# CHAPTER XI PORT MANAGEMENT AND OPERATIONS

## CHAPTER XI PORT MANAGEMENT AND OPERATIONS

## XI-1 Management and Operations

## (1) General

1) The main elements of port administration and operation systems are an appropriate form and structure of the port administrative body, efficient port operations, a sound financial system using modern accounting methods, a reasonable level of port dues, accurate port statistics, skillful promotion and publicity, development of the port city and of auxiliary commercial services, and regional cooperation with neighboring ports.

Port administration and operation systems vary greatly from country to country and from port to port. Furthermore, administration and operation systems at individual ports change over time in response to changing circumstances.

This chapter first describes the present conditions of the administration and operation systems and the current problems for the administration and operations at Valparaiso Port and San Antonio Port based on analyses of available data and field surveys.

Finally, considering these problems and the trends in worldwide maritime transportation, proposals to improve the administration and operation system for both ports are presented.

(2) Outline of the Governing Authorities for Ports in the Republic of Chile

As concerns the administration of ports in the Republic of Chile, there is no one organ which has overall responsibility or which plays the central administrative role. Port administrative authority and office work have been delegated to various systems and organs. The basic administrative framework is shown in Fig. XI-1-1.

•	Ministry of Transport	Decisions on policy, arrangement and
÷	and Telecommunication	control port of activities.
	(MTT)	The state of the s
ta e		Port administration and operations.
		EMPORCHI can also conduct improvement
	*EMPORCHI	and extension works of the ports under
•		the supervision of MOP (direction of
		port works)
. *	-Ministry of Public	Construction of port facilities
	Works (MOP)	conducted by the Government or under
		Covernment financing, supervision of
The T		construction of port facilities
President		conducted by private organs,
		maintenance of port facilities and
		dredging. (However, the maintenance
		costs of port facilities under the
		supervision of EMPORCHI are borne by
		EMPORCHI).
	Ministry of National Defe	nce, the Navy
	General Direction	Safety supervision of sea traffic, and
	of Maritime Territory	supervision of sea areas. Port police
	(DIRECTEMAR)	Safety of Port work.
	/ 2 m. 1 m. 4 m. 4 m. 1	Administration of the seacoast.
		remained tractor of one seacoast.
	Office of National	Fundamental adviser for national

<sup>\*</sup>Empresa Portuaria de Chile

Fig. XI-1-1 Basic Administrative Framework for Chilean Ports

The current Chilean port administrative system developed over time.

Due to the historical development, the present administrative system is quite complicated.

Different administrative bodies have been responsible for different aspects of cargo handling.

There are three main aspects of cargo handling:

- (1) Stowing and unstowing of cargo inside ship holds;
- ② Handling cargo from the hook to the transit sheds and warehouses;
  and
- (3) Management and control of the transit sheds and warehouses.

The historical development of port administration, including which bodies have been responsible for each of these aspects of cargo handling, is reviewed below.

Prior to 1960 Ports were administrated by the Department of Finance (Customs)

Cargo Handling: ① - Private labor hired by ships

② - S.E.P. (a department of the Customs General Board)

③ - Customs services

1960:

The customs department and the port department were separated. EMPORCHI was created to control port administration and operations. Port planning and construction were controlled by MOP.

Cargo Handling: ① - Private labor hired by ships

(2) (3) - EMPORCHI

1975:

MIT separated from MOP.

EMPORCHI placed under the control of MIT.

1981:

A new law (No. 18042) was passed to make port activities conform to the economic model adopted by the Government. However, this law has not been implemented.

Cargo Handling:  $\bigcirc \bigcirc \bigcirc$  - Private stevedore companies and EMPORCHI

(3) - EMPORCHI

In addition, safety supervision of the traffic on the sea and the supervision of sea areas is controlled by DIRECTEMAR, a department of the Ministry of National Defence, the Navy.

## (3) Characteristics and Organization of EMPORCHI

There are 68 ports of various sizes in the Republic of Chile.

These are classified as national ports, specialized ports, private ports and other ports. National ports are those ports which are crucial to the national economy, and they are controlled by EMPORCHI.

In 1960, EMPORCHI was created under Presidential Decree No. 290 as an autonomous public agency with the purpose of development, management and maintenance of the main public ports in Chile.

EMPORCHI is linked to the Government through the MIT and its head office is located at Valparaiso city. EMPORCHI manages Arica, Iquique, Antofagasta, Coquimbo, Valparaiso, San Antonio, Talcahuano, San Vicente, Puerto Montt, Chacabuco, and Punta Arenas ports.

It is stipulated in law No. 290 that at these main ports EMPORCHI is to receive or tranship goods loaded or unloaded within the port area and also to house the goods in transit sheds, open storage yards and other storage places, to watch over and store them and to deliver them to consignees.

EMPORCHI has the confidence of the President and is managed by the Director who has various duties and responsibilities as prescribed by law.

The director manages EMPORCHI with the assistance of the subdirector, the chiefs of bureaus and divisions and other persons nominated by the Director. The Director has the following authority, subject to the approval of the President.

- ① To charge for the services offered by EMPORCHI.
- 2 To lease port facilities for periods up to ten years.
- 3 To determine the sea and land areas where EMPORCHI works.
- ① To enter into loan agreements with entities outside the country as prescribed by law.
- (5) To issue debentures

A organizational chart of EMPORCHI is presented as Fig. XI-1-2 and Fig. XI-1-3 is an organizational chart of Valparaiso Port and San Antonio Port.

The number of EMPORCHI staff is about 1,470 persons as of 1986.

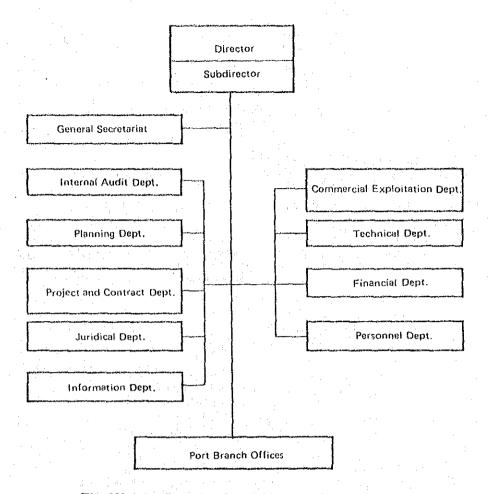


Fig. XI-1-2 Organizational Chart of EMPORCHI

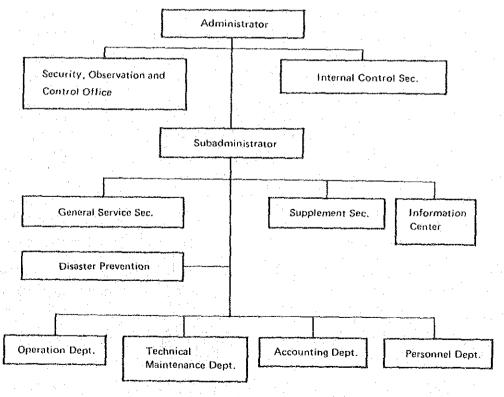


Fig. XI-1-3 Organizational Chart of Valparaiso Port and San Antonio Port

### (4) Financial Status of EMPORCHI

A review of EMPORCHI's financial statements for the last 5 years reveals that the status of EMPORCHI's financial affairs is as follows.

#### 1) Income and Expenditure

Table XI-1-1 shows the changes in EMPORCHI's profit and loss account for the last 5 years. As inflation accounting is widely used in Chile, figures for each year in the table are expressed in 1984 prices, adjustment based on the ratio of consumer price increases over the previous year.

Table XI-1-1 Profit and Loss Account

(Unit: thousand pesos)

	180	'81	82	83	'84
Operating Income	5,347,088	5,581,453	4,668,476	3,404,932	4,247,847
Operating expenses	4,324,575	3,308,013	2,161,857	2,042,035	1,922,600
Administrative expenses	932,724	766,824	712,995	604,941	616,490
Operating profit	89,789	1,506,616	1,793,624	757,956	1,708 757
Non-operating income and expenditure	86,957	292,401	-656	-942,631	-471,674
Profit before taxes	176,746	1,799,017	1,792,968	-184,675	1,237,083
Income tax	75,904	774,025	752,247		528,088
Profit after taxes	100,842	1,024,992	1,040,721	-184,675	708,995
(Inflation adjust- mentment ratio)	11.1%	20.0%	23.7%	22.2%	

Reference to this table shows that the figures for operating revenue in 1982 and 1983 are both substantially lower than those of previous years. Figures in 1984 are an increase over 1983 results. However, this increase did not reach 1982 levels.

A total annual volume of 8 million tons of cargo was handled by EMPORCHI consistently throughout the period from 1980 through 1983 leading to the conjecture that some changes must have been made to either the fees or the contents of port services. Further analysis is needed on this point.

Operating expenses during the past 5 years show consistent downward trends. The ratio of operating expenses to operating income for 1980 was 80.9%. EMPORCHI's operating expenses decreased by 1984 mainly because most of port operations (in the four main ports) were carried out by the private sector. In fact, the only part of port operations carried out by EMPORCHI were storage and part of porteo second phase.

Sales loss of assets and adjustment of owned capital as indicated by the Board of Audit are included in non-operating income and expenditure. For 1983 and 1984 respectively, of the -942,631 thousand pesos and -471,674 thousand pesos for non-operating income and expenditure, adjustment of owned capital included in these figures is 834,372 thousand pesos for 1983 and 673,955 thousand pesos for 1984.

Although EMPORCHI is a legally established public enterprise, it does not qualify for tax exemption for income received. EMPORCHI pays income tax in the same way as does a private corporation. In addition, it is decreed by the Minister of Finance that portions of excess profits be contributed to the national treasury. The balance sheets show that a contribution has been duly paid by EMPORCHI.

## 2) Breakdown of Operating Income

The main source of EMPORCHI's operating income derives from the following fees & service items: moorage fees, cargo handling fees, portage fees, storage/freight collection fees, transit fees, other service fees, license fees and miscellaneous revenue.

Figures for total operating revenue and shares for itemized revenue are shown in Table XI-1-2. These figures were obtained from INFORME RESULTADOS ECONOMICOS, EMPORCHI's internal document.

Table XI-1-2 Operating Income

(Unit: thousand pesos)

. <del></del>	1982		198:	3	1984	ł
	Value	Share (%)	Value	Share (%)	Value	Share (%)
Moorage fee	963,788	20.6	916,467	26.9	1,179,809	27.8
Cargo handling fee	1,673,077	35.9	1,403,628	41.2	1,657,665	39.0
Portage fee	116,271	2.5	111,019	3.3	125,903	3.0
Storage/freight collection fee	1,051,354	22.5	427,426	12.6	664,972	15.6
Transit fee	154,435	3.3	123,152	3.6	126,031	3.0
Other services	298,604	6.4	276,539	8.1	361,626	8.5
License fee	144,400	3.1	97,516	2.9	124,667	2.9
Miscellaneous revenue	266,546	5.7	49,184	1.4	7,174	0.2
Total	4,668,475	100.0	3,404,931	100.0	4,247,847	100.0

Looking at these figures, it can be seen that under the heading of operating income, moorage fees, cargo handling fees and storage/freight collection fees are major items. Together these items comprise about 80% of total operating revenue each year. Although there have been no major changes in the area of moorage fees and cargo handling fees during the past 3 years, storage/freight collection fees display a sharp decrease as a share of revenue after 1982.

## 3) Operating Income for Various Chilean Ports

EMPORCHI's 1983 and 1984 data from INFORM RESULTADOS ECONOMICOS include specific figures for operating revenue and the volume of cargo handled by EMPORCHI's 10 ports and the per tonnage cargo handling fee at each port. These figures are reproduced below.

Table XI-1-3 Operating Income for EMPORCHI Ports

	1983		198	4
	Value* (thousand pesos)	Share (%)	Value* (thousand pesos)	Share (%)
Antofagasta	654,196	19.2	894,689	21.1
Valparaiso	933,296	27.4	1,038,629	24.5
San Antonio	750,045	20.7	920,6167	21.7
Talcahuano-San Vicente	557,588	16.4	624,653	14.7
6 other ports	554,806	16.3	769,260	18.0
Total	3,404,931	100.0	4,247,847	100.0

Note: In terms of 1984 prices.

The four ports of Antofagasta, Valparaiso, San Antonio and Talcahuano hold an 80% share in both the total operating revenue and the total cargo tonnage handled at all ten EMPORCHI ports.

Table XI-1-4 shows the share of cargo volume handled at the EMPORCHI ports.

