considered in terms of diversification of product and supplier. Their principal objective is to accomplish a smooth transition from oil-fired electricity generation and cement production to coal, nuclear, natural gas, and hydroelectric power. The plans for reducing oil consumption will lead to a large increase in LNG imports and the continuation of the nuclear and hydroelectric development programs. However, in order to fully realize their goals of energy diversification it is forecast that the Far Eastern countries will become one of the largest markets in thermal energy coal. If the expansion of coal fired generating capacity and developments in the cement and steel industries proceed as planned, Japan alone will require 34 million tons of steam coal by 1985, increasing to 65 million tons by 1990.

Table 2.1 indicates clearly the desires of these nations to reduce oil as a fuel for their electric generating capacity. In the period from 1980 to 1990 Japan intends to reduce its oil dependence from 47.4% of projected generating capacity to 24%, Taiwan from 60.3% to 26% and South Korea from
Tables 2.2, 2.3, and 2.4 show the declining oil energy use in the broader spectrum of Total Primary Energy (TPE). As a percentage tag on TPE from 1980 to 1990 oil changes from 70% to 52% in Japan, 71% to 42% in Taiwan, and 61% and 17% in Korea.

The forecasts of energy shares by resource are dependent on a number of key factors: (a) the growth and demand for electricity over the period; (b) the general economic growth and health of the various economies; (c) the uninterrupted expansion of nuclear development programs as forecast; and (d) some stability in the crude oil markets. Most of the studies on this topic have covered a number of scenarios relating to: (1) different economic growth rates, (2) different oil price escalation levels, and (3) moratoriums on nuclear expansion. The thesis will concentrate on an approximation of the base case, (4-6% GDP growth, 2-3% oil price escalation, and continued nuclear expansion). Under an oil and nuclear energy shortfall situation, it is forecast that substitution of coal would cause imports of thermal coal to Japan, Taiwan and Korea to increase by 38%, 57%, and 54%, respectively above the base indications in the period 1980-1985.

B. DIVERSITY OF ENERGY FORMS AND SOURCES

Even in the most pessimistic economic growth scenario, it is apparent that the Pacific Rim countries of Japan, Taiwan and Korea, will substantially increase their imports of steam coal consistent with the objective of reducing their energy dependence on oil. The coal user companies and
responsible government agencies are defining and implementing import strategies which diversify the energy supply among different forms and suppliers.

Several studies have concluded that the supply diversity issue is as important to the three main Pacific Rim importing nations as the delivered price. This has yet to be proven through their purchasing policies. According to the U.S. Department of Energy, Inter Agency Task Force, the Pacific Rim purchasers are seeking to satisfy a number of criteria prior to entering into long term contracts with any supplier nation or company. Their preferences are as follows:

(i) A politically stable country where the government is prepared to support the continuous export of coal for the term of the contract.

(ii) A reasonably harmonious management/labour relationship in the coal producing sector.

(iii) A supply or mine owning company that is of a size, character, and corporate structure that a long term contract will be honored throughout its life.

First a group of countries and companies will be selected according to the above criteria. It will then become the task of utility/cement company purchasing agents, regional purchasing agencies (eg. EPDC), user group
purchasing committees (eg. JCDC), trading companies, and government departments (in the case of nationally run power companies in Taiwan and Korea), to develop and pursue a steam coal purchasing program including but not limited to some of the following factors (excluding political issues for the present time):  

(i) Supplies to be drawn from sources meeting the criteria as per numbers 1, 2, and 3 above.

(ii) Price to be one of the purchasing determinants but not necessarily the most important.

(iii) 40-80% (or some defined range) of requirement to be filled by long term 10-15 year contracts.

(iv) Balance of requirement to be purchased on spot-5 year contracts attempting to absorb the fluctuation in demand plus take advantage of favourable market conditions when they exist.

(v) Negotiate with lowest cost producers first to establish "market" or "world price" to be used on subsequent transactions.

The Pacific Rim countries want to avoid getting themselves into another OPEC situation and are indicating a preference for purchasing their coal
from as many producers as possible. There is a premium to be paid for this diversity of supply. If cost was the only purchasing determinant in this market it is reasonable to presume that Australia would be the single long term contract supplier. Present indications are that Japan, Taiwan, and Korea accept paying a premium for this diversification flexibility; they are presently in the process of attempting to stimulate the Western United States and a number of other countries to participate in their Far Eastern steam coal market. By increasing supply, a price decline could be expected if demand were held constant. However, demand is forecast to increase. Additionally, the newer facilities are considerably more capital intensive, and sometimes more operationally expensive than the present installations. This new tonnage could increase the market clearing price (more will be said on this topic later in the chapter).

As noted earlier, the energy diversification policies apply to energy forms as well as supply sources. The prospect of nuclear, natural gas, and hydroelectric energy will be discussed briefly with a mention of other energy sources primarily as derivatives of these three or coal. As per Tables 2.1, 2.2, 2.3, and 2.4, it is forecast that the natural gas, nuclear and hydroelectric resources will represent a substantial share of both the electric generation source energy and the total primary energy. Each of these energies are forecast to increase their share substantially during the period from 1980 to 1990. Table 2.5 shows the sensitivity of western coal exports to variables such as reduced power growth, reduced nuclear, and increased coal market share.
1. NUCLEAR ENERGY

It is recognized that the future growth of nuclear capacity will have a substantial impact on coal fired electricity generation, as every 1,000 MW increase in capacity will reduce coal consumption by approximately 2.5 million tons.\textsuperscript{15} At the time of the oil crisis, the industrialized Western countries saw nuclear power as the most attractive alternative. This was partly because the programs were already well advanced, but also because it appeared to represent a secure energy source. Recently, the anticipated benefit of the nuclear energy option has been brought into serious question and planned capacity in most areas scaled down. Even though official projections of nuclear energy capacity continue to be reduced, the contribution of the nuclear power source is expected to increase significantly during the period 1980 to 1990. In a recent study (entitled Energy Policies and Programs of the I.E.A. Countries), the International Energy Agency forecast that nuclear power will quadruple between 1978 and 1990 in absolute terms and increase from 11\% to over 25\% of total electricity generation.\textsuperscript{16}

Although the I.E.A. does not concentrate solely on the three principal Pacific Rim nations, it does highlight the impact the nuclear option could have on the use of solid fuels such as coal. The I.E.A. study forecasts there will be little change in the proportion of electricity generated from coal through the mid 1980's, which, on the basis of the fuel inputs foreseen, remains at 37.5\%.\textsuperscript{17} Oil's share of fueling electricity output from the countries covered by the I.E.A. study, reduces from 21\% in 1978

(22)
to 18.5% in 1985 and approximately 11% in 1990. Similarly, the share of natural gas falls from 11% to 5% over the same period. The I.E.A. appears to have underestimated the coal energy use in the Pacific Rim country of Japan, and does not address Taiwan or Korea. C. Itoh forecasts that in 1980 oil supplied 44% of electrical power but this will decrease to 17.6% in 1990 and 11% in 2000.

Coal forecasts could be conservative if the forecasted nuclear power growth proves to be overly optimistic. 30% to 50% of new power currently being planned in Japan, Taiwan and Korea is to be nuclear. However, it should be noted that according to Westpo data nearly 60% of the currently planned 35,000 megawatt additional nuclear capacity in Japan had not received official authorization as of June, 1981. Additional delays as a result of this authorization process, combined with the current rapidly changing electricity demand forecasts, could see the nuclear option decrease as a proportion of total energy requirements. In light of the demand uncertainty, coal fired stations may represent a better alternative given the smaller investment and shorter lead times required to construct and bring a plant into operation. Providing the end user with more flexibility in his power planning system may be an important attribute of coal. Table 2.6 shows the I.E.A. comparative cost estimates for new oil, nuclear and coal-fired electricity generation. Nuclear cost is $.065 per million BTU, coal is $1.13 and oil is $3.33.

In any event the nuclear power industry is in trouble, economically, environmentally, and technically. Its future development is clouded with
serious uncertainties and resolution depends largely on the domestic policy decisions of the representative Pacific Rim Governments.

2. **NATURAL GAS**

Natural gas is a clean and efficient fuel favourable for use in residential, commercial and limited industrial applications. In 1978 natural gas provided approximately 17% of the world energy supplies or the equivalent of 21 million barrels per day of oil equivalent. Natural gas will likely not maintain an increased share of world energy requirements over the next two decades. A great deal of the natural gas reserves are located in OPEC countries which can be expected to put ceilings on the level of exports to support continued high gas and oil prices. Additionally, regulations and pricing structures (related to residential and commercial use) have impeded the development program for natural gas discoveries in Western nations and will likely continue to hamper its expansion.

The capital intensive and specialized nature of the development and shipping of natural gas also serve to impede its development. Trade in liquified natural gas in 1978 was 500,000 barrels per day oil equivalent (BDOE) which could increase to 1.5 million barrels per day oil equivalent (MBDOE) by 1985. To get to 5 MBDOE by the end of the century would require massive new investments. Table 2.2 indicates that between 1985 and 1990 natural gas as a percentage of total primary energy will change from 7% to 9% in Japan, information for Taiwan and Korea is not available.

(24)
3. **HYDROELECTRIC POWER**

Hydroelectric power is the principal renewable energy source that currently provides a significant amount of commercial energy. This type of energy produces approximately 20% of the world electricity needs and 5% of the total world energy needs. With most prime locations already developed in Western nations, the largest growth potential appears to be in developing areas. New technology and reworking of existing facilities could make it possible that this energy source will maintain its 5% share of the world energy supply at the year 2000. In regard to the Pacific Rim countries this source will have a negligible effect on the import steam coal requirements.

4. **ADDITIONAL OIL AND GAS SOURCES**

Unconventional sources of gas in coal beds, shales, tar sands, and geopressurized formations may contain very large amounts of energy. A large resource base also exists for unconventional oil in oil shale, tar sands, and heavy oil. The development of these energy sources is characterized by very high capital costs and long lead times. As technological innovations make way for less expensive developments of these fuel sources, it is reasonable to expect that they will participate in supplying a part of the world's energy needs. Their introduction on a commercial scale can be expected late in this century with an anticipated rapid development early in the next century.

(25)
5. ADDITIONAL RENEWABLE ENERGY SOURCES

Energy technology in solar water and space heating, solar generated electricity, photovoltaic energy conversion, biomass conversion, windmills, ocean-thermal energy, wave energy, tidal energy, and geothermal energy provide only small amounts of commercial energy today. These sources could provide substantial promise for the future. Although many of these technologies are in the infancy of their development there exists the possibility for major innovations over the next several decades. It is ultimately possible, and may be a necessity that these renewable sources become a principal source of world energy supplies by the middle of the next century.

6. ADDITIONAL ENERGY FORMS FROM COAL

As with additional renewable energy sources there are a number of developing technologies relating to using derivatives of coal as energy forms. Some of the technologies are considered to have near term commercial potential and have been involved in lengthy testing programs. The speed of use of these technologies will be primarily dependent on the price of non-coal fuels as these coal derivatives will be high cost sources.

(a) Synthetic fuels - This involves using coal to produce a solid, liquid or gaseous product. Liquefaction has been tested since 1962 (Solvent Refined Coal Process) and several
test plants are now operating in the range of 50 tons per day. Gasification has been used commercially in Europe for some time with new highly efficient processes for developing synthetic natural gas from coal.

(b) Methanol production - although technically developed, energy recovery is approximately 40-50% which makes cost of resulting energy very high.

In addition to the derivative energy forms, the use of coal is also being improved through technological advances such as Fluidized Bed Combustion and Coal/Oil mixtures. These improvements are facilitating operating efficiencies in the use of coal, expanding its range of uses, and reducing environmentally damaging by-products.

C. BALANCE OF PAYMENTS ISSUES

Presently there exists a trade deficit of approximately 18 billion dollars between the United States and Japan, 4.3 billion dollars between the United States and Taiwan and .4 billion dollars between the United States and South Korea. With the world economic slowdown well entrenched and the overvalued U.S. dollar holding strong as a result of continued high interest rates, the prospects for improving these trade imbalances are dim.

With the exception of military products, it is unlikely that the United States could export mechanized equipment, machinery, or semi-finished
products to any of these countries which have an equally skilled and considerably less expensive labour force capable of making the same products. The only reasonable alternative appears to be in the export of raw materials of which coal promises to present a realistic option.

The export of the thermal coal from the United States Western mines can have a two-fold effect on the balance of payments situation. The first is the obvious reduction in the trade deficit through payments for the cargoes flowing to the Pacific Rim. Secondly the new mines may sell incremental production or inventory to domestic United States utilities and industry thereby reducing the need for imports of foreign oil or other energy supplies. With the West Coast steam coal trade levels that are presently being discussed, and assuming an F.O.B.T. price in 1982 dollars of $60/ton (assuming ocean carriage in foreign flag and owned vessels) trade credits would accrue in the amount of 558 million dollars in 1985, 1.32 billion dollars in 1990, 2.1 billion dollars in 1995, and 2.86 billion dollars in the year 2000.29

**PART II --- PRESENT MARKET**

A. VOLATILE MARKET HISTORY

The past three years have represented a very volatile period for West Coast steam coal exports to Japan, Taiwan, and Korea. The trade was nearly zero in 1979, grew to 1.5 million tons in 1980, and to 5 million tons in 1981.30 It is now forecast to decline to approximately 4 million
tons in 1982. Unfortunately the rapid increase in demand from the West Coast (coinciding with labour problems in Australia) has not given supply and demand nor prices a chance to stabilize in this market.

During this time frame the Pacific Rim buyers felt that they were being charged exorbitant CIF prices for the coal to take advantage of their shortage predicament. Conversely, the U.S. suppliers indicated that the Pacific Rim countries were purchasing inventories at prices below full cost and that the real price of replacement tonnage in the future would be considerably more expensive. These diverse market views have impeded the long-term volume contracts that are needed to develop this trade and have resulted in a cyclical spot market which has not been beneficial to either suppliers or users.

With inventory sold during 1981 and promises of a continued growth market in 1982, Western mines increased production, new mines were opened, and the transportation sectors geared up only to face a slackening first quarter and potential 1982 annual demand. There is presently a serious oversupply problem and buyers are taking advantage of excellent prices in purchasing mine inventory once again. Until these swings are arrested it is unlikely that a stable U.S./Pacific Rim trade pattern will develop.

B. SLOWED ECONOMIC GROWTH OF PACIFIC RIM COUNTRIES

With the worldwide economic slump becoming more entrenched, the Pacific Rim nations of Japan, South Korea and Taiwan have not been exempt from the
slowdown of regular trade patterns. Due to their large export base, their economies are more susceptible to fluctuations than countries which are less oriented to foreign trade. Additionally, protective trade laws and other actions are being implemented by many of these countries' trading partners as a method to curb imports and stimulate their own lagging economies.

As recently as 1978 the economies of Japan, Taiwan and South Korea were forecast to grow at 6%, 6.5%, and 7% throughout the period to 1990, with electric generating energy requirements growing at 8%, 9.5%, and 11% respectively. It now appears that each of these economies will grow at approximately 4-5% and forecast energy requirements will decrease also. If Japan's growth decreased from 5% to 4% in 1990, coal (MTCE) imports would decrease by 20%. In Taiwan if growth decreased from 6% to 4% coal imports would decrease 3% in 1990 and in Korea if growth declined from 7% to 5% coal imports in 1990 would decrease 24%.

This slower economic growth and its impact on the demand for electricity in the Pacific Rim countries will have a major effect on the growth of the steam coal trade. Many of the coal conversion projects are only in the planning stage and can be deferred or cancelled if necessary should electricity demand fall below forecasts. See Table 2.7 for indications of planned versus firm electric power industry generating fuel requirements. Until it is better known what real growth these economies will experience and the resultant energy requirements, it is largely speculation as to the levels of West Coast steam coal trade which will materialize.
The World Coal Study predicted that conservation may well become of the world's largest energy "resources". This will become particularly important as energy becomes more expensive and thereby increases the value to an economy of a conserved energy unit.

The initial 10-15% of energy savings are obtainable by relatively simple short-term measures such as car pools, better insulation, better building codes, improved heating controls. To expect additional gains beyond these immediate measures will require capital investments and substantial lead times. These decisions must be made during the process of the turnover of a particular country's capital stock and must be implemented as part of a national and local strategy possibly enhanced through tax and other financial incentives as well as policies and regulations. In the past energy conservation has been a reactionary process and this will need to be changed if it is to play a major role in the drafting of a country's energy budget.

The world coal study and many other recent reports have included in their forecasts that major efforts at conservation will become a reality carried out as matters of national concern. They have gone further to say that by year 2000, conservation could reduce energy consumption to levels 20-30% below what otherwise would be required.
PART III - SUPPLY AND DEMAND

A. SUPPLY BY MAJOR RESOURCE OWNERS

In the discussion of any bulk commodity such as coal an important distinction must be drawn between the terms "resource" and "reserves". According to the International Energy Agency, geological resources are taken to mean resources that may become of economic value at some time in the future. The IEA describes technically and economically recoverable reserves to mean reserves that can be regarded as actually recoverable under the technical and economic conditions prevailing today. This paper will deal strictly with reserves, recognizing that they are constantly changing in the light of new exploration efforts. As an example, the estimates of the world's coal reserves have increased by approximately 185 billion tons of coal equivalent (TCE) as a result of the increased exploration since the first oil shock of 1973 and 1974.

Coal is classified by rank and grade. Rank generally refers to the degree of metamorphism or coalification (percentage of fixed carbon and heat content) of the coal. Grade refers to the amount of chemical impurities present in coal. The rank of a particular coal source is determined by the conditions of formation and the age and depth of the coal. The grade is determined primarily by the presence of impurities such as sulphur, ash, and trace elements. See Table 2.8 for indications of rank and grade determination of coal quality.
Although coal deposits are distributed throughout the world, ten countries presently account for approximately 90% of the world's estimated reserves. Table 2.9 indicates the level of coal reserves provided by the International Energy Agency, World Coal Study, and a more recent ICF study. It can be seen that in the short period from 1978 to 1980 the reserve forecast has risen from approximately 637 billion tons in the IEA Study to 662 billion tons in the World Coal Study up to 766 billion tons in the ICF Study. It is presently anticipated that there will be few new major coal reserves found in developed countries which presently maintain a mature coal mining industry. It is expected, however, that there will be larger reserves identified as further exploration is made of the known resources.

The major suppliers of steam coal to the Pacific Rim countries will be Australia, Canada, the U.S.A., South Africa, and China. Their market shares will vary in the future according to pricing policies and political situations. The Department of Energy International Coal Export Task Force forecasts the relative supply shares to be as indicated in Table 2.10. Each of these countries clearly has the sufficient reserves to compete as a major participant in the Pacific Rim market. There are a number of drawbacks relating to the supply from each country which will continue to reinforce the Pacific Rim countries' desire to diversify their purchase origins. The following represents a number of possible concerns with respect to each of the supplying countries:
1. **Australia**

a) Labour disputes have been common in Australia, though their costs have as yet not been significant. The prospect of major work stoppages could limit Australian coal production and hence their ability to meet contracted commitments.

b) A growing domestic demand (presently less than exports) could bring some protectionism from the central authorities.

c) The Australian Joint Coal Board is responsible for regulating coal supply to insure that the opening of new mines does not bring instability to the market. Decisions by the Board to restrict export quantities could lead to supply shortages and higher costs for Australian coal.

d) The capital costs for new coal mines are substantial and available funds in Australia may prove to be limited. The Australian Government requires that foreign capital investment in any project be less than 50%, and indications are that the required capital formation would not be available in the Australian private sector to fund the remaining development costs.

2. **South Africa**

a) Coal mining is presently dependent upon inexpensive non-white labour. Mining methods tend to be less efficient than the more capital
intensive methods used in competing countries. Labour unrest and rapidly escalating costs could hamper their ability to produce substantial amounts of coal in the future.

b) With the country's continued isolation due to its apartheid policies, the government will likely be concerned with energy self-sufficiency and as a result may regulate the level of coal exports in the future.

c) The imposition of domestic price controls could limit supplies by denying adequate rates of return.

d) The significant political unrest and the black nationalist movement in South Africa will certainly affect the perceived stability by the purchasing Pacific Rim nations. This could limit their willingness to enter into long-term coal throughput contracts.

e) Pacific Rim countries' moral and political objections to the apartheid policies of the South African Government may prevent them from dealing on a substantial basis with this country.

3. Cañada

a) The federal/provincial delineation of this country's political framework means that the provinces have control over their internal coal production. British Columbia and Alberta, presently the two largest coal producing regions, have very differing policies on coal
development. The continued debate over federal versus provincial control of energy resources may cause the Pacific Rim countries to perceive a degree of instability in this supply source.

b) Inland transportation systems from the mines to the West Coast ports in British Columbia are presently nearing capacity utilization. There is concern by Pacific Rim users that large amounts of additional capacity will not be available to service their needs through the year 2000 should a substantial requirement for additional supply materialize.

4. China

a) The amount or quality of the reserves presently available in this country are relatively unknown but are thought to be vast including high quality deposits.

b) The transportation infrastructure is in its infancy. It is not known how much time or capital will be required to facilitate the efficient movement of the coal from mine to terminals when the facilities are available.

c) The government has total and unilateral control of all natural resources. They could change policies in favour of restricting exports and supplying more domestic energy requirements with locally produced coal.

(36)
5. United States

a) Although the United States is perceived as the most stable long range supplier of steaming coal, federal policies that support the export of this energy resource are not completely in place.

b) There appears to be excess capacity in the production, land, and sea transportation. The lack of a large West Coast terminal will present a bottleneck in any substantial increased trade levels.

c) Presently the United States steam coal is the highest priced source of the Pacific Rim alternatives. Prospects for a reduction in this price do not appear favourable. The consuming nations will need to be prepared to pay a premium for the security of using U.S. coal.

d) A growing domestic requirement may absorb present production and limit export tonnage availability.

e) In the Western United States, the supply of steaming coal will originate primarily from Utah and Colorado. Wyoming, Montana and New Mexico may enter the export market later in this century as technological advances are made. These advances will need to relate to processes that remove the moisture and other contaminants from the coal prior to its shipment to the end user. Improvements in boiler technology may also permit the burning of these lower quality fuels.
f) The reserves in these five States are indicated in Table 2.11 and the general reserve areas on Figure 2.12. It is evident that substantial reserves exist to more than adequately cover any export levels which should be required for the Pacific Rim countries. Utah and Colorado have the most mines presently in operation and currently have excess capacity. The short term forecasts of U.S. participation in the Pacific Rim steam coal market can adequately be covered. The coal from Utah and Colorado will be principally shipped through terminals in Northern and in Southern California.

B. DEMAND BY JAPAN

The forecasts of the Pacific Rim demand for steaming coal have varied significantly. Table 2.13 compares the Department of Energy forecast in 1978 with the 1980 Westpo forecast and recent C. Itoh forecasts. It can be seen that the forecast demand for 1990 U.S. west coast coal has increased from 33.1 MTCE in 1978 projections to 69 MMT in 1981 projections and decreased to 61 MMT in 1982 projections. The most recent forecast from the Ministry of International Trade and Industry (MITI) in Japan differs from the Westpo demand forecast for 1990 by 6 million tons. Changes in the forecast were explained as follows:

1. Demand for Electric Power

(i) Total demand for electric power in 1990 has been decreased by 12.5% due to the drastic change in the industrial structure of the Japanese economy.
(ii) Total demand for electric power in 2000 has been increased by 2.8% compared with the previous forecast. This is caused mainly by the relatively higher rate of growth of the demand for public use.

(iii) The share percentage of electric power in the total energy demand will increase gradually.

(iv) The peak load demand will increase for the following reasons:

(a) Popularization of home air conditioners.

(b) Demand by industries that need continuous operation will decrease. (For example: aluminum smelting).

(c) Demand by industries that operate in the daytime will increase (for example: machinery manufacturing).

2. Supply of Electric Power

(i) Nuclear power generation will be developed as the main source of electric power.

(ii) Coal-fired and LNG-fired electric power generation will be ranked next to nuclear electric power generation.
(iii) Oil-fired electric power plants will not be constructed in principal.

3. Fuel Consumption

Forecast of annual Japanese fuel consumption is as follows:

<table>
<thead>
<tr>
<th></th>
<th>1980</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal (10^3 tons)</td>
<td>9,780</td>
<td>42,000</td>
</tr>
<tr>
<td>LNG (10^3 tons)</td>
<td>13,440</td>
<td>31,500</td>
</tr>
<tr>
<td>LPG (10^3 tons)</td>
<td>740</td>
<td>2,200</td>
</tr>
<tr>
<td>Oil (10^3 litres)</td>
<td>5,250</td>
<td>3,900</td>
</tr>
</tbody>
</table>

There appears to be continuing strong indications of demand for steaming coal from the United States West Coast. The forecasts are based on estimates of electricity demand, cement production, and general economic growth. These estimates also reflect the objectives of substantially increasing nuclear powered electric generation and reducing oil consumption. As indicated in earlier sections of this paper, these estimates are subject to substantial change. The sensitivity of proposed coal exports from the U.S. West Coast is very high in relation to changes in economic growth rates, nuclear developments, oil supply reductions, or electricity demand reductions. (See Table 2.5 for sensitivity of coal to these items.)
This volatility of demand is particularly important to those groups considering the development of a major U.S. West Coast export terminal. All other components of the logistics system for steam coal are dealing basically with sunk costs for the short term and are prepared to accept the most optimistic Pacific Rim estimates of demand for U.S. coal. From the point of view of a port development program costing in the range of $250 million (1982 dollars), the establishment of some minimum guaranteed export coal quantity to these Pacific Rim countries is required. These commitments will need to be substantially supported by better evidence than currently available in published forecast reports from various U.S. and foreign sources.

C. COMPARISON OF PRICE COMPONENTS, PRICING PHILOSOPHIES, AND PRICING OF THE MAJOR PACIFIC RIM SUPPLIERS.

1. Coal Cost Components

The major determinants of the price of a ton of coal are as follows:

(i) Mining costs regarding geologic conditions, i.e. depth of overburden, seam thickness, presence of water, open pit or underground mining.

(ii) Technology employed at the mine, i.e. short wall, room and pillar, continuous or long wall mining methods.

(iii) Capacity of the mine and economies of scale.
(iv) Labour productivity.

(v) Age of the mine and capital intensiveness of operation.

(vi) Wage levels of local workers.

(vii) Quality of the coal.

(viii) Loading equipment at the mine, i.e. capable of loading a complete unit train.

(ix) Inland transportation system, distance, grade, residential sections, etc.

(x) Terminal handling facility, i.e. size of facility, storage, ship size capability, loading speed etc.

(xi) Ocean shipping distance.

(xii) Unloading technology.

(xiii) Additional marine or inland transport to inventory location.

(xiv) Carrying costs of inventory.

(xv) Willingness of buyers to pay the price.
In the Pacific Rim export markets, (excepting short term aberrations caused by strikes or political factors), the coal mining industry is generally assumed to approximate perfect competition. The long term contract price is assumed to represent the cost of production plus a normal return to capital. On this premise, the mine owner would be willing to sell coal on a long term contract basis where an acceptable level of return to capital was achieved after his operating costs were covered. The rate of required return will also be related to risks the mine owner accepts for escalating costs beyond his control. If this is not the case, the Theory of Exhaustible Resources indicates that should the market price of a resource rise faster than the rate of interest, the producer in keeping with his profit maximizing criterion, would leave the resource in the ground in order to achieve higher return at a later period.45

The price of coal imported by the Pacific Rim countries is impacted substantially by costs of the transportation system regardless of the country of origin. For the United States West Coast, this is of particular concern as the transportation system costs can represent 60% of the delivered coal price. To be competitive it is important that the supply countries keep transport costs at a minimum. To achieve minimum costs involves the port as a critical interface between the two higher cost modes of rail and ship. To the extent that a port terminal is designed to allow these other modes to efficiently discharge/load the cargoes, it will have a material effect on the delivered price of the coal.
2. **PRICING PHILOSOPHIES OF THE MAJOR SUPPLIERS.**

There are a number of approaches taken to the pricing of steam coal in the Pacific Rim market. These can be divided into categories of short and long run contract deliveries. In the short run, typified by the spot market presently experienced on the U.S. West Coast, the pricing is made at the equilibrium point of short term supply and demand. The prices tend to fluctuate considerably in this market. The coal delivered can be incremental mined tonnage sold at a higher than market price to cover some emergency need (e.g. caused by problems in other supply countries). The coal can also represent sale of inventory at lower than full cost (i.e. selling the product at a price which covers only variable costs in an effort to dispose of the inventory). In such a case the Far Eastern buyers would be taking advantage of an opportunity in the system to acquire low valued product.

The long run supply usually involves long term contracts and is predicated on a much more stable exchange of the product. According to the Interagency Coal Export Task Force the price of coal in this situation can be fixed through either a guaranteed rate of return basis or at world market price.\(^4^6\) The guaranteed rate of return situation is similar to what has been described earlier in the theory of resource depletion. The mine owner would be prepared to sell the product at a price which covers his cost of operation plus a return to his invested capital above the present rate of interest in the capital markets. To achieve this return a contract would establish a base level price. Escalation clauses would
cover the cost component increases basis the risk acceptable to the producer for a particular level of return.

A world market price contract involves an agreement between the parties to consider the range of prices being offered by various suppliers on some periodic basis (e.g. annually, semi-annually etc.). They will attempt to reach an agreement for the price of the throughput commitment for that period within a range of established guidelines. Presently there is no published data concerning the world price of steam coal (a good project for an information service). It is left to negotiations between the contracting parties to resolve the acceptable ranges. This can be extremely dangerous to any producer if the ultimate users want to include in the range the prices of a particular supplier (e.g. South Africa) which may be selling excess inventory as a result of a downturn in a non-competing (i.e. European) market. This demonstrates again the volatility of the market. Additionally these world price type contracts are usually "evergreen" in that they can be cancelled if the parties are unable to reach agreement on the price range. This gives the developer of a new mine or transport project little comfort that there will be a continued financial return for the life of the project.

It appears the guaranteed rate of return pricing system is preferred by both producers and buyers. They find some stability in the ability to approximate the long term price for this energy source. There are, however, impediments to the continued use and ultimate success of this mechanism. A number of examples of these have been noted by the Inter Agency Coal Export Task Force as follows:47
(i) Australian producers are regulated by the government coal boards which have a strong influence on the selling price based on their perception of a Pacific Rim market price.

(ii) Although coal sales from Canada are currently unregulated, there exists a possibility that this energy source will fall within the purview of the federal authorities as does the export of oil and natural gas.

(iii) South Africa currently has a policy of forcing producers to sell at a government estimated world market price to preclude ruinous inter-company competition.