Table XI-1-4 Volume of Cargo Handled by EMPORCHI Ports

	19	83	1984		
	Volume (tons)	Share (%)	Volume (tons)	Share (%)	
Antofagasta	1,345,993	16.2	1,728,104	18.8	
Valparaiso	1,537,521	18.5	1,664,730	18.1	
San Antonio	2,216,014	26.7	2,343,332	25.5	
Talcahuano-San	1,821,539	21.9	1,858,478	20.2	
Vicente 6 other ports	1,381,097	16.7	1,587,186	17.4	
Total	8,302,164	100.0	9,181,830	100.0	

Reference to Table XI-1-3 and XI-1-4 shows that although the Port of Valparaiso does not handled the greatest volume of cargo, it does generate the highest operating income of all the EMPORCHI ports. The Port of San Antonio, on the other hand, handles the greatest volume of cargo, but in terms of operating income it is placed after Valparaiso. This is attributable to the fact that the share of different cargoes handled at each port differs.

Income received per ton of cargo handled at the main Chilean ports, and the average value of these figures can be seen in Table XI-1-5. Together with the Port of Talcahuano, the income received per ton of cargo handled by the Port of San Antonio is below the average value for all EMPORCHI ports.

Table XI-1-5 Income per ton of Cargo Handled

(Unit: peso)

Port	1983	1984
Antofagasta	486	518
Valparaiso	607	624
San Antonio	318	393
Talcahuano-San Vicente	306	336
6 other ports	402	485
Average	410	463

#### 4) Fixed Assets and Annual Capital Investment

Reference to a detailed statement of fixed assets, which is appended to EMPORCHI's 1984 Financial Statement, shows that EMPORCHI retained the following fixed assets on 31 December, 1984. Total fixed assets before deduction of accumulated depreciation stood at 34,384 million pesos, and after deduction at 29,077 million pesos.

Roughly 73% of this figure, 21,199 million pesos, can be attributed to expenditure on breakwater structures, wharves and infrastructures. The remainder is related to expenditure on land, warehouses, buildings, cranes and other machinery and equipment.

The distribution of the above-mentioned fixed assets at each of the various EMPORCHI ports can be seen in Table XI-1-6. The total number of berths for all 10 ports is 52. The average balance of fixed assets perberth is evaluated at roughly 640 million pesos.

Table XI-1-6 Fixed Assets

(Unit: million pesos)

	and the state of t
Port	Balance of Fixed Assets*
Arica	4,328
Iquique	2,934
Antofagasta	5,926
Coquimbo	831
Valparaiso	6,490
San Antonio	5,899
Talcahuano-San Vicente	4,415
Puerto Montt	1,642
Chacabuco	241
Punta Arenas	572
Total	33,278

Note: After deduction of accumulated depreciation

Reference to the Statements of Sources and Uses of Funds in EMPORCHI's 1983 and 1984 Financial Statements shows that for the three years starting in 1982, the amount of capital investment (based on 1984 prices) was 438, 228 and 502 million pesos, respectively.

A large part of annual capital investment expenditure is aimed at the renewal of existing facilities. The remaining amount would not even cover the cost of constructing one new berth.

# XI-2 Present Activities at Valparaiso Port and San Antonio Port

Valparaiso Port and San Antonio Port have different characteristics, judging from the kind and income received per ton of cargo handled at the ports.

Valparaiso Port is a historic port, and about 500 thousand people live in the immediate hinterland. There is a substantial accumulation of commerce, government organizations and port-related enterprises at Valparaiso.

## (1) The Role of the Public and Private Sectors at the Ports.

Law No. 18042 created a National Port Committee to establish a new semi-governmental, self-supporting port corporation to take the place of EMPORCHI. However, this law has not been implemented because some authorities concerned, including EMPORCHI, have stated their opposition to the law. For some years, cargo handling operations at the subject ports have been changing. The private sector has been able to participate in cargo handling operations at the ports of Valparaiso and San Antonio since 1982. At present, the private sector conducts all cargo handling operations at San Antonio Port. Only the operation of the transit sheds at Valparaiso Port is currently conducted by EMPORCHI. Thus, the private sector now plays the dominant role in cargo handling at the ports.

Table XI-2-1 outlines the roles of the private and public sectors at the ports as concerns the flow of cargo and vessels.

Table XI-2-1 Outline of Port Activities for Ship and Cargo Flow

garing a dang makang dangkan labar dalah dan	Name of Sector	Contents of activities	Appro- aching Undo- cking	Berth- ing (ship)	Apron	Transit shed	To and from transit shed	Remarks
rublic	Customs	Inspection	0					
		Customs procedure		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		0		This is conducted even outside transit shed
	*1 S.A.G.	Quarantine			(	)		Export of fruits
	Directemar	Entrance notice Clearance notice	0	0			. :	
		Navigation control	0					
		Pilotage	0					
	EMPORCHI	Berth designation	$\circ$					
		Management of berths		0				
* .		Management of transit sheds				0		
		Cargo handling and storage				0		Only Valparaise Port
		Oil supply, Water supply		0				
Private	*2 Stevedore	Cargo handling		0	0	. 0	0	
	companies	Storage				10		
	Stevedore							
	companies	Tugboats	0					Valparaiso Port has 6 tugboats from 670 HP to 3,200 HP.
		Line handling		0				
	Shipping agents, Customs clear- ance agents	Tally and weighing		0	0	0		Conduct between three places.
:	ance agents	Vicarious execution of customs clearance	1 1 1			0		

o mark shows the stage and location where the activity is mainly performed.

<sup>\*1:</sup> Serviceio Agrico Gauadero (in charge of vegetable sanitation).

<sup>\*2:</sup> Saam, Agunsa and Ulutramar are the main stevedore companies

#### (2) Operations

#### 1) Working Hours

Port working hours and pilotage hours are 24 hours a day. There are no restrictions on night navigation.

Office hours of EMPORCHI are as follows:

Ship control : Daily, first shift: 8:00 - 15:30

second shift: 15:30 - 23:00

third shift: 23:00 - 6:30

Operational : Daily : 8:00 - 15:30

15:30 - 23:00

Administrative : Monday - Friday: 8:00 - 17:15

#### 2) Cargo Handling Operations

An outline of the main cargo handling operations at the subject ports is presented below.

#### (i) San Antonio Port

Imported wheat is discharged directly from ships to trains and trucks on the quaywall apron using pneumatic unloader with a hopper and a glove bucket. Exported copper is loaded onto ships using a glove bucket and pallets after being stocked in open storage areas and warehouses.

#### (ii) Valparaiso Port

Fruit for export is discharged directly from trucks on the quaywall apron onto ships using pallets.

Containers are handled using ship cranes and a level-luffing multipurpose crane (This is owned by the private sector). The container handling area is divided into two distinct areas: the loading yard and the unloading yard. All the container loading is conducted by private firms, all the way from the loading area to on board the ship. As for unloading, however, private firms can presently only carry the containers from on board the ship to the

edge of the unloading yard. Handling of containers within the unloading yard is carried out by EMPORCHI.

#### Formation of gangs and average cargo handling rate 3)

Handling of break-bulk cargo is generally conducted by two or three gangs, with an average of 12 longshoremen in each gang, that is 1 tally man, 1 foreman, 1 signalman, 1 winch man, 1 forklift truck operator and 7 stevedores, using ship cranes and/or cargo handling equipment which is provided by EMPORCHI and the private sector. Average cargo volume handled per gang per hour is as follows:

(i) Break bulk cargo	13 - 15 tons/hr
② Container cargo (conventional	ships) 5 boxes/hr

(container ships)

15 boxes/hr

2,400 boxes/hr(about 30 tons/hr) (3) Fruit cargo

90 tons/hr (4) Copper cargo 90 tons/hr

## (3) Administrative and Operational Problems

(5) Wheat cargo

The following analysis of present administrative and operational problems which impede the smooth flow of port cargoes, including organizational problems, is based on site surveys, analysis of data, and interviews with port officials and port users. The problems fall into two main categories, as follows:

## Problems Concerning the Institutional Structure

## (i) About law No. 18042

- o As law No. 18042 has been passed but not implemented, the legal status of the port administration is not clear.
- o If the ports administration and operations fall into private hands, the port in Chile may be monopolzed by a strong private sector as these ports are relatively small compared with the ports in Europe and America.

- o This law seems to have been issued without sufficient prior research.
- (ii) Separate management bodies are responsible for the sea areas and the land areas of the ports. This impedes comprehensive port administration.
- (iii) The port administration and operations are very complicated because there are many organs involved including EMPORCHI, the Navy, MOP, MIT and the Office of National Planning, and there is no one organ responsible for the overall management of the ports.
  - (iv) According to the customs regulations, carriers must deliver cargo to EMPORCHI within 24 hours of the ship's departure in the case of unloading. The C.F.S. facilities are inadequate and is not easy to carry out this operation as there is a large volume of L.C.L. each day. Furthermore, there are many customs regulations for the inspection of import goods and so on.
    - (v) Office procedures concerned with cargo handling are complicated and the customs and S.A.G. examinations are not coordinated.
  - (vi) Most of the cargo handling at the ports is now operated by the private sector, but this is still partially limited. Private firms would like to operate all cargo handling at the ports.
- (vii) In the past, all firms paying \$240 (U.S.) to DIRECTEMAR were permitted to engage in cargo nandling operations. Current cargo handling charges are somewhat confused. As a law was passed in December 1985 requiring licensing of all stevedore companies, the private sector expects that cargo handling operations will be performed effectively.
- (viii) As the stevedore wage system has changed from piece work, so much per ton of a given commodity, to time payment, so much per man per shift, there is no longer any economic incentive to promote efficiency.

- 2) Problems Concerning Infrastructures and Equipment
  - (i) S.A.G. control is carried out before the loaded trucks come alongside the ship, and this regulates the flow of cargoes to be shipped. The quaywall apron on which the palletized fruit is placed is a little too narrow for efficient cargo handling. As there are no refrigerated transit sheds or warehouses, the trucks and ships are forced to wait.
  - (ii) Though the private sector wants to use a large transfer crane on the apron at Valparaiso Port, EMPORCHI has not yet granted the requisite permission. Also, the area where the top lifter for containers is operated is too small.
  - (iii) There is a shortage of large handling equipment including equipment to handle containers, and the container yard is too small.
    - (iv) Berth use is not properly specialized.
      - (v) Dredging is sometimes performed to maintain the depth of the berths. However, the maintenance dredging is not being performed adequately. The berths are not being dredged uniformly to a sufficient depth, and this impedes the use of the berths by large vessels.
    - (vi) Fruit cargo trucks on the road to Valparaiso Port are sometimes forced to run at night because the roads are crowded in the summer season. As existing roads in Valparaiso city are narrow, new access roads which do not pass through urban districts are needed. On the other hand, parts of the roads to San Antonio Port are not wide enough, and many of the roads from the fifth and sixth regions are not paved.
  - (vii) The railway facilities are old and the trains occasionally derail. Cargo handling is inefficient because it sometimes takes about one week for trains to shuttle between Santiago and the ports.

(viii) There do not seem to be sufficient facilities, systematic training and drilling to respond to earthquakes and fires.

#### XI-3 Proposals

## (1) Proposals for Management and Operations

Considering the current problems at the port based upon site surveys and analysis of data, various proposals are presented below to improve the port administration and operations in the future. The analysis is limited to the main problems at the ports.

#### 1) Form of Port Management

As mentioned at the beginning of this chapter, port administration and operation systems vary greatly from country to country and from port to port.

The following are the main types of port administrative systems.

- 1) The central government administers the ports directly.
- ② The ports are administered directly by the local government.
- 3 The ports are administered by an independent public agency.

In the case of Japan, historically ports developed rapidly using national funds based on a national policy to promote international trade for economic growth. At present, Japanese ports are generally administered by system ② above, that is they are administered directly by local (city or provincial) government bodies.

The ports in Chile have been classified as national ports, specialized ports, private ports and other ports. Thus, in Chile a progressive port administrative form has already been established. As mentioned before, a law which place those national ports which are presently administered by EMPORCHI under the control of the private sector was passed in 1981. However, this law has not been implemented. Placing these ports under private administration would bring quick changes to the present port administration and operations systems. When deciding the best form for port administration in Chile, the following aspects have to be considered.

- (1) The historic background of port development in Chile.
- ② The ports currently administered by EMPORCHI are relatively small compared with the ports in Europe and America, and there are many large and small traders who make use of the ports.
- (3) The cargoes which are being handled at these ports include a wide variety of public cargoes.
- (4) The main ports which are important to the national economy should probably be administered by an independent public body under the supervision of the central government.
- (5) The private sector now plays the dominant role in cargo handling at the ports (Valparaiso and San Antonio Ports), and cargo handling efficiency seems to be pretty good.

Overall, we conclude that in Chile it seems preferable that at present the main national ports continue to be administered by a public government agency like the current EMPORCHI (not EMPORCHI as defined in Decree No. 290), although these ports may possibly be placed under private administration at some time in the future.

## 2) Form of Port Opertations

Cargo unloading operations can be divided into four parts as follows:

- () Cargo handling within ships' holds
- ② Unloading cargoes from ships to the quaywall apron
- (3) Transporting cargoes from the quaywall apron to the storage yard
- 4 Delivery of cargoes from the storage yard to trucks and trains.

Similarly, loading cargoes onto vessels involves the same 4 steps (in reverse). Efficient cargo handling operations are crucial to the overall smooth functioning of each port.

Another important aspect of port administration and operations is whether these cargo handling operations are carried out by the administrative body itself or by the private sector. There are advantages and disadvantages to both systems.

If the port administrative body is directly responsible for cargo handling operations, the handling operations will tend to be unified and orderly. However, when cargo handling operations are carried out by the administrative body directly, there is no free competition and this could result in less efficient operations. Furthermore, the administrative body may tend to attempt to increase overall revenues by applying a relatively expensive tariff for cargo handling. Finally, as the administrative body is a public organization, there may be certain limitations in its charter which would restrict the scope of its operations.

On the other hand, if the cargo handling operations are carried out by the private sector, there would probably be no major limitations on the operations which the private firms could engage in. The main advantage of private sector operations is free competition which tends to result in more efficient cargo handling and less cargo damage.

On the whole, it seems that cargo handling operations are probably best left to the private sector. As mentioned above, the private sector already plays an active role in port operations in Chile.

Of course, the port administrative body would still retain the overall administrative control of the cargo handling works as at present, but it would be better for the private sector to carry out the actual cargo handling works.

#### 3) Control of the Entire Port Area

For smooth port operations, it is essential that one body (the port administrative body) retain primary administrative control over all the major port operations including the management of the flow of vessels and cargoes, pilotage operations and port maintenance. Ideally, one body should be responsible for all the wharves, sea areas and on-land facilities. Especially, if the port management body does not have control over all the undeveloped areas within the port, it is virtually impossible to design efficient plans for future port expansion.

Naturally, there are certain operations such as customs, health inspection, navigation control and so on which must be executed by the local representatives of various ministries and departments of the central government.

Concerning these special operations, the port administrative body must still take the responsibility to ensure close cooperation among the related

agencies. Essentially, the administrative body is responsible for the smooth flow of information, for proper scheduling and for allocating space as necessary.

The central point is that for smooth port operations, the entire port including both sea and land areas must be considered as an organic whole. Dividing the management of the port up into separate sections is generally inefficient: it tends to hinder both regular port operations and port development projects.

In Chile, the administration of main national ports is currently undertaken by two bodies: EMPORCHI and the Chilean Navy. The Navy is responsible for sea areas, and EMPORCHI is responsible for all other port activities. As noted above, this situation may not be ideal.

For national security, the Navy may have to retain control over certain sea areas nearby major ports. However, if possible, EMPORCHI should be given some control over the sea areas. Specifically, EMPORCHI should be given administrative responsibility for the following sea areas:

- (i) Water areas used for the construction and maintenance of port facilities.
- (2) Water areas where the weather and sea conditions directly influence port operations.
- (3) Water areas where navigation, anchorage, handling and other operations related to the port are conducted frequently.
- (4) Water areas where flotage which may interfere with safe navigation needs to be cleaned to ensure smooth port operations, and other areas which need to be administered to prevent pollution at the port.
- (5) Areas related to reclamation and dredging works in and around the port.

Thus, in general, the port administrative body should be responsible for all the water areas in the Immediate vicinity of the port and for the major shipping lanes leading into the port.

#### 4) The Importance of Port Statistics

Accurate port statistics are essential for both regular port operations and long-term port planning. Statistics concerning ship traffic and cargo handling volume are particularly important.

Without accurate statistics, it is impossible to know the actual state of operations at the port. Of course, some statistics are being kept, but the following items should be recorded accurately to facilitate efficient port operations and good long-term planning.

- ① Entrance ship ----- by month and tonnage class
   by year and tonnage class
   by route and tonnage class
- ② Entrance and ----- by item and kind\*
  exit cargoes by liner route and kind
  by destination and origin\*

\*Note: Ideally, these classifications should be quite precise. If the classified groups are too large or vague, the statistics are of limited value.

by container vessel route
by containerized cargo route and kind

- ③ Handling conditions-- by facilities of the mother ship
- 5) Improvement of Relations with Persons and Organizations Concerned with Port Activities

To promote port activities, the port administration body should keep close contacts with governmental officials, local entrepreneurs, transportation companies, local inhabitants, and other individuals and groups concerned with the activities of the port.

Periodic meetings should be held with all the parties concerned. This will make the port more responsive to the needs of its users, and help promote the growth of the port.

#### 6) Maintenance

A reduction in the number of handling machines due to mechanical troubles will directly reduce working capacity, resulting in lower efficiency of overall operating work. Thus, maintenance and repair work must be sufficient. In particular, inspection and maintenance work for preventing trouble in advance should be conducted: maintenance inspections should take place regularly. For this purpose, it is necessary to maintain a sufficient mechanical staff, to establish a training program, to ensure proper supplies and to arrange facilities for the orderly storage of mechanical parts.

## 7) Introduction of a Computer System for the Administration of the ports

The bigger Japanese ports each control a large variety and number of port infrastructures and equipment such as wharves, transit sheds, and cargo handling machinery. In order to efficiently administer these large-scale ports, computers are widely used. Through the computers, the port managers have access to a large volume of timely data which they can use for making decisions concerning the flow of vessels and cargo. This results in more efficient use of the port facilities and better service for port users.

In Chile, along with the futrure growth of cargo throughput, it may also be appropriate to introduce a computer system to help with the administration of the ports. To give a rough idea of the ways in which such a system might be used, below is an outline of the main ways in which computers are currently used at major Japanese ports.

- (1) To control the entrance and exit of vessels

  The computer system is used to record data concerning the movement of vessels and to prepare berthing schedule based on information supplied by shipping companies or agents.
- (2) To control the use of public facilities

  Based on data supplied by shipping companies and timely data on
  current and planned conditions, the computer is used to produce
  schedules for the use of various public facilities including
  transit sheds and cargo handling yards.

- (3) To collect port tariffs

  The computer is used to compute charges, print bills, and generally keep track of accounts receivable and income from port tariffs.
- (4) To record statistical data

  The computer can be used to keep track of the historical flow of cargo and vessels and of other statistical data which, as noted above, is necessary for proper port operations and planning.

## (2) Proposed Operating System

Judging from the site surveys and the analysis of data from both of the ports, the cargo handling system for general cargoes and bulk cargoes like wheat and copper is already mechanized, and the handling efficiency seems to be relatively good. The average cargo volume handled per gang per hour in Chile (actual and future) and in Japan are shown in Table XI-3-1.

However, the container cargo volume in Chile is currently small and the related port facilities such as container yards, gantry cranes and C.F.S. are not sufficient. In the future, the throughput of containerized cargoes will increase substantially and an improved handling system for containers like the one proposed below will have to be implemented.

Finally, the necessity of a refrigerated transit shed for exported fruit is considered.

Table XI-3-1 Average Cargo Volume Handled per Gang per Hour

L	Type of Cargo		Chile	Japan	
		Actual	eaning	Actual	Remarks
L		13 - 15 c	- 50 ¢	20€	
	General Cargo	Wharf crane or ship gear	Mobile crane or ship gear	Mobile crane or ship gear	
L		12 - 15 boxes	25 boxes	25 boxes	
<u></u>	Container	Container gantry crane, 50 t mobile crane	Container gantry crane	Container gantry crane	
<del></del> -	\$	30 t	90 t	(*1)	(%1)
	whea t	Pneumatic unloader, ship gear	Pneumatic unloader, ship gear		This varies depending on the efficiency of the pneumatic unloader (handling volume/unit time)
	f	30 t	30 с	(*2)55 t	(*2)
	21024	Wharf crane, ship gear	Mobile crane, ship gear	Wharf crane, ship gear	ship quaywall apron refrigerated transit shed
1		3 06	90 t	(*3) 65 - 115 t	(*3)
	Copper	Wharf crane, ship gear	Mobile crane, ship gear	Wharf and mobile cranes, ship gear	loading and unloading of steel

Note: The figures given in the table are in metric tons (t)

## 1) Container Cargo Operations

## (i) Administrative structure

To accommodate a large number of containers and full container ships, the best management of container terminals is performed by a single organization which has enough skillful officers and workers to be able to supply full service to customers (shipping companies, shippers/consignees) from receiving containers to loading them onboard ship, or from discharging containers to delivery to the consignee.

There are two main ways to administer container terminals. Basically, the terminals can function as public terminals or as specialized terminals. Specialized terminals are basically terminals for the exclusive use of a firm or group of firms. In this case the shipping companies or terminal operators lease the terminal (the wharves, handling yards, etc.) from the port management body for a set period of time (usually 10-30 years), and then use the terminal facilities without paying any additional tariff beyond the leasing fee. At specialized terminals, the companies thus have the advantage of using the terminal without any incremental charges, and they may tend to maximize cargo handling efficiency as they directly realize all the benefits of the improved efficiency.

The specialized terminal system gives the shipping companies a great deal of freedom to choose the type of handling system and administrative system which they will use at the terminal. On the whole, this system is advantageous when one company handles a large volume of container cargoes. On the other hand, if the company only handles a small volume of containers, the leasing costs are generally prohibitive.

Under the public terminal system, the terminal facilities are usually managed directly by the port management body. The terminal is used on a public basis by all shipping companies, and the companies pay tariffs to the administrative body for the use of wharves, yards, etc.

In the case of Chile:

- (1) The number of container berths is small;
- ② There are a large number of shipping companies which use the existing facilities at both of the ports; and
- 3 Containerization is still in its first stage with a relatively small volume of containerized cargo.

Thus, it would seem that the public terminal system would be preferable for the administration of the container terminal at the ports.

At any rate, the port management body should consult with present and future users of the terminal facilities (shipping companies, etc.) when determining the proper administrative system for the container terminals.

## (ii) Operation of Container Terminals

Efficiency of operation and quality of the terminal service are governed by the selection of the container handling method and the kinds and numbers of equipment assembled at the container terminal.

Container handling methods in general use are classified by the handling equipment used such as the chassis system, the straddle carrier system and the transfer crane system. In the chassis system, each container is placed on a chassis and stored in the container yard. In the two other systems, containers are stacked in the container yard in layers, 3 layers maximum using a straddle carrier and normally 5 layers using a transfer crane, which facilities the efficient use of the land area.

There are some other stacking machines for containers such as forklifts and side loaders (side forklifts), but they are mostly used as auxiliary equipment for terminal container handling.

The chassis system has the best handling efficiency among the three systems and results in the least damage to containers as the actual handling is kept to a minimum. There is no need to pave the yard heavily under this system. However, this system requires a large terminal land area, a large number of chassis and high

initial investment since the containers are stored in a single layer.

In contrast, the straddle carrier system can make good use of limited space because the containers are stacked in the storage area. However, since the wheel load of the straddle carrier is about ten tons and the carrier runs all over the yard, the entire terminal area has to be paved heavily, requiring an additional investment.

The transfer crane system has the highest storage capacity of the three systems. The running cost including maintenance is cheaper than for the straddle carrier system. However, the service areas (spots for receiving and delivering containers) are not fixed, and when delivering containers, more time is required than under the other systems because of the multi-stage shipment.

The selection of the best operation system for each container terminal has to be performed carefully considering the geographical conditions of the terminal as well as the flow of vessels and container cargoes. Each of the three main systems has advantages and disadvantages.

At the subject ports, there is a relatively large volume of L.C.L. cargoes and empty containers, and considering the available land area, the storage capacity, the estimated cargo throughput and other relevant factors, it seems that the transfer crane system would be most appropriate for the subject ports. Especially, there are relatively few mechanical difficulties under the transfer crane system.

(iii) Construction of Container Terminals and Container Handling Equipment

Construction of container terminals is divided into two parts:

1) the public works such as the preparation of the wharves (including gantry cranes), the reclamation of land and the pavement of yards, and 2) the works related to port operations such as the preparation of cargo handling equipment, etc. It is proposed that EMPORCHI should provide the necessary minimum facilities, that is the public works, and that the users should provide the necessary handling equipment for port operations themselves.

Various kinds of container handling equipment must be combined functionally in order to effectively carry out the terminal work of loading/unloading, storing and receiving/delivering a large number of containers. The kinds and numbers of equipment must be selected and determined in consideration of the specifications, working efficiency and capacity of each piece of equipment.

The average quantities of required main equipment are shown in Table XI-3-2 based on the conditions at terminals using the transfer crane system in Japan.

Table X1-3-2 Cargo Handling Equipment for Container Cargo per Berth

Equipment	Capacity	Number of Machines
Container Gantry Cranes	30.5 t	2
Transfer Cranes	30.5 t	5
Container Chassis	20', 40'	12 - 18
Trailer Head		6

## (iv) Management of the Terminal

The number and functions of workers which will be required to effectively perform the container terminal operations depends on various factors such as regulations related to labor, employment agreements between laborers and employers, and work schedules as well as the ability of each worker at the ports in Chile. It is difficult to predict the number and type of workers required. The roles of workers in container terminals in Japan are described below for reference.