The United States appears to be one area where the guaranteed rate of return type contract will continue to be used. This is a result of the current fragmented market which differs significantly from other producing countries. This fragmented supply and transport sector is a feature of the current Pacific Rim steam coal trade particular to the United States and Canada. Excepting the U.S. and Canada, this new market for energy coal is characterized by a number of very large traders in both the supply and purchase countries. As an example on the purchasing side, the Japanese electric utility industries have formed a joint venture called the Japanese Coal Development Corporation (JDCD) which is responsible for the following items:

(1) Purchasing 50% of the required steam coal as a central purchasing agency.
(ii) Investigating investment opportunities in mines, land transport, port facilities, and ocean transport which will facilitate the continued supply of coal to the Japanese electric utility industry.

(iii) Overseeing the logistics system in terms of deliveries and inventory sizes of steaming coal.

JCDC has designated one major trading company to look after the Canadian and U.S. market; another to look after the Australian market; and another to look after the South African market. Taiwan and Korea presently each have one major government owned electric power corporation which controls all purchasing of steam coal for electricity generation purposes. It also appears that in Taiwan and Korea, one major cement company will also act for the others as a central purchasing agency for the purchase of steam coal.

The number of participants involved in the supply of steam coal to the Pacific Rim market is very small. Australia has five or six coal exporting companies of major significance, South Africa has six or seven, Canada has approximately five of which two are presently dominant and China will likely have only one. According to the ICE Task Force the steam coal market in the Pacific Rim is characterized by large sellers facing large buyers except in the United States trade. This large number of producers and sellers in the U.S. market will continue to make this a fragmented supply source. The pricing will be based on the

(47)
policies of each producer related to costs of production and required capital return. This type of diversity represents flexibility and security to the Pacific Rim nations which are looking to the U.S. Western States to accommodate approximately 15-20% of their steam coal imports over the next twenty years.\textsuperscript{49}

Discussion in this section has related primarily to the F.O.B. mine price and the contracting relationship between the producer and ultimate user. The mine mouth price greatly affects the marketability of the steam coal. However, the effects of the transportation costs on the final delivered price can be the deciding factor regarding a particular mine's ability to compete in the market.

3. \textbf{PRICES OF STEAM COAL IN THE PACIFIC RIM MARKET}

There are significant differences in the delivered price of coal in the Pacific Rim countries depending on country of origin. These prices will be examined to give a better understanding for the differentials that presently exist and how these differences relate to the individual components in the logistics system.

Table 2.14 indicates the 1981 C & F price of steam coal in Japan originating from Canada, the United States, South Africa, Australia, and China. The prices have a $12.71 per M/T maximum spread or 19% of the average price. Table 2.15 indicates the ranges of F.O.B. mine costs, inland transport, terminal, and ocean freight charges which make up the
delivered coal charge. Table 2.16 presents the rail and shipping distances for the supply countries.

It is reasonable to expect that the United States West Coast coal would be comparatively expensive in the Pacific Rim market. This is because of the greater land and ocean shipping distances involved. It should be noted, however, that these price indications are near term prices in a market which reflects a relatively new U.S. industry competing with relatively mature export mining industries in Australia, South Africa and Canada. There could be less pressure on the United States inland transportation system to price on a basis which allows the products to compete. In South Africa and Australia the railways are regulated by the government relating to a supportive policy of increasing or at least maintaining a particular level of coal export trade.

The market fragmentation in the United States appears to be hampering the product's ability to compete in these foreign markets. The present potential steam coal supply areas of Utah and Colorado are geographically located such that a terminal in Southern California will likely be the export site. The only rail service to Southern California from these areas is Union Pacific Railroad. To date the U.P. Railroad has shown no compunction about extracting additional rents from the export coal. The question of whether the railroad pricing is preventing coal from moving off the West Coast is a hotly debated issue. It appears that the railroad prices are so high in the short term that they are restricting the sales potential of the Western producers. Long term contracts are being
"discussed" not "negotiated" in the present soft coal market. The Union Pacific Railroad (and others) have indicated a willingness to price their services for long term contracts at a level which will allow the coal to move.

The development of the Western U.S. export coal logistics system through Southern California involves many small and medium size coal producers and a near-monopoly railroad. It can be further anticipated that the first major export terminal will also be a pseudo-monopoly (it will initially only face competition from smaller less efficient ports with ship size limitations). In this environment the potential for a systems approach is not promising.

This means that participants in the coal sales or purchase programs are constantly changing negotiating practices and transaction terms. For example a Japanese trading house will negotiate independently with the mine, rail, port, and ocean shipping to sell CIF coal. This process differs from an agent or producer that sells FOBT basis their perceived ability to negotiate better rail and terminal rates.

Conceptually this is a difficult issue to analyze. The Far Eastern buyers recognize that a fragmented system will have a higher cost. This does not however mean it will have a significantly higher price. The Pacific Rim coal purchasers have indicated a preference for the fragmented system because they can exert more leverage on the individual logistic components. If it is assumed that the Western U.S. coal logistics system
is as technically and operationally efficient as its competitors we are really talking about system pricing. The buyers prefer to negotiate prices with the logistics components individually. This may result in slightly higher costs than if the system were priced according to long run average cost but it does appear to give the buyers a sense of commercial security. This security from 'system' price increases appears to be unique to the United States and will likely not change even when long term contracts are available. The number of producers and sales agents plus the legal consequences of collusion/restraint of trade seem to be barriers to a system development in the coal chain.

The ability to compare prices of delivered coal is hampered by the many measures used by both producers and suppliers. The United States tends to deal in short and long tons whereas the other supplying nations deal in metric tons. With the substantial range of heating values and contaminants inherent in coal, the only effective measures of the comparable coal price is on a delivered price basis per B.T.U. or metric ton of coal equivalent (MTCE). Although these exclude any measurement of operating efficiencies that may be gained from a coal with less sulphur or other chemical impurities it is presently the best comparative measure available. It is difficult to locate this type of data for all the supplying countries.

D. FORECAST OF CHANGES IN COMPARATIVE PRICES

Doubts presently exist about the ability of the principal coal producing countries to increase the export availability of steam coal fast enough to
keep pace with the growth of import demand in the Pacific Rim countries during the next two decades. This feeling is generated despite intensified exploration and development programs by various industries and governments. The reserve base in most countries is adequate (as indicated earlier in the chapter). However, the lead times required to bring new mines into production and develop new infrastructure are long and the costs are very high. Additionally, there are a number of serious political, social, and environmental constraints which have to be overcome prior to various supply countries entering a new threshold level of expanded trade.

It also appears probable that in the years ahead, major supplying countries will become concerned with meeting domestic steam coal energy requirements as they continue to reduce their dependency on oil. Additionally as the expense of these new mines and facilities increases substantially, there will be a need for foreign capital to support these developments as private domestic capital formation may not be adequate (this situation is presently occurring in Australia).

As indicated earlier the present Pacific Rim steam coal market for the United States is not representative of a long term stable market. Such a market will need to develop if the Pacific Rim purchasers are to pursue their policies of diversity and security of supply. The volatile marketplace presently has many producers without long term contracts and selling on the spot market below full cost to reduce their inventory and cover their short term variable costs. This business environment cannot
continue if there is to be a healthy western coal export business in the United States. The purchasers must consider signing longer term throughput contracts to prevent these cyclical swings in supply and demand. The economic life of capital equipment designated for major projects in this logistics system is 20-25 years.

Although the United States is presently at a price disadvantage compared to the other major suppliers of the Pacific Rim countries, ICF and other analysts feel that this U.S. price disadvantage will be eliminated eventually. Their thinking is predicated upon the "catch-up theory" which predicts that because of the substantially higher reserves in the United States, prices for U.S. coal (based on costs of developing this incremental supply) will rise more slowly than the other supply countries. The U.S. steam coal supply curve is less steeply sloped than those in Canada, South Africa and Australia.\(^{51}\) As low cost resources are depleted in the other supply countries, they will be forced to develop more expensive mining sources. The efforts to develop these marginal areas will be more expensive than the United States efforts to develop easily accessible reserves. The U.S. long run supply curve can also be expected to be flatter than that for steam coal from other countries.

Adding to the forecasts for improved U.S. competition over the long run are several transportation factors. Firstly, there will be a number of large U.S. West Coast terminals built which will allow better utilization of the railroad and ocean shipping sector equipment. These terminals will also allow deeper draft ships which can take advantage of economies of
scale presently limited to the other competing countries. Secondly, as mentioned earlier, there are labour problems in Australia and South Africa which could increase their operating costs more quickly than the United States.

The present market disadvantage experienced by the United States may not continue throughout the life of a long term contract. Considering again the tables in the pricing section, if the modern port terminal were to reduce rail charges by $2.00 per ton due to operational efficiencies and shipping costs by $7.00-$8.00 per ton due to larger ship capabilities, the U.S. would be competitive at the present time and could possibly expect distinct advantages in the future.

E. **TERMINAL COST AS A FUNCTION OF CIF PRICE**

From Table 2.15 it can be seen that the terminal price as a percentage of delivered coal price ranges from 7.0% in Australia to 4.1% in South Africa, 5.4% in Canada, and 9.1% in the United States. Although this small percentage would appear to make the terminal function the least important component in the coal logistics system, this is certainly not the case. To define the terminal function in perspective, it is necessary to consider it as the interchange point of the railroad and shipping modes. At the present time the United States West Coast primary coal export terminals at Los Angeles and Long Beach have no loop track capability. This means the unit trains must be split into individual cars, shunted to the sidings, and gravity fed to single car rotary dumps.
These systems can take twelve to fifteen hours to unload one unit train thereby substantially decreasing the railroad equipment utilization and increasing costs. From the seaborne side they are located at water depths which will allow the loading of panamax vessels or slightly larger. With loading rates of 2,000 tons per hour or less, these vessels are not loaded efficiently.

The terminal cost on the West Coast of the United States (considerably higher than most other coal loading ports in the world) is in the region of $4.00-$6.20 per ton (depending on direct or indirect delivery). If new terminals are designed to allow the rapid turnaround of rail equipment through the efficient use of a loop track and double rotary car dump, the overall rail rate on a dedicated unit train basis could be reduced the equivalent of the total throughput charge of the terminal. Additionally by constructing a new terminal facility in deep water, (where dredging costs are capitalized as part of the project rather than waiting for the U.S. federal dredging 20 + year lead time) the terminal will allow efficient loading of vessels in the 120,000-150,000 ton deadweight range. The economies of scale here can again reduce the delivered price of coal by more than the cost of the total terminal throughput charge. (This is not the case at the present time due to the instability of the ocean freight market caused by a substantial overcapacity in the panamax class. In the long run, however, economies of scale will prevail in this market.)

In perspective, although the throughput charge for the terminal function itself is not high in relation to the delivered CIF price, the
efficiencies which the terminal facilitates in the rail and seaborne functions can act to reduce the delivered price by an amount greater than the terminal charge. It is for this reason that the proposed new terminal in Long Beach is such a critical factor promulgating the continued expansion of the U.S. steam coal export trade. This remaining link in the system is extremely capital intensive. Part of the construction expenses may be incurred in an effort to improve the efficiencies of the complementary transport modes which interface at the terminal. Although these costs can contribute to an overall reduction in the delivered price of coal, they may or may not contribute to an increased return to the developers. The fabric of the U.S. institutional and regulatory system causes barriers such that logistics components are unable to function as a true system in regard to the development and construction of this final and important link to the coal chain. It is the purpose of this thesis to examine the organizational and institutional boundaries involved in the development of an efficient system.


7. U.S. Department of Energy, (prepared by Zider-Neris Inc.) op. cit., Chapter 1, Part VI, Section 4, and Chapter 2, Section VI.

8. Ibid., Chapter 1, Part VI, Section 2, and Chapter 2, Section VI.

9. Ibid., Chapter 1, Part VI, Section 3 and 4, and Chapter 2, Section 6.


12. E.P.C.D. - Electric Power Development Corp., a joint government-utility venture which functions as a wholesale supplier of power to 9 regional utility companies. EPDC is financed 70% by the government, and 30% by the utilities, and will play a major role in the coal-fired plant development in Japan.

13. JCDC - Japan Coal Development Corporation, a corporation formed by the Independent Electric Utility companies and EPDC. Its purpose is to organize and coordinate the acquisition and transportation of approximately 50% of the import steam coal required by the Electric Utility members.


16. Ibid., p. 52.

17. Ibid., pp. 20-22.

18. Ibid., p. 30.


24. Ibid., p. 77.

25. Ibid., p. 81.

26. Ibid., p. 78.

27. Ibid., p. 81.


31. Ibid.


34. MTCE - Million tons of coal equivalent, a ton of coal equivalent is a metric ton with a specific heating value of 12,600 BTU per pound.


36. Ibid., sections 2.6.1-2.6.10.

37. World Coal Study, op. cit., p. 80.

38. Ibid., p. 80.


40. Ibid., p. 33.

41. World Coal Study, op. cit., p. 35.

42. Ibid., p. 35.


46. U.S. Department of Energy, (prepared by Zinder-Neris Inc.), op. cit., sections 0.1.18-0.1.20.

47. Ibid., section 0.1.21.

48. Ibid., section 0.1.16.

49. Western Governors Policy Office, op. cit., p. 17.


TABLES AND FIGURES
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Note: "Other" fuel source includes liquefied natural gas (LNG), hydroelectricity, and geothermal energy.
**TABLE 2.2a**

**Japan: Volume and Composition of TPE, 1980-1985**

*(Based on GDP Growth of 5.0 Percent Annually)*

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Imported Coal is the Residual

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Imported Coal is the Residual

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Oil Imports represent the Residual

TABLE 2.4

Korea: Volume and Composition of TPE, 1980-2000
(Based on GDP Growth of 5.0 Percent Annually)

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<td>334</td>
<td>263</td>
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<tr>
<td>Coal</td>
<td>28</td>
<td>351</td>
<td>503</td>
<td>879</td>
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### TABLE 2.5

**Sensitivity Analysis**

Western U.S. Coal Exports 1985-2000

<table>
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<th></th>
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<tr>
<td>CPSEDD Projection</td>
<td>10.9</td>
<td>26.6</td>
<td>37.7</td>
<td>51.8</td>
</tr>
<tr>
<td>Reduced Power Growth</td>
<td>10.4</td>
<td>23.3</td>
<td>31.4</td>
<td>41.1</td>
</tr>
<tr>
<td>Reduced Nuclear Growth</td>
<td>13.0</td>
<td>30.6</td>
<td>43.2</td>
<td>59.1</td>
</tr>
<tr>
<td>(more coal growth)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increased Market Share</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>for Western U.S. Coal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced Power Growth and</td>
<td>11.8</td>
<td>31.5</td>
<td>43.5</td>
<td>57.0</td>
</tr>
<tr>
<td>Increased Market Share</td>
<td></td>
<td></td>
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</tr>
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</table>

### TABLE 2.6

Cost Estimates for Electricity Generation in New Baseload Nuclear, Oil and Coal-Fired Power Stations

1976 Dollars; Average Cost per KWH for 1st 20 years Operation for Plants Commissioning in 1986

<table>
<thead>
<tr>
<th>Avg. Cost per KWH for 20 years ($mills)</th>
<th>Nuclear</th>
<th>Fuel Oil</th>
<th>Bituminous Coal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PWR 2 x 1100 mw</td>
<td>Low Sulphur</td>
<td>High Sulphur</td>
</tr>
<tr>
<td>Capital Cost</td>
<td>14.9</td>
<td>7.5</td>
<td>9.6</td>
</tr>
<tr>
<td>Operation and Maintenance</td>
<td>2.4</td>
<td>2.0</td>
<td>4.2</td>
</tr>
<tr>
<td>Fuel</td>
<td>6.5</td>
<td>31.0</td>
<td>29.0</td>
</tr>
<tr>
<td>Total Avg. Cost per KWH at 5500 h/a</td>
<td>23.8</td>
<td>40.5</td>
<td>42.8</td>
</tr>
<tr>
<td>7000 h/a</td>
<td>20.7</td>
<td>38.9</td>
<td>40.8</td>
</tr>
<tr>
<td>6000 h/a</td>
<td>22.6</td>
<td>39.9</td>
<td>42.0</td>
</tr>
<tr>
<td>5000 h/a</td>
<td>25.3</td>
<td>41.2</td>
<td>43.8</td>
</tr>
<tr>
<td>4000 h/a</td>
<td>29.5</td>
<td>43.3</td>
<td>46.4</td>
</tr>
<tr>
<td>3000 h/a</td>
<td>36.3</td>
<td>46.7</td>
<td>50.8</td>
</tr>
<tr>
<td>Cost of Construction $/KW</td>
<td>$700</td>
<td>$350</td>
<td>$450</td>
</tr>
<tr>
<td>Avg Fuel Cost for 1986-2006</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$ per Toe (10^7 kcal)</td>
<td>$25.79</td>
<td>$132</td>
<td>$118</td>
</tr>
<tr>
<td>$ per 10^6 Btu</td>
<td>$0.65</td>
<td>$3.33</td>
<td>$2.97</td>
</tr>
<tr>
<td>Heat Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Btu/Kwh</td>
<td>10,000</td>
<td>9,325</td>
<td>9,715</td>
</tr>
<tr>
<td>Kcal/Kwh</td>
<td>2,620</td>
<td>2,350</td>
<td>2,445</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm</td>
<td>3.8</td>
<td>12.0</td>
<td>27.0</td>
<td>27.0</td>
<td>27.7</td>
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<tr>
<td>Planning Stage</td>
<td>2.5</td>
<td>2.5</td>
<td>19.0</td>
<td>37.7</td>
<td>48.7</td>
</tr>
<tr>
<td>Total</td>
<td>6.3</td>
<td>14.5</td>
<td>46.0</td>
<td>64.7</td>
<td>76.4</td>
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<tr>
<td>Taiwan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm</td>
<td>2.3</td>
<td>9.8</td>
<td>12.4</td>
<td>12.4</td>
<td>12.4</td>
</tr>
<tr>
<td>Planning Stage</td>
<td>0</td>
<td>0</td>
<td>7.6</td>
<td>17.9</td>
<td>46.0</td>
</tr>
<tr>
<td>Total</td>
<td>2.3</td>
<td>9.8</td>
<td>20.0</td>
<td>30.3</td>
<td>58.4</td>
</tr>
<tr>
<td>Korea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm</td>
<td>1.7</td>
<td>7.1</td>
<td>7.5</td>
<td>7.5</td>
<td>7.5</td>
</tr>
<tr>
<td>Planning Stage</td>
<td>0</td>
<td>0</td>
<td>3.3</td>
<td>9.1</td>
<td>12.8</td>
</tr>
<tr>
<td>Total</td>
<td>1.7</td>
<td>7.1</td>
<td>10.8</td>
<td>16.6</td>
<td>20.3</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>6.3</td>
<td>15.3</td>
<td>26.9</td>
<td>39.5</td>
</tr>
<tr>
<td>Total Pacific Rim</td>
<td>6.1</td>
<td>37.7</td>
<td>92.1</td>
<td>138.5</td>
<td>194.5</td>
</tr>
</tbody>
</table>


Note: "Firm" means plants currently in operation, conversions under construction or planned, and new plants under construction.

"Planning Stage" means new plants that are not as yet under construction.
TABLE 2:8

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>177,000</td>
<td>166,950</td>
<td>166,950</td>
</tr>
<tr>
<td>China</td>
<td>99,000</td>
<td>98,883</td>
<td>98,883</td>
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<tr>
<td>U.S.S.R.</td>
<td>110,000</td>
<td>109,900</td>
<td>109,900</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>45,000</td>
<td>45,000</td>
<td>---</td>
</tr>
<tr>
<td>India</td>
<td>33,000</td>
<td>12,427</td>
<td>---</td>
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<tr>
<td>South Africa</td>
<td>27,000</td>
<td>43,000</td>
<td>53,160</td>
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<td>Germany</td>
<td>35,000</td>
<td>34,419</td>
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</tr>
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<td>Poland</td>
<td>21,000</td>
<td>59,600</td>
<td>59,600</td>
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<td>Australia</td>
<td>27,000</td>
<td>32,800</td>
<td>60,050</td>
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<tr>
<td>Canada</td>
<td>10,000</td>
<td>4,242</td>
<td>49,945</td>
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<tr>
<td>Others</td>
<td>53,000</td>
<td>55,711</td>
<td>172,105</td>
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<td>Totals</td>
<td>637,000</td>
<td>662,932</td>
<td>766,593</td>
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</table>

mtce — one million metric tons of coal equivalent defined as having 12,600 Btu per pound.

TABLE 2.10

MARKET SHARE OF STEAM COAL TRADE IN THE PACIFIC RIM

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>Australia</th>
<th>South Africa</th>
<th>China</th>
<th>Canada</th>
<th>All others</th>
</tr>
</thead>
<tbody>
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<td>Japan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>15</td>
<td>30</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>1990</td>
<td>15</td>
<td>30</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>2000</td>
<td>25</td>
<td>25</td>
<td>10</td>
<td>12</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>South Korea</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>-</td>
<td>50</td>
<td>50</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1990</td>
<td>-</td>
<td>50</td>
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<tr>
<td>2000</td>
<td>-</td>
<td>50</td>
<td>50</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Taiwan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1985</td>
<td>20</td>
<td>60</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>1990</td>
<td>20</td>
<td>60</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>20</td>
<td>60</td>
<td>-</td>
<td>-</td>
<td>20</td>
<td>-</td>
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TABLE 2.11

COAL RESERVES IN THE 5 PRINCIPAL WESTERN PRODUCING STATES

<table>
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<tr>
<th>State</th>
<th>Bituminous</th>
<th>Sub-Bituminous</th>
<th>Lignite</th>
<th>Anthracite</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorado</td>
<td>62,203</td>
<td>18,492</td>
<td>---</td>
<td>90</td>
<td>81,785</td>
</tr>
<tr>
<td>Montana</td>
<td>2,363</td>
<td>132,151</td>
<td>87,533</td>
<td>--</td>
<td>222,047</td>
</tr>
<tr>
<td>New Mexico</td>
<td>10,948</td>
<td>50,801</td>
<td>---</td>
<td>6</td>
<td>61,755</td>
</tr>
<tr>
<td>Utah</td>
<td>28,222</td>
<td>156</td>
<td>---</td>
<td>--</td>
<td>28,378</td>
</tr>
<tr>
<td>Wyoming</td>
<td>13,235</td>
<td>108,319</td>
<td>---</td>
<td>--</td>
<td>121,554</td>
</tr>
<tr>
<td>Totals</td>
<td>116,971</td>
<td>309,919</td>
<td>87,533</td>
<td>96</td>
<td>515,519</td>
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TABLE 2.12

WESTERN COAL FIELDS

<table>
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</thead>
<tbody>
<tr>
<td></td>
<td>mtce</td>
<td>mtce</td>
<td>mmt</td>
<td>mmt</td>
<td>mmt</td>
</tr>
<tr>
<td><strong>Japan</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>--</td>
<td>--</td>
<td>9.4</td>
<td>17.9</td>
<td>15.1</td>
</tr>
<tr>
<td>1985</td>
<td>13.7</td>
<td>6.0</td>
<td>27.5</td>
<td>34.0</td>
<td>32.0</td>
</tr>
<tr>
<td>1990</td>
<td>33.1</td>
<td>--</td>
<td>62.7</td>
<td>63-69</td>
<td>61.3</td>
</tr>
<tr>
<td>2000</td>
<td>76.5</td>
<td>53.0</td>
<td>90-107.8</td>
<td>107.6*</td>
<td>--</td>
</tr>
<tr>
<td><strong>Taiwan</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1981</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>4.7</td>
<td>4.5</td>
</tr>
<tr>
<td>1985</td>
<td>--</td>
<td>7.0</td>
<td>3.5</td>
<td>10.6-14</td>
<td>9.0</td>
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<tr>
<td>1990</td>
<td>--</td>
<td>12.0</td>
<td>15.8</td>
<td>18.1-27</td>
<td>12.5</td>
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<tr>
<td>2000</td>
<td>--</td>
<td>54-65</td>
<td>37.7</td>
<td>69.0</td>
<td>--</td>
</tr>
<tr>
<td><strong>Korea</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>1981</td>
<td>--</td>
<td>--</td>
<td>0.5</td>
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<td>3.7</td>
</tr>
<tr>
<td>1985</td>
<td>--</td>
<td>14.0</td>
<td>8.7</td>
<td>13.1-14.8</td>
<td>8.3</td>
</tr>
<tr>
<td>1990</td>
<td>--</td>
<td>30.0</td>
<td>15.8</td>
<td>18.6-20.3</td>
<td>13.0</td>
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<td>2000</td>
<td>--</td>
<td>69-88</td>
<td>46.1</td>
<td>38.2*</td>
<td>--</td>
</tr>
</tbody>
</table>

* CH2M HILL 1982 projections

mtce: metric ton coal equivalent at 12,600 Btu/lb.
mmt: million metric tons

### TABLE 2.14

STEAM COAL IMPORT PRICES TO JAPAN DURING 1981

<table>
<thead>
<tr>
<th>Source</th>
<th>Tonnage Share</th>
<th>C&amp;F Average Price ($)</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>18.20%</td>
<td>$ 74.50</td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>10.21%</td>
<td>$ 68.00</td>
<td></td>
</tr>
<tr>
<td>U.S.S.R.</td>
<td>2.19%</td>
<td>$ 62.87</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>9.79%</td>
<td>$ 61.79</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>10.85%</td>
<td>$ 67.82</td>
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<tr>
<td>Australia</td>
<td>48.76%</td>
<td>$ 69.01</td>
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</table>

TABLE 2.15

RANGE OF COAL COST COMPONENTS FROM VARIOUS SUPPLIERS TO JAPAN
(1980 U.S. ($) PER TONNE)

<table>
<thead>
<tr>
<th></th>
<th>*Western U.S.</th>
<th>Queensland</th>
<th>New So. Wales</th>
<th>W. Canada</th>
<th>S. Africa</th>
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</thead>
<tbody>
<tr>
<td>F.O.B. Mine</td>
<td>$19.00-23.00</td>
<td>$23.00-28.00</td>
<td>$21.00-26.00</td>
<td>$18.00-26.00</td>
<td>$14.00-22.00</td>
</tr>
<tr>
<td>Rail</td>
<td>$19.00-23.00</td>
<td>$5.00-10.00</td>
<td>$4.50-9.00</td>
<td>$13.00</td>
<td>$6.00</td>
</tr>
<tr>
<td>Port Handling</td>
<td>$5.00-6.15</td>
<td>$3.00-4.00</td>
<td>$3.00-4.00</td>
<td>$2.00-3.00</td>
<td>$1.00-2.00</td>
</tr>
<tr>
<td>Demurrage</td>
<td>-</td>
<td>-</td>
<td>$3.00-8.00</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Delivered Cost</td>
<td>$58.70-67.85</td>
<td>$39.40-54.15</td>
<td>$45.45-60.95</td>
<td>$42.15-55.15</td>
<td>$32.80-48.30</td>
</tr>
</tbody>
</table>

*1982 U.S.$ per short ton

Sources: 1. Western Coal Routes to Long Beach and Portland, Bechtel report of March 1982.

TABLE 2.16

COMPARISON OF RAIL AND OCEAN SHIPPING DISTANCES
FOR PACIFIC RIM SUPPLY COUNTRIES

<table>
<thead>
<tr>
<th>Country</th>
<th>&quot;SHIP&quot; (to Japan)</th>
<th>RAIL</th>
<th>Representative distance to Port (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Queensland 1</td>
<td>4065</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>Queensland 2</td>
<td>4065</td>
<td>220</td>
<td></td>
</tr>
<tr>
<td>New South Wales</td>
<td>4270</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>Western Australia</td>
<td>4270</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>South Australia</td>
<td>4800</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Tasmania</td>
<td>-</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northeastern B.C.</td>
<td></td>
<td>700-760</td>
<td></td>
</tr>
<tr>
<td>Southeastern B.C.</td>
<td>4265</td>
<td>680-730</td>
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</tr>
<tr>
<td>Alberta Mountains/Foothills</td>
<td>680-750</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alberta Plains</td>
<td></td>
<td>800-850</td>
<td></td>
</tr>
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<td>South Africa</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Northern Transvaal</td>
<td></td>
<td>740</td>
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<td>Southern Transvaal</td>
<td></td>
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<td>Wyoming</td>
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<td>1200-1650</td>
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Sources:
2. H. P. Drewry (Shipping Consultants Ltd.) The Growth of Steam Coal Trade, 1980, p. 60.
CHAPTER 3

POTENTIAL U.S. WEST COAST TERMINAL LOCATIONS

PART I - POTENTIAL TERMINAL SITES

A. INTRODUCTION

Westpo and other recent reports have projected that the West Coast of the United States will export 8.5-10.8 million tons of steaming coal in 1985, 18.7-25.5 million tons in 1990, and 45-55 million tons in 2000.¹ To facilitate the development of this trade, a major port facility must be constructed. Such a facility represents the final critical component in the Western U.S. Coal logistics system. Although more than one port facility will be needed later in the century to accommodate the larger tonnages, a facility must be constructed within the next three to four years which is capable of: (a) efficiently handling unit trains; (b) achieving a loading rate of 6-10,000 tons per hour; (c) accommodating 60 foot draft ocean vessels; and (d) providing a minimum storage capability of 700,000 metric tons.²

With the economies of the U.S. West Coast States slowing down, especially in Oregon and Washington, every port planning commission and board of harbour commissioners has been under pressure to investigate the possibility of developing a new port facility in their area. During 1980/81 almost every conceivable bulk loading location on the West Coast
had a feasibility or impact study in progress. The Westpo report identified 26 sites in the following areas:

- 7 sites in Puget Sound
- 6 sites along the Columbia River
- 2 sites on the West coast of Oregon and Washington
- 7 sites in the San Francisco Bay area
- 3 sites in Southern California
- 1 site in Alaska

Other studies have indicated as many as 30 locations investigating a coal port opportunity (see Figure 3.1 for West Coast map and terminal locations.)

The World Coal Study indicated that "the steam coal trade with the Pacific Rim is at least as much a transportation business as it is a coal mining business". Chapter 2 stated that the greatest leverage available to make the U.S. steam coal more competitive in the Pacific Rim lies in the completion of an efficient large scale port facility. Presently, the lack of this type of port on the West coast is certain to constrain the growth of the steam coal trade.

If the United States supply market was not characterized by such a large number of mine owners and traders, a system could possibly be developed based on a location which minimized the delivered costs of coal given the constraints of ship size limitations, rail distances and, most
importantly, origin of the coal. There are currently no long term steam coal contractual commitments from the Pacific Rim purchasers. This causes some question as to the level of trade that will materialize. With near/medium term mine supply locations not identified and new mine locations to satisfy long term commitments postponed, it complicates the port planning and development process and continues to support multiple port planning efforts.

To further complicate this issue, each of the candidate West Coast port development groups have a membership which includes either a resource owner, a railroad, or a port operator. The objectives of these participants may not necessarily relate to being part of a profit making coal terminal but rather to use the port as a vehicle to promote the business interests for their primary business lines. By ensuring the first port development is either near a participant mine location, or on a participant railroad line, the Pacific Rim buyers will be forced to set purchase criteria according to the established port location whether or not it is the optimal port site. This situation could nullify any prospect of a 'systems approach' to the most favorable port location.

The preceding paragraph is not meant to diminish the importance that these other logistics system participants take an active interest in the new port facility developments. Without this support, along with very aggressive port harbour commissioners and executives, there would be very little interest generated in an export coal terminal. Such a project, at the present time, does not represent a financially sound investment.
without the existence of long term contracts covering some minimum break even position.

Levels of thermal coal exports from the West Coast are expected to increase substantially. It is obvious that the present port facilities on the U. S. West Coast are incapable of processing such throughput levels. They are unable to allow neither the efficient operations of the interfacing rail and ocean shipping modes nor do they have adequate storage requirements necessary for the forecast volumes. The present effective capacity of the U. S. West Coast is 5 to 6 million metric tons per year. These port facilities are located in the Southern California San Pedro basin at the Ports of Los Angeles and Long Beach.

The Port of Los Angeles export coal terminal is located on the East Channel at berths 49 and 50. It is owned by National Metal & Steel Corporation (part of the Shapiro family) and operated by American Bulk Loading Enterprises Inc. (ABLE). There is 51 feet of water depth at the berth for a length of 800 feet and the terminal is served by Union Pacific, Southern Pacific, and Sante Fe Railroads. (U.P. is the main line originating in many coal producing areas.) There is no loop track so cars from unit trains must be fed one by one into the non-indexed single car rotary dump. The maximum capacity is approximately 2,000 metric tons per hour with a storage capacity of 70,000 to 120,000 tons. The facility is extremely old and was initially designed to handle iron ore, iron pellets, copper and zinc ores. These other bulk products are presently handled at the facility with coal. This operation has a history of significant down
time for repair and maintenance. It is unlikely this facility could handle more than 2 million tons of thermal coal per year.\textsuperscript{6}

The other existing export facility is located in Long Beach on the Southern Basin of the Long Beach Harbour at Pier G (berths 212-215). The Pier G facility is owned by the Port of Long Beach and operated by Metropolitan Stevedore Company. Again, the existing facility is extremely old and was designed initially to handle iron ore. The main function of the terminal at the present time is the export of petroleum coke from captive storage warehouses at the port. Petroleum coke is a residual by-product of the local refining processes. The water depth at the pier is 40-45 feet and they can reach 50 feet by breasting off 8 feet.\textsuperscript{7} The berth length is 2,100 feet. There is open ground storage of approximately 135,000 tons and the maximum loading rate is 2,000 metric tons per hour.

The Port of Long Beach has entered into an agreement with a fabricator and construction company to install a new 5,000 ton per hour loader at Pier G during early 1983. The cost of this project is budgeted at 18 million dollars. The objective is to gain more flexibility in handling petroleum coke, coal, and other major and minor bulks through the Pier G facility. If a new terminal is constructed no coal would be handled at G. The Long Beach terminal is served by the Union Pacific, Southern Pacific, and Santa Fe Railroads, but the Union Pacific is the principal railroad with either direct or interchange access to many of the coal fields in the Western States.
Of the 26 Ports indicated in Figure 3.1, only a few are continuing with development programs. If each of these ports had proceeded with their development plans, the United States would have a West Coast coal export terminal capacity of 100 million tons by 1985. It is not a significant expense to announce a development program and undertake an initial investigative or conceptual study. However, once an engineering study and environmental assessment have been started, the developers can anticipate spending 3 to 4 million dollars to finalize this phase. Many of the indicated locations have not proceeded with this more expensive investigation and will not go beyond their initial announcement made in 1980 or 1981. The port development programs which are continuing are dependent on a number of important factors prior to making any further major capital commitments. Most will complete their engineering and environmental studies and defer further consideration until there are some long-term throughput contracts available.

The most important factors involved in the intermediate stages of development are:

(i) Determination of a functional terminal design and realistic cost estimates.

(ii) Securing adequate financing packages (for both the initial investigative programs and the down stream terminal construction).
(iii) Completion of satisfactory environmental impact assessments.

(iv) Conclusion of a satisfactory operating agreement with a stevedoring company (operating costs and their escalation are a major component of any terminal cost.)

(v) Securing long term throughput contracts to cover an agreed break even level for the depreciable life of the assets.

B. POTENTIAL DEVELOPMENT LOCATIONS

Figure 3.2 shows the Western United States primary coal deposit and production areas including the major port development proposal sites and the servicing railroads. In general, Southern California is the preferred hauling distance from Utah, Arizona, New Mexico and most Colorado locations. Northern California and the Northwestern States port sites are the shortest distance from Wyoming, Montana and some Colorado locations. The ports in the Northwest range from 1,100-1,400 miles from coal sources. The Southern California ports range from 800-1,100 rail miles from the producing areas. Distance, however, is only one of the factors relating to the land transportation cost. Another extremely important factor is the Westbound grades involved in traversing the coast and interior mountains en route from the coal producing locations to the proposed ports in the Pacific Northwest. Because of these gradients the Union Pacific and Burlington Northern Railroad have indicated they will use seventy-five car unit trains as opposed to the eighty-four to one hundred car unit
trains used in the Southern California sector. There is no economical way the grade increases may be changed. The only alternative available is substantial increases in line haul power (thereby significantly increasing costs).

The Southern California locations also appear to have a comparative advantage in ocean shipping. The ocean transport distance to Japan from Southern California is approximately 4,850 miles compared to 4,300 from most Northwest port locations. The economies of scale of the larger vessel size capability of Long Beach and Los Angeles will easily overcome this distance disadvantage. There are some deep water ports in Puget Sound but these appear to be plagued with environmental problems. Resolution of these problems will extend the planning horizon significantly for these sites.

At the present time there are a number of ports which have active development programs. They are pursuing the Pacific Rim markets to secure long term throughput contracts to be used as the financing base for the development programs. The following paragraphs provide a brief synopsis on each of these locations:

1. **Port of Vancouver, Washington** — A group consisting of the Port, Westmoreland Resources Incorporated, Penn Virginia Corporation, and Morrison-Knudsen have joined together to develop this terminal location. It will rely principally on the Westmoreland Corporation coal deposits in the Powder River Basin which would be marketed
through this port facility. Morrison-Knudsen is involved in the project to generate business for their port engineering construction division (presently experiencing a very slow period in terms of activity). The proposed site is 42 acres (owned by the Port) at the junction of the Columbia and Williamett Rivers approximately 93 miles from the Pacific Ocean. A two-phase development is proposed. The initial phase would handle approximately two to three million tons per year and expand to eight million tons per year at a future date. The initial storage is planned at 150,000 tons with an expansion capability of 300,000 tons. The project is forecast to cost $40-50 million and will include one 2,500 ton per hour ship loader and a rotary car dumper. The operational start date is planned for late 1984. Trade would be based on the use of panamax vessels given the 39 feet maximum channel depth in the Columbia River and bar. The railroads servicing this site are the Burlington Northern and Union Pacific.8

2. The Port of Kalama, Washington -- The developers are the Port of Kalama and Pacific Resources Incorporated (PRI). Pacific Resources hopes to use this facility as a vehicle to expedite sales of their coal resources from the western United States. The site is located at Mile Post 72 of the Columbia River and consists of 175 acres upon which PRI presently holds an option to proceed with a long-term lease. The development plan is predicated upon a 5-15 million ton per year throughput with storage capacity of about 10% of this amount. Again, the maximum vessel size on the Columbia river is
panamax. This facility is envisaged to cost $70-80 million and will include two to three 3,000-5,000 ton per hour loaders. The final environmental impact statement was released in early 1982 and the comment period will be expiring soon. Their plans indicate a startup date in 1984. The servicing railroads are Burlington Northern and Union Pacific.\(^9\)

3. **Portland, Oregon** -- This location is being developed by Pacific Coal Corporation (owned by the American Guaranty Financial Corporation), and the Port of Portland. The site is located on 100 acres of land directly across the river from the proposed coal terminal site at Vancouver, Washington. Phase I is indicated to be 12 million tons per year with Phase II increasing to 18 million tons per year throughput capability. Storage is planned for 5-10\% of annual throughput. The development is projected to cost between $60 and $80 million. The environmental and construction permits are presently in hand and a ground breaking ceremony was held in early 1982. Dravo\(^{10}\) are in charge of the design and construction and plans were to complete the terminal in late 1983. These have been delayed given the current slowdown in coal sales to the Pacific Rim and there is no construction activity at the present time. Their development plans call for one 6,000 ton per hour loader and a single rotary car dump. The servicing railroads are Burlington Northern and Union Pacific. The maximum ship size will be panamax vessels.\(^{11}\)

4. **Astoria, Oregon** -- The developers of this location are Burlington Northern, Nerco, PanOcean Bulk Carriers Limited, and the Port of
Astoria. Located 10 miles from the mouth of the Columbia River, there may be a possibility of dredging in later stages to allow vessels above panamax size. The 85-acre site is planned to accommodate a 10 million ton per year terminal with 600,000 ton storage capability and two 2,500 ton per hour loaders. The project is forecast to cost between $50 and $60 million and an operational startup date is anticipated in 1985. Burlington Northern is the only servicing railroad to this location.12

5. **Coos Bay, Oregon** -- The Port of Coos Bay has joined with Canasia Coal Company to develop a coal facility planned to handle 3-4 million tons by 1983 and 12 million tons by 1988. The project is in the permitting and detailed engineering phase. The environmental impact analysis is under way. The developers plan to initially export 1-1/2 - 2 million tons per year of Canasia's Oregon coal (after cleaning). This would be supplemented by 4-5 million tons per year of Utah and Colorado coal. If the anticipated Powder River Basin13 development takes place, they also plan on 5-6 million tons per year of this coal in the 1990's. The harbour depth is 35 feet which can accommodate 50,000 deadweight ton bulk carriers. This could be deepened for approximately $30-40 million which could be included as a project cost. The advantage of this location is its shorter rail distance and avoidance of crossing some of the mountain ranges required in shipment to the Columbia River and Puget Sound port locations. The rail distance from Price, Utah to Coos Bay and Long Beach, California is approximately equal.14

(88)
6. **Stockton, California** — The developers of this project are the Port of Stockton, Crowley Maritime Corporation, and Metropolitan Stevedore Company. The permitting is complete and construction is about 80% finished. This project, including a loop track, rotary dump pit, and 4,000 ton per hour loader, is scheduled for full operation by October, 1982. It is located on 100 acres of land at the Port of Stockton and is projected to handle 2.5 million tons of coal per year in the first stage. Expansion to 5 million tons per year is anticipated later in the decade. Storage capacity will be 300,000-400,000 tons and will depend on the amount of other bulk cargos such as copper concentrate and soda ash that share the terminal and storage areas. This terminal was originally designed to handle copper concentrate. It has been redesigned to handle coal and now anticipates controlling a small share of the export steam coal market given the early start-up date. The railroads servicing this location are Southern Pacific, Western Pacific, and the Sante Fe. With draft limits of 32 feet the maximum shipment size is 30,000 tons.

7. **Port of Los Angeles** — The port is presently seeking interested investors and operators in their potential facility but as of yet do not have any joint venture members. They have retained the Long Term Credit Bank of Japan as financial advisors on the project. This bank is also assisting with some of the marketing and attempting to secure long term contracts to be used as a financing base. The development plans include an initial capability of 15 million tons per year
increasing to 20-30 million tons per year by 1990. The site would be 200 acres of land that is currently being reclaimed through dredging on Terminal Island. Plans call for two 4,000-6,000 tons per hour ship loaders and a storage capability of 2-3 million tons. With the land preparation costs included in the project development it appears the total costs would be in the region of $450 million. Terminal construction would not be complete until 3-5 years after the landfill completion (earliest 1987-1988). With very little dredging the facility could handle 65-foot depth vessels, this would allow 150,000-200,000 ton vessels to call. The railroads servicing this terminal are Union Pacific, Southern Pacific, and Santa Fe.  

8. Long Beach — There are two developments at this location. The first is an expansion of the present Pier G facility which includes a new ship loader and slightly more storage. This will increase its throughput capability to 4-6 million tons per year. Additionally a group consisting of Union Pacific Land Company, the Port of Long Beach, Crowley Maritime Corporation, Metropolitan Stevedore Company and C. Itoh, have formed a joint venture to develop a 100 acre site on the north side of the Cerritos Channel. The conceptual engineering has been completed, and a design and construct bid package is being prepared. Environmental permitting is nearly complete. The terminal facility is designed around a 15 million ton per year initial throughput increasing to 30 million tons. The storage will be 700,000 tons with two 6,000 ton per hour ship loaders. Development costs are estimated to be in the region of 250
million U.S. dollars and terminal operation is forecast to commence in late 1985. Plans call for dredging the approach channel and berth to 65 feet and capitalizing this as a project cost. This would enable 150,000-170,000 deadweight ton colliers to load coal at this location. It is served by Union Pacific, Southern Pacific and Santa Fe railroads. These Southern California locations are approximately 800 miles from the coal fields in Utah and 1,000-1,200 from the fields in Colorado. More detail will be given on the Long Beach location and development later in the paper.17

As can be seen from the port projects outlined above, there does not appear to be any general belief that the first West Coast export terminal should be a deep water location. H. P. Drewry projects that in the next 10-15 years, 30% of the West Coast export coal will be carried in panamax size vessels.18 This supports the claims of most Columbia River developers that the limitation to panamax size vessels is not an inhibitor to the growth of the Pacific Rim export trade through their ports. Additionally, the Pacific Rim purchasing policies as outlined in Chapter 2 indicate that only a small number of ports or receiving centers will be capable of handling the larger tonnage vessels.

Most forecasts indicate that in the long run there will be a requirement for more than one coal export terminal on the United States West Coast. The immediate questions to be answered are: where should the first terminal be located; and should it be a deep or medium draft port facility. It is unlikely that any of the port projects will proceed

(91)
without at least some amount of base cargo throughput guarantees. It appears that the first project to proceed will be one that can take advantage of transportation economies in the near term to make the U.S. product more competitive in the Pacific Rim markets. Such a location should minimize the inland transportation costs and take advantage of sealift price differentials available between panamax and larger size vessels. One of the more favorable locations for the first West Coast export terminal is the Cerritos Channel Project at Long Beach, California. The advantages of this port location are outlined in the next section.

C. THE LONG BEACH EXAMPLE

There are two main reasons for using the Port of Long Beach as a case study in this thesis:

(i) From a purely logistical point of view, the Southern California San Pedro Bay location offers many advantages. The shortest and most level grade route from the highest quality coals is from Utah/Colorado to Long Beach/ L.A. Other than Los Angeles, this location is the only feasible deep water location available which does not involve major environmental problems or substantial dredging. The climate in the port area and along the transport corridor is the most favorable of any alternative on the Coast. The logistics and operational advantages inherent in this location favor it as the first large terminal site.
This project represents the most complete development plan to date. Considerable time and capital have been spent in drawing together a joint venture management and operational team. Major progress has been made towards completing the engineering design study, the environmental permitting, and other important terminal aspects. While other terminal locations have slowed down their development program due to the present soft market for steam coal in the Pacific Rim, the Long Beach Project is continuing on plan and on schedule.

The Port of Long Beach management has a reputation for operating one of the more aggressive public ports on the Coast in regard to their strategic planning abilities and efforts to expand the port business. For some time the Commissioners of the Port of Long Beach have entertained the objective of expanding their present coal exporting facility and/or developing a completely new "state of the art" export terminal. In July, 1981, they joined with Union Pacific Land Corporation (Upland Industries) to fund a Kaiser Engineers study on the prospect of developing a coal port facility on Union Pacific Land property north of Cerritos Channel. Upland Industries became involved as they saw a profitable opportunity of leasing a large block of land to the project. This land is currently an oil drilling field which would allow an additional surface area use.

The Kaiser Engineers Conceptual Study indicated that for a cost of $112 million (1982 dollars excluding removal and redrilling of oil wells), a modern bulk loading facility capable of 10-15 million tons throughput per year could be constructed on the designated site. The Kaiser Study
further indicated that at this capital cost level, the site and operation would be competitive with any other potential locations on the West Coast. The Port and Upland Industries at this point decided to seek additional equity participants for the development of this project. The objective was to locate partners capable of providing cash resources in addition to expertise and operational assistance in the areas of terminal operation, maritime shipping, marketing to the end users, plus design engineering and construction. Through a period of negotiated discussions, they approached Crowley Maritime Corporation of San Francisco, Metropolitan Stevedore Corporation of Long Beach, and C. Itoh and Company of Japan. Each agreed that the project represented a reasonable investment opportunity and joined with the Port and Upland on the basis of preliminary equity participation levels. This represented the formal beginning of the Long Beach International Coal Project (L.B.I.C.P.) commencing activities on the project in August of 1981.

Over the last twelve months, this group has actively pursued a development program. This program has included: a major conceptual engineering study; environmental impact statements; environmental impact reports; public hearings; and a full marketing campaign and information program in both the United States and the Pacific Rim countries of Japan, Taiwan, and Korea. A complete financial program was also developed to take best advantage of Yen and U.S. dollar financing including various import/export credit financing and leveraged leases.

From an operational point of view, the Long Beach location offers a number of distinct advantages which are important in the short term. These
advantages will allow transportation savings to be effected to the extent that U.S. West coal can become more competitive in the Pacific Rim. The demand growth for U.S. Western coals by Pacific Rim users is predicated upon its competitiveness with other suppliers.

In terms of inland transportation there is a savings of between 300 and 800 miles of rail haul compared to points in the Pacific Northwest. The Long Beach route also avoids the long and steep grades involved in transport to the Northwest. These grades require that unit trains are smaller in cargo component and require substantially more energy and time to move a very short distance. Other advantages on the transport corridor the Southern California location enjoys are lack of ice, snow, and rain which tend to increase the combustibility of the lower quality steam coal. Moisture and cold temperatures generally shorten coal's stockpile life and make it more difficult to handle through the rotary dump and conveyor systems. The effect of these items on the price of the rail transportation is demonstrated in the estimated differential of $6.00-$8.00 a ton between Utah and Colorado and Long Beach versus the Puget Sound or other Northwest locations. There is also an estimated difference in favour of Long Beach of $2.00-$5.00 a ton between Utah and Colorado locations exporting through Long Beach and Wyoming and Montana locations exporting through the Northwestern ports.

There are also advantages in ocean shipping to locating a terminal at the Long Beach site. In the short term this advantage is not as great due to the great surplus of Panamax size vessels. This has caused panamax owners
in this present market to operate at something less than a full cost recovery. They may price their vessels on the basis of variable costs to keep them out of lay up and avoid the high restart costs of bringing a vessel back into operation. Most large vessels of the 100,000-150,000 deadweight type are built for a specific term contract and there are not a great number available on the open charter market. This situation means that to use larger tonnage vessels in the short term may require a new building. This would only be undertaken by an owner if he could be assured of a long term contract which would include covering his operating costs and returning a reasonable profit to his capital investment. In comparing the full cost price of the larger vessel with the variable operating cost pricing of the panamax vessel, the present world situation is that the panamax vessel can likely be chartered for less money per ton of capacity.

This present oversupply in the ocean shipping market is a short term problem. In the long run, economies of scale should dictate that vessels in the 100,000-150,000 ton deadweight category will offer significant transport advantages to the Long Beach location over other locations capable of handling only panamax size vessels. In May of 1982, the project developers determined that, after taking account of the longer voyage distance from Long Beach to the Pacific Rim over a Columbia River Port, the benefit of using a 125,000 ton deadweight vessel over a panamax size vessel for the shipment of steam coal would be in the range of $3.56-$5.00 per ton in favour of Long Beach.22

(96)
Average weather conditions at the terminal location are also very important. The steam coals anticipated in this new export market will be of substantially lower quality than the metallurgical coals previously shipped to the Pacific Rim users. The higher sulphur content and inherent moisture in the steam coal product will present problems for terminal locations in rainy climates such as the Pacific Northwest. These terminals will need to be more concerned about the product storage life, degeneration, and other spontaneous chemical reactions caused by the moisture. The amount of rain and general climatic conditions in the San Pedro Basin are very favourable and will enhance the storage life of the steam coal product. It will also mean less concern to vessel owners who will be putting a considerably drier product on board their vessels and hence will be less concerned about the possibilities of fire and/or other chemical/spontaneous reactions.

An optimum port location choice can make a substantial difference in the delivered price of the product. This is a critical aspect to the development of the West Coast steam coal export trade. The Southern California location has several distinct advantages as outlined above which have led the developers to press on with their program and receive the continued support of a number of the major purchasing agencies in the Pacific Rim countries. It is entirely reasonable to expect that the first major coal terminal to be built on the West Coast of the United States will be at Long Beach.


5. Interview on March 16, 1982 with Mr. Allan Ide, President and Chief Executive Officer of Metropolitan Stevedore Company, Wilmington, California.

6. Ibid.

7. Breasting-off -- involves the use of small barges or other floating equipment which acts like a spacer by holding the ship a specified distance from the pier face.


9. Ibid., p. 6.

10. Dravo, a major construction and engineering company located in Pittsburg, Penn.


12. Ibid., pp. 139-142.

13. Powder River Basin - an area in Wyoming and Montana that consists of one of the largest coal reserve areas in the United States. The Coal (mostly surface mines) is of medium quality (BTU/lb approx. 7500 and high moisture).

15. This project currently under my direction for CMC partner.


17. This project was under my direction for the CMC partner.


19. Steam coal generally has an inherent surface moisture of 5-8%. If subjected to significant rain or other moisture, spontaneous reactions between the additional moisture and the sulphur in the coal can result. This reaction can result in the production of acid, or the generation of heat which can set the coal afire.


21. Ibid.,

22. Report to the Marketing Subcommittee of the Long Beach International Coal Project, made by the Port of Long Beach, April, 1982.
TABLES AND FIGURES
FIGURE 3.1

POTENTIAL TERMINAL SITES

PUGET SOUND

a. Bellingham  
b. Anacortes  
c. Tulalip  
d. Everett  
e. Tacoma  
f. West Tacoma  
g. Dupont  

COLUMBIA RIVER

h. Longview  
i. Kalama  
j. Vancouver  
k. Portland  
l. Astoria  
m. Warrenton  

NORTHWEST COAST

n. Grays Harbor  
o. Coos Bay  

BAY/RIVERS

p. Sacramento  
q. Stockton  
r. Benicia  
s. Selby  
t. Richmond  
u. San Francisco  
w. Redwood City  

SOUTH COAST

w. Port Hueneme  
x. Los Angeles  
y. Long Beach  

ALASKA

z. Seward  

GRAYS HARBOR
COLUMBIA RIVER PORTS
WARRENTON
ASTORIA
LONGVIEW
KALAMA
VANCOUVER
PORTLAND

COOS BAY

SACRAMENTO
STOCKTON
BENICIA
SELBY
RICHMOND
SAN FRANCISCO
REDWOOD CITY

PORT HUENEME
LOS ANGELES
LONG BEACH

Source: As in Figure #3.2b
Source: Puget Sound Coal Export Opportunities and Issues
CH2M HILL February 1982, p. 103.
CHAPTER 4

MANAGING A JOINT VENTURE: ISSUES IN ORGANIZATIONAL DEVELOPMENT AND STRUCTURE

INTRODUCTION

The purpose of this chapter is to highlight the significant internal problems involved in establishing a multi-partner joint venture to undertake a complex transport project. The discussion will delve into the detailed aspects of the conceptual and operational origins of the Long Beach Project. The organizational issues involved in setting up a functional management framework for such a large project are enormous and complex. The complexity of these internal organizational issues is developed through a discussion of the participants, sub-contractors and their respective responsibilities.

The management structure established by the developers is presented and discussed in relation to alternate frameworks. The diverse objectives among the owners are also discussed as they affect the organizational development.

PART I - MULTI-ORGANIZATIONAL DECISION MAKING

A. THE PLANNING/CONCEPTUAL PHASE

Decision making can be difficult within a single organization; in the realm of a multi-organizational joint venture it can be a test of the cohesiveness of the group and the soundness of the project format.
William Evan indicates "the phenomena and problems of inter-organizational relations are part of the general class of boundary relations confronting all types of social systems. All such boundary relations tend to be enormously complex."\(^1\) Friedman & Kalmanoff indicate "the central concept of a joint international business venture is that of partnership".\(^2\) They also indicate that a partnership has both "technical and emotional" aspects.\(^3\) The emotional side is most severely strained during the conceptual planning phase of a project as decisions are made in an environment of uncertainty. Changes to original objectives have to be continually made to allow for financial or operational trade-offs and social/political situation changes. Timeliness is also an important aspect of many decisions. Group decision making can be contrary to this objective. This is further exacerbated in the Long Beach group by significant geographical distances and travel time involved to allow the participants to meet on a face to face basis.

For the Long Beach International Coal Project (LBICP), five major organizations, the Port of Long Beach, Upland Industries, Crowley Maritime Corporation, C. Itoh and Company, and Metropolitan Stevedore Corporation have formed two inter-related joint ventures. The objectives are to: (a) conceptually design and plan the terminal; and (b) construct and operate the terminal on the Cerritos Channel of the Long Beach Harbour.

The nesting of one joint venture within another complicates the development program. However, the institutional and regulatory fabric of the United States legal system necessitates this type of program for a
The objectives of the LBICP in the planning and conceptual stage are as follows:

(i) Finalize formal organization of the LBICP joint venture.

(ii) Through a letter of understanding (LOU)⁴ set forth the initial objectives and timing for the conceptual phase.

(iii) Complete formation of the subset joint venture by the three private companies who will eventually become the terminal operating group.

(iv) Determine equity participation of each of the joint venture members in the conceptual phase of the project and assist the
potential owners in resolving division of their shareholdings of the Terminal Operating Company.

(v) Complete a conceptual engineering design package. This design must meet partner developed criteria with respect to cost, environmental acceptance, operational efficiencies, user acceptance, and financial return. It must also demonstrate a competitiveness with other potential U.S. West Coast port locations.

(vi) Establish a financing program resulting in minimum capital costs and minimum partner guarantees.

(vii) Complete major aspects of the environmental assessment program to the point that a determination can be made regarding the acceptance of the conceptual location/design parameters and the flexibility allowed in the final design of the terminal.

(viii) Complete a marketing program aimed at providing engineering design criteria, operational format, and general development progress to U.S. mine owners, agents, trading companies, and Pacific Rim users. These potential users will be encouraged to provide input during the planning stage. Maximum exposure of the terminal progress is an important part of securing letters of intent and or other commitments for Terminal throughput.
(ix) Establish a range of terminal throughput rates which can be indicated to potential users as a basis for securing their support. Such rates to be predicated upon inputs from the marketing, engineering, and finance sub-committees.

(x) Complete the above objectives within prescribed financial and temporal constraints.

The organization and behavioral operation of the joint venture partners presents similarities to behavioral aspects of participants in distribution channels. Louis P. Bucklin says "A channel of distribution shall be considered to comprise a set of institutions which performs all the activities (functions) utilized to move a product and its title from production to consumption".\(^5\) In the Long Beach project, the participant organizations (institutions) are performing activities necessary to move the coal terminal concept (product) from conception to operational reality. An examination of participants in a large joint venture could draw on channel theory to explore a number of concepts such as roles, role theory, inter-organizational relations, communications, and conflict.

B. PARTICIPANTS AND ROLE

1. Equity Participants

(a) The Port of Long Beach

As indicated in Chapter 3, the Commissioners and executive group of the Port of Long Beach have a reputation for aggressively pursuing new
projects in areas that offer long term growth potential. The steam coal export trade from the U.S. West Coast has created a great deal of interest for the port management. The deep water access and rail advantages encourage the development of a San Pedro Bay location as the first large West Coast export terminal. In the LBICP joint venture, the port management is acting primarily as a catalyst and co-ordinator in the terminal conceptual planning phase. Their principle objective is to organize a group of companies with demonstrated operational and financial strengths. It is hoped these participant companies will be motivated by the results of the conceptual and planning study to proceed with the terminal construction. The Port officials would benefit politically from such a major development and would expand the Port's revenue earning capability through wharfage charges levied against the coal tonnage.

If this project represented less financial risk, and did not require major marketing, marine, and operations inputs, the port has the ability to undertake such a project on its own. In such an alternate development format the Port would lease the completed facility on a long term basis to a stevedore operator group.

The Port's primary external source of funding is through the use of tax exempt city or port industrial revenue bonds. These bonds are secured by the assets and earning ability of the issuing authority. The maximum debt the Port can assume under this type of financing is regulated by the 1980 Harbour Bond Resolution. Under this resolution, the Port is presently limited to approximately $100 million of additional borrowing. As they
have several other projects under consideration, $60-70 million would represent their maximum financial support for the terminal. This situation increases port management support for the participating terminal developers. Even if the project appeared extremely favourable and was supported by a number of throughput contracts, the Port would presently be unable to secure the financing independently.

The Port functions on a day to day basis under the direction of an executive port director reporting to a Board of Harbour Commissioners. The Commissioners are appointed by the Long Beach City Council. The City of Long Beach is a municipal corporation. The Executive Director is an operational salaried individual while the Commissioners are appointees consisting primarily of community business leaders. As is the case in other major public ports in the United States, the success of the Port of Long Beach and the resulting financial support for the local communities has made this an important arm of the local governments.

The Port may become involved in some financial support of the construction and development of the terminal. It appears, however, that its financial participation principally will involve efforts to mediate major partner differences regarding disputed financial commitments. Some of these disputed amounts may need to be assumed by the Port. Their preference is to have little financial or operational participation in the project.

In addition to their role as co-ordinator and mediator, the Port management is also providing marketing contacts with western producers and
Pacific Rim users. These contacts are considered valuable as a result of historical trade associations and trade development missions. In particular the governments and principal end users in the Pacific Rim countries attach great importance to the active participation by the Port Executive and Commissioner groups. Their participation is regarded as an indication of serious support for the private group proposing the construction and operation of the terminal facility. In essence, the Port management is expending significant funds on a conceptual study to convince a private investor group of the Long Beach potential in relation to other sites on the West Coast. If their program is successful, they will co-ordinate and conclude a conceptual and planning study which leads to an undertaking by the private group (PBT) to finance, construct, and operate a new facility. The success of the development program will largely depend on the Port's success in securing the participation of partners that have complementary business experience and interests.