## (1) Operations management department

Ship planner: Preparation and

Preparation and execution of ship

loading/unloading plan

Yard planner: Preparation and execution of container

yard plan

Radio operator:

Communicating and giving instructions for work to be performed to drivers of container handling equipment in accordance with the containers yard plan and the ship plan.

Gate clerk:

Receiving and delivering of containers at the gate and necessary documentation work.

Documentation/accounting clerk:

Preparation and issuing of necessary documents, and receiving of payment for work done.

Maintenance engineer:

Inspection, maintenance and repair of containers and handling equipment

② Operations department Operators of container cranes, transfer cranes, yard tractors, etc.

Gage checker:

Inspection of containers upon receiving

or delivery at the gate

Worker on ship:

Lashing and unlashing of containers on ship

③ Container freight station (CFS) department

Clerk:

Preparating and issuing documents for cargo receiving and delivery, and preparation of plans for loading cargo into containers.

Worker and forklift operator:

Stuffing/unstuffing cargo to/from containers, and receiving cargo from and delivering cargo to trucks.

Tallying man:

Tallying and checking during cargo stuffing and unstuffing and during cargo receiving and delivery.

## 2) Fruit Cargo Operations

The flow of exported fruit cargo as now conducted at the ports is as follows.

Control by S.A.G. --- Transportation to quaywall apron by trucks --Discharging directly from trucks to ships.

In the case of direct delivery systems like this, S.A.G. control may interfere with the smooth cargo flow, and the direct delivery method does not provide efficient cargo handling since the buffer function of transit sheds is not effectively utilized.

If transit sheds are provided with appropriate refrigeration equipment, the following benefits may be expected:

- () Improved handling efficiency
- (2) Ships can load and unload cargo smoothly without waiting
- ③ Since the trucks which carry fruit cargo will not concentrate at the ports at one time, traffic congestion on the access road will ease up.
- ① The time the trucks remain in the ports will decrease.
- (5) S.A.G. control will not directly interfere with the smooth cargo flow.

Below, we attempt to roughly estimate the appropriate storage tariff for the refrigerated transit shed.

- (i) Rough Estimation of the Refrigerated Transit Shed Tariff
- i) Fruit Cargo Refrigerated Transit Shed
  In 2010, the volume of fruit cargoes at the port of Valparaiso is
  597 thousand tons and the volume of cargoes passing through
  transit sheds is 298 thousand tons, about half of the 597 thousand
  tons total. Fruit cargoes are mainly handled during half the year
  from November to May.

The necessary area of transit sheds is determined by the following formula:

$$\Lambda = \frac{N}{R\alpha W}$$

A: Necessary area of transit sheds  $(m^2)$ 

N: Annual volume of cargoes handled: 298 thousand tons

a: Utilization rate: 0.6

R: Turnover of transit sheds: 24 times a year

W: Volume of cargoes per unit area: 1 t/m<sup>2</sup>

Table XI-3-3 shows the necessary size of the transit sheds.

Table XI-3-3 Required Area of Transit Sheds

Volume of	Annual storage	Required area
cargo handled N (thousand tons)	volume RaW (tons/m <sup>2</sup> )	N/Raw (m <sup>2</sup> )
298	14.4	20,000

## ii) Estimation

The transit sheds will be two storey reinforced concrete buildings constructed on  $10,000~\text{m}^2$  lots. The construction costs are estimated as follows.

① Transit shed	3,430,000	thousand pesos
② Electric equipment	2,920,000	
③ Refrigeration equipment	2,040,000	
<u>Total</u>	8,390,000	

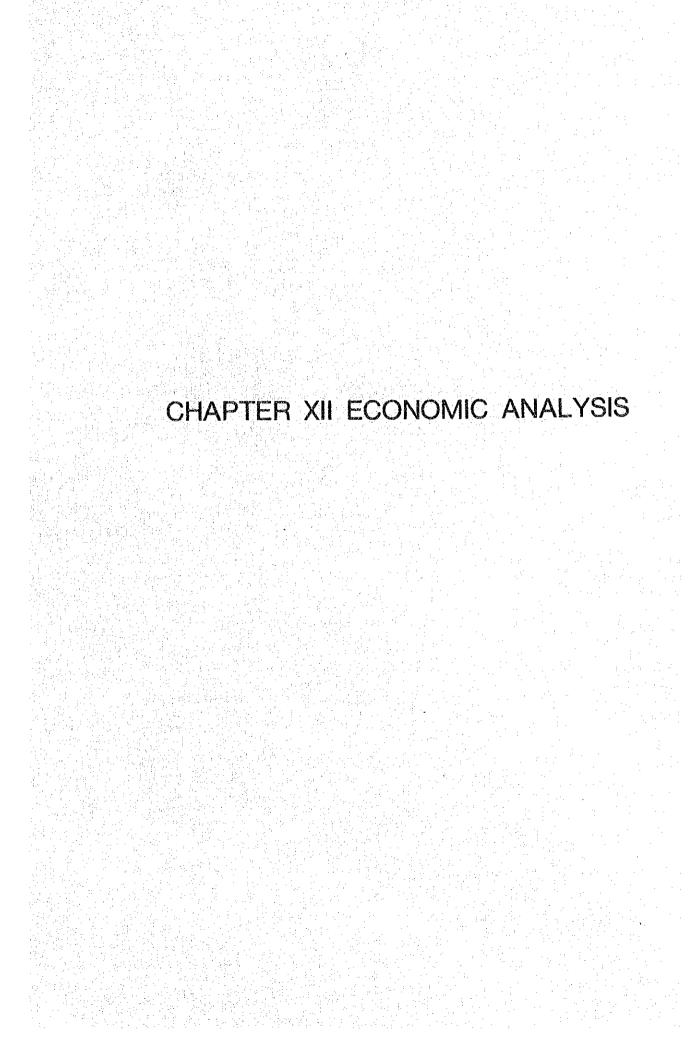
The appropriate refrigerated transit shed tariff roughly estimated on the basis of these costs is shown in Table XI-3-4.

As a result of this estimation, it seems that the construction cost of the refrigerated transit sheds is pretty expensive, and the cost per ton of cargo handled, 3,450 pesos/tons, will significantly affect the transportation cost.

However, since the construction of such sheds would provide many benefits as noted above, we believe that the sheds probably should be constructed, but the decision should be made based on an economic analysis which would analyze the economic costs and economic benefits of the proposed construction from the viewpoint of the national economy, and through detailed discussions with the future users of the facilities.

Table XI-3-4 Appropriate Refrigerated Transit Shed Tariff

1				Unit: thousand pesos
<b></b>	Number	Items	Amount	Details
l	t	Management cost	2,880	
		° personnel cost	1,440	2 workers x 60,000 pesos/month x 12 months
:		° operation cost	1,440	
	2	Maintenance cost	83,900	8,390,000 thousand pesos x 1 percent
L	3	Depreciation cost	308,020	basis cost x (1-residual ratio) x $1/(\text{the life of the machine})$
		° transit sheds	102,900	3,430,000 thousand pesos x (1-0.9) x $1/30$ years
····	-	° electric equipment	105,120	2,920,000 thousand pesos x (1-0.9) x $1/25$ years
		° refrigeration equipment	100,000	2,040,000 thousand pesos x $(1-0.9)$ x $1/17$ years
<u></u>	7	Electricity cost	120,000	1,000 thousand KW x 10 pesos x 12 month
	S.	Interest	499,205	principal and interest equal repayment system interest 9 percent, term 20 years
<b>.</b>	9	Land rent	13,500	total area of facilities x rent of wharf area: 10,000 m <sup>2</sup> x (250 US\$/m <sup>2</sup> x 180 pesos x $\frac{2.5}{1000}$ x 12 months)
<del>   </del>		Total	1,027,505	
	Cost pe	Cost per ton of cargo	3,450 pesos/ton	1,027,505 thousand pesos ÷ 298,000 tons



## CHAPTER XII ECONOMIC ANALYSIS

#### XII-1 Objectives

The volume of container cargoes handled at the two ports of Valparaiso and San Antonio is expected to grow at an average annual rate of 8.6% until the year 2010, constituting nearly half (46%) of the total cargoes at the two ports in that year. As the two ports share a common hinterland, the port development plans of the two ports will have a strong influence on the future distribution of cargoes between the two ports.

While the two ports are in a region prone to earthquake activity, it was found through the survey that the design of present port facilities does not give sufficient consideration to the potential for earthquake-related destruction. The early construction of new port facilities should be encouraged as a means to avoid a halt in port services caused by possible future earthquakes.

With these considerations in mind, analyses are performed in this chapter with three major objectives:

- ① To establish standards for evaluating from an economic viewpoint the three alternative plans outlined in VII-2, Allotment of Container Berths Between the Two Ports, to meet expected container cargo handling requirements.
- ② To consider from an economic viewpoint the optimal number of aseismic berths to be constructed in the near future.
- (3) To evaluate whether or not the execution of the entire Master Plan can be justified from an economic standpoint given the risk of earthquakes.

Futhermore, in response to a request by the Chilean counterpart, additional analysis is performed in the last part of this chapter to evaluate the Master Plan without consideration given to the occurrence of carthquake.

#### (1) Methodology

Of the three alternative plans outlined in Chapter VII, the optimal plan is to be determined using the least cost method.

The reasons this method has been chosen are as follows:

- ① Although it is normally a prerequisite to set up a "Without" case in order to apply a cost/benefit analysis, it is difficult to set up such a case for this project, given the risk of an earthquake which may cause severe damage to the port facilities at the two ports.
- ② Port facilities in all three alternatives are designed to meet the same cargo demand until 2010 and thus it is assumed that the effect of the project would be the same under all three alternatives.

Under this method of analysis, the total costs of undertaking each plan in each year until 2010 are estimated, and the present value of these costs are to be calculated and compared using an annual discount ratio of 12% as recommended by ODEPLAN.

The cost of land transportation is included in addition to port-related costs in the determination of total costs for this analysis. Although the same total tonnage of containerized cargoes are forecast under the three alternative plans, the decision to route cargo through a specified port affects the cost of transportation to and from the hinteland even when the same means of transportation is utilized. Moreover, it is conceivable that the means of overland cargo transportation will be determined by the choice of port.

Port costs have been estimated in four major categories: construction, ship waiting, cargo handling, and maintenance and administration. The three alternatives differ in the number of berths to be constructed at each of the two ports of Valparaiso an San Antonio. The number of container berths and the total containerized cargo demand forecast for the two ports in the year 2010 are given in Table XII-2-1.

Table XII-2-1 Alternative Plans

	Items	Valparaiso	San Antonio	Total
Alternative 1	Number of Container Berths	3	1. **	<i>l</i> <sub>4</sub>
	Cargo demand (1000 tons)	3,084	551	3,635
Alternative 2	Number of Container Berths	2	2	4
	Cargo demand ('000 tons)	1,818	1,818	3,636
Alternative 3	Number of Container Berths	1 *	3	4
	Cargo demand ('000 tons)	551	3,084	3,635

<sup>\*:</sup> Multi-purpose berth

## (2) Assumptions

## 1) Cargo demand

Non-containerized cargo demand is assumed to remain the same at the two ports under all three alternatives. The cargo demand by cargo type under each alternative is given below for the two ports.

Table XII-2-2 Cargo Demand

# (a) Port of Valparaiso

				(Unit	: 1000 to	ons/year
Y	ear	1990	1995	5000	2005	2010
Common	Fruit	523	523	532	561	597
	Copper	225	225	201	210	210
	General Cargo	539	546	630	716	768
	Sub-total	1,287	1,294	1,372	1,487	1,575
Alt. 1	Container	1,295	1,848	2,432	2,778	3,084
	Total	2,582	3,142	3,804	4,265	4,659
Alt. 2	Container	764	1,089	1,433	1,637	1,818
	Total	2,051	2,383	2,805	3,124	3,393
Alt. 3	Container	232	330	4 35	496	551
	Total	1,519	1,624	1,807	1,983	2,126

## (b) Port of San Antonio

Y	ear	1990	1995	2000	2005	2010
Common	Wheat	481	472	518	629	724
	Fruit	135	139	142	149	156
	Copper	644	723	480	480	480
	General Cargo	731	764	946	1,090	1,336
	Sub-total	1,991	2,098	2,086	2,348	2,696
Alt. 1	Container	232	330	435	496	551
	Total	2,223	2,428	2,521	2,844	3,247
Alt. 2	Container	764	1,089	1,433	1,637	1,818
	Total	2,755	2,187	3,519	3,985	4,514
Alt. 3	Container	1,295	1,848	2,432	2,778	3,084
	Total	3,286	3,946	4,518	5,126	5,780

#### 2) Cargo Handling Capacity

Plans for the improvement of facilities at both ports in order to meet cargo demand under the various alternatives are given in Figures VII-2-1 $\sim$ 6. The number of berths that can be used for different types of cargo in these plans is illustrated graphically below.