A new coal export terminal would represent one of the more significant projects undertaken by the Port of Long Beach. The Port's gross and net revenues for the fiscal year ending June 30, 1981 were $41.4 million and $26 million respectively. It is a 33-1/3% participant in the expenses of the conceptual phase. This phase has a budget of four million dollars. If a decision to continue with construction is made by PBT (based on port agreed design and operation criteria), the Port involvement will likely be substantially reduced. The port management would function as consultants or advisors regarding technical questions in relation to Port operations interfacing with the new terminal.
(b) Upland Industries Corporation

Upland Industries (Union Pacific Land Corporation) is a wholly owned subsidiary of Union Pacific Corporation. With annual revenues of $55 million in 1981 it represents the smallest division of the U.P. group of operating companies. U.P. consolidated income for 1981 was $6.38 billion.

Upland's interest in the project relates to their ability to secure lease revenues from the 100 acre proposed terminal site on the North side of the Cerritos Channel. This land is presently the site of a drilling field operated by Champlin Oil (another wholly owned U.P. subsidiary). The potential annual lease revenues of $2-5 million certainly justify their support of the conceptual phase. It appears conceivable that their interest could also be stimulated by the potential revenues for Union Pacific Railroad. Based on 15 million tons per year throughput, (U.P. is the monopoly rail carrier) it could mean 500 million dollars revenue per year for the railroad.

After the conceptual/planning phase, Upland Industries' participation would primarily be as a liaison and consultant. They would assist in resolving legal/technical/financial problems relating to the relocation and re-organization of the Champlin drilling fields. Additionally, Upland is regarded by the group as a link to the Union Pacific Railroad. This link could be important for seeking guidance/information on comparative rates and the railroad's attitude towards supporting the terminal project in Long Beach versus other locations presently on the planning boards. The extent and availability of this information is presently unknown.
Upland have indicated that, due to fears of being charged with restraint of trade or discrimination charges, the railroad would not likely be willing to indicate comparative rate levels between different ports at the present time.

The sensitivity of the Union Pacific Corporation to discrimination charges is important. Although supportive of the Long Beach project, they have indicated that they cannot in any respect appear to favour or support the Long Beach terminal over Los Angeles or any other Port as this could: (a) expose them to legal action with respect to restraint of trade and possible collusion practices with the Port of Long Beach group; and (b) damage their long term business relationships for other cargoes with other ports. It is the intention of the Union Pacific parent company to remain neutral to any of the terminal site developments that are served by its railroad trackage.

The Upland group are supporting the conceptual planning phase for 33-1/3% of the budgeted expense. Along with the Port they can be considered catalysts in trying to establish a conceptual planning program which leads the private participants to a decision to proceed with the construction of the terminal. Upland will not participate in the terminal ownership or operation.

(c) C. Itoh and Company

C. Itoh is Japan's third largest trading company following Mitsubishi and Mitsui. Their 1981 turnover was $28.4 billion. They specialize in the
trading of major bulk commodities including petroleum. The Japan Coal Development Corporation (JCDC), on behalf of the private electric utility companies and the Electric Power Distribution Company (EPDC), have assigned C. Itoh trading responsibility in developing the United States western coal supply. They may participate in production and infrastructure projects that will make steam coal supplies available from the Western United States as they are required to support the forecast energy needs of Japan.

C. Itoh's initial verbal support of the project was enhanced by their acceptance of the offer to join the conceptual study phase and subsequently as a member of the potential owner and operating group. C. Itoh are regarded by the group as the communications link to the end users in the Pacific Rim countries. Their primary role is to secure long term commitments of tonnage through: (a) sales efforts in Japan, Taiwan, and Korea; and (b) distributing their equity share among the Japanese electric utilities and cement companies. This latter approach is to promote the concept of price security and protection from excessive escalation through ownership. This concept did not originate with C. Itoh or the group of joint venture participants. The electric utilities in Japan and the Japan Coal Development Corporation have indicated there is a need on the part of the major users to participate as owners of the terminal entity. Part of any agreement to becoming an equity participant from the end users would be a minimum long term throughput contract (i.e. 500,000 to 1,000,000 tons per year for a 10 year period). There are no plans to offer equity participation to users in Taiwan or South Korea.
C. Itoh presently has a 15% interest in the conceptual planning phase. They intend to own 45% of the terminal facility and operation. This participation will be diluted among major Japanese end users with C. Itoh maintaining a small participation (5-10%) but remaining as the liaison for the group of owners and carrying the single vote for this block shareholding. The role of C. Itoh during the conceptual planning stage is critical as they are aware of the tonnage required by the Japanese, Korean, and Taiwanese end users. Their information will indicate whether or not adequate throughput can be anticipated to sustain the terminal in the early operating years. They are the principal far eastern marketing arm for the project which complements their appointment as purchasing negotiator for most of the Japan required steaming coal.

C. Itoh has been appointed by JCDC and the Japanese government to assist in the development of the U.S. West Coast/Japan steam coal export market. It is important they involve themselves in terminal and infrastructure projects which offer the best potential for improving the logistics system. In this context, they are similar to the Port and Upland Industries in that they also are acting as a catalyst. They have a significant stake in making the project proceed (even if the financial returns are marginal). If Los Angeles or another West Coast port were developed first, this would be an extremely embarrassing situation for C. Itoh after they have committed to the Long Beach Project. This relates to the earlier discussion on the Port of Long Beach choice of partners. Participants were sought that would support the terminal development and assist the Port in their "selling" efforts to the other participants.
Crowley Maritime Corporation (CMC) is a diversified marine operating company. They concentrate primarily on support of the offshore oil and construction industry as an owner of tugs, barges, supply boats, crew boats, offshore drilling rigs, and related marine assets. Annual revenue for this privately owned company is in the region of 750 million U.S. dollars.

The role of CMC in the LBICP is primarily related to their marine management capabilities and knowledge of the shipping market. Their involvement in the project is also a result of the excellent working relationship they have established with the Port of Long Beach over a period of many years. CMC are the principal tug/barge, lighterage, ship assist, construction, shipyard, and tour boat operator in the San Pedro basin. Crowley also have a partnership with Metropolitan Stevedore Company (another LBICP partner) in Stockton, California regarding the ownership and operation of a bulk coal and copper concentrate loading facility which is coming on stream later in 1982 (see Chapter 3 for details of the Stockton terminal). The construction and operating knowledge CMC has gained from being the general contractor plus 50% owner on the Stockton project, and their excellent relationship with Metropolitan, made this company a natural choice for one of the participant positions.

Crowley's participation in the conceptual study phase is 7-1/2%. They will maintain between 35 and 45% of the terminal ownership and operation.
(the final share will be set after negotiations between CMC and Metropolitan as to splitting the 55% American interest in the terminal ownership).

Crowley have acted as the marine consultant (along with C. Itoh) in regard to ocean shipping rates and as part of the marine survey team. These efforts involved considerable time at Long Beach evaluating the approach and berthing channels at the project site. CMC has additionally indicated an interest in the purchase and operation of dedicated super colliers which would service the trade established in the long term contracts between the end users and the U.S. West Coast suppliers. Ships to service this trade may require special design and construction because of the narrow approach channels, low power cable, and bridge overhead clearances at the Long Beach site. At the present time however, Crowley's role comes closest to that of a pure investor in this project. They are looking to the terminal ownership and operation for a reasonable financial return. The complementary business lines in which they would initially be involved are minimal.

This role has turned out to be a very important part of the project conceptual development phase. Other partners (including Metropolitan Stevedore which will be discussed in the next section) could possibly be biased by objectives which do not necessarily relate to the terminal functioning as an independent profit making entity. The other partners' motivations could stem partially from business lines which are complementary to or resultant from the terminal operation per se.
Considering the terminal in this context may enable them to cross-subsidize low profitability on the terminal from other profitable complementary business.

(e) Metropolitan Stevedore Company

Metropolitan Stevedore Company is a privately owned stevedore operator located in Wilmington, California. Along with an associated company in Northern California (California Stevedoring & Ballast) it represents the largest stevedore group on the United States West Coast.

Metropolitan presently handles all major bulks out of Long Beach at Pier G and Pier 218 for soda ash and other white bulks (see Chapter 3). Their participation in the LBICP is based on: (a) their history of excellent performance in the stevedoring of bulk cargoes for the Port of Long Beach; (b) their operational experience in manpower planning; and (c) the need for their support to meet the Port of Long Beach objective of transferring all coal from Pier G to the new facility. Metropolitan presently operate under a recently signed 10 year preferential assignment agreement with the Port. Under this agreement they maintain the right to handle all bulk cargoes at Long Beach based on an agreed tariff schedule including lease costs and escalation schedules for the Port supplied terminal equipment. As the new terminal is planned to be on stream in 1985, Metropolitan are being asked to turn over loading rights to coal products for which they presently hold preferential assignment for the six final years of their contract with the port. The participants in LBICP and PBT have undertaken to resolve this issue with Metropolitan. The likely approach will be to
compensate Metropolitan for the loss of profits on the Pier G anticipated coal cargoes in excess of those profits they will make as a participant in the new terminal entity. This is an extremely difficult issue to resolve and represents a major source of disagreement between the Port, Metropolitan, and the other partners.

The size of Metropolitan (approximately 100 million U.S. dollars per year revenue) prevents them from taking a major equity participation in the ownership of the terminal. Their participation in the LBICP conceptual planning phase is 7-1/2% and their participation in the ownership and operation of the terminal will be likely 10% to 20%. In addition to being an owner of the terminal entity, Metropolitan will provide contract and International Longshoremans and Warehouseman Union (ILWU) labour for the day-to-day terminal operation. The terminal operations management will be by a PBT management board.

Metropolitan's principal role in the conceptual stage has been to assess the engineering designs in terms of manpower requirements and recommend trade-offs between capital and labour costs. This involvement has been critical in developing the terminal design. The objective has been to combine state of the art technology with the background knowledge of West Coast stevedore practises as they relate to labour intensity for different design criteria. The differences of opinion on this issue became so severe at one point in the planning stage that a second engineering company had to be retained. Bechtel and Metropolitan each had designs which claimed to be more operationally and labour efficient. As operating
costs represent an escalating component, it is extremely important that the project maximizes the trade-off benefits between capital and anticipated operating costs.

An illustration of the importance of having a stevedore operator as a participant is the fact that they recommended that no approaches be made to the ILWU in regard to their assistance on manning levels for the different design criteria. Apparently, if brought in very early in the development process, the Union will make every effort to press for a design which is unnecessarily labour-intensive. Additionally, they will have drawings and other materials which could be used to build a solid defense to present to various labour boards when it comes time to negotiate the manning for the project. The project used primarily Metropolitan generated manning levels with some further investigation done by NYK Line of Japan at the request of C. Itoh. NYK's efforts were to provide support that Metropolitan were making reasonable assumptions for the conceptual operating alternatives.

2. Contractor Participants

(a) Engineering

Bechtel Civil and Minerals Division secured a contract with the LBICP to develop a conceptual design including detailed engineering drawings and specifications. This information ultimately could be released as a bid package. There was keen competition for this work from other major engineering contractors such as Soros and Associates, Dravo, Fluor, Ralph Parsons, and Morrison-Knudsen. The engineering consultant is to develop a
"state of the art" terminal subject to the following major constraints:

(i) Conceptual engineering costs are not to exceed $1.6 million.

(ii) The terminal location is on an operating oil field which will need to be redrilled, moved to drilling islands, and re-piped to additional storage areas without major production interruptions.

(iii) The site, 100 acres less 30 acres required for the continuing oil operation, is minimal and will require an extremely efficient design to meet the minimum 700,000 metric ton storage requirement for Phase I.

(iv) The site is characterized by a history of subsidence as a result of the continued oil removal. The subsidence has already been as much as 8-10 feet in some sections. With planned coal storage of 700,000,000 metric tons, water re-injection into the oil wells will need to be accurately forecast and monitored to ensure that additional subsidence does not adversely affect the tunnels, reclaim systems and conveyor routes.

(v) The terminal site and operation must be designed to meet or exceed the environmental pollution regulations and requirements in effect in the San Pedro Basin.

(vi) The conceptual design must be formulated on a negotiated basis with Metropolitan Stevedore. The full benefit of
Metropolitan's labour knowledge and experience must be taken into account in designing all phases of the operation.

(vii) Certain minimum throughput quantities per hour and minimum equipment requirements were set by the engineering committee including but not limited to: (a) at least 1 dual rotary car dump with indexer; (b) 1 complete rail loop track capable of holding a 100-car unit train with a siding for an extra 50-cars; (c) stacking and reclaiming at a minimum rate of 10,000-12,000 tons per hour with at least two units and preferably more; and (d) shiploading at 10,000-12,000 tons per hour with at least 2 ship loaders and preferably more.

(viii) The terminal capital cost should not exceed $180 million (in 1982 dollars).

During the conceptual phase engineering Bechtel will be primarily investigating the following major areas of development:

(i) Design Criteria
   - Latest technology automation
   - Degree of standardization
   - Plant cleanliness
   - Maintainability
   - System simplicity, flexibility, and availability

(ii) Preliminary design

(iii) Material flow diagrams

(iv) Operations simulation

(v) Major equipment list
During the course of their conceptual engineering work Bechtel recommended a number of alternatives for proceeding with the final construction and development phase of the project. Their principal recommendation was that Bechtel be retained on an A & E contract basis (architect and engineering services contract). Under this concept (which is basically cost plus) Bechtel would provide overall project management. They indicate this would allow the greatest attention to be focused on compliance with equipment design criteria and specifications. They would submit a billing according to actual manpower used, subcontractor costs, and materials consumed plus an agreed level of profit according to the following responsibilities:

(i) Initial contractors studies.
(ii) Engineering
(iii) Procurement
    - Purchasing
    - Inspection
    - Expediting
    - Traffic and material logistics
    - Contract administration
(iv) Construction
(v) Construction management
(vi) Pre-operational testing
(vii) Start up
(viii) Operations
(ix) Financing services.

With this system, once the final design criteria had been approved by the developers, Bechtel would take over the final engineering, and construction management. They would basically hand over a completely up and running terminal to the terminal owners. It can be argued that this represents the most efficient method of maintaining exacting specifications and requirements. The partners in PBT felt that this concept relates more to a government sponsored contract which may not be as concerned with the level of costs as with adherence to specifications. The project LBICP and PBT groups decided the A & E concept would not be used. They will likely proceed on the basis of asking for lump sum quotations from major engineering companies according to a Design and Construct contract.

With a Design and Construct concept, the Engineering Sub-Committee would release formal Request For Proposal (RFP) packages developed by Bechtel as project Engineer. These packages would include the following: 8

(i) Instructions to Bidders.
(ii) Information for Bidders.
(iii) Agreement Form.
(iv) Project General Conditions.
(v) Project Special Conditions.
(vi) Pricing and Contract Data.
The RFP would include sufficient detail in all respects to allow interested contractors to develop all-inclusive turnkey replies. Major financially secure construction companies such as Dravo, Fluor, Bechtel, Parsons, Morrison-Knudsen, would submit a lump sum bid package based on equipment drawings and specifications in response to the request for bid proposal. Their costs would be non-escalating to the greatest extent possible with some exceptions allowed on items they felt were beyond their control. With this concept the majority of the construction cost escalation risk is shifted to the Contractor. In better economic times contractors would not bid on this basis. The present worldwide economic slump, however, has most of these major engineering firms aggressively seeking new business opportunities. They have sizeable staffs that are presently under utilized. Although the cost of responding to a project of this magnitude is in the range of $250,000 to $1,000,000, this present market situation allows companies to undertake the response as their labour costs are sunk and the other costs of preparation are not high. The developers expect to find a number of willing contractors to bid on this basis.

There will likely be need for a small engineering group (likely one of the partner companies) to oversee the design and construct basis (should the project proceed to completion). A close watch will need to be kept to ensure the contractor is meeting the equipment specification requirements.
and design criteria. These relate very importantly to the environmental and operational aspects of the terminal development.

(b) Environmental Permitting

The project retained Enviro-sphere Ebasco as the environmental consultant and processor of the environmental applications. The environmental aspects of the permitting process are critical as the project is introducing state of the art operations technology to the permitting agencies. If these new technologies and designs are not completely elucidated to the environmental consultant at the outset of the project, the environmental impact report/environmental impact statement (EIR/EIS) may be inadequate. The project may then either fail to achieve initial permitting, or encounter interminable delays at a number of the permitting stages. Such delays could eventually consume all available development funds and time allocated for the project.

Enviro-sphere has indicated they envision the EIR/EIS not only as a legal requirement but more generally as a planning tool. This can assist the project developers in structuring the final design for maximum benefit at minimum environmental cost. If completed in a timely manner, the documents may also provide a data base and impact analysis which could continue to provide guidance for mitigations that would condition coal supply agreements and subsequently proposed site expansion projects.

Enviro-sphere has brought to the attention of the project group that under the California Environmental Quality Act (CEQA), permitting in the South
Coast Air Basin and permitting under the authority of the California Coastal Commission is unique from any other place in the United States. Additionally Enviro-sphere has raised the following crucial items:

(i) A project of this magnitude has not been previously addressed in a Southern California EIR/EIS and successfully permitted.

(ii) It is important that the EIR/EIS demonstrate that the significant adverse environmental impacts to the Southern California urban public can be mitigated when these same people may receive little of the economic benefit of the project.

(iii) Rail transportation analysis, rail traffic analysis, rail corridor noise, and associated air quality elements in the EIR/EIS will directly affect more people in the Los Angeles basin than the entire population of some of the supplying States.

(iv) The Long Beach Coal Terminal Project cannot be considered a singlesite project. It is really a multiple EIR/EIS in that the coal terminal project generates a large amount of linear impact. The environmental analysis must be devoted to the total linear transportation corridor which comprises a multitude of interconnected sites.

(v) Interaction between the environmental consulting group and the engineering design contractor are vital as the economic trade-offs for this project will be the hinge point of any EIR/EIS.
The project must be justified economically and the impacts mitigated practically. Unless the project can be demonstrated to generate sufficient economic benefits to pay for the anticipated substantial mitigation measures, the project will unlikely be able to receive permitting or developer approval.

The general responsibility and role of the environmental consultant will be as follows:

(i) Assemble a thorough description of the proposed project including environmental protection systems, planning, and economic analysis.

(ii) Identify, review, and assess all relevant environmental data in order to:

(a) Summarize the data base, focusing on the regional areas potentially affected by the project,

(b) Identify and discuss sensitive environmental features,

(c) Identify data gaps,

(d) Identify and discuss environmental features that can affect the project conduct and the design of subsequent development plans.

(iii) Identify, describe, and place in perspective all potential environmental concerns associated with the Long Beach Coal terminal project.

(iv) Recommend mitigating measures.

(v) Evaluate feasible alternative plans

(vi) Discuss other planning considerations including:
(a) potential growth-inducing impact
(b) boundary of the potentially affected area
(c) relationship between short term uses and long term productivity
(d) irreversible and irretrievable commitments of resources
(e) energy consumption
(f) aesthetics.

(vii) File for and monitor the completion of necessary environmental permits from the relevant agencies.

(c) Geotechnical Consultant

The geotechnical consultant for the project is Ertech Western (formerly Earth Technology Corporation). Although not a major component of the conceptual study in terms of cost, this geotechnical analysis represents an important initial element of the design and costing program.

The proposed site is located on an operating oil field characterized by considerable subsidence due to removal of large quantities of oil. Water has been reinjected into the wells to support the stable surface elevation. Additionally, there are a considerable number of underground waste sumps used by the oil field operation which can further act to destabilize the soil conditions. The geotechnical analysis will determine the vertical and lateral stability of the soil. It will also complete shear tests to determine how far beyond the coal storage pile surface locations subterranean movements can be expected.

(129)
There are many pipelines running through this area which would be affected through lateral movements in the soil. This requires a quadrant examination of the complete area to determine what effects can be anticipated and proposed solutions to these problems. The oil well removal and redrilling process will include a very large amount of underground water pumping/reinjection equipment which will be examined in the quadrant analysis. Additionally along the pier face there is a subterranean dike which will need to be sheet piled or otherwise contained to prevent the soil from sloughing into the harbour channel.

The primary role of the geotechnical consultant will be to provide input for the engineering and design contractor specifying where the major direct loads should be placed in relation to unstable soil areas and sumps. The geotechnical contractor will also recommend methods of preventing the soil subsidence and shear movements which can be evaluated in comparison with alternative engineering or construction costs. All of the geotechnical analysis will be done on the basis of drilling core samples and the linear vane shear test.

(d) Financial Advisor/Consultant

The Industrial Bank of Japan (IBJ) has been retained as the financial advisor for the project. The Bank was hired because of its significant experience in the financing of large coal port projects throughout the world and its consequent close relationships with the major Japanese coal users. IBJ has been actively involved in the promotion, development, and financing of major mine and port facilities in Australia, South Africa,
Peoples Republic of China, Latin America, and South America. They have a large data base regarding the needs of the eventual users and have made a significant contribution towards the project's progress.

Their responsibility is to develop a detailed financial pro-forma based on the anticipated construction and development costs, and timing of these expenditures. They are charged with developing alternative programs which minimize the liability exposure of the participants while providing the project with the lowest possible funding costs available in the present market.

Once a financial mix is accepted by the project developers, the Industrial Bank of Japan will actively participate in the securing of funds and negotiating of contracts with the ultimate lending institutions.

(e) Oil Field Operator

Champlin Oil (a Union Pacific Subsidiary) presently operate a major oil production field on the proposed project site. Although committed to assist the project it appears they have been less than totally cooperative. Champlin 1981 revenues were 4 billion dollars which makes them U.P.'s most influential division. They may not feel the $2-5 million annual lease revenue is important enough to risk interruptions to their drilling and production operations on the site.

There are 22 production wells, 15 water injection wells, 8 water disposal wells, 4 water source wells, a waste water treatment plant, and numerous

(131)
pipelines throughout the area which must be moved. The major problem is that Champlin have demanded that these units be moved with the absolute minimum disruption to production. The relocating and redrilling process will substantially improve the field operation and increase the production potential. Champlin, however, have been reluctant to give the project credit for these improvements as they represent unbudgeted expenditures for improvements Champlin would not otherwise make to this operation.

(f) Secondary Engineering Contractor

Early in the engineering conceptual design by the Bechtel group, Metropolitan Stevedore had significant problems with the type of coal reclaiming methods Bechtel were proposing. This difference of opinion between the design engineer and operating partner became so significant that it was hampering the development plans and stalling the group's ability to proceed on schedule with the final engineering and design. Metropolitan's opinions are given considerable weight by the partners and it was agreed that a second engineering contractor would be hired to work with Metropolitan to develop an alternative to the Bechtel reclaim scheme. Comparative costs and environmental impacts between the systems could then be evaluated. The Bechtel proposal involved above ground combination stacker reclaimer units with a very large diameter high speed bucket wheel reclaimer. The Metropolitan proposal involved a completely underground reclaim fed by rotary plow feeders and gravity through the bottom of the stock pile. Metropolitan claimed their system significantly reduced: (1) manpower; and (2) pollution effects.
To assist Metropolitan in the development of their alternative proposal, Conveyco Engineering of Covina, California was retained. Conveyco specializes in conveyor and bulk handling systems, and have done considerable previous work for Metropolitan and the Port of Long Beach.

Within very tight time constraints, the Metropolitan/Conveyco proposal was quickly and expertly developed. The Engineering Sub-Committee were put in the position of deciding between conflicting engineering designs. Bechtel did not want their design repudiated by the efforts of a small engineering and stevedore company. This could have serious impacts on their future marketability for major coal terminal projects. Bechtel expanded their design group to include a number of project development and marketing staff to assist in defending their design. In the final analysis the costs were difficult to compare. Prior to the Metropolitan/Conveyco presentation Bechtel had revised their scheme and reduced their costs. At the same time Bechtel completed a study on the Metropolitan alternative which they costed significantly higher than Conveyco. The environmental impacts were not substantially different between the two schemes and it was finally agreed that there was enough difference in favour of the Bechtel scheme to proceed with their program.

(g) Systems Consultant

To support the operational credibility of the conceptual design the developers desired a simulation model be developed. This model would generate important resultant variables such as ship and train queues, equipment utilization, and stock-pile size for different design criteria.
The responsibility for developing and implementing the model fell within the responsibilities of the Engineering Sub-Committee. It was part of the Bechtel engineering contract.

Bechtel retained Reese-Chambers Consultants Inc. from Los Angeles. This company had just completed a model for the Port of Long Beach concerning the expansion of Pier G. Bechtel basically transposed the Reese-Chambers model onto Bechtel hardware and changed the inputs. Despite some questions regarding Bechtel's inputs and assumptions in the model, it proved to be an invaluable management tool. Certain designs or equipment groups could be immediately eliminated from consideration as the terminal simulation could assist in identifying areas where the particular design would not meet minimum operating criteria.

C. SUMMARY

The number and complexity of the problems involved in the terminal development reinforce the multi-dimensional aspect of a transportation problem. The previous sections have described the subcontracts needed by the developers in disciplines such as engineering, finance, geotechnical, environmental assessment, and management science. The problems in each of these areas were outside the capabilities of the developer group. This presents an interesting point. In resolving the multi-dimensional transportation problem, it is acceptable (and necessary) to subcontract the detailed problems for various disciplines. This does not mean the owner/developers are any less responsible for the result. The subcontractors like all other aspects of the development, must be managed.
The management of a large terminal development or other large transport project is a difficult responsibility. To manage the project successfully is a function of the abilities of the management individuals, and their organizational structure. As the number of owners participating in a project increases the management structure becomes increasingly important. Considerably more internal organizational issues can obstruct the progress on external issues and problems.

PART II - MANAGEMENT STRUCTURE

In their "International Survey of Business Opinion and Experience", Bivins and Lovell recorded that "Participation by several partners not only allows greater resources to be amassed but also encourages a more realistic allocation of responsibilities on the basis of 'real' contributions rather than the conventional or artificial one that frequently results from a simple 50-50 partnership or a minority-majority arrangement between two parties." A joint venture to develop a terminal the size and scope envisioned in this project could be operated under a number of management structures. The partners in both the LBICP and PBT joint ventures decided on committee management as the means to best accomplish the objectives of the project in light of the differing inputs from the participant partners. Comments on how well this program has functioned and other management frameworks which may work in a similar situation will be made at the end of this section.

Figure 4.1 depicts the organizational structure for the LBICP joint venture while Figure 4.2 indicates the joint venture structure for PBT. In the LBICP
each of the committees were made up of one member and one alternate from each partner. As the Port was the project co-ordinator their member was designated as the initial chairman on each committee. A Letter of Understanding (LOU) dated the 7th of July, 1981, formally established the Joint Committee for the purpose of undertaking the LBICP conceptual and design stage. A Memorandum of Agreement (MOA) dated September 25th, 1981, formally established the PBT Joint Venture and set forth the principles by which the Terminal Operating Entity (TOE) would be formed. As these two joint ventures are significantly different they will be discussed in separate sections.

A. LONG BEACH INTERNATIONAL COAL PROJECT

1. Joint Committee

The Letter of Understanding dated July 7th, 1981 established a Joint Committee consisting of one member from the Port of Long Beach, Upland Industries, Crowley Maritime Corporation, Metropolitan Stevedore Company, and C. Itoh. This Joint Committee met initially to decide the organizational structure for the project management. They formed an Executive Committee which would have overall control and authority in the project. A number of functional sub-committees were also established in the engineering, finance, marketing, environmental, government regulations, and legal areas. Each of these sub-committees reported to the Executive Committee.

The objective of the executive committee was to manage the conceptual design and planning program. According to the Letter of Understanding the responsibilities of the Executive Committee were as follows:

(136)
(i) To review from time to time the projected demand for U.S. Western coal. To identify and, to the extent possible, solicit commitments from the end users of this coal in Japan and other Pacific Rim countries.

(ii) To review and report on the conditions of the receiving terminals in Japan and other countries.

(iii) To review and advise on the desirable vessel sizes, equipment and scheduling.

(iv) To search out and obtain commitments for the financial resources required to construct the Terminal.

(v) To assist and advise in developing and completing the various agreements to be concluded between all interested parties related to the construction and operation of the project.

(vi) To monitor, aid, and assist the progress of the design of the terminal and the obtaining of government permits.

(vii) To ensure that each member of the executive committee makes available and shares with other members of the committee relevant information on the economic feasibility of the project.

On behalf of the participants, the Executive Committee is responsible for developing a strategic plan. Included in this plan will be a critical path. This scheduling tool will assist in allowing the project to
accomplish the objectives of determining the feasibility of this terminal location within the time and budget constraints. The Executive Committee will meet at least quarterly and on an ad hoc basis as necessary. At these meetings they will resolve major conflicts in any of the subcommittees and make decisions regarding the development issues. Voting in this committee is on a majority basis with the Port of Long Beach maintaining a tie break vote.

2. Joint Co-ordinators of the Executive Committee

To facilitate the day-to-day decision making required to support the subcommittees, the Executive Committee established two joint co-ordinators as an operating arm. One of the joint co-ordinators is a Commissioner of the Port of Long Beach, and the other is a senior executive of C. Itoh & Company in Japan.

The major responsibilities of the joint co-ordinators are to coordinate the activities of the committees in an manner that project goals are met on schedule. They also must ferret out the problems and concerns of the committees and individual participants as they relate to the project. Problems must be resolved quickly to avoid delays to the time schedule set by the Executive Committee. Additionally, they have authority to assist in pressure points or bottlenecks in the development program through the following means:

(i) Applying extra resources when required.
(ii) Dealing directly with one or more partners on individual and confidential matters relating to the project and/or the Port where items need to be negotiated outside of the committee process.

(iii) Initiating alternative investigations (principally in the financial areas) outside of the committee purview in an effort to improve the overall cost of financing for the project.

3. **Engineering Sub-Committee**

The Engineering Sub-Committee had initial responsibility for selecting the major engineering and geotechnical sub-contractors. The Committee then concentrated on managing and monitoring the conceptual design and engineering work. Significant attention was paid to the cost parameters. It was important that this committee draw information from the marketing, environmental, and other sub-committees to ensure the terminal design was consistent with regulatory requirements and the needs of the final users.

The Engineering Sub-Committee was also assigned the task of estimating the operating costs for the recommended terminal design. This included an examination of the potential trade-offs between labour and capital costs. The Executive Committee expected the Engineering Sub-Committee to provide major inputs with respect to the terminal conceptual design, capital costs, operating costs, bid and construction process, and the construction timing schedule. Activities at the time of this writing have spanned 12 months. The progress has involved significant differences between the partners which were ultimately arbitrated by either the joint coordinators or the Executive Committee.
4. **Finance Sub-Committee**

The objective of the Finance Sub-Committee is to recommend a financial package which represents the least cost to the developers with minimum partner liability. The committee basically is a reporting mechanism through which the project financial advisor (Industrial Bank of Japan) presents alternative financing schemes. A base case cash flow model was developed. A sensitivity analysis was performed on critical project variables such as the forecast tonnages, capital costs, operating costs, and throughput charges. IBJ and the Committee also prepared proposals outlining different levels of equity participation and ownership alternatives.