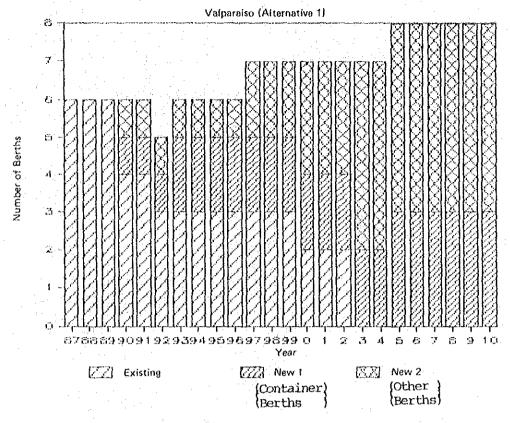


Fig. XII-2-1 Number of Available Berths

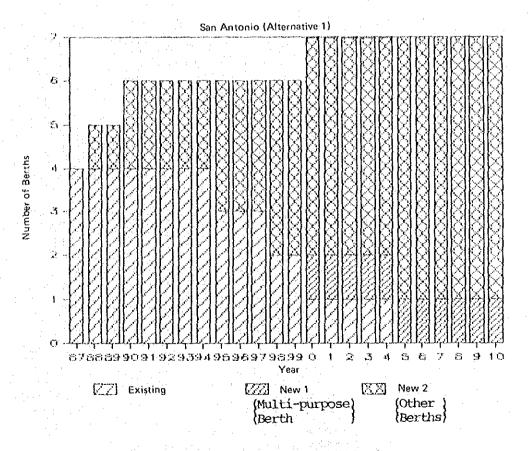


Fig. XII-2-2 Number of Available Berths

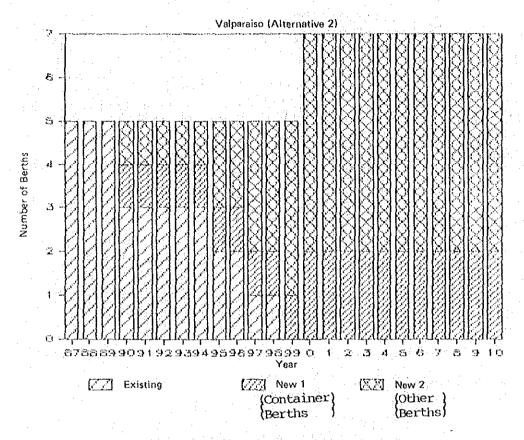


Fig. XII-2-3 Number of Available Berths

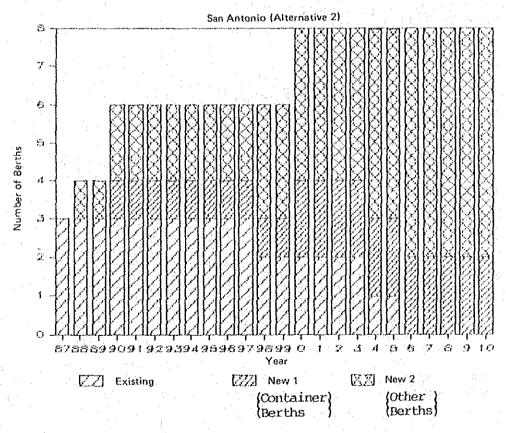


Fig. XII-2-4 Number of Available Berths

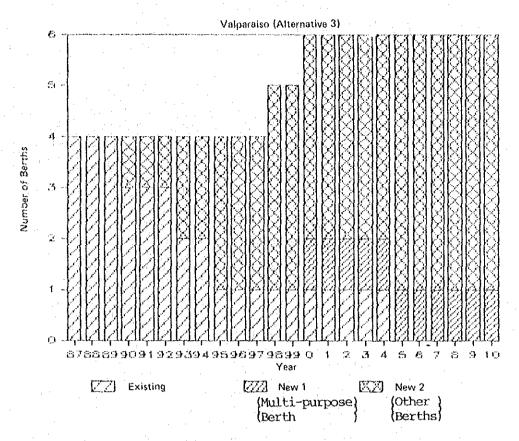


Fig. XII-2-5 Number of Available Berths

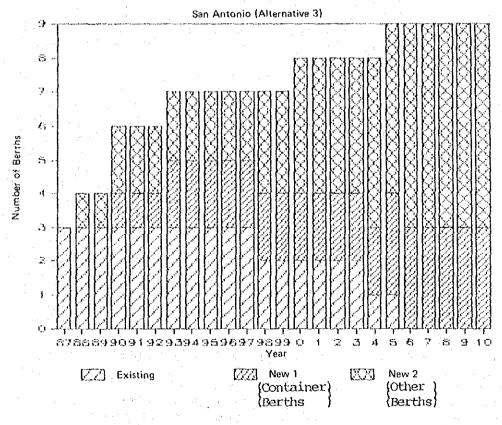


Fig. XII-2-6 Number of Available Berths

#### 3) Market Prince and Economic Prices

The following adjustments have been made to determine economic prices on the basis of market prices.

#### (i) Improted materials

In Chile, imported products are generally subject to import duties, value added tax, maritime freight cahrges and import registration fees. These various charges are applied in different manners to different products. As mentined in VIII-6-(1)-2), Condition of Cost Estimation, the market prices for imported materials do not include import duties, and thus no adjustment is made for these market prices in this analysis except for an adjustment of the exchange rate.

#### (ii) Labor costs

Personal income taxes in Chile in 1985 progressed in eight stages from a low of 0% to a high of 56%. Estimating that the average tax rate of persons related to the port project is 10%, economic labor costs are calculated to be 90% of wages.

#### (iii) Domestic materials costs

Domestically obtained materials are subject to a 20% value added tax. The economic cost of domestically obtained materials is assumed to be 15% less than the market price considering the recovery, to a certain degree, of such tax.

#### (iv) Skilled and unskilled workers

Of the workers in the port construction works, it is estimated that 50% will be unskilled. The economic price of this labor is estimated to be 50% of the market price, as recommnded by ODEPLAN. The market price of unskilled laborers is assumed to be 70% of that of skilled ones.

## (v) Exchange rate

The market price of imported materials has been converted into pesos using the official exchange rate of the Central Bank of Chile as of December 31, 1985 of US \$1 = Peso 180.22. In determining economic prices, this has been multiplied by a factor of 1.13 to US \$1 = Peso 200 as recommended by ODEPLAN.

#### (3) Costs :

#### 1) Construction Costs

Construction costs based on market prices are given for each alternative in Appendix XII-1. These costs are given in economic prices in Appendix XII-2. Conversion factors used to calculate the economic costs are given in Appendix XII-3. Construction costs for each alternative are summarized for each phase below.

Table XII-2-3 Construction Costs in Economic Prices

(Unit: Milllion Peso)

	<del></del>			7	<del></del>
		Phase 1 ('87-'92)	Phase 2 ('93='00)	Phase 3 ('01-'10)	Total
	Valparaiso	13,584	17,003	17,955	48,542
Alternative 1	San Antonio	8,346	5,338	6,918	20,602
	Total	21,930	22,341	24,873	69,144
	Valparaiso	8,270	23,326	229	31,825
Alternative 2	San Antonio	21,663	13,434	9,485	44,583
	Total	29,933	36,760	9,714	76,408
	Valparaiso	6,768	9,040	2,844	18,651
Alternative 3	San Antonio	31,032	4,140	18,492	53,669
	Total	37,800	13,180	21,341	72,320

As can be seen from this table, Alternative 1 has the lowest cost of the three, followed by alternative 3 and Alternative 2. The total construction costs of Alternative 2 and 3 are higher than that of Alternative 1 by 10.5% and 4.6% respectively.

The present value of total construction costs is given below.

Table XII-2-4 Present Value of Construction Costs

(Unit: Million Pesos)

	<u>Valparaiso</u>	<u>San Antonio</u>	Total
Alternative 1	17,631	8,082	25,713
Alternative 2	13,541	21,334	34,875
Alternative 3	7,709	25,327	33,036

In this case, Alternative 1 is again the lowest among the three alternatives and Alternative 1 is judged to be most economical as far as the total construction costs are concerned.

## 2) Ship Waiting Costs

The costs of keeping ships waiting at each port under the three alternatives are calculated as follows.

- ① The number of berths available for respective cargo uses are determined for each year based on the total available berths listed in XII-2-(2).
- ② The number of ships that will call at the various berth in each year are then estimated. Consideration is given to the annual cargo throughput based on the demand forecast, the size of ships, and the average amount of cargo loaded by size of ship.
- 3 The time required per ship to load/unload cargo is then determined. Consideration is given here to differences in the cargo handling speed at existing and new berths.
- Based upon the above data, queuing theory is used to calculate the annual number of hours that ships will wait to borth, and then the annual cost of ship waiting is determined by multiplying the waiting time by the ship cost per unit time (daily ship cost).

As the daily ship cost will differ depending upon the size of the ship, a standard ship size is assumed for each cargo type. Moreover, as the average size of such ships is forecast to continue to become larger, the size of the ships is estimated for each 5-year period until 2010.

The daily ship cost used in the calculation is given below:

Table XII-2-5 Daily Ship Cost

		187-190	'91-'95	196-100	'01-'05	'06-'10
General	Ship Size (DWT) Ship Cost (US\$/day)	13,600	14,000	14,300	14,700	15,000
Cargo		5,200	5,300	5,400	5,500	5,600
Wheat	Ship Size (DWT) Ship Cost (USS/day)	28,000 8,700	28,500 8,800	29,000 8,900	29,500 9,000	30,000 9,100
Con-	Ship Size (DWT)	17,000	19,000	21,000	23,000	25,000
tainer	Ship Cost (US\$/day)	6,000	6,500	7,000	7,500	8,000

The hours of ship waiting and the total ship waiting costs until the year 2010 are given in Appendix XII-4 for each alternative. The ship waiting costs by phase for each alternative are summarized in the following table.

Table XII-2-6 Ship Waiting Costs in Present Value

(Unit: Million Pesos)

		Phase 1 (187-192)	Phase 2 ('93-'00)	Phase 3 ('01~'10)	Total
	Valparaiso	940	758	1,321	3,019
Alternative 1	San Antonio	1,798	1,440	1,276	4,514
	Total	2,738	2,198	2,597	7,533
	Valparaiso	1,371	1,559	613	3,543
Alternative 2	San Antonio	2,280	2,066	988	5,334
	Total	3,651	3,625	1,601	8,877
	Valparaiso	1,162	808	988	2,958
Alternative 3	San Antonio	7,102	1,586	1,780	10,468
	Total	8,264	2,394	2,768	13,426

Although the total ship waiting costs at Valparaiso Port under the three alternatives differ somwhat, the ship waiting costs at San Antonio Port under the three alternatives differ greatly. The greater the number of container berths at San Antonio, the greater the increase in total ship waiting costs. This is due to the high occupancy ratio of berths at San Antonio Port brought about by the limited number of available berths during the construction period.

The ship waiting costs of Phase 1 for Alternative 3 at San Antonio are extremely high. This is based on the assumption that the annual container cargo volumes handled at San Antonio port from 1987 to 1990 will be in the order of 0.7 million tons, 0.9 million tons, 1.1 million tons and 1.3 million tons respectively, levels which are far beyond the present container cargo volume handled at the port. If Alternative 3 is selected, it will be necessary to further investigate the allocation of container cargo handled at each port under Phase I, so that minimum total ship waiting costs can be achieved for both ports.

## 3) Cargo Handling Costs

In this section, the total cargo handling costs under each alternative are estimated. Annual cargo handling costs are estimated by commodity type for the three major commodities of the two ports (fruit, copper and wheat) and by two cargo types (non-container and container) for general cargo. The total costs are estimated based on the estimated per ton handling costs and estimated volume of each type of cargo handled annually until 2010.

Cargo handling costs include the costs involved in loading, unloading, transport and strage of cargoes in the port. Cargo handling operations are divided into two categories. One, at the apron, includes loading and unloading, and the other comprises transport between the apron and the port gate. Operation flow is also divided into two cases, one in which the cargo is moved directly from apron to gate (or vice-versa) and the other in which cargoes are temporarily stored in a storage facility and later transferred to the apron or gate. Each type of cargo may have different handling costs depending upon whether the cargo is handled directly or indirectly. This aspect is also taken into consideration in estimating the per ton handling costs.

The per ton handling costs include labor costs, machine and equipment costs which are not included inthe constructon costs, and the cost of materials and energy consumed by machines and equipment.