Although the sub-committees report to the Executive Committee of the LBICP, their final recommendations also need to be approved by the PBT management committee. If the project proceeds to construction it will be the PBT partners who assume financial and operating responsibility for the terminal.

5. **Marketing Sub-Committee**

The Marketing Sub-Committee is responsible for investigating the market for terminal services in the United States and Japan. The Committee has been relatively inactive as PBT was allocated project funds to complete a major marketing study. This would give the private partners an opportunity to be directly involved in the market assessment. The PBT study would report through the Marketing Sub-Committee. PBT and the Sub-
Committee also used the participant partners as sources to secure information concerning potential competing terminals with development plans on the West Coast. All presentations to the Executive Committee were made by PBT as an arm of the Marketing Sub-Committee.

6. Environmental Sub-Committee

The primary assignment of this sub-committee was to secure the services of an environmental consultant. The consultant would be responsible for completing the environmental, social, and political analysis required to finalize the Environmental Impact Report and Environmental Impact Statement (EIR/EIS). With Envirosphere-Ebasco retained to complete the permitting activities, the other functions of this committee were done under the auspices of the Port Planning and Environmental Group. This group has had significant experience in "managing" environmental permitting processes for other projects. It is important that public hearings and/or announcements and/or advertisements are made indicating the level of benefits achieved by the community through the anticipated project and how any adverse environmental affects will be mitigated. This group will also use their data base and considerable experience in these matters to make recommendations to the Executive Committee on appropriate trade-offs between environment related capital expenses and design change costs.

Timing was important in all committees due to the constraints established by the scheduling program. There were additional urgent time pressures in the environmental group as major Federal and State changes are
contemplated in the environmental permitting procedure. The major concern relates to a New Source Review Act change in Regulation 13. This change, as initiated by changes in the Clean Air Act, would require a terminal or stationery pollutant source to include pollutants from the railroad, ships, and other transit sources in their permitting process. Presently these transit sources are not included in measuring the terminal pollution. This change would put the project considerably in excess of the allowable pollution limits in the Southern California San Pedro basin. If the permit process could be filed by August 1st, 1982, there was a reasonable chance that the project could be "grandfathered" and exempted from complying with the new regulations expected to go into effect late in 1982.

7. Legal Sub-Committee

The Legal Sub-Committee was primarily charged with ensuring that all of the joint venture documents and participant agreements were duly authorized, signed, and notarized. The developers desired to avoid any charges of discrimination and/or other legal infringements as a result of the Port's public status. As most of the exogenous legal requirements would be determined by the Port as a public body, the Legal Sub-Committee was managed by the Long Beach City Attorney's Office. This office functions for the Port on a day-to-day basis. The problems involving the private partners were minimal and related to the avoidance of any liability due to violation of municipal laws relating to the Port functioning as a member of the group.
The Legal Sub-Committee also worked with the Finance Sub-Committee to determine the legal impacts regarding the question of partnership versus corporation. The analysis included tax and legal implications of each of these organization types.

8. **Government Affairs Sub-Committee**

This Committee was fairly inactive during the conceptual/planning phase. It was formed with the intention of combining the resources of the participants in terms of their lobbyists in Washington and Sacramento and their political action committees. The developers recognized the need to have accurate and timely information relating to governmental process and/or change that could affect the terminal development. As this was more a monitoring function during the conceptual phase, the Committee met fairly infrequently. They were principally concerned with the following two major items in the Congress:

(i) **The Port User Charge Controversy** -- This relates to fees for maintaining and dredging channels and ports. There is a Bill in the House that would preserve the status quo (the Federal Government pays for project and maintenance dredging) by diverting a share of Customs fees to the dredging budget. A national user charge would discriminate against Long Beach (where little dredging is required and will be capitalized as a project expense). Under a National User Charge system the Port would be subsidizing deepening/maintenance projects in other ports through charges against coal which are estimated
at 50¢ per ton\(^{10}\) (there would be different charges for different commodity groups).

(ii) The expiration and reenactment of the Clean Air Act — Ships and trains could discontinue being considered as transit sources and would be counted as part of the stationary terminal source. This would significantly impact the project's ability to receive permitting approval.

B. PBT JOINT VENTURE

The PBT Joint Venture was formed by a Memorandum of Agreement dated the 25th of September 1981. It is an agreement between Crowley Maritime Corporation, C. Itoh & Company, and Metropolitan Stevedore Company. The agreement formally recognizes that these companies have been selected by the Port to create a terminal operating entity and operate the proposed terminal. It is the desire of all parties in the LBICP that the majority terminal ownership be American. The agreement specifies that C. Itoh would own 45% of PBT, and CMC and Metropolitan would own 55% to be divided as agreed finally between them. The purpose of the agreement was to set forth a mutually satisfactory understanding of the principals by which the terminal operating entity would be formed, owned, and operated. This was in reference to a number of sections of the Letter Of Understanding which formed the LBICP.

PBT will eventually own and operate the proposed terminal. The terminal activities will be primarily storage of coal for transit, unloading of...
rail cars, unloading other modes of land transportation, and loading of ships and other forms of ocean transportation. The terminal owners will also be responsible for furnishing quality and quantity controls, tug services, bunkering, supply boats, and other marine services to vessels using the terminal. Environmental protections, clean up services, safety services, and fire protection will also be part of the terminal responsibilities. The PBT partners at the time of the signing of the Memorandum Of Agreement were unable to decide upon a partnership or corporation so this point was left open. It was agreed that voting would be on a majority basis to protect the interest of the American majority. This was important considering the C. Itoh ownership may be diluted if Japanese cement and utility companies obtain minor shareholdings.

The management of PBT is by a committee consisting of two members from each of the partners. Additionally it was agreed that as the development proceeds towards the construction and operation stage, the responsibilities would be shared as follows: marketing would be principally undertaken by C. Itoh; the marine activities managed by CMC, and the stevedoring labour activities directed by Metropolitan.

C. EFFECTIVENESS OF MANAGEMENT STRUCTURES

In the case of PBT it appears reasonable that the Management Committee structure will be one that can solve major problems. This Committee is certain to have senior management representation from each of the participants given the possibility of committing to share of a 250 million
dollar expense. The requirement for sub-committees initially is eliminated as all decisions will be handled by members of the Management Committee. The construction and operation will be based upon criteria already agreed by the LBICP members. The operating management is usually less difficult than the conceptual development management.

In the case of the larger Long Beach International Coal Project Joint Venture, the committee management structure may not be the most effective means of completing the design/planning schedule on time. The committee process is cumbersome at best. In a large project of this nature with multiple participants, the time required for a committee to function and make decisions can become unreasonable. With the objectives and budget for the study and design phase well defined, it did not necessarily require total participation of each of the partners in all of the committees during this phase.

Committee decisions are only as good as the abilities and authority of the committee members. Due to the significant travel schedules of most of the senior management of the partner companies, many of the committee meetings were attended by alternates who were in some cases not prepared to make major binding decisions. This meant that major committee decisions were often deferred until such time as the absent senior executive could be informed of the background to the problem. Late responses tended to include qualified decisions requiring either considerably more communication or another meeting to finally resolve the problem. Additionally, in the case of such a large number of participants there
appears to be "psychology of meetings". Each of the participants has a need to make some contribution otherwise the requirement for their attendance could be questioned. Louis Stern in his discussion of roles for channel analysis indicates: "The concepts of positions and associated roles are basic to understanding the relationships of members in a social system." A large joint venture involves roles of individuals within their respective organizations and roles of organizations within the joint venture system. Often the discussion topics become increasingly complex and tangents representing one particular point of view are investigated to insure compliance with all the wishes of the participants. A positive aspect of this approach is that the participants have an opportunity to be directly involved in the decision making process. Once decision/problem hurdles are overcome, the development program can continue, confident that progress is being made toward an eventual conclusion. The negative aspect of this approach is the time required to deal with all partner-originating concerns.

In this project the significant efforts of the joint co-ordinators of the Executive Committee enhanced the success of the committee system. These individuals spent considerable time behind the scenes with individual partners resolving problems. They were successful in motivating the sub-committees to complete their assigned tasks within the allowed time. The development program was continually reviewed in light of the participants' desire to continue on the schedule. The publicity surrounding this project meant that press releases and news conferences geared to certain task completion dates could not be delayed. Departing from the
development schedule could result in the lost support from the U.S. 
producers and Japanese end users. This support was being aggressively 
pursued.

A more effective structure for the conceptual design phase of this project 
may have been to assign one of the partners or an independent outside 
entity (i.e. Bechtel or similar) with overall management of the conceptual 
design phase. The 'contractor' would function within the guidelines of 
the budget and developmental framework established by the Executive 
Committee. The Executive Committee could be updated on a monthly or 
quarterly basis regarding the progress of the management contractor. This 
would allow their involvement in all major decisions. The objective would 
be to minimize individual partner involvement until a proposal including 
the design, construction program, financing alternatives, and economic 
analysis was available. This structure would allow the energies of the 
participants to be focused on analyzing the major proposal. They could 
then undertake specific investigations in areas they felt warranted more 
information or support prior to making their decisions. In the committee 
framework, the executives and other participant committee members are 
over-involved during the development process. The final result can be 
affected by a pride of authorship in technical detail. It becomes 
politically difficult in the final stages to question or insist on 
additional investigation of some of the areas which had previously been 
laboriously debated in various sub-committees.

Another approach may have been for the Port to independently fund the 
conceptual phase. The resulting report document would then be used as the
basis of their "marketing efforts" to secure interest from various organizations. This would have given the port more flexibility in completing the conceptual design study. Their preferred design and operations format could have been implemented without the compromises necessary in the committee decision making structure. The recommendation from this type of analysis would have the ports complete endorsement and would be open to further investigations by the prospective partners should they question particular areas.

A well defined conceptual stage, which required a significant amount of external technical detailed engineering support, could have possibly been better managed than through the committee structure. The need to have the eventual owners and operators involved in this phase was important; however, the committee management structure was cumbersome. It may have inhibited the level of analysis required in some of the areas as continual trade offs were being made between the objectives of the different partners. Additionally with the committee approach, the partners were committed to following through with the committee action accepting the majority decisions. In a management contract structure, the partners would have had more flexibility to undertake individual analysis or investigations in areas they felt were sensitive to their entering the project in a major financial way.

By bringing in the three selected owners early in the conceptual phase, the Port also lost a great deal of its flexibility. The PBT group could decide that they would not be interested in pursuing the development and
construction of the terminal after the conceptual design is completed. By this time, the PBT group has significantly biased and changed the conceptual design to reflect their desires. These may not have been identical to the Port's desires had they been making a conceptual study for the purpose of attracting a number of diverse investor groups.

A multiple-partner joint venture is a difficult organization to manage effectively. If the major development objectives are well defined (i.e. maximize profits, minimize costs, remain on schedule, etc.) a reasonable approach may be to seek a structure which minimizes the need for participation by the multiple partners. The management responsibility would be given to a company or group (internal or external to the joint venture) in which the participants place a high degree of trust and responsibility. This type of management framework is better able to react to the decision making environment than multi-participant committees. This business environment is usually characterized by a significant investment requirement and a high degree of risk, otherwise there would not be the multiple partner joint venture. Conflicting and diverse viewpoints could be settled by the participant executives after the major proposals and reports have been completed. This avoids the entanglement of different company committee members who may be applying inconsistent criteria to technical and operational problems. The major objectives of the project can become circumscribed. This aspect again relates to individual and organizational roles as discussed in the literature on distribution channels. Louis Stern feels that "the greater part of the literature on role theory, and most empirical studies on the subject, have
been related to the roles of individuals within organizations. Little emphasis has been placed on inter-organizational interpretations, that is, organizational roles and relationships among organizations. The time required to facilitate the individual and organizational roles for this project could have been significantly reduced in the conceptual planning phase. The management contractor structure could have offered an opportunity for more effective planning.

The participants could always be given security that major issues such as changes in the objectives, changes in capitalization or shares, dissolution, or declaration of dividends would be handled only through executive committee decisions. The management contractor would only operate in certain functional and technical areas in which there exist specific objectives, instructions, and cost/time constraints.

Another problem of the multi-participant sub-committees was the difficulty in controlling the major sub-contractors. This structure invited behind the scenes lobbying directly to partners by the sub-contractors. This could be an effective means of circumventing decisions or directions of a particular sub-committee. The opportunity for this type of situation would be less under a management contractor concept. There would be less partner-supplied staff involved in the decisions to act as support for the sub-contractor.

There are a number of reasons why one of the possibly more efficient management frameworks was not used. The first of these relates to the
role of C. Itoh. They were appointed by JCDC to assist in developing the U.S. Western steam coal logistics system. Such a position required total involvement to ensure the desires of the Japanese end users were being met. This active participation by one participant encourages the same level of involvement from others.

The diverse objectives of the participants were also at the root of the decision for committee management of all functions during the development stage. Each of the partners except CMC had large business opportunities complementary to the project. In this situation it is possible to speculate the participants would want to avoid a management contractor. The rational approach taken by such a contractor would preclude the possibilities of in-committee compromises. Compromises could allow the development phase to proceed even if specific information indicated an infeasibility in some areas.

D. OWNERSHIP ISSUES AND DIVERSITY OF OBJECTIVES

The Long Beach International Coal Project joint venture brings together businessmen of different backgrounds, experience, nationalities, and ability. Their corporations function according to a wide range of business methodologies. Bivins and Lovell indicate "the principal drawback of a joint venture, in the opinion of many of the world's business leaders, is the artificial and uneasy atmosphere created by trying to combine the resources and management approaches of a number of separate going concerns in the same business enterprise."13 They also
indicate that "companies have firmly established long and short range objectives and operating procedures, and individuals have set ideas and loyalties not easily changed or effectively compromised."\textsuperscript{14} They further recorded that "in general the purpose of a joint venture is to put together complementary resources of already existing firms."\textsuperscript{15} Such resources normally comprise not only ordinary (in the sense that they could be bought in the market) financial, technical, human resources but also acquired resources of partner firms (like goodwill, knowhow, team spirit, and other intangible assets). "The latter are less easy to assemble and the difficulty of putting them in common is one of the limitations of joint ventures".\textsuperscript{16}

Traditional joint ventures are formed primarily for the purpose of combining resources and talents of a company in a developed country with those of a company (private or government owned) in a less developed country. The objective will usually be to expand or exploit a business opportunity in the developing country. Typically, the host country company offers local business knowledge and an operating license, while the foreign investor offers capital plus marketing and other technical expertise. The LBICP group has been formed as a means to: (a) spread the financial risks involved in a significant project; and (b) expand the in-house expertise level through equity participation. With the exception of CMC, all of the participants view their investment in this project as an extension of their main stream business activity. This is less typical of the international joint ventures characteristic of one dominant firm. The Long Beach project is further complicated by the segregation of the
conceptual/planning phase and the construction/operation phase. The major participants in the conceptual planning stage (the port and Upland Industries with 33-1/3% each) will have little participation in the $250,000,000 terminal expense or operating costs. The minor participants in the study phase will be the major financiers and operators of the terminal development.

What has evolved is a nesting of one joint venture within another. Joint ventures with multiple partners are complicated enough. This project has two joint ventures operating simultaneously, each with different partners. The three private companies in Pacific Bulk Terminals have a subset of objectives. These may be different from the LBICP project as a whole or the individual members of either of the joint ventures.

The Port of Long Beach and Upland Industries have certain constraints regarding the construction, operation and land use. They need to see these constraints considered as part of the terminal development. However, a number of these items could represent significant costs to be sub-group PBT. To the extent that PBT does not see any financial benefit derived from the incremental investment required to meet the desires of the non-participating investors (the Port and Upland), there is room for major divergence of objectives. The operational environment, however, has been one of cooperation and cohesion. The Port wants to ensure that the private investors are satisfied with the terminal development phase to the extent they are motivated to invest in the construction and operation phases.
As can be expected, items of consensus early in the project become divergent as the development proceeds and more identifiable detailed aspects of these general problem areas begin to surface. A number of major areas from the critical path in figure 4.3 provide good examples of the diverging views of the partners over time. There are four major issues and a number of minor issues which will be discussed in the following sections.

1. **Oil well relocation** -- this represents the single most critical aspect of the terminal development and one on which divergent views among the partners are most evident. The initial Kaiser Engineering study indicated that the oil well relocation on the terminal site would cost 15 to 20 million dollars. This cost, although not inconsequential, was not of a magnitude that would materially affect the terminal development decision. The participants felt that it would eventually be resolved in a fair and equitable manner between Uplands, the Port, and the private partners. As Bechtel began to further define the oil well relocation costs, after consultation with Champlin Oil, the cost of the program escalated to 63 million dollars. Bechtel further indicated there could be an additional 10 million dollars of costs that were at that time undefined.

This substantial escalation in costs could have stalled the development plans. The Port and Upland interceded to make vague assurances that the oil well costs could be handled in a manner that would relieve the private companies from bearing the full cost.
burden. As recently as June of 1982, however, the Upland group indicated that neither Union Pacific Corporation nor any of its subsidiaries could participate in any costs as part of the oil well relocation. The reasons for this apparent change in approach were the costs would not constitute a reasonable investment from the point of view of U.P. parent company. Additionally, this type of support could be interpreted as U.P. discrimination in favour of the Long Beach terminal.

C. Itoh were indicating that the potential Japanese end users (and partners) would not be willing to participate if the project had to bear the full 63 million dollars for the oil well relocation programs. They felt this was part of the Upland cost in presenting the leasehold property to the project in all respects ready to commence construction activities. CMC and Metropolitan indicated their financial analysis demonstrated that the 63 million dollar oil well relocation cost reduced the project financial returns below their corporate cutoff rates (for throughput tonnages indicated). The Port in their role as co-ordinator advised there was a possibility they could fund the oil well relocation costs and charge the project only the interest expense on this capital for the project life. Although this alternative has not yet been accepted, it represents a compromise that would attain the private companies desired financial returns. It also contributes to resolving the problems on this issue for Upland and the Japanese end users.
2. **Capital costs versus operating costs** — this is a critical problem for any large project. However it becomes extremely important when the labour component of the operating costs consists of members from a very strong West Coast stevedoring union. The maximum benefits from capital to labour tradeoffs must be sought. The construction design must rely heavily on the input from the operating partner (Metropolitan Stevedore) to reduce the manning levels. Although this objective appears straight-forward there are some underlying factors in this project which have led to divergent views on this topic and made it one of the more difficult to resolve.

The participation of C. Itoh and the Industrial Bank of Japan is based on their representation of the Japanese end user (and government) views towards establishing a reliable U.S. West Coast steam coal supply system. These same Japanese interests prefer to see the maximum amount of Japanese manufactured equipment form the major components of the terminal system. Because of this desire and the close working relationship between C. Itoh and the Bechtel Corporation, it is possible that Bechtel made reasonable efforts to ensure that their conceptual design was consistent with equipment that is being manufactured in Japan. Metropolitan Stevedore were indifferent as to the origin of the equipment. They preferred that the conceptual design avoided major machinery components and recommended a less labour intensive underground reclaim system.

The giant stacker/reclaimer combination units typical of manufacture in Western Europe and Japan were proposed by the Bechtel conceptual
design. They were strongly disputed in concept by Metropolitan. Metropolitan demonstrated that these units: (a) required significant inventory (no standard parts); (b) were much more unsightly in terms of their size and noise components; (c) were environmentally inefficient because of fugitive dust raised by the large bucket wheel reclaimer; and (d) their functional combination reduced the operating flexibility of the terminal considerably. Metropolitan's general proposal made sense to all those involved. However, the short preparation time allowed Metropolitan and Conveyco did not give them sufficient time to substantiate the cost of their system versus the Bechtel proposed system. The problem for the partners not directly involved in this dispute was that Metropolitan had never engineered a major terminal nor had Bechtel ever operated a major terminal yet each was arguing about their abilities in an unproven area of experience.

3. **Terminal pricing compared with other existing/potential terminals** -- the Japanese partner was continually pressing the need for the terminal to be price competitive with other existing and potential port developments on the coast. C. Itoh were indicating that potential end users participation in the project would be predicated on a competitive terminal charge compared to the proposed Portland fee of $5.00 per metric ton in 1982 dollars. The response of the other partners was that the Long Beach site was being developed for its advantages in relation to the total coal logistics system which would reduce the delivered price of the thermal coal to the Japanese
end users. It was felt the terminal to terminal charge should be no more comparative than the rail to rail charge or ship to ship charge for the different origin/destination pairs. Different capital and operating costs must produce different terminal throughput charges. The Japanese partner argued that although differences in delivered price may exist based on larger tonnage ships and the shorter rail haul, there will be a large component of the Japanese thermal coal market that is served in conventional panamax vessels (30% in next 10-15 years). They further feel that the difference in rail rates will be reduced when a number of ports are available and there is active competition between the railroads for these various port destinations.

At this point the American PBT partners were concerned that they would be unable to earn a reasonable rate of return on their investment or missing profit potential on the terminal if they priced the throughput charge equivalent to other terminals which could be constructed for approximately 1/3 to 1/2 of the Cerritos Channel project cost.

4. Diverse objectives of the participants regarding the terminal ownership and operation -- The problems outlined earlier and some of the minor problems which will follow in this paragraph relate to internal problems of the joint ventures which must be resolved by the groups. Outside of the venture itself each of the major participants has proprietary objectives relating to the terminal which may or may not relate directly to a financial return from the throughput of
cargo. As speculative examples it could be realistic to consider the following:

(i) Upland Industries and Champlin Oil may be willing to accept some portion of the oil well relocation expense and/or reduce their land lease charges. This would facilitate the terminal proceeding whereby the Union Pacific Railroad and hence the parent corporation could earn substantial revenues from the rail transportation of the coal to the terminal location.

(ii) The Port of Long Beach is extremely committed to the terminal development. They may be willing to accept some financial burden (especially in relation to the oil well relocation) or other major project stumbling blocks to facilitate the development of the coal terminal. The project will generate revenue to the Port of between 20¢ and 50¢ per ton wharfage for the life of the project. There are also attendant social and political benefits to having the first major West Coast coal export facility in the Long Beach harbour area.

(iii) C. Itoh & Company, as a trading house, are not large asset owners. They will likely be willing to earn their revenue on the trading income from coal sales from the Western United States. Their objective may not be to maximize their profit from participation in the terminal facility. It can be reasonably expected that C. Itoh and the other Japanese partners which eventually may join the project would be satisfied with a break-even or marginal profitability for the
terminal. This would mean they were getting the best loading value for their thermal coal imports. A lower throughput charge also assists in their negotiations with other ports. Additionally, if the profitability of the terminal rose too high, it can be reasonably anticipated that C. Itoh and the Japanese end users would exert pressure on the PBT partnership to reduce the rates.

(iv) Metropolitan Stevedore Company will be responsible for providing the labour and supervision for the operation of the terminal entity. Although senior terminal management will be a joint venture matter, it could be possible that Metropolitan have some profit already priced into the labour and supervision cost components. These labour related profits could allow them to accept a lesser rate of return on the terminal investment.

5. **Partnership versus corporation** -- the Japanese partner insisted on a corporation as the operating entity. They could then limit the liability of the Japanese end users according to their participation in the project. This was opposite to the American participants who preferred a partnership in light of the beneficial tax advantages in the U.S. to the partnership entity. These tax advantages relate primarily to capital structure, reporting requirements and depreciation allowances. Additionally, to form a corporation in the United States with a foreign company requires a significant amount of data reporting all financial and operational aspects of the corporate
shareholders. This will include all the Japanese utilities and cement companies that would eventually become participants and would literally involve truckloads of information which could take years to provide. At the time of this writing the question of partnership versus corporation could be resolved through the financial structure discussed in Chapter 5.

6. **Debt/Equity ratios** — The Port of Long Beach prefer to see an equity component of approximately 30% as an indication of the motivation of the private partners towards making this project a success. The private partners were more interested in a smaller equity component of 10%. Leases would be used to make up the additional funds that would have been equity contributions. Presently the construction costs are escalating, and the Japanese throughput guarantees are not materializing. It appears the Japanese financing may not be available to the level originally anticipated. There additionally may be a requirement for higher equity contributions if the project is to receive financing support from any lenders.

7. **Return on investment/Return on equity requirements** — A previous section indicated that the participants could have different objectives from the terminal ownership and operation. They also measure the performance of the terminal according to different financial criteria. The Port and the Japanese partner use a return on equity which bases the return on the cash flow available to service the equity portion of the investment after interest expense and retirement of the debt. This number, although a reasonable
measure of the performance of the project according to the invested equity, does not take into account the financial obligation of the parent companies according to the loan obligations for the project. Crowley and Metropolitan have chosen to use a return on investment criteria (IRR) which looks at the total investment and its ability to generate a cash flow return to support this investment. Metropolitan base their return on a cash flow before interest whereas Crowley use an after interest analysis. Crowley typically have a higher hurdle rate and use a more rigorous financial criteria (namely the after interest component) because they have been able to earn high returns on their mobile marine equipment. Metropolitan are operating a typically thin margin labour intensive business. Regardless of the financial criteria employed, in the final analysis the participants will make an independent assessment of whether they should proceed with their share of the partnership.

8. **Unanimous versus majority vote in PBT** — The intention of all parties is for the American partners to maintain the terminal ownership majority. There has been preliminary agreement that C. Itoh will dilute their ownership and maintain 5% to 10% of the equity themselves while carrying the proxy vote of other cement and utility companies. The Japanese are pressing for the unanimous vote thereby giving any of the minority owners an ability to veto a major decision. This system has the potential of making the terminal very difficult to operate. The American partners have insisted on a majority vote allowing them the ability to operate the terminal and set rates to an established return that is reasonable. This
protection has been demanded due to the lack of interest in participating in a terminal project which is priced and operated on the basis of marginal profitability.

E. CONCLUSION

The issues involved in developing a management structure for a major terminal project are many and complex. The multi-organizational decision making units must be able to overcome problems inherent in a joint venture of this magnitude. To the extent they are successful in implementing an effective management and communications framework, they will be able to proceed towards resolving the external problems. The operation of the internal management structure can exhaust the personnel and time resources of the group. This will significantly detract from their ability to carry out their development program.

2. Ibid., p. 5.


4. Letter of Understanding, signed July 7, 1981 by the LBICP partners, representing formal commencement of the project.


6. Long Beach Harbour Department, 1980 Bond Resolution, "Resolution HD1182", stipulates that a new bond issue cannot be made unless the net port revenues for previous 12 months (ending at least 90 days prior to delivery of additional bonds), or the estimated net revenues for the 12-month period beginning when the improvements financed by the bonds become operational, must equal at least 1.5 times the maximum combined annual debt service on the outstanding and additional bonds.

7. Contract for Engineering Services signed between Bechtel Civil and Minerals Corp. and the Long Beach International Coal Project on November 4, 1981.


10. Information from a Report on the User Charge Controversy presented to the Long Beach International Coal Project by the Director of the Port of Long Beach, June, 1982.


15. Ibid., p. 48.

16. Ibid., p. 48.

TABLES AND FIGURES
FIGURE 4.1

LBICP ORGANIZATIONAL STRUCTURE

CROWLEY MARITIME CORP.

UNION PACIFIC LAND CO.

C. ITOH AND CO.

METROPOLITAN STEVEDORE

PORT OF LONG BEACH

LONG BEACH INTERNATIONAL COAL PROJECT

EXECUTIVE COMMITTEE

JOINT COORDINATORS OF EXECUTIVE COMMITTEES

PORT OF LONG BEACH PLANNING GROUP

GOVERNMENT AFFAIRS SUBCOMMITTEE

ENVIRONMENTAL SUBCOMMITTEE

FINANCE SUBCOMMITTEE

ENGINEERING SUBCOMMITTEE

LEGAL SUBCOMMITTEE

MARKETING SUBCOMMITTEE

ENVIRO-SPHERE EBASECO

INDUSTRIAL BANK OF JAPAN

BECHEL ENGINEERING

CONVEYCO ENGINEERING

REESE-CHAMBERS CONSULTANTS

PACIFIC BULK TERMINALS

MISC. CONTRACTORS

MISC. CONTRACTORS

MISC. CONTRACTORS
FIGURE 4.2
PBT ORGANIZATIONAL STRUCTURE

- CROWLEY MARITIME CORPORATION
- METROPOLITAN STEVEDORE COMPANY
- C. ITOH AND COMPANY

- PACIFIC BULK TERMINALS
  - LBICP MARKETING SUBCOMMITTEE
  - LBICP ENGINEERING SUBCOMMITTEE
  - MANAGEMENT COMMITTEE
    - MARKETING
      (C. ITOH & CO.)
    - OPERATIONS
      (METROPOLITAN STEVEDORE)
    - SHIPPING
      (CROWLEY MARITIME)
FIGURE 4.3

LBICP TIME SCHEDULE

<table>
<thead>
<tr>
<th>'82</th>
<th>'83</th>
<th>'84</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>July</td>
<td>Aug.</td>
</tr>
<tr>
<td>Mar.</td>
<td>'83</td>
<td>'84</td>
</tr>
</tbody>
</table>

- Executive Committee
- Decision of Terminal Rates
- Reduction of relocation cost of oil wells
- Study of operation cost
- Negotiation of transfer of Pier G operation
- Presentation for Customers
- Study & Decision of LBICT Organization structure and equity allotment thereby
- Approval for EIR/EA and Permits
- Incorporation of TOE and operator's contract with POLB
- Start of Construction Work
- Engineering
  - Create private corp. to solicit bids
  - Bechtel assemble Prepare bid. Bid period Negotiate and data for bids packages select contractor

Final Decision...

A. INTRODUCTION

Legal and institutional factors have an important influence on the development of the United States West Coast coal export trade. Earlier chapters have focused on the developing Pacific Rim Coal Market, the potential competitive port locations on the West Coast, and the organization of a joint venture to manage the development of this last remaining link of the coal logistics system. This chapter will demonstrate that with the development of the Long Beach Port Terminal project, external regulatory and institutional factors present a number of barriers as difficult to overcome as the geographic, geologic, and economic constraints.