The estimated per ton handling costs are given below:

Cargo Type:	Per Ton Handling Costs	Assumptions
Allen and development of the constitution of t		
Fruit	750 pesos	1) Number of Laborers per gang : 20
		2) Machines & Eqipment per shift gang:
	•	Wharf crane - 1 unit
·.		forklift - 2 units
		3) Handling Capacity: 225t/ shift.gang
		4) Share of Direct Transport: 100%
Copper	300 pesos	1) Number of Laborers per gang : 22
•		2) Machines & Eqipment per shift gang:
		Wharf crane - 1 unit
		forklift - 4 units
:		trailer - 2 units
e t		3) Handling Capacity: 675t/ shift.gang
		4) Share of Direct Transport: 0%
Wheat	170 pesos	1) Number of Laborers per gang : 9
		2) Machines & Eqipment per shift gang:
e e e e e e		Pneumatic unloader - 1 unit
		3) Handling Capacity: 675t/ shift.gang
General Cargo	1,000 pesos	1) Number of Laborers per gang: 17(28)
(non-container)		2) Machines & Eqipment per shift gang:
		Wharf crane - 1 unit
		forklift 2(4) units
		Numbers in parentheses are those for
		indirect transport.
:		3) Handling Capacity: 150t/ shift.gang
		4) Share of Direct Transport : 70%
General Cargo	320 pesos	1) Number of Laborers per berth: 104
(container)		(including those at the CFS)
		2) Machines & Equipment:
		Transfer crane - 5 units
		Chassis - 45 units
		Tractor - 10 units
	•	Forklift - 4 units
		3) Other facility:
		CFS -1 unit
		4) Handling Capacity: 1 Million tons/ye
		669

Appendix XII-5 shows caluculation of per-ton cargo handling costs for each cargo type.

Annual handling cost are given in Appendix XII-6 for each alternative. Cargo handling costs in present value are given below.

		Container	Others	Total
	Valparaiso	4,084	7,967	12,051
Alternative 1	San Antonio	773	9,156	9,929
	Total	4,857	17,123	21,980
	Valparaiso	2,439	7,967	10,406
Alternative 2	San Antonio	2,418	9,156	11,574
	Total	4,857	17,123	21,980
	Valparaiso	794	7,969	8,761
Alternative 3	San Antonio	4.063	9.156	13.219

4,857

17,123

21,980

Table XII-2-7 Cargo Handling Cost in Present Value

## 4) Maintenance and Administration Costs

Total

In order to keep cargo handling operations in the ports smooth and efficient, it is necessary that the port authority carefully administer all activities in the ports including periodical investigation of the facilities and appropriate maintenance. The costs for such activities are not included in the construction costs nor in the cargo handling costs in this analysis, and are therfore estimated separately.

The two ports are administered by EMPORCHI, and the number of staff in EMPORCHI's administrative divisions are 216 for Valparaiso and 76 for San Antonio as of march 1986. The Valparaiso workers also help administer EMPORCHI's other ports in Chile. In order to calculate the administration costs of the two ports, it is assumed that 100 employees are required for each and that an amount equal to the labor costs is additionally required for materials and other general expenses. The average monthly salary and wages needed to maintain an employee are assumed to be 100,000 pesos.

As for maintenance costs, one percent of the accumulated construction

costs of the facilities is assumed as the maintenance costs per year.

Annual maintenance and administration costs are given in Appendix XII-7 for each alternative. These costs are summarized by phase in the following table in present value.

Table XII-2-8 Maintenance and Administration Costs in Present Value

(Unit: Million Pesos)

		Phase 1 ('87-'92)	Phase 2 ('93-'00)	Phase 3 ('01-'10)	Total
Alternative 1	Valparaiso San Antonio	1,069 977	936 670	782 498	2,787 2,145
	Total	2,046	1,606	1,280	4,932
	Valparaiso	1,045	836	654	2,735
Alternative 2	San Antonio	1,363	960	784	3,107
	Total	2,408	1,796	1,438	5,642
	Valparaiso	953	689	483	2,125
Alternative 3	San Antonio	1,461	1,120	807	3,388
	Total	2,414	1,809	1,290	5,513

#### 5) Inland Transport Cost

Per ton inland transport costs by truck and rail in economic prices are given in Chapter VI, Inland Transport System. The modal split of future cargo to and from the two ports is analysed in that Chapter for major commodities and containerized cargo. The percentage of modal split is calculated for each origin/destination by the hinterland region.

Based on these data, calculations are made in order to obtain the average percentage of future modal split for five categories (fruit, copper, wheat, general and containerized cargo). Also, average per ton inland transportation costs by cargo volume for each route are calculted for each category. Then, the total annual inland transportation costs are obtained by multiplying the cargo volume by average per ton cost for each category.

Below are the figures used to estimate the inland transportation costs.

Cargo Mode		Valpa	raiso	San Antonio	
Vargo	riode	Modal Split(%)	Cost/ton (US\$)	Modal Split(%)	Cost/ton (US\$)
Wheat	Truck Rail		• • • • • • • • • • • • • • • • • • •	6 94	17.37 (0.02) 20.71 (0.02)
Fruit	Truck Rail	100 0	24.23 (0.11)	100	28.08 (0.12)
Copper	Truck Rail	80 20	6.09 (0.07) 7.06 (0.13)	· -	9.30 (0.11) 16.42 (0.21)
General	Truck Rail	88 12	20.55 (0.13) 38.97 (0.43)		22.53 (0.15) 27.63 (0.34)
Container	Truck Rail	81 19	16.26 (0.16) 27.78 (0.44)		18.41 (0.17) 20.96 (0.25)

Note: Figures in parenthesis represent time cost in per-ton inland transportation costs.

Annual Inland transportation costs are given in Appendiz XII-8. Inland transportation costs by phase are summarized in the followings table in present value.

Table XII-2-9 Inland Transportation Costs by Container and Others
in Present Value

(Unit: Million Pesos)

		Container	Others	Total
Alternative 1	Valparaiso San Antonio	47,088 9,191	41,846 66,602	88,934 75,793
	Total	56,279	108,448	164,727
Alternative 2	Valparaiso San Antonio	28,125 28,752	41,846 66,602	69,971 95,354
	Total	56,877	108,448	165,325
Alternative 3	Valparaiso San Antonio	9,153 48,304	41,846 66,602	50,999 114,906
	Total	57,457	108,448	165,905

## 6) Results

The following Table XII-2-10 summarizes all the above-mentioned costs for the three alternatives, and the costs in present value are given in Table XII-2-11. From these tables it is concluded that Alternative 1 involves the least total cost, and this alternative is therfore the most economically viable plan.

Table XII-2-10 Total Costs of Alternatives

(Unit: Million Pesos)

***************************************				p
		Valparaiso	San Antonio	Total
	Port Costs:		·	
 ; <del>←</del> 1	Construction	48,542	20,602	69,144
1	Ship Waiting	4,213	5,563	9,776
ati	Cargo Handling	42,611	34,177	76,788
Alternative	Maintenance & Administration	11,012	7,605	18,617
Alt	Inland Costs:			
	Transportation	326,444	255,443	581,887
	Total	432,822	323,390	756,212
	Port Costs:			4
2	Construction	31,825	44,583	76,408
Cive	Ship Waiting	4,721	6,883	11,604
มล	Cargo Handling	35,908	40,881	76,789
Alternative	Maintenance & Administration	9,463	11,415	20,878
A	Inland Costs:			:
	Transportation	249,141	335,149	584,290
	Total	331,058	438,911	769,969
	Port Costs:			
9	Construction	18,651	53,669	72,320
tiv	Ship Waiting	4,117	12,583	16,700
rna	Cargo Handling	29,204	47,584	76,788
Alternative	Maintenance & Administration	7,470	12,413	19,883
4	Inland Costs:			
	Transportation	171,847	414,843	586,690
	Total	231,289	541,092	772,381

Table XII-2-11 Total Costs in Present Value

		(Unit: Mill	Lion Pesos)
	Valparaiso	San Antonio	Total
Port Costs:			
Construction	17,631	8,082	25,713
	3,019	4,514	7,533
Cargo Handling	12,051	9,929	21,980
Ship Waiting Cargo Handling Maintenance & Administration Inland Costs:	2,788	2,146	4,934
Inland Costs:			
Transportation	88,934	75,793	164,727
Total	124,423	100,464	224,887
			and the second of the second o
Port Costs:			
∾ Construction	13,541	21,334	34,875
Ship Waiting	3,543	5,334	8,877
g   Cargo Handling	10,406	11,574	21,980
Ship Waiting  Cargo Handling  Maintenance & Administration  Inland Costs:	2,535	3,107	5,642
Inland Costs:	Large Annual Control of the Control	The state of the s	
Transportation	69,971	95,354	165,325
Total	99,996	136,703	236,699
Port Costs:			
° Construction	7,709	25,327	33,036
Ship Waiting	2,958	10,468	13,426
Cargo Handling	8,761	13,219	21,980
Cargo Handling  Maintenance & Administration	2,125	3,388	5,513
Inland Costs:			
Transportation	50,999	114,906	165,905
Total	72,552	167,308	239,860

## (1) Intruduction

In the stability investigation outlined in III-3, it was determined that the current port facilities have not been engineered to withstand the level of earthquakes which many occur in the region. According to this analysis, if a major earthquake of magnitude 8 were to occur in the vicinity of the two ports, all the facilities with the exception of Berth 5 at San Antonio Port would suffer severe damage, and port services could possibly come to halt. Consequently it is important that measures be taken in the near future to improve port facilities to withstand such a shock.

However, it is obviously unrealistic to begin all construction works at the same time, as this would stop port services at all the berths under construction. Additionally, it might be difficult to obtain all the necessary funding for such an undertaking within a short period of time.

Therefore, analysis has been made to determine the appropriate number of berths that could be constructed at one time.

## (2) Methodology

It is obvious that the more berths to be constructed at once, the greater the construction cost. It is equally apparent that the economic loss of a major earthquake will be lessened by the extent that new aseismically-engineered berths are completed at the time such an earthquake occurs. This is particularly true given the inadequate engineering of the current facilities, which are likely to become unusable in the event of such an earthquake. At the same time, construction of new berths will have a negative effect on the handling of cargo during the period of construction, and if the number is great then additional expenses become necessary to ensure adequate cargo handling during this construction period.

Below we give the estimated costs involved in constructing new berths at existing berth sites in the two ports. These costs include the construction costs, the additional costs of inland transportation to and from the alternative ports and the possible losses that might be incurred if an earthquake of magnitude 8 occured at the completion of the construction. From an economic viewpoint, the optimal number of berths to be constructed immediately would be the case in which the total of these three figures is the least. We have undertaken an analysis of six cases, as given below:

Case	Number of ascismic berths					
	for container cargo	for non-container cargo	Total			
1	1.	<u>l</u>	2			
2	1	2	3			
3	<b>1</b>	3	4			
4	I	4	5			
5	1	5	6			
6		6	7			

#### (3) Assumptions

1) Economic cost of improvement per berth (as of Dec., 1985)

container berth : 8,000 million pesos

non-container berth: 3,000 million pesos

These costs include not only berth construction but also land reclamation, dredging, pavement, warehouse construction and crane purchase.

## 2) Cargo handling capacity of existing berth facilities

The earthquake of March 3, 1985 rendered Berth 1 nad 2 at San Antonio Port unusable, leaving a total of 15 berths in service at the two ports. The cargo handling capacity of each berth is estimated at 400 thousand tons per year, for a total current capacity of 6 million tons.

## 3) Handling capacity of improved berths

Newly constructed berths are anticiapted to be state-of-the-art facilities, and the annual handling capacity of container berths especially is expected to rise. The new handling capacity is expected to be as follows:

container berth : 1,000,000 tons/year non-container berths: 400,000 tons/year

#### 4) Construction period

Following the completion of this Master Plan survey, it is expected to take at least one year to complete engineering designs and arrange financing, and an additional two years to complete the necessary construction. Thus, the construction period is expected to last a full three years from January 1, 1987 to December 31, 1989.

# 5) Cargo handling demand

The volume of cargo handled at the two ports in 1984 was 3,607 thousand tons. Demand is forecast at five-year intervals from 1990 to 2010 for the two ports in Chapter V, Demand forecast. Under this forecast, total demand (exports plus imports) is expected to be 4,805 thousan tons in 1990 and 5,570 thousand tons in 1995. Based on these three figures, we have estimated cargo volume to be as follows:

	Cargo Volume
Year	(thousand tons)
1987	4,200
1988	4,400
1989	4,600
1990	4,805
1991	4,960
1992	5,110

# 6) Additional costs associated with construction

The volume of cargo to be handled during the constructin period is the largest in 1989, when 4,600 thousand tons are forecast. If the cargo handling capacity per berth is 400 thousand tons as outlined above, then at least 12 of the available 15 berths must be in service to handle this volume of cargo. For example, if only eleven were operational at that time, then the total handling capacity of the ports would be just 4,400 thousand tons, or 200 thousand tons short. If the handling capacity is short by just this amount, however, it would be possible to raise the handling capacity somewhat through measures to raise the occupancy ratio of the available berths, though this would come at the loss of more ship-waiting time. If the number of berths to be constructed were to be raised still higher, however, it would not be feasible to compensate for the shortfall through such measures, and portions of the total cargoes would probably be lost to other nearby port. In this analysis, it is assumed that such cargoes will be lost to a nearby port, in which case the cost of inland transportation from the hinterland origin to the nearby port (or vice-versa) is calculated to rise by  $3,000^{1/2}$ pesos per ton.