The purpose of this chapter is to discuss the external development issues and their implications for the Long Beach port development program. Potential institutional barriers in the areas of environmental permitting, finance, foreign participants, legal/restraint of trade, socio-economics, and technology-market risks will be presented in detail. The implications of these potential barriers and the developers' approach to resolving these issues will form the basis of discussion.
B. THE UNITED STATES POLICY AND REGULATORY FRAMEWORK

As can be expected in any emerging export trade, the institutional and regulatory environment is constantly changing. The Westpo Report indicates, "The institutional framework for western coal development is dynamic and reflects state, regional, and national changes in economic circumstances and political direction."¹ The number and magnitude of these changes provide a good example of how deeply involved governments can become in all aspects of coal production, transportation, trade, and use. The U.S. Inter-Agency Task Force describes some of the U.S. and Japanese policies and their possible effects on the development of the coal export trade to the Pacific Rim, these are:²

1. For coal production:
   
   (i) Leasing federal lands for coal production and, if conservative, possibly restricting coal supply and boosting coal prices for export;

   (ii) Developing mine safety regulations for underground mines and possibly cutting labour productivity;

   (iii) Requiring land reclamation and thereby adding to the costs of coal production;

   (iv) Imposing state severance taxes which increase the ultimate cost of the coal product.

(172)
2. **For coal use:**

(i) Limiting prices on competing fuels like oil and natural gas such that coal's full price advantage does not become apparent;

(ii) Prohibiting the use of oil and gas in utility and industrial boilers thereby encouraging coal use;

(iii) Setting emission limits for air pollutants such that coal costs more to use and one coal type is preferred over another;

(iv) Delaying nuclear development such that coal-fired power plants are chosen more often;

(v) Denying adequate returns on investments by electric utilities thereby blocking conversions to coal.

3. **For coal transportation:**

(i) Regulating rail rates and allowing cross-subsidization (rail rates are kept higher than justified by cost of service);

(ii) Blocking the use of coal slurry pipelines to protect railroads and possibly losing an opportunity to cut delivered coal prices.

The federal government's attitudes toward coal supply and use need clarification. They are, however, better elucidated than those relating to coal transportation and more specifically to port development programs.
The Westpo Report indicates the federal government made a policy commitment beginning in 1966 to set new economic standards for the sale of federal coal to private developers and ultimately to end users within and outside the United States. This objective has been followed through and in 1981, competitive coal lease sales were successfully conducted under the finalized program. The lack of understanding of federal direction in regard to the port development programs is inhibiting the expansion of this sector in the face of a strong indicated demand and other economic and political pressures towards expanding the export trade.

The largest institutional barrier confronting expanded U.S. coal exports to the Pacific Rim countries is the United States Government. The Government has to date not yet established a firm policy on coal exports. This is widely perceived throughout the Far East as both an error in omission and an admission of disinterest on the part of the Government. Not only is the declaration of intent to support exports missing, but possible financial incentives that would permit coal exports to begin on a commercially economic basis are not on the planning boards. The Government, as the final maker and arbiter of U.S. policy towards exports, must decide how to best support this growing trade. Positive steps should be taken at the national level to encourage investor participation in these activities. The problems just outlined are not reserved specifically for the U.S. Federal Government, but are also part of the state and local governments and agencies which are presenting a cumbersome institutional obstacle for the development of West Coast terminal facilities (and other components of the coal chain).
The Westpo Report differs with the views as stated above and concludes that "no policy questions can be accurately characterized as impediments to achieving the desired level exports. Projected coal exports can be accommodated within the existing framework of federal and state environmental, safety, and other regulations." Westpo then qualify this statement by indicating that there is a large and expanding institutional framework under which new coal projects must comply. Rigorous attention must be given to the detail of the various policies and regulations. If not followed to the letter, these can cause significant delays to the project's completion. The unresolved issues surrounding mining and coal conversion methods, transportation and utility corridor systems, port facilities and marine delivery systems pose significant obstacles to the Western U.S. coal export trade. The U.S. Inter-Agency Task Force report on the Far East advises there are a number of impediments to the ability of the U.S. Western coal to participate in the Pacific Rim market. These are:

1. The lack of a firm, pro-export policy which articulates the U.S. desire and willingness to ship coal abroad and the Federal Government's supportive function in this trade.

2. The need for improved and expanded export infrastructure which is capable of efficiently and economically transporting U.S. coal to the country of destination.

3. The burden of government regulations which inhibit mine development, rail system expansion, and generally raise the costs of supplying coal to the export market.
(iv) The existing, inflexible system of federal mineral leases which has negative short-term effects on mine development and capital investment.

C. **EXTERNAL DEVELOPMENT ISSUES**

External development issues are those that originate outside the control of the joint venture partners. There are institutional and operational aspects of these problems. The implications to the project development resulting from these external issues are significant. Their resolution will tax the abilities of the developers and their consultant subcontractors.

1. **Environment**

A large multi-faceted environmental project such as the permitting for the Long Beach Coal Terminal Project involves trade-offs between the human environment and practical economics. To the extent the project is able to support the economic costs of mitigating negative environmental impacts, it will likely succeed in permitting efforts. A brief outline will be made of the environmental permitting framework for the Long Beach Coal Port Development. This will be followed by a section on major environmental issues.

The environmental permitting for a project of this size is a major task. The following agencies are a preliminarily list of those
having some jurisdiction or interest in the project.

(i) Local Agencies

City of Los Angeles
City of Long Beach
Port of Los Angeles
County of Los Angeles
County of Riverside
County of San Bernardino
County of Orange

(ii) State Agencies

California Air Resources Board
Department of Fish and Game
State Office of Historic Preservation
California Water Quality Control Board
California Coastal Commission
Department of Boating and Waterways

(iii) Federal Agencies

Fish and Wildlife Service
U.S. Coast Guard
U.S. Geologic Survey
U.S. Army Corps of Engineers
EPA Region 9
Bureau of Land Management
a) Federal Framework

The Clean Air Act (CAA) of 1970, along with major amendments adopted in the Clean Air Act Amendment of 1977, have brought significant changes to the federal regulatory mechanism governing pollution and control. Although the complexity of the Clean Air Act precludes full discussion here, certain essential features of the statutory framework need to be recognized to understand how the law may affect coal terminal developments.

The CAA requires the Environmental Protection Agency (EPA) to develop two types of standards for ambient air quality called National Ambient Air Quality Standards (NAAQS). The "primary" standards are necessary to protect public health and "secondary" standards are designed to protect public welfare. To date, the EPA has established standards for seven major classes of pollutants:

1. Particulates
2. Sulphur Dioxide
3. Carbon Monoxide
4. Ozone
5. Hydrocarbons
6. Nitrogen Dioxide
7. Lead

The EPA has developed both short-term and long-term exposure standards for these pollutants. Short-term standards establish
limits on emissions for periods of twenty-four hours or less. Long-term standards are measured on an annual basis.

To coordinate the control of air pollution, the EPA divided the country into 247 Air Quality Control Regions (AQCR's). These regions can include interstate or intrastate areas. They are formed according to meteorological, industrial, and socio-economic factors and are treated as a single unit for the purpose of controlling air pollution. The EPA and individual states have designated areas of the country that do or do not meet NAAQS. Classification of an area determines what actions the state and EPA will be required to take to regulate air pollution from existing and new emission sources. An area is designated a non-attainment area (NA) if it is not in compliance with these standards for a particular pollutant.

Prevention of Significant Deterioration (PSD) provisions are designed to protect air quality in areas now meeting all ambient air quality standards; PSD limits the degradation of air quality in so-called "clean air" areas, provides a mechanism to regulate pollutant emission from new sources, and allow states to determine the degree of new source growth desired in clean air areas. These functions are carried out through the specific requirements, all of which are to be incorporated in State Implementation Plans (SIPS). The regulatory effect of NA/PSD requirements is as follows: if NAAQS are not met in an area, NA rules must be met for each new or expanded facility. When NAAQS are met, PSD rules apply. NA provisions, in general,
require that states include in their SIPS special provisions designed to upgrade non-attainment areas. PSD rules require that states maintain, above EPA approved levels, the air quality of their clean air areas.

New Source Performance Standards (NSPS) are federal standards governing emissions from new or modified stationary sources. These standards comprise the least stringent emission limitations to which applicable new sources are subject; individual states, through implementation of new source pre-construction reviews, may establish stricter pollutant emission restrictions. Emission standards are established by NSPS for categories of sources with respect to any type of air pollutant emitted.

b) State Framework

State Implementation Plans (SIPS) are the mechanisms by which individual states implement, maintain, and enforce the regulations and provisions of the CAA. Each state is required to submit this plan for EPA approval. Construction of new major emitting sources is prohibited if the source emits a non-attainment pollutant in a non-attainment area in a state without a full or conditionally approved SIPS. SIPS vary substantially within and between states.

Under the Clean Air Act SIPS must assure attainment of NAAQS by December 31, 1982; if severe oxident and carbon monoxide problems exist, the deadline may be extended to December 31, 1987. As part of
an effort to meet these deadlines, as well as to maintain air quality in areas needing NAAQS, many states implement New Source Review (NSR) programs. Such programs regulate new sources of air pollution. NSR programs generally require new sources to implement best available control technology (BACT). They also must undergo air quality assessment to demonstrate that emissions from the new source will not interfere with the maintenance or attainment of any state or National Ambient Air Quality Standards. Most NSR programs cover more sources and have stricter requirements than federal Preventions of Significant Deterioration (PSD) and non-attainment provisions.

c) Major Environmental Issues for the Long Beach Terminal Project

A brief introduction to the site-specific environmental permitting problems related to the Long Beach Terminal Project was given under the Envirosphere Ebasco section of Chapter 4. The details of the external permitting environment for the Long Beach Project will be outlined in this section followed by the manner in which the Project's management decided to approach the permitting task. Implications related to this part of the Project will be discussed.

The California Health and Safety Code has designated the Air Resources Board (ARB) as the control agency for the purpose of the Clean Air Act. The duties of the ARB also include regulation of emissions from motor vehicles and establishment of standards of air quality for each air basin. Permit authority to operate stationary sources rests with the local air pollution control district, with the
ARB acting as a review board in case of appeals. The local districts must also adopt rules and regulations to achieve state and federal ambient air quality standards. The South Coast Air Quality Management District (SCAQMD), established by the Lewis Air Quality Management Act, includes the counties of Los Angeles, Orange, San Bernadino, and Riverside. The SCAQMD has the responsibility to adopt an air quality management plan to achieve the NAAQS and to issue permits in accordance with rules and regulations for stationary air pollution sources.

Activities within the Port of Long Beach which will have air pollutant emissions must obtain permits from the SCAQMD. Emission levels must comply with EPA standards and the new offset policy, since this area is classified as a non-attainment area. Because EPA has not yet approved California's implementation plan, an EPA permit is also required for all new sources. Under the current EPA emission offset policy, in a non-attainment area, a new source permit may only be granted if the following conditions are met:

(i) Emission limitations are defined as the lowest achievable emission rate (LAER) for that source.

(ii) All other existing major sources owned or operated by the applicant within the state are in compliance with applicable emission limitations and air quality standards.

(iii) At least one-to-one emission reductions or offsets from
existing sources in the area are achieved in order to provide for reasonable further progress towards attainment of the NAAQS.

(iv) The emission offsets obtained must provide a positive net air quality benefit in the affected area.

The lowest achievable emission rate is defined as either the most stringent emission limit for any source found in any SIP or the lowest rate achieved in practice or reasonably expected to be achieved for such sources. The source may demonstrate that the former condition is not appropriate to its case. Nonetheless, LAER is intended to be much more stringent than best available control technology (BACT) which is required for new sources in attainment areas.

Although EPA requires at least one to one emission reductions, SCAQMD requires more than an equivalent offset. Depending on the distance of the trade-off source from the new source, the emission ratio may be as high as 2.2/1 but no less than 1.2/1. Otherwise, the SCAQMD policy is similar to EPA's.

The final condition to demonstrate a net air quality benefit is generally based on modelling. Improvement is not required at every location but the net benefit to the region must be clearly demonstrated.
Air Quality.

By early June 1982, the project had filed an application with the South Coast Air Quality Management District (SCAQMD). As indicated earlier in the paper, the SCAQMD is presently proposing to modify Regulation 13 to include ship and train emissions within the district for larger projects such as a coal terminal. If the Long Beach application is accepted as complete the project will likely be evaluated using the present Regulation 13 standards. The present standards do not require inclusion of transit emission for ships and trains.

The agency may take exception to the applications, assumptions and methodologies in the emission calculations. This could result in emissions above the regulated maximum. The investigating agency would require offsets or other demonstrations of the Project's ability to mitigate these matters successfully. Some examples of possible offsets are indicated below:

(i) Use of shore-based electrical power for the bulk carriers calling at the facility (eliminating the need for operation of on-board generators during the loading process).

(ii) Use of two-stroke instead of four-stroke diesel engines by the railroads within the confines of the coal terminal.

(iii) On worst case days, shut down one of the two idling train engines within the terminal boundaries.
California does not have an adopted vehicle inspection program which is approved by the EPA. As a result, EPA could withhold approval of any project that falls under their authority. Some concern has been expressed that the LBICP could be affected by this moratorium; however, present research indicates that the project should avoid this constraint. The project would be blocked only if federal funds were being used or if the air emissions for the stationary source (the terminal itself) exceeded 100 tons per year. Neither of the above is representative for the Long Beach terminal.

Hazardous Wastes.

A file search of the records of twelve governmental agencies has been undertaken by the geotechnical consultants. They attempted to determine if any permits had been granted in the last 20 years to Champlin Oil for dumping hazardous waste in the oil field sumps. These sumps are subterranean to the proposed terminal site. No information was located. Removal of the sumps cannot now begin until extensive physical sampling and testing programs are complete. Such a program will cost approximately $200,000 and is needed promptly so that the sump restoration program can be undertaken in the most cost effective method (this program can take from 4-12 months depending on the techniques required).

Dredging Disposal

A bioassay was made of the proposed berth and channel dredge
material. The proposed dredge material was found not to be contaminated. This will permit the developers to dispose of the dredge spoils at an ocean dumping site. If contamination signs had been found, ocean dumping would have been prohibited. The incremental costs of loading the spoils material onto trucks or other land transport and locating a fill site would have been 4-5 million dollars more expensive than the ocean dumping alternative.

Noise

The issue of noise impacts at the terminal location are not significant. Problems will likely result from increased unit train frequency through populated areas in Los Angeles and Long Beach. The extent of opposition will not be known until public hearings on the terminal are held. Local pressure groups can make the permitting difficult if they can successfully demonstrate adverse effects on their quality of life.

Water Quality/Storm Run-Offs/Ballast Water

It has been determined that storm water run-off can be adequately handled by the proposed storm water system engineered as part of the project. Additionally, the Environmental Sub-Committee have met with the Los Angeles Regional Water Quality Control Board (LARWQCB) to discuss the discharge of ballast water from bulk carriers calling at the Port of Long Beach. LARWQCB has tentatively agreed to a program whereby the Port would monitor ballast discharge through a permit
system. This system would require that the ship's master or agent certify that the ballast water is clean. Clean ballast water is either ballast water from segregated ballast tanks, or cargo tanks that have been flushed at sea. Violation of the Port's regulations would become the liability of the ship's master or agent and secondarily a liability of the developers and the Port itself.

Railway and Highway

Consultants are investigating the impacts of rail/vehicle interactions. Unit trains passing grade level crossings cause major problems with the road users. There are approximately 300 grade level crossings that were initially evaluated by the Project according to criteria developed by the consultants. The list has since been reduced to 22 crossings and there may only be six crossings that warrant further detailed investigation. The California Public Utilities Commission (CPUC) will be contacted to determine methods of improvements to grade level crossings and which are nominated for federal or state funding.

d) Managing the Permitting Process

The key to successful environmental permitting is an experienced management team and staff. The environmental sub-committee, supported by the executive committee, felt this work could best accomplished by retaining an environmental consultant and charging them with responsibility for the complete permitting process (see
section on Envirosphere Ebasco in Chapter 4). The environmental consultant will need to analyze and quantify the effects on water quality, biology, geology, air quality, noise, socio-economics, aesthetics, recreation, and other cultural resources. It was necessary that the environmental sub-committee develop a framework which would accurately set forth the performance criteria for the consulting group. The following initial general scope of work was outlined for the consultant:

(i) The impacts at the mine would not be included in the EIR/EIS.

(ii) Impacts outside the San Pedro Basin would be characterized generally and would not require site-specific detail. For example, the air quality impacts on the rail corridor would be described in terms of pollutant emissions per mile. There need not be detailed reference to the nature of the affected lands, whether residential, agricultural, vacant, etc. On a generalized level the corridor could be characterized by approximate percentages of land devoted to different uses. Considerably less consulting resources will obviously be spent in areas where it is felt the permitting task will not be constrained.

(iii) The Geotechnical consultant will provide all necessary field work. Depending on the level of detail desired in the EIR/EIS, such items as subsidence investigations, analysis liquifaction potential, and percolation tests could be required.
A computer simulation model to be developed by the engineering sub-committee would demonstrate ship, rail, and terminal activity and provide the following subsets of information.

- Ship location -- shipping lane pick-up and break-off points, traffic patterns from the break-off point into the harbour, and vessel movement patterns in the Port.

- Duration of collier modes of operation -- duration of arrival, berthing, hotelling, loading, deberthing, and departing.

- Number and spacing of collier arrivals, berthings, and deberthings.

- Collier characteristics -- size, number of hatches, steam or motor, whether in ballast, type of fuel used, flag flown, etc.

- Numbers of tugs and support vessels and duration of service.

- Scenarios of modes of vessel operation which take into account sea conditions, simultaneous arrival of vessels, loading difficulties which might cause stacking up of vessels waiting to load etc.

Information from the model will be used in air emission projections, estimates of waste water disposal needs, and assessment of navigation and safety impacts.
Major problems will be brought to the attention of the environmental sub-committee and trade-offs necessary can be implemented during the planning and design phase.

The executive committee, upon the recommendation of the environmental sub-committee, chose Envirosphere Ebasco over other consulting companies first because of their experience and knowledge in the business, but second because their experience and knowledge was all in-house. Many of the environmental proposals represented teams of companies which specialized in different areas in the permitting process. The project developers felt that a single company with the total capability of carrying out the permitting process when combined with the port planning staff would best handle this critical aspect of the development phase.

The delegation of responsibilities for the permitting process to outside professionals appeared to the project developers to be the preferential course in the permitting process. The cumbersome task of dealing with various institutions and public agencies should only be undertaken by experienced individuals. They must possess the technical ability and political wherewithal to conclude the task successfully within time/cost constraints. The primary objective of the environmental consulting group would be to prepare complete, unbiased, and fully defensible EIR/EIS documents. These must comply completely with the intent of controlling environmental legislation. Concerns of other public agencies and affected citizenry must also be fully recognized.
In order to satisfy the objectives within the established budgetary and temporal constraints, the environmental consulting program needed to be supported and controlled by a competent management system. The process will be monitored according to a detailed critical path schedule which will be updated semi-monthly for sub-committee meetings. The total permitting effort will take from 8-15 months. As an indication of the scope of this requirement, Figure 5.1 presents an example of a detailed preliminary table of contents for an EIR/EIS development program.

The project planning and design phase has been organized to be responsive to the major permitting areas of concern. Technologies must be implemented which are consistent with the objectives of the regulatory framework and wishes of the developers. If mitigating measures cannot be accomplished due to financial or operational constraints, it may be necessary to seek assistance from the railroads or ocean shipping sector. They would be requested to structure their operations in a manner which would reduce emissions at the terminal location. The environmental permitting regulations are quite inflexible. The project will succeed only on the basis of its ability to mitigate the adverse environmental impacts associated with the terminal construction and operation.

B. FINANCIAL ISSUES

This section will discuss the overall project financing and the implications to the financial alternatives of a participating Japanese
investor. The choice of a financing package affects the allocation of risk to all parties involved in the project. Risk will be analyzed for a number of alternative financial programs. Additionally the issue of parent company guarantees versus throughput contracts will be related to the present level of demand.

1. Project Finance

It is important that a differentiation be made between conventional financing and project financing. Project financing basically is an extension of credit in which the lender looks specifically at the cash flow stream from the asset being financed for the debt repayment. This is different from conventional financing which would involve recourse on the debt extended as a general liability against all assets of the sponsor. The project type of financing usually means that a separate entity is formed for the purpose of financing a major development. It is from only this entity and the project assets that the lending institutions seek their repayment. If parent company security or pledges against any other assets or revenues are required, it cannot be regarded as project financing. This is a very important distinction as it indicates the strength of the project in the eyes of the lending institutions and gives the project developers an important independent opinion as to the credibility of their investment format. Lending institutions have complained that project financing shifts a great deal of the new project risk to the lender.
The risks encountered by the developers and lending institutions for a terminal project of this type can generally be catalogued as follows:

(i) Market risks: Will there be adequate cargo throughput to generate the stream of earnings required to repay the debt and return a profit to the owners on their invested equity? If there are good long-term throughput contracts arranged with credible customers, typically lending institutions will assume such a market risk based on these contract agreements. However, if the developer group were to approach the lending institutions with anticipated cargo based solely on expressions of interest, letters of intent, or contracts cancellable in 90 days, it is highly unlikely that the transaction would be based on a project financing or limited recourse basis. The lending institutions in this case would seek additional security from the development parent companies.

(ii) Participant risk: The Long Beach Project has a large number of potential investors (after C. Itoh dilutes their shareholding to major Japanese coal users). It is important the lending institutions are satisfied with the track record of the participants in the particular joint venture. This will relate to independent success in undertaking major projects and completing repayment of the financing on a timely basis. Additionally the financial strength, management style,
and business acumen of the parent company will be examined according to their history of participation in successful joint venture projects.

(iii) Completion risk: In project financing, there typically will be a clause in the debt agreement indicating that the completion of the project will be at a date and for an amount not to exceed a stipulated aggregate value. Failing this, the developers must provide necessary additional funds as contributed equity. The lending institution, in such a case, will not be required to loan additional funds. Lenders are rarely willing to accept completion risk.

(iv) Foreign Exchange risk: In a project such as the Long Beach terminal, the financial program will span a 20-25 year time horizon. There are significant currency risks involved. Hedging, buying forward, and other methods of reducing the risk of short-term currency fluctuations are not applicable to a long-term project of this nature. The lending institutions will usually propose a currency or mix of currencies which are stable and preferably undervalued against the principal repayment currency. The criteria is to maximize the benefit of lower interest rates available in foreign currency (principally yen).

The lower interest rates, however, must be compared to the total financing cost. This total cost will include
sensitivity for exchange rate fluctuations. For the Long Beach Project, it has been recommended that a number of the long-term throughput contracts be denominated in yen to service the yen portion of the debt thereby reducing the risks of the present undervalued yen increasing in value vis-a-vis the dollar. Any upward valuation of the yen would increase the repayment costs of the sponsors in dollars.

(v) Political Risks: In most major financing contracts there is a **Force Majeure** clause which exempts the parties from performance under very clearly prescribed terms of reference. These usually include Acts of God, war, acts of government, and other items beyond the reasonable control of the parties at the time the contract was agreed. In the Long Beach Terminal case, the major lending institution (and sponsor) concerns would be that during times of U.S. national energy shortages, the export of coal to the Pacific Rim and other countries could be significantly reduced or halted by law. The objective would possibly be to insure the continuing supply of energy sources to serve U.S. domestic needs. In this Force Majeure situation, the functioning of a coal export terminal would cease and the sponsors and bankers would need to work with the government and/or other sources to see if credit could be extended through the government-initiated crisis. A major restructuring may need to be considered. In a Force Majeure circumstance the risk of financial loss would
be borne by the lending institutions for an amount equal to the debt obligation. The developers risk losing their contributed equity, or possibly the return to this equity during the export interruption.

2. **Financial Structure**

The structure of project financing can be quite complex. It involves several different types of lenders and a large number of debt service documents legally binding the interrelated project developer companies. There are many possible variations of a project structure; however, there appear to be a number of features common to most projects.

(i) A separate entity is usually created to hold the project assets and to conduct external financing for the project. By using this format, project assets may be separated from the normal assets of the sponsors and used as security for the project debt. The cash flow from the project may also be segregated from the individual partners in order to service such debt.

(ii) The project entity can take different structural forms including a corporation or partnership. The partnership form is sometimes selected for tax reasons although it can present problems in meeting the legal requirements of lenders. In general a partnership has less stringent capital structure
requirements than a corporation. Additionally faster depreciation schedules and expensing of certain cost categories are more favorable for partnerships.

(iii) Depending on the ownership structure of the project, the debt associated with the project may be "off-balance-sheet" for the sponsors.

(iv) With project financing, from the borrower's point of view, the objective is to provide lenders with security based solely on the revenues from the project assets. Lenders may be satisfied with this type of security if the technology and processes involved are well-known and the market for the project output is very strong and is committed by long-term contracts. Lenders are often concerned that this form of security is insufficient because the debt is not supported directly by the participants' other business operations. The lenders, therefore, are exposed to a majority of the risks of the project itself. In such circumstances the lenders may require additional credit support for the debt of the project entity such as a higher level of throughput agreements. Alternatively, the sponsors may provide indirect support through guarantees or contingent obligations. This is less favourable from the standpoint of the sponsors since one of the objectives of project financing is to limit the credit exposure and to preserve the debt capacity of the parent companies.
Project financing often allows higher leverage than traditional financing. Because the project revenues are dedicated to the payment of project debt service, lenders are often willing to provide as much as 75-80% of capital requirements providing they are satisfied with the underlying security arrangements.

3. Financing Alternatives

There are many types of financial instruments available to a major terminal project; several of these are discussed below:

a) Direct Long Term Project Loans

These could be in the form of bonds placed on the open market, long term loans from major financial institutions, long term loans from major banking institutions, tax exempt bonds sponsored by the participants through the auspices of a local port or municipal authority, and other sources of market financing and paper debt instruments. As the new joint venture entity proposed for the Long Beach Terminal will not have an established record the use of long term public bonds is very unlikely. The participants however do wish to proceed with a long term financing package based on a fixed rate basis.

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The major banking institutions in the United States have cash resources available to lend the participants. The disadvantage is the floating rate nature of bank financing and the relative short maturity period compared to the project planning horizon. Bank instruments would be more suited to the construction phase of the project.

A most likely form of financing for some portion of the project would be the use of industrial revenue bonds issued through the authority of the Port of Long Beach. This provides an excellent source of funds as many institutions and individuals are seeking tax exempt investments to form a part of their portfolio. The participants can expect to pay lower interest rates under the tax exempt structure. The Treasury Department, however, has announced some features of a legislative proposal it will soon pass to congress which could reduce the benefit of this type of financing. The proposal will include: 7

(i) Private projects financed with tax free industrial revenue bonds issued after 1982 must be depreciated according to the straight line method rather than the accelerated cost recovery system depreciation recently expanded under the 1981 tax recovery act.

(ii) Industrial revenue bond issues must be approved by a State or local legislative body.
(iii) After 1985, the industrial revenue bond project must receive a financial contribution, commitment, or obligation from the local government.

(iv) Small issue industrial revenue bonds will not be available for large corporations.

The main thrust of the proposal is to prevent corporations from using both the tax exempt financing and accelerated depreciation for the same project. This form would certainly be one of the more appropriate financing alternatives for a terminal development scheme.

b) Yen-Denominated Funding From Japanese Financial Markets

Financial support may be possible from the Japanese market. The three principal forms would be: (i) Export credit; (ii) Overseas investment credit; and (iii) Yen syndicated loans. (See Figures 5.2, 5.3, and 5.4 for the structure of the funding proposal and resulting responsibilities)

(i) Export Credit

Export credit may be available in the Long Beach project based on utilization of Japanese built equipment, parts, accessories and other qualified items required in the terminal construction. The Japanese equipment exporter must negotiate the loan with the Japanese lending institutions. The credit
scheme is illustrated in Figure 5.2. The amount of the export credit cannot exceed either the value of the export contract or 70% of the joint financing with other institutions. The terms for this type of credit are 5-10 years and interest rates are currently in the region of 8.5-9.5%.

(ii) Overseas Investment Credit

This type of financing would need to be arranged through the Japanese partner (C. Itoh). The Export-Import Bank of Japan would be approached for the purpose of obtaining funds which the Japanese partner would use to invest in the foreign corporation. Depending on the perceived value of the investment to Japan, (a coal terminal on the West Coast is perceived as high value energy related project) the terms range from 1-10 years and interest rates range from 6-9%. The amount of the loan can be no greater than 70% of the required total funds. The lending scheme is presented in Figure 5.3.

(iii) Yen-Syndicated Loan

Unlike the Export Credit or Overseas Investment Credit the Yen-Syndicated loan would be made directly to the terminal owners (PBT). These types of loans are regulated by the Japanese Ministry of Finance (MOF)
and applications must qualify according to one of the following criteria:\(^8\)

1) The loan must be to international institutions such as IBRD, EIB, EURATOM, EUROFINA.

2) The loan must be for projects geared to the development of mineral and/or energy resources for export to Japan.

3) The loan must be used to finance the import of Japanese goods.

4) The loan must be part of a co-financing arrangement with international financial institutions.

For the Long Beach Terminal the loan could be based on categories 2 or 3.

The interest rate would be Japanese long term prime (currently 8.6\%) plus a premium. The term would be 10-20 years. The amount of the loan would depend on the project size and credit standing of the borrowers. Yen-syndicated loans have seldom been more than $100 million.

Any yen credit facility will involve exchange risk. In the case of a coal terminal the following scheme represents a way to reduce this risk. Figure 5.4

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indicates that the terminal owners would be paid the throughput charges in yen either from the Japanese buyers, or the coal sellers. The objective is to have yen-based throughput commitments in an amount which supports the yen borrowing. This would assist in reducing currency risk to the developers. This system requires the cooperation of the terminal owners, producers and users based on long term contracts. It will likely be difficult to secure this support from American producers. An additional complication is that there are several components to the terminal charge (labour, wharfage) which are dollar expenses, this could present an adverse effect if the yen devalued.

Yen borrowing appears to be an attractive alternative to dollar borrowing in the current financial markets. Table 5.5 shows the IBJ analysis of the effective interest burden for the project given different yen/dollar exchange rates. Even if the yen rises substantially (to $ = 172Y) the real interest cost of 11.2% is still below the January 1982 6-month Eurodollar rate of 14.88%.

Borrowing from the other Pacific Rim countries has not been considered by the project developers.
"Off-Balance-Sheet" Financing

This has become a popular buzz word in financial circles. There are principally two ways to undertake financial obligations which do not result as liabilities on the balance sheet. One is to own 50% or less of a joint venture. In this instance the financing is not consolidated on the parent financial statements, but is indicated only as a footnote. Only the equity investment in the project is shown on the parent company financial statements. The other off-balance-sheet method is leasing. There are several types of leasing which can be used in a project of this type. One is the standard form of leasing (which will not be discussed due to its relative unimportance in projects of this size and term). Two types of lease which are more appropriate for a major terminal project are the leveraged lease and safe harbour lease.