<sup>1/</sup> We have assumed that US\$15.00 per ton would be added to the inland transportation costs regardless of cargo type and route if cargoes were transferred to alternative ports, based upon the economic costs of inland transportation as shown in Chapter VI, Inland Transport System.

# 7) Additional cargo handling capacity of alternative ports

The alternative ports for Valparaiso and San Antonio ports are Coquimbo in Region 4 and Lirquen, Talcahuano and San Vicente in Region 8. Based on a study by the Universidad Catolica de Chile entitled "Programa de Inversion para el Sistema Purtuario Quinto Region: 1986 - 2000", we have estimated the additional handling capacity of these ports to be as follows:

Year	Additional Capacity (thousand tons/year)
1987	2,200
1988	2,200
1989	2,200
1990	2,000
1991	1,800
1992	1,600

## 8) Extent of loss in case of earthquake

We assume here that if an earthquake of magnitude 8 were to occur after the completion of the new berth construction on December 31, 1989, then the cargo handling capacity of the two ports would be limited to the capacity of the new berths plus berth 5 at San Antonio Port. It is assumed that alternative ports will handle cargo demand in excess of capacity at that time, but if the cargo handling capacity of the alternative ports is unable to meet this demand, then it becomes necessary to consider halting some portion of the trade-related transpostation.

The earthquake loss for that portion of cargo handled at the alternative ports is considered to be the additional 3,000 pesos per ton inland transportation costs.

It is particularly difficult to estimate the losses which would be incurred on that portion of cargo which would cease to be traded due to inadequate port handling capacity. In the case of export commodities, it would be necessarty to either stop production or to sell to he domestic market. A halt in production would hinder the economically efficient utilization of production facilities and labor, while the sale of these products on the relatively small domestic market would definitely be limited and could lead to a significant fall in the domestic prices of the commodities in question. In the case of import commodities, a halt in availability of intermediate production factors could act as a hindrance to Chile's own

production capability or lead to drastic price increases or production capacity increases for domestic alternatives or both.

As this explanation suggests, it is not possible to accurately determine the actual loss which would be incurred on those cargoes that cannot be handled even at the alternative ports. For the purposes of this evaluation, we apply the value-added ratio of related industrial sectors to the trade-suspended cargo prices. The value-added ratio is obtained from the "Matriz de Insumo-Producto de la Economia Chilena 1977" by ODEPLAN.

Although the value-added portion in an input-output table consists primarily of employee compensation and opearting surplus, only the operating surplus portion was used based on the assumption that workers who would lose thier jobs due to the reduction of production activity would have the opportunity to find employment in other areas.

The following figures are used to estimate the trade-suspended loss:

Commodity	Trade Price	Related Sector V	alue-added
	(US\$/ton)	in Input-output Table	Ratio
	= 1		•
Copper	1,300 2/	Minería del Cobre	0.2608
Fruit	670 2/	Producción Agrícola	0.2669
Wheat	140 2/	Fabricación de productos	0.1213
	•	alimenticios	
General Cargo Export	1,200 <u>3</u> /	All Sectors in Manufacturing Industry	0.0956
General Cargo Import	1,200 <u>3</u> /	All Sectors in Manufacturing Industry for intermediate good	0.0821
		All Sectors for capital goods	· · · · · · · · · · · · · · · · · · ·
(Average)	( 891 )		(0,1492)

<sup>2/</sup> Source: Indicadores de Comercio Exterior, Diciembre 1985, Banco Central de Chile

<sup>3/</sup> assumption based on available data.

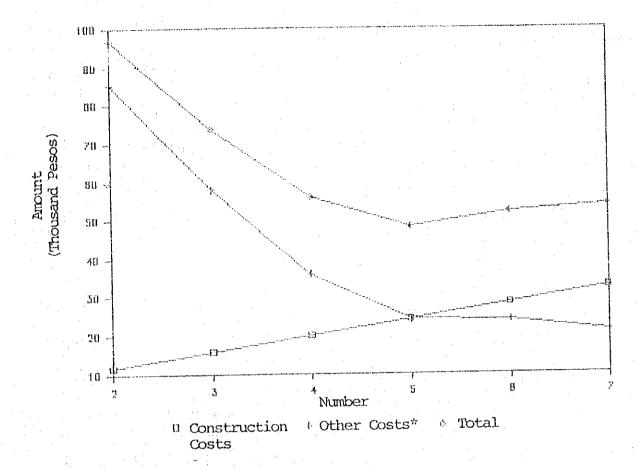
It is also assumed that the trading of wheat would be the first to be halted in the event of an earthquake, followed by general import cargo, general export cargo, and finally fruit and copper, based on the amount of trade-suspended loss per ton.

#### 9) Period of earthquake-induced loss

It is assumed here that if the existing berths were destroyed in an earthquake with magnitude 8 then these berths would be reconstructed with state-of-the-art features. The period of time required to bring these berths to completion would be three years from the time of the earthquake. Trade-suspended losses are therefore calculated for a period of three years.

## (4) Results

Construction costs and other costs (the total of additional inland transportation costs and trade suspended loss) are illustrated in Figure XII-3-1. Details of the calculation are shown in Appendix XII-9. Case 4 for the construction of one container berth and 4 non-container berths, shows the minimum value. This indicates that construction of five berths as in Case 4 is optimal from the economic viewpoint. A number of rough assumptions have been used in this analysis, so it would be advisable to conduct further technical analyses on this proposal.



\* Additional Inland Transportation Costs and Trade Suspension Loss

	2	. 3	4	. 5	<b>δ</b> .	7
Construction Costs Other Costs	Case 1 11700 85262	Case 2 15900 58017	Case 3 20100 35873	Case 4 24300 24032	Case 5 28500 23763	Case 8 32700 21222
Total	96962	73917	55973	48332	52263	53922

Fig. XII-3-1 Number of Aseismic Berths

XII-4 Evaluation of the Master Plan with Consideraion Given to Earthquake Probability

#### (1) Methodology

Given the potential for an earthquake of magnitude 8 which would cause severe damage to facilities at the two ports of Valparaiso and San Antonio, bringing port services to a virtual halt, the Master Plan calls for the construction of aseismic berths. The analysis here is aimed at evaluating the appropriateness of the optimal plan using a cost/benefit analysis that examines two specific cases, the case of executing the construction along the lines called for in the Master Plan (the "WITH" case), and the case of not doing so (the "WITHOUT" case).

In evaluating the benefits, the probability of carthquakes discussed in Chapter III has been taken into consideration. The Internal Rate of Return (IRR) is adopted here as the standard for evaluation. Earthquake-related damage to port facilities will differ according to the resistance of port facilities to earthquake shock. For instance, those port facilities with a seismic coefficient of Kh=0.25 should not suffer damae in the case of an earthquake of magnitude 8, but the existing port facilities would suffer severe damage, bringing port services to a standstill with the exception of just one berth, Berth 5 at San Antonio Port. We consider that this difference of damage is represented by the cargo handling capacity of each berth taking the probability of earthquake into consideration. The expected cargo handling capacity of each berth is defined here as the cargo handling capacity of the berth multiplied by the probability of non-destruction, which is derived from the probability of earthquake occurrence.

#### (2) Determination of Benefits

Benefits are determined in the following manner:

- 1) First we calculate the expected cargo handling volume for the two ports for each year by comparing the expected cargo handling capacity and cargo damand for each year in the WITH and WITHOUT cases (the expected cargo handling volume is the lower of the expected cargo handling capacity and the projected cargo demand).
- 2) Cargo demand that exceeds expected cargo handling capacity is the expected demand surplus that would be transferred to alternative ports or halted in the case of an earthquake.

3) The expected value of losses in the case of an earthquake are defined as the economic loss incurred in inland transportation to alternative ports plus that incurred from the stoppage of trade (the volume of cargo demand subject to such losses multiplied by the expected loss per ton). The beneit of undertaking the Master Plan is defined as the difference between the value of these losses in the WITH and WITHOUT cases.

#### (3) Costs

Constructon costs in the WITH case are those indicated in Chapter VII, Master Plan.

The WITHOUT case envisions leaving facilities in their current state, so there are no costs incurred.

## (4) Assumptions

## 1) Project Life

Project life is from 1987 until 2030: The year 2030 is 30 years after the assumed average completion year of the new facilities in the WITH case. A service life of 30 years for the new berths which are major port facilities is a conservative estimation; berths in fact have a much longer service life.

#### 2) Cargo Demand

Cargo demand is forecast to grow as illustrated below. The tonnages from 1987 to 2010 are the same as those used in Alternative 1 of Section XII-2, Determination of the Preferred Alternative Plan.

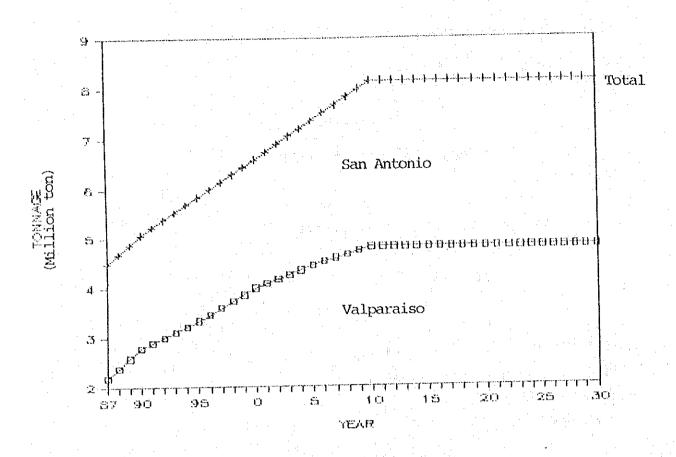


Fig. XII-4-1 Cargo Demand

# 3) Cargo Handling Capacities

WITHOUT case : 6,000 thousand tons/year

(It was assumed that each of the existing 15 borths in both ports have a capacity of 400 thousand tons/year)

WITH case

: The number of existing and new berths will increase in accordance with the construction plan and as illustrated in Figures XII-2-1 and XII-2-2. Following are the cargo handling capacities by berth type.

Container berths : 1,000 thousand tons/year
Multi-purpose berths : 500 thousand tons/year
Others : 400 thousand tons/year

#### 4) Earthquake resistance of facilities

WITHOUT case: All facilities with the exception of Berth 5 at San Antonio Port have a seismic coefficient of Kh=0.15.

San Antonio's Berth 5 has a seismic coefficient Kh=0.25.

WITH case : The facilities at one berth in Valparaiso and two berths in San Antonio are to have a seismic coefficient of Kh=0.25, with others to have a seismic coefficient of Kh=0.20.

#### 5) Probability of non-destruction

The relation between the seismic coefficient level (Kh) and the ground acceleration, and the relation between the ground acceleration and the return period of earthquakes are explained in Chapter III. We assume the probability of non-destruction for each berth at the two ports as follows:

Port	Kh	α	T' <sub>R</sub>	Pi
Valparaiso	0.25	408.3	94	(1-1/94) <sup>TD</sup>
1 · · · · · · · · · · · · · · · · · · ·	0.20	326.7	66	(1-1/66) <sup>TD</sup>
H	0.15	245.0	41	$(1-1/41)^{TD}$
San Antonio	0.25	408.3	161	(1-1/161) <sup>TD</sup>
<b>.</b>	0.20	326.7	- 110	(1-1/110) <sup>TD</sup>
N.	0.15	245.0	67	(1-1/67) <sup>TD</sup>

where Kh = Seismic coefficient

α = Ground acceleration

Tp = Return Period of earthquake

Pi = Probability of non-destruction

TD = Number of years from 1985

## 6) Expected cargo handling capacity

The expected cargo handling of given facilities (Ci) during a given period of years (Ti) is determined by applying the probability of non-destruction (Pi) in the following manner:

 $Ci = Pi \times Ti \times Ca;$ 

Where Ca = annual cargo handling capacity of facilities. Therefore, the annual expected cargo handling volume  $(T_i - T_{i-1})$  is

$$C_{i-(i-1)} = (P_i x T_i - P_{i-1} x T_{i-1}) x C_a$$

For example, in the case facilities with a seismic coefficient of Kh=0.25 at Valparaiso and a cargo handling capacity of 400 thousand tons annually, the probability of non-destruction would be defined as  $P_i = (1-1/94)^{TD}$ , so the expected cargo handling capacity in each year would be as follow:

Year	Years from 1985			Volume in the year i $(\Delta C_i = (P_i \cdot T_i - P_{i-1} \cdot T_{i-1}) \times C_a$
	ARREST OF THE PROPERTY OF THE	(Unit:	thousand tons)	(Unit: thousand tons)
1987	3		1,162.1	379.0
1988	4		1,533.0	370.9
1989	5		1,895.8	362.8
•				
1995	11	*	3,911.6	317.4
•				
2000	16		5,393.3	282.6
: 2010	26		7,874.9	221.1
2030	46		11,249.8	126.0

7) Losses per ton of cargo in the case of earthquake
Expected costs for cargoes handld at Alternative Ports:

US\$ 15.00 per ton as used in XIII-3, Consideration of the Number of Aseimsic Berths.