(i) The Safe Harbour Lease

The Safe Harbour Lease (under the Economic Recovery Tax Act of 1981) allows the sale of the tax credits. Companies with a federal income tax liability become nominal lessors on a fairly risk free basis by becoming equity investors in a leveraged lease. Potential nominal lessors include any company which is subject to federal income tax. In the Long Beach project, participant lessors could be Upland
Industries or Crowley Maritime. To the extent that the tax credits could not be fully utilized by members of the project, major external companies with a large tax liability such as General Electric or International Business Machines could become lessors in the transaction. Using the safe harbour lease, a possible funding scheme for PBT is as shown in Figure 5.6. In such a scheme, PBT would receive an outright cash payment from the lessor of approximately 30% of the total equipment cost. The lessor in turn receives the benefit of the 10% investment tax credit and depreciation deduction for the total capital cost which exceeds the above-mentioned 30% passed to the lessee.

During the period since the passage of the ERTA, the safe harbour leasing provisions have been under constant examination and criticism. It presently appears that the safe harbour leasing provision will be repealed and that this method will not be in place at the time the major project financial underwriting is completed. The use of conventional leveraged leasing appears most probable for the project.

(ii) Leveraged Lease

In a leveraged lease, a lessor that has taxable income from other sources is in a position to profit from the
lease because, for tax purposes, depreciation expense on the total value of the property may be taken. The lessor may only put up 20% of the cost of the depreciable property to gain a tax credit equal to the total project value. This is where the term leveraged is derived. A leveraged lease scheme is shown in Figure 5.7.

The Long Beach project has 3 distinct characteristics which make the leveraged lease an attractive possibility. First, the project is not expected to generate taxable income during the first 3-5 years of operation; second, the Japanese partner does not have substantial other U.S. taxable income against which to use the depreciation and investment tax credit from the projects; and third, there is pressure towards a corporate entity for the PBT owners which would deny them many of the partnership tax advantages (which will be retained under a leveraged lease).

The Internal Revenue Service guidelines determine a number of qualifying standards for a true lease. Some of their requirements which relate to the Terminal Development are as follows:9

(i) The lessor at all times during the lease and at the time the equipment is first placed in
service must have a minimum "at risk" investment in the equipment of at least 20% of the adjusted basis of the property.

(ii) The remaining useful life of the equipment at the end of the lease term must be the greater of one year or 20% of its originally estimated useful life.

(iii) The lessee must not have a contractual right to purchase the property at less than its fair market value nor may the lessor have a contractual right to cause any party to purchase the asset.

(iv) The lessee may not have furnished any part of the purchase price of the asset nor have loaned or guaranteed any indebtedness created in connection with the acquisition of the property by the lessor.

The project components that may be eligible for leveraged leasing include the terminal facilities, storm drains, utilities, and dredging. The oil facilities' relocation may not qualify for leveraged leasing since the lessor will probably not be legally able to "own" the improvement.
The effective interest cost to the developers can be lowered through using various lease alternatives. The group must however give up the tax benefit derived from depreciation. The depreciation would ultimately reduce the amount of tax liability when the project becomes profitable. The trade-offs between the future tax expenses and the lower effective interest costs under the leasing alternatives must be continually reviewed. The final mix of debt and/or leasing funds will depend on the project profitability. Such profitability will be measured after consideration of many variables such as capital cost, throughput, tariffs, operating costs, etc.

d) Deciding on the Financing Mix

In the absence of long-term throughput contracts, borrowing by PBT from outside lenders will not be on the basis of project financing. The debt will need to be secured by guarantees from the PBT participants' parent companies. Should the project proceed on this basis, PBT's parent companies have agreed to guarantee the debt repayment to outside lenders in an amount proportionate to their shareholding. Figure 5.8 indicates the structure of this type of financing situation.

The Industrial Bank of Japan was retained as the initial financial advisor. Subsequently they secured the services of
the Investment Banking/Project Finance Division of the Bank of America in Los Angeles. Their joint responsibility was to develop and recommend an optimum U.S. dollar/yen financing package. The primary inputs for IBJ and the financial sub-committee originated as follows:

capital expenditure - source: Bechtel Civil and Minerals Inc.
                    Port of Long Beach.
operating cost      - source: Metropolitan Stevedore Co.,
throughput          - source: Marketing Committee of LBICP
                    and C. Itoh
port charge         - source: Port of Long Beach, C. Itoh,
                    Metropolitan Stevedore Co.
land lease costs    - source: Upland Industries.

The anticipated capital cost of the project including escalation and interest during construction will be in the region of 300 million U.S. 1985 dollars. The financial advisors and the financial sub-committee structured a detailed cash flow analysis. Their purpose was to determine the financial attractiveness of the project and to test the project's sensitivity to changes in the following items:

1. capital costs
2. operating costs
3. terminal charges
4. throughput tonnage.

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Although the financial return of the project was sensitive to each of these parameters, the most significant changes were experienced by varying the terminal charge or throughput tonnage.

The return on investment, return on equity, payback period, and debt service ability were each analyzed through the cash flow presentation. The primary concerns of the partners during the conceptual and planning phase were the return on investment and equity; a very brief description will be given of these below.

(i) Return on Investment.

The internal rate of return on investment (IRR) is the discount rate which equates the present value of expected future cash flows to the initial cash outlay or investment. In this case, ROI was determined before financing and income tax. (As noted in Chapter 4 each of the participants prefer different financial indicators based on somewhat differing criteria.)

(ii) Return on Equity.

The return on equity is the discount rate which equates the present value of the equity investment with the present value of the annual residual cash
flow after debt amortization, interest, and income taxes. A return on investment calculation is based on the total investment while return on equity is based on only the equity contribution.

To assist the "marketing" of the project financing, a feasibility study on the proposed terminal was to be prepared. The results of the study should demonstrate its competitiveness with several other proposed locations on the U.S. West Coast. The criteria supplied by the executive committee was 1) the ultimate terminal charge must be lower than $6.00 per ton (1982 dollars) and 2) the return on investment must be above 15%. The financial advisor developed a computer model which analyzed the circumstances in which the above conditions could be satisfied given different levels of capital and operating costs. Various graphs and charts were then presented indicating the ranges of financing costs, operating costs, and capital costs that could be accommodated to keep the project within the stated criteria.

The issues involved in the financial planning of such a project are many and complex. Resolving these issues is further complicated by the number of participants and their possible divergent interests.
with respect to the financing package. The cash flow and sensitivity analysis have indicated there is only limited flexibility allowed in making changes without departing from the boundaries of the indicated financially feasible range. With such large sums of money involved, there are small "fine tuning" changes that can be made to the financial scheme but these tend to only marginally affect the overall project return or capital requirements.

The theoretical minimum cost of financing can usually be determined. The non-capital aspect of the problem relates to the developers' ability to control the operating costs (an escalating component) and their relation to initial costs. The trade-offs between capital and operating costs are at best difficult to make. For example the project cost can be reduced by removing the second shiploader, installing a smaller loop track, or developing smaller amounts of ground storage. If a project is well conceived initially, these decreases in capital costs usually result in increases in operating costs. Manpower planning efficiency decreases when compromises are made to the terminal plant and equipment. Additionally, these changes significantly detract from the terminal's ability to be a cost-effective interface with the
other components of the coal chain. How these capital/operating cost trade-offs are made represents a crucial aspect of the terminal planning program.

C. FOREIGN INVESTMENT PARTNER

Foreign direct investment in the United States more than doubled in the past 5-6 years, amounting to 53.2 billion U.S. dollars in 1979. The Federal Government has proclaimed a neutrality to this foreign investment. The State and Local Governments are making significant efforts to increase the foreign investment base. The above factors and the large and stable United States investment market will likely result in this level of investment continuing to increase over the next decade. This section will primarily be discussing foreign direct investment where the investor exercises some degree of control over the operation of the enterprise in which the investment has been made.

A large port (and other infrastructure) projects related to the development of the steam coal logistics system in the Western United States appear to be likely candidates to attract foreign investors for a number of reasons. As outlined in the Westpo Report these are: 1) the desire to gain access to United States technological developments, managerial skills, and marketing techniques; 2) the proximity to large United States capital markets for future financing needs; 3) the possibility of vertical integration to secure raw material supplies; 4) relatively low United States tax rates; 5) a future depreciation of the
United States dollar in foreign exchange markets; and 6) the 30% tax ceiling on dividend and interest remittances to foreign investors (depending on treaties applicable).

The Federal Government continues to maintain its neutrality towards the foreign investors. It is realized that the rate of capital formation is a significant contributor to the rate of economic growth in the country. They would likely prefer not to implement any policies or regulations which would decrease the amount of foreign investment to avoid the adverse effects to this rate of growth.

The State and Local Governments depart significantly from the neutrality policy of the Federal Government. They actively encourage and solicit foreign direct and indirect investment in their areas. According to the Westpo Report, the State and Local Governments may utilize four types of fiscal policies to stimulate foreign investments, these are:¹²

(i) Efforts to make the overall level and structure of state and local taxes attractive to industry;

(ii) Specific tax incentives, such as exemptions, temporary tax abatements, and low rate assessments that lower operating costs.

(iii) Access to industrial development bonds which provide lower borrowing costs enjoyed by State or Local Governments because of their tax exempt status.
(iv) A policy providing new firms with public services such as roadways or utility hook-ups at little or no cost.

Although it is evident that foreign investment is welcomed in the United States, there are some concerns that limits should be placed on the amount of direct investment in projects that are in key areas of national interest or energy. These limits could also apply in areas that have possible major implications on the environment or other social phenomena for United States citizens.

According to the Institutional/Regulatory Task Group of the Westpo, there are number of federal acts which give the Government authority to "monitor" the level of foreign direct and portfolio investments in the United States, these are:

Under this Act, the Secretary of Commerce was directed to conduct a comprehensive, overall study of foreign direct investments in the United States while the Secretary of the Treasury was authorized to do the same for foreign portfolio investments.13

Under this Act, the President is directed to set up a regular and comprehensive data collection program to conduct periodic benchmark surveys on direct and portfolio investment.14

(iii) The Domestic and Foreign Investment Improved Disclosure Act
(P.L. 95-213). This requires expanding disclosure to the Securities Exchange Commission (SEC) of beneficial owners (both foreign and domestic) of more than 5% of specified kinds of securities.\textsuperscript{15}

The above legislation does not seek to limit or restrict the amount of foreign investment. It does provide a system of monitoring these levels and would be a starting point should some protection be deemed necessary in certain areas of national security, interest, or energy policies. There are, however, some exceptions to this broad federal policy of non-interference. They are related specifically to areas of ownership of firms in national defence industries, certain natural resource sectors of economy, coastal and fresh-water shipping, domestic radio communications, domestic air transport, acquisition of federal mineral lands, and hydroelectric power.\textsuperscript{16}

As discussed in Chapter 2, most proposed bulk loading terminals have as participants either a resource owner, a foreign trading company, a foreign coal user, or a combination of these. The C. Itoh partner of the Long Beach Project plans to dilute its 45% direct investment through selling parts of this ownership to Japanese electric utility and cement companies. These same companies will become major users of the terminal. This structure is acceptable to the United States Government. It has further been based on a minority foreign ownership by the developers to avoid future problems should changes be made that would discriminate against majority or equal foreign ownership.
The potential owners of the terminal, through guidance by the Port, have been sensitive to all federal/state/local regulations that may pertain to the foreign ownership issue. This point becomes extremely important given the "public" aspect of the terminal facility and the surrounding political sensitivities to the economic function of the terminal in allowing the export steam coal trade to materialize. It must be realized that matters of national strategic importance, restraint of trade, and discrimination, are all important aspects of operating a public export terminal on the West Coast. There could be additional problems if the proposed terminal is perceived as a monopoly in relation to some mine locations.

D. LEGAL AND RESTRAINT OF TRADE IMPLICATIONS

There are a number of U.S. Federal laws which seek to prevent monopolistic market situations and other restraints of trade. These laws attempt to promote competition in all U.S. trade. The principal laws in this area are the Sherman Anti-Trust Act of 1890, the Clayton Act of 1914, and the Federal Trade Commission Act of 1914. In addition to these federal statutes, most states have created anti-trust statutes as part of their body of law. It cannot be emphasized enough that a public port facility, in addition to being bound by the Acts mentioned earlier, are constrained very severely against any discrimination in price or services through the nature of their state controlled "public" authority to operate. The Port operations are further controlled by the Inter-State Commerce Commission and the Justice Department.
Although it may be possible that there is adequate competition on the producing, inland, and ocean freight markets, it is conceivable that the first large West Coast coal port could be in a perceived monopoly situation. This could continue for a number of years until the demand for steam coal swells to a point which would justify a second major facility. The issue here is one of ensuring that initial operating costs and terminal throughput charges are identified very precisely as major increases in price may be subsequently difficult to attain due to attention these price increases may receive from the various governmental/legal bodies.

The developers may have some relief from the restraint of trade position through the Webb Pomerantz Act of 1918. This Act allows protection from the Sherman Anti-Trust Act if the association has been formed solely for the purpose of engaging in export trade. Obviously the function of a major export terminal is export trade. However, there is no significant history of use of the Webb Pomerantz Act to give the partners assurances they will be protected from accusations of restraint of trade or monopoly pricing techniques.

The project development with a foreign partner should not be impeded by the regulatory/legal framework of any U.S. Governments. The most difficult issue in this respect has been an internal matter of choosing a partnership or a corporation. In the case of a U.S. corporation with a foreign participant, the U.S. Government requires complete and detailed financial reporting of the parent companies. This regulatory requirement
would apply to the U.S. owners, C. Itoh and Company and all potential Japanese end user participants. These detailed reporting requirements may be an obstacle to the formation of the corporation.

E. SOCIO-ECONOMIC ASPECTS

There are two areas which need to be discussed in regard to the socio-economic impacts of a major terminal project in the San Pedro Basin. The first is the 3-4 years of construction activity during which as many as 300-400 local tradesmen and other construction personnel will be involved. They will be employed by the sub-contractors completing various portions of the terminal installation and construction work. The second is the terminal operation.

The detailed engineering and design will likely be undertaken by a construction firm located outside of the Los Angeles/Long Beach area. It will not be until actual construction activity commences that any major impacts can be anticipated. It is reasonable to assume that, with the very large population base in the Los Angeles/Long Beach areas, there will be little need to import any of the work force. Further, a construction project of this nature will have a relatively minor impact through the construction wages and or other secondary benefits/costs that are anticipated to accrue given the large metropolitan area. Additionally, the high degree of unionism in all the construction trades involved on the site area will mean that local residents will retain all of the construction work. This is very different from the construction of a new
mine project where the population of a small mining community could be increased by over 100%.

There will be permanent employment for approximately 85 people at the terminal location. The socio-economic impacts to the local community will not be great given this size labour force. An important contribution to the community will be the revenue from the port. This will improve the financial ability of the City of Long Beach to serve its local citizens.

Where large socio-economic impacts can accrue are in regard to a new mine project opening because the port facility is allowing a more cost effective logistics system. This could be encouraging expansion of the trade which would have not otherwise materialized.

The Westpo Report indicates that socio-economic problems should "rank highest in the priority of those seeking to expand the development of western coal, because they do not lend themselves to the kind of regulatory definitions and solutions characterized physical environmental issues, but can have consequences that are just as tangible and troublesome".20

The Westpo statement highlights the fact that the socio-economic aspects have been relegated to a lower level of importance. They are more easily compromised due to their lack of definition compared to the environmental constraints. It must be realized at the present time the major socio-economic impacts from the development of western coal will likely be at

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the mine sites. These are the communities which will experience the most rapid growth and other social and economic changes that accompany this type of change. The Westpo Report does not include a very important consideration. Until the end of the century the preponderance of Western steam coal will be sold domestically. Estimates are that only 8.6 percent of production will be exported in 1985 and 5-8% will be exported in 1995.21 As the Port will not have the socio-economic impacts of a major mine development, Westpo may be overstating the socio-economic impacts caused by the export sector of the western coal development.

The terminal developer will likely continue with the project on the basis of some minimum throughput guarantee levels for the export of western steam coal to the Pacific Rim users. If these long-term throughput contracts exist, it can be assumed the developers of the mines, the railroads, and other links in the logistics chain must have overcome or at least mitigated the socio-economic (and all other) impacts.

F. TECHNOLOGY AND ENERGY MARKET RISKS

Future changes in the availability of other energy sources, competition from other ports, and changes in technologies could present major external issues in the development of the Long Beach Terminal Project. In addition to the various site locations espousing proposed development plans in Chapter 3, the role of oil and nuclear energy may change during the terminal planning horizon. Technologies and methodologies regarding alternatives to conventional port loading facilities may materialize.
With a 20-year project horizon, it is entirely possible that present ideas could be refined and implemented or that totally new energy systems could be conceived. If these concepts become an operational reality it could significantly impact the success of the Long Beach Terminal. A number of these alternatives and their impacts on the Project will be discussed in this section:

1. **The Market For Oil**

   The stability of the petroleum market and/or a substantial number of new discoveries could seriously impact the utilization of coal. Oil imports appear to dominate all other issues in the world energy policy and it is unlikely this will change in the future. New oil discoveries, or a greater willingness of the more stable supply countries to enter into long-term supply contracts, could have a drastic affect on the anticipated Pacific Rim demand for coal. Economists are not sure that economics of coal versus oil have yet reached the stability point. Over the next few years, the relative importance of coal to the Pacific Rim economies could be substantially changed should OPEC and other oil producing areas take steps to reduce their price to a level which made coal a less competitive alternative. This situation could change in favor of coal also.

2. **The Nuclear Option**

   The proliferation of nuclear power is another source that could
counter the move to massive coal utilization in the Pacific Rim countries. As indicted in earlier chapters, at present there are various economic, environmental, and social problems related to the development of the nuclear option. It is possible these could be reduced through new technological or safety developments such that an expanded nuclear program could develop. It appears that nuclear problems are with us for the short term. There is, however, no indication that in the next ten to fifteen years, breakthroughs cannot be taken to resolve some of the problems. The nuclear option could then be implemented as a major energy source.

3. Coal Slurry Transport and Ship-Loading

The technology of coarse and fines coal slurry has been investigated and tested sufficiently to make this a probable alternative within the next 2-5 years. Programs are currently being developed by Wheelabrator-Frye and Bechtel in this research area. The concept involves a conventional on-shore coal receiving and storage location. Coal would be reduced to a 4 inch minus size and pumped through an underground/seabed pipeline to an offshore mooring buoy (approximately 2-3 miles offshore and in 100-200 feet of water). After the coal was loaded aboard a vessel, the decanted water would return via a second pipeline to the Terminal facility for reuse. The capital costs for this type of facility would be approximately 20-30% more than a conventional coal loading facility. However, the operating costs would be significantly reduced and the opportunity of using maximum size colliers to take full advantage of the economies
of scale for ocean shipment would be available to many locations (for both shipping and receiving). This system offers the opportunity to locate in a non-residential port area and take advantage of remote coastal locations thereby reducing the environmental and socio-economic impacts considerably below that of a standard facility.

4. **Shallow Draft Colliers**

Development of shallow draft colliers has been a topic of interest in the United States and the Pacific Rim countries for a number of years. There are presently several low draft/high deadweight vessels operating between the New South Wales ports in Australia and Pacific Rim countries. Additionally, many research and development programs are presently in progress by the Maritime Administration in the United States and various departments of the Japanese Government. Marad published a preliminary design in 1982 which would enable a 45-foot draft vessel to be loaded to 144,000 tons deadweight (this is an increase of 60,000 tons deadweight over a conventional 45 foot draft vessel).\(^2^2\) There are further studies necessary regarding the construction costs of this type of vessel versus standard vessels. Measures must also be made of additional operating costs relating to the lack of flexibility in trading patterns. It appears that this technology could be developed and used for dedicated vessels to service a particular set of ports over a long term throughput contract. This development has the potential of enabling ports on
the Columbia River and other locations on the West Coast to effectively compete with Long Beach in ocean shipping economies of scale.

5. **Coal Derived Sources**

Technological developments are being made in the use of coal derived energy sources such as different gases, coal oil mixtures, and methanol. United States conversion facilities could produce the coal by-products and ship the more refined energy sources. The requirement for the export coal itself and an export terminal facility could be reduced. These types of changes are certain to come as the world diversifies its menu of energy alternatives. The developers of a major conventional port loading facility must be reasonably confident that these changes will not occur within the planning horizon of their investment schedule. The alternative is to secure enforceable long-term contracts which will protect the investment for its accounting life.

E. **CONCLUSION**

The essence of business is risk. The ability of management to quantify and minimize risk is a major aspect of any project development. The external issues outlined in this chapter contribute to the risk profile which must be considered by the developers. These risks are not mutually exclusive. The total perceived risk resulting from the different aspects of the external development issues will form the bases for the development
decision. These will be augmented by technology changes and currency fluctuations which are beyond present day forecasting ability. The decision to proceed will not be an easy one.


4. Ibid., p. 16.

5. Ibid., p. 18.


7. U.S. Treasury Department, Proposed Resolution to Tax Exempt Financing Programs, Washington Week, January 16, 1982, p. 11.

8. Presentation to Long Beach Executive Committee by Industrial Bank of Japan, April 14, 1982.

9. Ibid.


11. Ibid., p. 158.

12. Ibid., p. 159.

13. Ibid., p. 162.


15. Ibid., p. 162

16. Ibid., p. 168.

17. Ibid., p. 183.

18. Ibid., p. 190.

19. Ibid., p. 191.

20. Ibid., p. 32.

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1. Assemble a thorough description of the proposed project including environmental protection systems, planning and economic analysis.

2. Identify, review and assess all relevant environmental data in order to:
   - summarize the data base, focusing on the regional areas potentially affected by the project;
   - identify and discuss sensitive environmental features;
   - identify data gaps; and
   - identify and discuss environmental features that can affect project conduct and the design of subsequent development plans.

3. Identify, describe, and place in perspective all potential environmental concerns associated with the Long Beach Coal Terminal project; assess significance.

4. Recommend mitigating measures.

5. Evaluate feasible alternative plans.

6. Discuss other planning considerations including:
   - potential growth-inducing impact;
   - boundary of the potentially affected area;
   - relationship between short-term uses and long-term productivity;
   - irreversible and irretrievable commitments of resources;
   - energy consumption; and
   - aesthetics.

FIGURE 5.3

OVERSEAS INVESTMENT CREDIT FORMAT

Export-Import Bank of Japan

Japan Commercial Lead Bank

Japanese Investor (C. Itoh & Co.)

Pacific Bulk Terminal Company

FIGURE 5.4

YEN-SYNDICATED LOAN FORMAT

JAPANESE COMMERCIAL BANKS

PACIFIC BULK TERMINAL COMPANY

TABLE 5.5

EFFECTIVE INTEREST COSTS WITH U.S. DOLLAR/YEN

EXCHANGE RATE MOVEMENTS

<table>
<thead>
<tr>
<th>Annual Rate of Revaluation (or Devaluation)</th>
<th>Exchange Rate at 10 Years Later</th>
<th>Real Interest Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devaluation of Yen</td>
<td>- 1.0</td>
<td>243.26</td>
</tr>
<tr>
<td></td>
<td>- 0.5</td>
<td>231.31</td>
</tr>
<tr>
<td>Base Case</td>
<td>-</td>
<td>220</td>
</tr>
<tr>
<td>Upward Revaluation of Yen</td>
<td>0.5</td>
<td>209.30</td>
</tr>
<tr>
<td></td>
<td>1.0</td>
<td>199.16</td>
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<tr>
<td></td>
<td>1.5</td>
<td>189.57</td>
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<tr>
<td></td>
<td>2.0</td>
<td>180.48</td>
</tr>
<tr>
<td></td>
<td>2.5</td>
<td>171.86</td>
</tr>
<tr>
<td></td>
<td>3.0</td>
<td>163.70</td>
</tr>
</tbody>
</table>

Assumptions

1 Interest Rate: 8.6% p.a.
2 Term: 10 years, including a 3-year grace period
3 Repayment: Semi-annual equal amortization schedule
4 Base Currency: Japanese Yen.

(Borrowing in yen and repaying in U.S. dollars based on the revised exchange rate in effect at the time of repayment)

FIGURE 5.6

SAFE HARBOR LEASE FORMAT

MANUFACTURERS

sale of equipment

TRADING FIRM

supplier's credit

PBT (LESSEE)

debt 70%

Sale of equipment

THIRD PARTY (LESSOR)

lease back

down payment 30%

yen credit or dollar credit

JAPANESE COMMERCIAL BANKS

U.S. FINANCE SOURCES


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LEVERAGED LEASE FORMAT

PARENT COMPANY FINANCING GUARANTEE FORMAT

* including lenders of debt portion in the leveraged lease transaction

CHAPTER 6

PROJECT/IMPLEMENTATION AND CONTRACTING

A. INTRODUCTION

The management of the implementation phase is very different from that of the conceptual/planning phase. The reality of managing a 250 million dollar construction project is equally as complex as undertaking a feasibility study. The significantly greater detail required in relation to all the development issues is obvious. However, the organizational structure must adapt to changes from a study environment to an operating environment.

The chapter will outline the objectives which must be accomplished if the implementation phase is to proceed as planned. This will include discussions of (a) the major contractor requirements; (b) the marketing programme; (c) financial issues; (d) organizational start-up; and (e) union negotiations. Additionally, the throughput contract will be examined in relation to the risks accepted by the various parties to a coal sales and transportation agreement.

B. PARTICIPANTS

The roles of the participants change dramatically from the conceptual stage to the implementation phase. The port and Upland Industries were
major contributors to the cost of the conceptual phase. The implementation phase up to and including the operation of the terminal will likely be funded primarily by the PBT partners (C. Itoh, CMC and Metropolitan). The Long Beach port management will have a major role in the continuing development given their requirement to control the design and operational parameters of the facility to ensure that it is as successful as possible. Additionally the Port and/or Upland may have a financial involvement up to an amount of $66 million for the oil well relocation programme. The private partners are indicating they will not accept this cost as part of the project.

C. IMPLEMENTATION

If the developers decide to proceed with the implementation and construction phase of the project, it is important that this be managed, co-ordinated, and administrated competently to ensure the owners' objectives are achieved. Unlike the conceptual/planning phase which by definition allows the flexibility for making major changes (including cancelling the project), the terminal must proceed according to plan or there will be major cost increases. The privilege of having an interim decision point will pass. If a go-ahead decision is made, reversing or changing plans will be either impossible or very expensive. This will not be acceptable to the owners in any case.

There are six basic tasks to implementation of the Long Beach project:
1. Resolving the issue of a corporation versus a partnership.
2. Finalizing major engineering and construction contracts.
3. Establishing a marketing program.
4. Finalizing the financial program.
5. Setting up the initial administrative and operations organization.
6. Commencing union negotiations.

1. **Corporation vs Partnership**

The problem of a corporation versus a partnership is a difficult one for the participants to resolve. The U.S. Anti-Trust provisions require a lengthy reporting process involving significant data and reports from the foreign partners. If the project proceeds it will not be possible to continue with the PBT unincorporated joint venture status. The structuring of the financing package will be dependent on the types of organization and the tax consequences of each. There are a number of ways which this problem can be overcome initially to allow the financing programme to continue, (this will be described in the finance section). Additionally, as part of this fundamental ownership issue, the legal details such as articles of the association, Board members, voting rights, share holding etc., will need to be completely and formally resolved.

2. **Engineering Contract**

The developers will have to decide whether to proceed with an Architect and Engineering (A & E) or Engineering Procurement and
Construction Management (EPCM) engineering contract. The details of these agreements will need to be worked out regarding what is included/excluded in the fixed portion of the price and what escalations would continue as a responsibility of the developers (these would relate primarily to large terminal equipment components which could not be ordered presently on a fixed price basis from suppliers).

The engineering procurement and management activity will need to be divided into two separate functional areas; (1) the oil well removal programme and (2) the terminal construction. While the terminal construction costs contain a high degree of risk on some of the major operational components, these have been reasonably covered by contingencies in the engineer's/estimator's pricing mechanisms. This same contingency policy has been followed under the oil well relocation programme. However, a much greater risk exists in this area to exceed expense and time frame schedules. There are a large number of unknowns with respect to the condition of the underground piping, the extent of sump geological decay, etc.

The engineering contractor will function under the supervision of the PBT partnership and the port engineering management. The contractor will need to co-ordinate these two tasks to remain on the construction schedule without adversely affecting the productivity from Champlin's drilling operations.
The engineering contract will specify the construction schedule. Major target dates may involve penalties or bonuses (if any) for late or early completion. A major aspect of this document would be the indicated timing of the capital expenditures as this would form the basis of the draw-down from financing sources.

The engineering contract document is much more than a commitment to complete the work within financial and temporal guidelines. It involves a specific relationship to a stated level of technology and design criteria. These form the minimum acceptable levels for the structural and operating terminal performance. One of the most difficult tasks during the construction phase will be the engineering supervision of suppliers and sub-contractors. It must be determined that they are meeting the requirements of the detailed specifications. Another difficult task is the owner/developer supervising the engineering contractor to ensure that he is discharging his responsibilities in a professional manner and monitoring the sub-contractors effectively.

3. **Marketing Programme**

A minimum acceptable level of throughput guarantees are a prerequisite for building the terminal facility. In the present Pacific Rim coal market this level is likely to be below the level of activity which would achieve the owner's desired return on the terminal investment. It is possible that the developers would
proceed with the project if throughput contracts were available which only covered a break even cash position in the first few years. To expand the terminal business to the planned tonnages, a professional marketing/ information program will be designed to make western coal producers and potential end users aware of the facility completion date and operating capabilities.

Part of this marketing program will involve developing a set of "rates" for throughput based on the competitive environment, tonnage volumes, contract durations, storage requirements, technical specifications of the coal, and a number of other parameters. These rates must take into account the rate levels used in the financial pro-formas but also must consider the realities of the market in the near and medium term and the "inducement effect" required to stimulate expansion of the trade.

As a vital part of the throughput contract, (discussed further in a separate section), the operating capabilities will need to be reviewed to the extent that commitments are made as to the terminal's "performance". This will involve participation in demurrage and dispatch for ships and trains. Additionally, this type of commitment will give potential users confidence in the capabilities of the terminal. It also will assist the rail and ship modes in making final price refinements which previously had been based on results of the conceptual study. The fact that the developers are prepared to accept financial liabilities should performance fall short of a
stated criteria will enhance the ability of the project to attract new customers.

In the Long Beach example, there is an added advantage that long term throughput contracts can be signed during the implementation stage involving near term coal shipments. These early shipments would be serviced by the existing Pier G facility until the new facility became operational. There may be some price differentials involved in the first several years to reflect the much slower operating rates of the present facility, but it does provide a continuity of service that other planned terminals are unable to offer.

4. Financing Issues

The financing schemes discussed during the conceptual stage will need to be finalized with the developers making decisions regarding financing mix, duration of debt, currencies, etc. Although the three private companies in PBT will meet to make these decisions, there may be inputs from the port and/or Upland should either decide to assist with: (a) oil well relocation costs; (b) placing Industrial Revenue Bonds; or (c) establishing lease transactions.

To the extent that port revenue bonds are used, they may be either secured specifically against the project assets or against the general revenues of the Port. In the latter case the port would need to be involved to ensure that the covenants are not so restrictive as
to preclude or restrict further borrowing possibilities by the port for other projects.

Although the financial commitments will involve covenants as to minimum working capital levels, debt service coverage, and other criteria, the present lack of throughput agreements will require parent company financial guarantees for the majority of the financing based on their participating shareholding. This will not represent pure project financing as discussed earlier and indicates the high degree of risk the project represents to potential lenders.

One of the prime original objectives of the Finance Sub-Committee was to avoid partner guarantees through the use of either yen syndicated loans or yen export credits which would be tied to the contractual performance of the major throughput contracts (representing ultimately a Japanese government guarantee). With no throughput guarantees available initially to support the yen loans, this type of financing will also likely need to be supported by parent company guarantees.

Although the final financing package is only speculation at this time, some generalizations can be made about the likely approach of the developers given the present situation, (as of 3rd quarter 1982), in both the financial and coal markets. Current interest rates do not make long term obligations attractive and it may be anticipated that some interim construction financing may be considered. The

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placement of the long term debt would be deferred until market conditions become more favourable. There are presently yen export credits available (given the decision is taken to purchase major terminal components from Japanese suppliers) in 7-8 year maturities with no penalty for prepayment. Yen-syndicated loans and Port Industrial Revenue Bonds would then be used in conjunction with a leveraged lease to cover a portion of the basic financing on a long term basis. This would reduce the risk to the developers in the medium term should interest rates stabilize at a very high rate at a time they must roll-over the interim financing.

Whatever the financing scheme, it will be based on a "framework" for construction/ownership of the terminal which takes maximum exceptance from the regulations imposed on the public port sponsored work. These regulations can be avoided by delegating construction responsibilities to one of the private sector owners. An example of such a framework, although not representing what will be done by the group, offers an indication of the varieties of approaches to solving the public versus private issue.

Three major overriding factors are involved in the establishment of a framework for constructing the terminal facility. The first is that the port as a public facility must proceed with all contracting work on a total bid basis (which means sealed bids and lowest bidder receiving the work). They are not allowed to proceed with port work on the basis of negotiated contracts. The second item is that C.
Itoh and the other Japanese steel and cement companies will be the ultimate owners of 45% of the terminal. These companies have little independent interest in the tax credits which will flow from this project. The third item is the difference of opinion between the PBT partners as to their formation as a corporation or a partnership. To the extent that these issues can be resolved through the management framework it will enhance the project's total cost of funding and improve the ability of the operators to control the construction phase.

One framework which would allow some benefits in each of the above areas would be to allow one of the larger private interests to construct the terminal on a negotiated bid basis (this would need to be either Upland Industries or Crowley Maritime Corporation). The funds which they would use to construct the terminal facility could be provided by the Port of Long Beach based on short term tax free notes sold to the institutional market at 9 or 10% interest.

Uplands could lease the land to Crowley Maritime or to another party who would agree to complete construction of the terminal facilities. The completed terminal facility would be leased to the Port of Long Beach. The Port's master lease would guarantee the take-out financing with regard to Yen loans and/or credits. The port in turn would sub-lease its lease to the PBT partners with the principals guaranteeing financial performance. The constructor and lessor of the terminal would be entitled to receive all the tax credits
available under a partnership. This could resolve the difficulties in finalizing the proposed PBT organizational structure.

This approach would allow the partners to take full advantage of the tax credits individually. This would permit a corporate structure for PBT without any loss of tax benefits. The above example represents one of a number of ways that creative financing packages could be organized under a construction management framework. The objective is to take maximum advantage of available tax benefits and minimize the difficulties involved with such a large joint venture. It should be noted, however, that the number of alternatives will decrease as the financial risk of the project is perceived to increase by the potential lenders. If there were throughput guarantees and substantial lender confidence, the number of frameworks could be considerable. The constraints would be the legal and financial requirements of the United States, California, and the various lending institutions.

The financing package is important to the project as both a source of funds and an indication of how others (especially in Japan and other Pacific Rim countries) view the project's feasibility. The cost of this package should not be the deciding factor. If the developers make a decision to proceed, it will not necessarily be based on an analysis which shows an attractive project beyond the sensitivities to different interest rates or financing schemes. The financial objective in the implementation stage is to minimize the cost of
funds for the life of the project given the construction management framework decided by the owners.

5. **Organizational Start-Up**

This is an important task during the implementation phase. Both an operational (overseeing the construction/engineering), and administrative organization must be set up to manage costs, disburse funds, report progress to owners, and complete a host of other activities similar to most new organizations. The important aspects are the voting rights, rotating chairmanship, expenditure authorities, and general operational and administrative policy formulations. There are differences of opinion at this point in respect to whether the senior management in the operations and administrative functions should be generated internally from the partners or hired from outside the group. In the Long Beach case it had been agreed previously that should the project proceed Metropolitan Stevedore would manage the operations and CMC would manage the administration. An engineering construction management committee with representatives from each partner would oversee the detailed aspects of the engineering and construction.

During the construction stage the involvement of the senior partner management would likely be only on an exception basis if costs or schedules were departing substantially from targets. Otherwise, the engineering contractor and administrative group would manage the
project. The developer's engineering management committee would supervise details of the engineers and sub-contractors' performance. The administrative group would also solicit major proposals from Metropolitan and CMC as to the tasks they would perform in their role as operation and administrative managers. Charges for these services would need to relate to costs agreed to earlier in the conceptual stage.

6. **Commencement of Negotiations with the INternational Longshoremen & Warehousemen's Union (ILWU)**

In most terminal projects, the union negotiations would be a very critical part of the implementation phase. In this case, the partners have been somewhat insulated from this problem because Metropolitan Stevedore previously agreed to accept the management and stevedoring operations on an established price level (in 1982 dollars). Metro had provided detailed manning levels for the project's conceptual design for which they were certain they could get the concurrence of the local union management. The detailed cost schedules were used to derive the manpower costs. Indications of escalation were tied to the increases in stevedoring direct and indirect contract benefits.

D. **CONTRACTING**

A terminal throughput contract is a secondary agreement predicated upon a primary export sales agreement between a mine owner/agent in the United
States and a trading house/agent/end user in a Pacific Rim country. The details of this primary contract will usually determine responsibility for the port loading function. Additionally, the terminal agreement typically will be the last one negotiated after the higher cost logistics system components of rail and ship have been finalized. This allows the shipper maximum flexibility in dealing with the transportation "chain" and recognizes the port function as being the least cost component in the system.

1. The Terminal Contract

The primary purpose of a throughput contract is to set out the commercial/operational/legal terms which are acceptable to the shipper and terminal owners. The commercial terms relate generally to the loading charge, invoicing, payment timing, and responsibilities with respect to demurrage/dispatch. Costs will be allocated according to the terminal guaranteed performance levels. The terminal owner will accept some obligations as part of the throughput rate. These will be items such as wharfage, labour costs, maintenance and operation of the facility, and equipment repair. Additionally, services which will require additional costs are specified in detail. These will be items such as opening/closing hatches, cleaning hatches, standby time waiting for ships or trains, handling coal that is wet or otherwise not free flowing, and fire control. The commercial terms represent the charges for services by the terminal operators for normal loading operations.
The contract operational terms represent how the terminal owner and shipper agree to have the trains, terminal, and ships interface with one another. The purpose of stating and guaranteeing the operational performance levels is to promote the maximum operational efficiency of each of the modes. In theory this should result in the minimum cost of operation and best possible price to the ultimate customer. The assessment and charges for inefficient performance are also elucidated. Typically the terminal owner will agree to handle, and the shipper will agree to deliver, a specified number of unit trains in each eight-hour shift. Amounts/rates of coal for storage will also be specified. This aspect of the contract is critical to the shipper as it must be compatible with similar clauses he will have in the rail and ship contracts.

To the extent there are differences between the terminal operations agreement and the shipper rail or ocean transport contracts as they relate to the terminal interface, there could be extra costs experienced by the shipper. The operational sections of the contract will also specify what responsibilities the terminal will accept in regard to rotating cargo, weighing, blending, quality sampling, etc. The shipper will agree to establish planning schedules which give the terminal a set of notices at different time intervals regarding the arrival of trains or ships, their cargo volume and type, storage needs, and discharging/loading programs.

The legal "boilerplate" represents the division of responsibilities in relation to damages and liabilities. It sets forth the relevant
law, and prescribes the notice and legal arbitration processes. This will specify when responsibility for the coal passes from one party to another and what is the measure of the transfer of this responsibility. Also specified are the grounds for fault in certain instances such as sole negligence. Additionally, indemnifications are made to protect the respective parties from losses which are rightfully the responsibility of others and which may in fact be covered under present insurance policies in effect (these principally relate to injuries or damage to persons or personal property of the parties or their agents). Warranties of workmanlike procedures and operations within the relevant laws are expressly stated while other general warranties are disclaimed by all parties.

The last major item in any coal loading contract is the Force Majeure clause. This allows the parties to escape performance without penalty under certain circumstances (usually war, acts of God, control of exports, etc., or other major circumstance changes which could not have been reasonably foreseen at the time of the contract agreement). In the event of such circumstances, the party being prevented from carrying out their obligation under the contract is exempted from liability due to non-performance while the force majeure condition exists.

2. **The Contract as a Solution to Unresolved Internal/External Problems During the Development Phase**

A major project such as the Long Beach Terminal will have many
residual problems at the conclusion of the development phase. Some of these problems will be generated by delayed decision making, but others will arise as a result of inevitable oversights on the part of the developers or their consultants during the planning phases (an example would be incorrect manufacturer specifications on pollution emissions used in calculations). These problems must be resolved between the partners, or between the partners and outside agencies if the project is to proceed successfully. Sometimes the only available alternative is to formulate restrictive or corrective language in the contract document which will serve to correct these residual problem areas.

In the name of expediency and usually supported by effective political maneuvering by the joint coordinators, a number of items were left unresolved by the partners during the development phase. These items could represent differences of opinion between the Japanese and American partners regarding an operational, costing, or service issues relating to the terminal. These items tend to remain suppressed while major items continue to be resolved. It is usually not until the operations planning sessions begin that these past problems surface. In many cases it will be too costly to make design changes to respond to the majority desires. The contract must be considered as a means of resolving these internal residual problems.

An example would be the Japanese partners initially wanting 15% of the annual throughput contract guaranteed as storage for their
customers. The American partners could want a significantly smaller proportional guarantee. The engineering and design phase is completed and the total storage allocation has been finalized as part of the major construction criteria. This problem regarding the guaranteed portion for a particular customer needs to be resolved. At this point, it may be that the partners agree to 5% of throughput as free storage, 5-10% of the throughput as storage carrying a nominal charge, and 10-15% of throughput allowable but only at a significant charge to the customer. This would allow the customers the incremental storage if they required but compensate the owners for this provision. Earlier in the development process these items would have been much more difficult to resolve. During the implementation phase they tend to be either more easily resolved, or more easily described in financial or contract terms which assists in settling these types of issues between the partners.

Many external issues are also unresolved during the course of the development process. This is primarily a result of the slow response time from a number of the regulatory and environmental agencies. If responses are handed down from these agencies which differ considerably from what had been anticipated, one of the primary remedies is the contract document. An example would be the air quality management district responding that the level of particulate emissions was marginally high and would need to be mitigated to allow the terminal permitting process to be concluded. If final design work had been completed, major changes at this point would be
extremely expensive. The resolution of this problem could be made through specifying in the contract that unit trains would need to have minimum spacing or that coal quality would not include "fines" and would be a minimum 2-inch plus size for 70% of the cargo. The contract could further indicate that non-compliance with these conditions would require indemnification of the terminal owners from any cost relating to fines or other penalties imposed by the regulatory authorities specifically in this area.

3. The Framework for Negotiations

The primary coal sales contract between buyer and seller will usually specify which party is responsible for the terminal function. The coal sales terms and the ultimate party negotiating the terminal contract can significantly affect the negotiating process for the loading operations for reasons which will be covered shortly.

In general whoever pays the ultimate bill will control the cost sensitive areas of a coal sales contract. In the case of an ocean coal terminal it can be reasonably anticipated that the Pacific Rim end user will control the coal loading port. The exception to this (which may be quite frequent in the United States West Coast steam coal trade) is an FOBT sale where the producer may have the option of choosing the terminal. In this case the producer must usually assume load rate guarantees, vessel demurrage/dispatch, and other
obligations. The four primary steam coal sales terms to be used in the West Coast steam coal trade are as follows:

(i) FOR — Free On Rail. Under these terms the producer agrees to load the coal into the rail cars with his equipment and the delivery of the coal to the final user and turnover of responsibility is made once the coal is aboard the train at the producer's rail classification yard.

(ii) CIF — Cost Insurance and Freight. With these terms, all transport and insurance expenses until the coal has been off-loaded at the Pacific Rim port destination, are for the producer's account. These costs form part of the total delivered price. In the case of Pacific Rim nations where trading companies play a very major role in the coal import trade, these companies will likely be selling to the final users on a CIF basis and undertaking all the purchase and transportation negotiations/risks.

(iii) C & F is identical to CIF except that the insurance is excluded. Insurance becomes the responsibility of the ultimate end user or trading company once the coal is aboard the train at the producer's classification yard.

(iv) FOBT — Free On Board Terminal. With these terms the purchaser will take delivery of the coal on board the ocean
vessel at a loading port to be named (depending on the details of the contract the port choice may be either the producer's or user's). The producer/agent is responsible for rail and terminal loading charges.

The rigor of the negotiating process appears to be a function of: (a) the terminal price as a percentage of the total sales price under the particular terms; and (b) how much of the shipping market risk the coal producer must accept to facilitate the sale of his coal. If the coal export market was characterized by very high demand and only marginal supply, it could be anticipated that all of the producers would be able to sell their product on the basis of free on rail mine site. This would shift the risk of the transportation costs and their possible escalation over the contract period to the end user and/or trading company whichever was the purchaser. Regardless of whether it is the seller or purchaser that takes on the shipping risks, they will be attempting to negotiate the best rate and term provisions with the logistics components after finalizing the sales agreement.

In some cases the producer/purchaser may prefer to accept the shipping risks. Their decision would be based on a belief they could translate lower shipping prices into profits for themselves. An example would be a producer preferring FOBT terms basis a belief that American to American negotiations will produce better results in terms of transportation costs. On an FOBT price basis, the terminal
price as a percentage of the sales price is much higher than on an CIF or C & F basis. Additionally, the producer/agent may not have sold on the basis of a particular port. Against an FOB background it is difficult for the terminal operators to argue a defence of the port charge in relation to the large ocean freight saving which is available to the Long Beach deep water facility. This ocean freight charge is the responsibility of the end user and not part of the FOB contract. (This assumes that economies of scale will prevail in the ocean shipping market.)

In the FOR sales concept, the transportation responsibilities lie with the trading house or ultimate purchaser. As in the C & F and CIF sales the terminal cost is a smaller and less conspicuous portion of the total price. In the FOR situation, the Long Beach Terminal owners would be negotiating from a position that the site has been chosen as it minimizes the rail and ship costs. This is a significantly better negotiating basis for the terminal charge and conditions. In terms of American U.S. West Coast export steam coal through West Coast ports, it can be reasonably anticipated that the most difficult negotiations from a terminal viewpoint will relate firstly to FOBT contracts. C & F and CIF contracts with the producer carrying the transportation responsibility can be expected to involve less onerous negotiations. The least difficult contracts to negotiate will be FOR contracts with the Japanese end user responsible for all transportation and a CIF or C & F sale negotiated by a Japanese trading company that has taken possession of the coal at the mine site.

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E. SUPPLY/DEMAND VARIABILITY

Chapter 2 has already discussed the pricing mechanisms that may be used in coal sales (i.e. world price, ROI criteria, etc.). This has been expanded to cover other issues and terms involved in a throughput agreement binding the producers, transport components, and users on a long-term contractual basis. An important concept to explore in this area is the responsibility between the parties in the event of a significant demand or supply variation outside of the force majeure concept. The supply side variability is seldom considered as it is currently evident there is a significant thermal coal oversupply in the Western U.S. producing sector which would service the Pacific Rim countries.

There are two basic types of long term agreements used in the coal trade. One is the "take or pay" concept where the user agrees to purchase an annual tonnage from a producer and pay for such tonnage amount even if it is not ordered. The other more popular concept is the "evergreen" contract. In this case the contract continuity is based on the producer/user's ability to continue to negotiate acceptable pricing escalation agreements at specified intervals during the life of the contract. If they are unable to come to an agreement during one of these negotiating intervals the contract is cancelled with no resulting penalties.

The strict take or pay contracts are rare, especially in today's coal market. Variations of these may be used if a producer is bringing a new
mine on stream to satisfy a particular requirement. The evergreen type contract shifts the risk between producer and purchaser depending on the Pacific Rim market supply and demand circumstance. In times of low demand and high supply the risk is shifted to the producer who may need to price in relation to a South African low cost producer during escalation negotiations. When demand is high the purchaser increases his risk of paying high prices under the evergreen concept.

In reality, the transportation components of rail, terminal and ship can not expect to receive any better guarantees than those of the producer. Otherwise the producer and/or trading company would be assuming a risk outside the scope of the sales agreement. Transportation component owners are faced with either the evergreen concept from the producer/agent/trading house (if the sales contract continues transportation will continue) or some take or pay concept. This becomes burdensome if major capital expenditures (such as the new Long Beach facility) are predicated on this type of contract. Although the purchase contract may stipulate a 5 million ton per year throughput for 15 years, due to a decrease in demand over a particular period the end users may reduce tonnage to 1 million tons per year for 3–4 years in the hopes of using the incremental tonnage in later years. This situation can be catastrophic to mine owners or transport facility owners who have undertaken major capital expenses in anticipation of a relatively smooth income stream.

The Pacific Rim countries have a poor record of living up to their contract tonnage commitments and this is likely to continue. They have
seldom taken their full annual contract commitments from South Africa, Australia, or Canada.

Presently the financial burden of demand variability falls primarily on the producers and logistics systems component owners who have accepted (and it appears will continue to accept) loosely worded contracts in the area of tonnage guarantees. Additionally, with the U.S. West Coast steam coal industry in its infancy, the Pacific Rim purchasers know there will be reluctance to resort to legal remedies against a limited number of user companies who represent the long term success of the developing export market. On this basis the demand variability financial responsibility does not appear to be shared and the end users will not maintain responsibility for substantial decreases.

In the situation of a supply side variation, it is more reasonable to anticipate that the transportation sector would resort to legal remedies against the mines (if their contracts were of substance in the areas of guaranteed tonnage). Presently, the railroad and ocean shipping sectors are not insisting on take or pay tonnages due to: (a) they are operating with current capital equipment and the guaranteed tonnage is only used by the mines to qualify for a preferred "rate"; and (b) as stated earlier the transport sector can have no better terms than the sales agreement. The terminal, as the smallest link in the logistics chain, will be unlikely to negotiate concessions beyond those given to the rail or ocean sectors. Even though major capital expenditures are required, it is unreasonable to expect that solid take or pay contracts will be available.
The U.S. West Coast steam coal trade will not develop to its full potential if the producers and transportation system owners require solid take or pay contracts prior to their committing to service this industry. The coal export terminal is in the position of being the first component to need to commit major funds towards the development of this trade without a solid contractual basis. As the trade develops it is reasonable to assume that new mines will open and the railroads will also make major capital improvements. These improvements will likely be without the comfort of solid guarantee contract language but at least there will be an established track record of purchases from the West Coast. The present point of view of the Pacific Rim users, and a number of the Western suppliers, is that investments in the coal chain at this time represent normal business risks. They are indicating that the needs of the Pacific Rim countries have been outlined in detail basis their conversion from oil to coal in many of the electric generating power stations and other industrial and utility sectors. Furthermore, their interest in diversifying their sources of coal to the extent that they need rely less on Australia as their single major producer should be regarded as a major commitment. This is far from satisfactory to any group of developers considering major financial commitments to a sector of the coal logistics system. It appears to some extent the growth and stability of demand will need to be accepted as as a business risk for the first major terminal facility.
F. CONCLUSION

The implementation of a contracting phase is an exciting part of a major terminal development project. The organization and management structures must change significantly from the conceptual phase. Timing and budget constraints have replaced conceptual requirements as the most important functions to be managed.

This phase is related primarily to constructing the terminal according to pre-established guidelines. There are many issues that surface during this phase which were deferred or unanticipated during the feasibility analysis. Some of these issues can be resolved through changes in construction design. Others will need to be resolved through the contracting with terminal users. The export market to the Pacific Rim countries will determine the final contractual risk which is accepted by the project. This may be substantially different from the risk anticipated during the planning stages. A high proportion of this risk will result from the demand variability and contractual protections from this variability.
CHAPTER 7

CONCLUSION

A. INTRODUCTION

The hypothesis of the paper is that organizational structure has a significant effect upon the decision making and management of a joint venture. The impacts of the organizational structure upon the management of many technical, social, and institutional problems in the Long Beach Coal Project are described. It is concluded that the decision-making processes which evolve as part of a multi-participant joint venture often serve the transportation issues last. Technical transportation problems are the least complex aspects of this terminal development program.

The paper uses the Long Beach International Coal Project (LBICP) to demonstrate a number of multi-faceted aspects of problems involved in the development of a coal terminal. This project, because of its financial size and the number of participants involved, offered an opportunity to examine a wide range of issues. The important issues related primarily to the multi-participant decision making processes, the management structures, the institutional obstacles, and the resolution of diverse objectives among multiple participants.

The primary objective was to generalize about the ability of various management structures to facilitate decision making which could resolve technical and institutional problems.
To develop the generalizations, the following support objectives were included:

(a) To set the scenario for the development of the United States West Coast steam coal export trade.

(b) To analyze the competing port sites.

(c) To describe the joint venture management structure of the Long Beach project.

(d) To analyze how the decision making processes worked in relation to a number of problems.

(e) To illustrate the multi-dimensional aspect of a major transportation project.

(f) To examine a number of the institutional problems in detail.

B. THE MARKET

During 1980/81, the Pacific Rim countries of Japan, Taiwan, and Korea forecasted substantial increases in their requirements for thermal or steaming coal. This strategic energy resource would be used primarily to fuel electricity generation networks. Their plans called for stimulating the growth of the Australian, Canadian, and United States coal supply sources. This would enhance competition and assure a diversity of supply.
C. THE U.S. SOURCE

At the time of this renewed interest in steam coal by the Pacific Rim countries, the U.S. west coast steam coal production was in its infancy.

Exports originating in Utah, Colorado, and Wyoming were less than 2 million tons per year. With mine development and expansion programs in place, it appeared the U.S. western states would have the productive capability to satisfy the forecast short and medium term requirements of Pacific Rim buyers.

The principal railroads operating to the West Coast from the coal producing areas had been upgrading and increasing capacity for a number of years. They were anticipating the steam coal export expansion. There was excess capacity on most lines capable of handling anticipated volumes for at least 2-3 years without additional capital expenditures.

The missing component in the logistics system or "chain" was a modern, efficient, bulk handling facility on the U.S. west coast. Such a facility would need to be capable of receiving, handling, storing, and loading large volumes of export coal. A terminal of this type is a capital intensive undertaking with a financing horizon of 20-25 years. As this is the final link in the logistics system it is important that it interfaces with the other already existing modes. With the terminal charge as the smallest component of the delivered coal price and the project success dependent upon incremental investment by rail and mining sectors within 4
years, the development risks were substantial. The LBICP offered an excellent opportunity to see major management structures developed from the project inception. The LBICP developers had substantially different criteria to view the growth of the steam coal trade than management of other logistics system components with capital costs already sunk.

D. MULTI-PARTICIPANT JOINT VENTURES

Decision making in a joint venture is a complicated process. The LBICP example is an extreme case consisting of two interrelated joint ventures during the development phase. The two joint ventures had a common ultimate objective which was to develop the Port of Long Beach coal terminal. To allow for different decision criteria in the development phase, the two joint venture organizations separated the investor/operators from the promoter/sponsors. It was initially anticipated that different decision criteria would cause significant problems across these joint venture lines. This was the case. The magnitude of the institutional and organizational problems encouraged cooperation between the two joint ventures. It became obvious that the full and cooperative efforts of both joint venture managements would be required to complete the development phase and continue with implementation.

E. ORGANIZATIONAL ISSUES

Establishing a management framework was the foundation of the success of the development phase. The paper has discussed the committee framework
utilized by the partners and suggested a number of alternatives which may have worked more efficiently. The combination of highly technical transport problems, major institutional obstacles, and a multi-participant owner group became a major management challenge.

Some technical and institutional problems were handled by consultants which eased the decision making issues within the joint venture. The diversity of objectives within and between the two joint ventures became difficult for the committee framework to overcome. As the development phase proceeded, individuals and companies assumed roles which became a material part of the decision making process. The executive committee roles would be 'negotiator' or 'agitator' or 'too much detail' etc. Once the roles were established they were not changed. At a number of critical points in the decision-making process it was expected that role playing by particular individuals/companies would be critical to resolving the issue.

The diverse objectives stemmed from two major participant positions: (a) their view of the technical transport process, and (b) their associate business interests which could be expected to derive benefits from the construction and operation of the terminal. Positions taken on a number of issues could have indicated the lack of requirement for the terminal to stand on its own financially.

Despite a number of shortfalls, the committee structure worked reasonably well even with its cumbersome machinery. The composition of the various sub-committees added different personal interpretations to a particular
company's objectives. Although this situation could be expected, in this project the executive committee became embroiled in arbitrating operating committee differences. Its function should have been to make decisions based on clearly prescribed alternatives sourced at the operating committee level. Other organizational concepts discussed in the paper may have allowed the executive committee a better opportunity to function principally at a policy level.

F. INSTITUTIONAL PROBLEMS

Institutional obstacles presented a significant deterrent to the completion of the project development phase. The two areas highlighted in the paper were the aspects of environmental permitting and project finance. The ability of the project sponsors to overcome these institutional obstacles was principally a function of their willingness to contract outside consultants. The issues of environmental permitting, project financing, and government relations presented institutional barriers of a magnitude that the combined resources of the sponsor companies were unprepared to tackle.

Some of these institutional problems contained many unquantifiable unknowns. They were characterized as presenting the greatest risks to the project sponsors throughout the development, construction and implementation periods. Engineering costing data can be quantified with upside/downside sensitivities. Most of the project institutional issues do not lend themselves to definitive cost/risk comparisons. An example
could be the particulate emissions from the terminal sources. The final practical EPA and SCAQMD tests are made after the terminal is complete. It is possible the terminal emissions could exceed permissible standards, (due to inaccurate engineering or changes in the pollution standards). This could cause delays in final permitting subject to completing timely and expensive engineering/construction changes. There is no possibility of the engineering/permitting contractor/consultant guaranteeing the permitting. This risk lies solely with the participants.

G. BEHAVIORAL ASPECTS OF JOINT VENTURE MANAGEMENT

The ability of the project to proceed on schedule was not dependent on the technical solutions to the transportation problem. It became dependent on the organization's management structure and the evolving decision making processes. The roles of the key transportation experts became somewhat subordinated to the "generalists" within the participant group. Individuals who demonstrated an ability to assimilate the transport and non-transport aspects of the program emerged as the motivating force in continuing the development. Only a few of the members involved were able to truly see direction through the complex multiple issues.

A large joint venture such as the Long Beach project has distinct differences from a single large corporation. In the latter case, loyalties are usually directed towards objectives of the organization as indicated by incumbent management. With the Long Beach joint venture the group was trying to agree on the organizational structure and management
format which could best control/manage the multiple technical and institutional issues. Additionally, most organizations would have a degree of maturity by the time they would consider a 250 million dollar investment project. The Long Beach project lacked such organizational maturity as it accelerated into the development phase.

The chances of success in a new business venture are a function of the time spent pre-planning the organization structure and decision making framework. If more planning in these areas had been undertaken at the commencement of the coal terminal project, it is reasonable to anticipate that the committee structure would not have been used for the conceptual development phase. The approach would have likely been to appoint a project consultant (Bechtel, Fluor, etc) assigned the responsibility of presenting a comprehensive plan for a complete terminal including permitting and financing. Such a consultant, in my opinion, would be more capable of establishing a development team with proven project capabilities. The focus towards a "hands-on" management style by the partner companies was implemented prior to their full understanding of the major difficulties involved in completing the conceptual development phase of a major transport infrastructure project.

Once started in the committee organizational format, it is difficult to change. The management process then becomes reactionary as new unanticipated problems arise. Changes in designated operating committee membership were frequent. The continuity of the planning effort was less than may have been possible through a single consultant format. These
effects were mitigated by the adaptability, flexibility, and excellent business judgement of the partners' senior management.

Despite the management structure, institutional obstacles, diverse objectives, and complicated joint venture interrelationships the development phase progressed very nearly on schedule. This was primarily the result of two factors: (a) the members of the executive committee and joint coordinators were powerful individuals with excellent political abilities and business acumen. Their personal energy and management skills were used to ensure that the development program was completed on time, and (b) towards the end of the development phase, the steam coal market in the Pacific Rim countries softened considerably. The main objectives of the participants were shifted towards finalizing the engineering/environmental studies, stopping further expenditures, and getting the project in a holding pattern until the market improves.

H. THE PROJECT FUTURE

The precipitous fall in oil prices in late 1982 combined with excess oil supply has stemmed the tide of rising short-term interest in steam coal. Many of the major electrification projects in Japan, Korea, and Taiwan have been revised to use alternate fuels than coal. These plants will burn oil until the economics of steam coal again appear attractive. It is difficult to predict when steam coal will make its resurgence. It is now speculated that major thermal coal exports from the U.S. west coast will not begin until 1986-87.
The LBICP terminal project has completed the engineering design work and environmental permitting. It will likely remain dormant until a number of long-term throughput contracts can be generated. Such contracts would support the base financing and renew partner interest. The Port is presently handling the marketing of the potential terminal facility. One complication is that the environmental permits expire in two years if construction activity has not commenced. The permitting effort would need to be repeated, possibly facing more stringent regulations or new available technology. Institutional issues will present continuing problems for the developers even while the project is in a dormant stage.
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