Expected Trade suspension Loss:

US\$132.8 per ton for the expected trade suspended volume (This amount equals 14.9% of US\$891.00, which is the weighted avarage

trade price per ton for both ports. 14.9% is the avarage value-aded ratio as shown in XIII-3)

## (5) Results

On the basis of the above assumptions and cost/benefit analysis, the internal rate of return is calculated to be 23.4% for the Master Plan as noted in Appendix XII-10, and it is concluded that the execution of the Master Plan is justified from the economic standpoint.

## (6) Sensitivity Analyses

In order to gauge the sensitivity of the Master Plan to various factors related to the project, sensitivity analyses are conducted and the internal rates of return are calculated as follows:

Factors	IRR
Construction Cost Increases by 20%	21.9%
Cargo Demand decreases by 20%	21.0%
Trade suspension loss decreases by 20%	21.2%

Although the IRR for each of these sensitivities is somewhat lower than that of the base case, it is also higher than the opportunity cost of capital in Chile. It is concluded that execution of the Master Plan will not be adversely affected by a change in the above factors.

# XII-5 Evaluation of the Master Plan without Consideration Given to the Occurence of Earthquakes

## (1) Background

In Chapter VII, it is proposed that berths be constructed with an earthquake resistance high enough to prevent destruction even in the case of a large earthquake. An evaluation is carried out in XII-4 for the implementation of the Master Plan based on this proposal.

However, it is impossible to predict such an earthquake and governmental authorities may decide not construct berths with higher earthquake resistance. An evaluation of the Master Plan is therefore made in this section taking into account the need for higher earthquake resistant berths.

#### (2) Method

As in the case of XII-4, a cost/benefit analysis is used in evaluating the Master Plan. The Internal rate of return (IRR) is a dopted here as the standard for evaluation.

#### (3) Assumptions

#### 1) Project life

As in the case of XII-4, a project life of 47 years from 1987 to 2030 is assumed.

#### 2) Cargo Demand

As for the figures of cargo demand for the period from 1987 to 2010, those for alternative 1 in XII-2, Determination of Prefferved Alternative Plan, are used. The figures after 2010 are assumed to be constant.

#### 3) Cargo Handling Capacity

In the "With" case, cargo handling capacity is assumed to be sufficient to meet cargo demand throughout the project life. In the "With" case, cargo handling capacity throughout the project life is given below based on the analysis of capacity of present facilities for both ports in Chapter VII.

## Port of Valparaiso

Type of Berth	Number of Berths	Capacity ('000 tons)
General Cargo	6	2,140
Container	1.5	1,060

#### Port of San Antonio

Type of Berth	Numbe	r of Berths	Capacity ('000 tons)
General Cargo	•	3	1,400*
Wheat		1	72 <sup>1</sup> 4
Container		1	670

\*: Tonnage at 90% berth occupancy ratio, which is calculated taking into consideration the different cargo volumes for each type of ship and different cargo handling capacities per hour for each type of cargo.

#### 4) Costs

## (i) Construction Costs

wITH case : Construction Costs shown in VIII-6 (1), Cost Estimate for the Master Plan, includes those to strengthen the berths' seismic coefficient up to Kh=0.25. In the With case, such costs are excluded since all the berths are assumed to have a seismic coefficient of Kh=0.20.

WITHOUT case: As in the case of XII-4, no construction costs are incurred since the WITHOUT case envisions leaving facilities in thier current state.

# (ii) Maintenance and Administration Costs

## i) Administration Costs

In both the With and Without cases, administration costs are estimated based on the number of EMPORCHI staff in Valparaiso and San Antonio Ports. It is assumed that 100 employees are required for each ports in the WITH case, as in the case of XII-4. In the WITHOUT case staffs of 120 and 80, respectively, assumed for the Valparaiso and San Antonio ports considering the number of EMPORCHI as of March 1986.

# ii) Maintenance Costs

WITH case : One percent of accumulated construction costs are assumed to be incurred for each year.

WITHOUT case: WITHOUT case: 70 and 30 million pesos are assumed to be incurred annually for the maintenance of Valpara-

iso and San Antonio ports, respectively, based on the actual maintenance costs of both ports for the year 1985.

#### (iii) Cargo Handling Costs

In both the WITH ans WITHOUT cases, the cargo handling costs shown in XII-2 are used to calculate the total annual cargo handling costs.

#### 5) Benefits

#### (i) Saving of Ship Waiting Costs

Even if the port facilities are constructed based on the Master Plan so that cargo handling capacity can meet cargo demand, ship waiting will occur to some extent due to the fact that not all ship entries and departures can be controlled.

However, if future cargo demand is to be handled at the present port facilities without implementing the Master Plan, ship waiting will increase tremendously year by year.

Therefore, the difference in ship waiting costs between the case where the Master Plan is implemented (WITH case) and the case where it is not (WITHOUT case) clearly shows the benefits of implementing the Master Plan.

In order to calculate annual ship waiting costs in the WITH case, annual ship waiting hours in Alternative 1 of XII-2, Determination of the Preferred Alternative Plan, are used until 2010 and the ship waiting hours thereafter are assumed to be constant. The figures of daily ship costs in Table XII-2-5 are applied to obtain the annual ship waiting costs by ship types.

In the Without case, ship waiting hours are calculated annually based on the data of available berth numbers by cargo type, number of ships, and average time of loading/unloading per ship. It is assumed that in case the cargo handling capacities of the general cargo berths at Valparaiso port exceed the annual general cargo demand of Valparaiso, the berths will receive the additional general cargoes not handled by containers at container berths (due to the limited capacities of such berths). It is also assumed that Valparaiso container cargoes will be handled at San Antonio's multi-purpose berth, provided it has remaining cargo handling

capacity and Valparaiso port does not handle all of Valparaiso container cargoes. Annual ship waiting hours for every five years from 1990 to 2010 are summarized below.

Table XII-5-1 Annual Ship Waiting Hours in the WITHOUT Case

(Unit: hours)

		1990	1995	2000	2005	2010
pariso	General Cargo Berth	873	5,849	6,889	6,777	6,638
Valpa	Container Berth	2,986	2,986	2,986	2,986	2,986
nio	General Cargo Berth	23,973	24,513	22,853	23,800	24,745
Antor	Bulk Berth	625	625	757	1,256	1,819
San	Multi-purpose berth	999	5,379	5,353	5,328	3,763
	Total	29,456	39,352	38,838	40,147	39,951

Annual ship-waiting hours after 2010 are assumed to be constant. The following daily ship costs are applied to obtain ship waiting costs in the WITHOUT case:

General Cargo (13,600 DWT) : US\$5,200

Wheat (28,000 DWT): US\$8,700

Container (17,000 DWT): US\$6,000

In the WITHOUT case, no consideration has been paid to the enlargement of average ship size.

### (ii) Savings of Inland Transportation Costs

In the With case, expanded port facilities are planned to meet future cargo demand for both ports for cargo assumed to be handled at no other ports in Chile.

However, future cargo demand exceeding the capacity of the port facilities in the WITHOUT case will be handled at other ports in neighboring regions of Chile.

Transporting the cargo to and from any other port leads to an increase in inland transportation costs. The additional inland transpotation costs in the WITHOUT case show the benefits of the

WITH case, since the Master Plan does not regulre such cost. Additional inland transportation costs are assumed to be 3,000 pesos per ton, as in XII-3.

### (iii) Savings of Trade Suspension Loss

As for Cargo demand exceeding the handling capacity of the two ports and not handled at any other ports in neighbouing regions due to limited capacity, it is assumed in this analysis that the trade representing such demand will be suspended. This suspension will leads to the loss of possible opportunities to add economic value in manufactusing export goods and in manufacturing domestic goods using imported materials. This loss shows the benefits of the With case, since it would not have occurred if the Master Plan were implemented. US\$132.8 per ton is the assumed figure of loss for the volume of trade suspension as in the case of XII-4, Evaluation of the Master Plan with Consideration Given To Farthquake Probability.

### (iv) Results

On the basis of the above assumptions, the internal rate of return is calculated to be 10.88% for the Master Plan with the modification of berth aseismic coefficient from Kh=0.25 to Kh=0.20 (as noted in appendix XII-II). This figure may be found to be a little bit below the Chilean opportunity cost of capital based on the 12% of discount ratio suggested by ODEPLAN. However, it is appropriate in terms of the execution of the Master Plan since both ports are prone to the risks of earthquake damage, which is not considered in this analysis.

# Table of Appendices in Chapter XII

		,,,,,,,,	page .
XII- 1	Construction Costs in Market Pice		694
XII- S	Construction Costs in Economic Price		697
XII- 3	Conversion Factors of Economic Prices		700
XII 4	Ship Waiting Costs		701
XII- 5	Calculation of Per Ton Handling Cost		707
XII- 6	Cargo Handling Costs		711
XII- 7	Maintenance & Administration Costs		714
XII- 8	Inland Transportation Costs		717
XII- 9	Number of Aseismic Berth and Costs Involved		720
XII-10	Output of Cost/Benefit Analysis with Consideration Given to Earthquake Probability		726
XII-11	Output of Cost/Benefit Analysis without Consideration Given to the Occurrence of Earthquakes		732

Construction Costs in Market Pice Appendix XII-1

## CONSTRUCTION COST ( UNIT : MIL. PESO ) ##

1998 1999 2000 5271 644 643
-----------------------------------

OTHERS CONTAINER CRARE NAVISATION AID TENPORARY ERBAKKENT LAKE ACQUISITION		** COMSTRUCTION COST ( UNIT : MIL. PESO ) **	SAN ANTONIO : ALTERNATIVE !		BERTH	PAYORATION	SK190380	200	LISHTIM TOWN	BESTATER	OTHERS	CONTAINED CRAME	TENEDRARY EMBANTMENT	LAND ACQUISITION
	i	* COST (	AL TERMIT							<b>.</b>		Ų.	E CA	5
	9	CENT :	1 34	1385						٠.				
	4660 2706	IIL. PESO		38	1822						152	:	됬	
9,791	2705	#		1583		8\$ iš	i iš		16.					
	0			26	55 E			523		×.	152		٠.	
	2317		:	13%		3 E	. 25 . 25		<u>.</u>					
1676	3546		· .	1992				88						
	63			1993										-
	2636 7			1661				. •						
28%	7941			1995							٠			
	3331			1 9661	[65]		:		* :	:				
	1953			1 2661	63		}	8	8					
	644 6			61 3661	2885	~								
	643 5271			1999 2000		<b>4</b> 27		<b>~</b> 4	39					
	71			2001	1931			S.						s .
	0	:		2002 10	<b>.</b>	1337		:	29	751		333	٠,	٠
	0 4815			2 2003	7291	7			φ.			, co	~ <b>7</b>	
1676	7431			2004		87			-15		٠			
	123			2002	 								-	
	0			5002										
	0			2002										
	0		. 11	23038					•					
	Ð			5003		·	,							
	8273# 0			2010 TOTAL		3168	· '',							:

1502 0

<>

0

¢,

Ö

63

Š

1622

217

2082

ž

965

\$8 88

315

1881

818

188

23

88

6/81

\*\* CONSTRUCTION COST ( UNIT : MIL. PESO ) \*\*

VALPARATSO : ALTERNATIVE 2

1783 1787 1770 1771 1772 1773 1774 1775 1776 1777 1778 1779 1779 1779 1779 1779 1779			1		;			. :	. :	. !	1	;		:			:			٠	. :					
422 2196 423 423 423 4223 4224 4223 4224 4224 4		8	<u> </u>	<b>2</b>	£	<u>\$</u>	1887	266	*6	1995	9661	1997	1998	6667	2000	2007	S S	3603	2004 2			2002	2005	2002	98	10TA
64 241 241 1448 1448 1448 1448 1448 1448	BERTH	٠.	ğ	.*		•	· ·	2136		2196		2136	135				٠			. ;	•					315
1214   320   320   320   320   2108   1448	KEVETKENT																									١.
241 241 241 241 241 241 341 644 644 644 644 644 644 644 644 644 6	I KORONA			121					330		320		320	2108										٠.		8
241 241 241 544 544 544 544 544 544 544 544 544 5	RECLAMATION			:					1448	:	1448		1448													Z,
241 241 241 241 644 644 644 644 644 644 644 644 644 6	285D51345	÷	35			٠.																				10
322 379 444 644 644 644 644 644 644 644 644 64	ROAD		. :		241					241			241		242											*
352 378 19 39 278 1676 1676 1676 1676 1676 1676 1676 16	035			:			:		7		3			75	•											5
1676 1676 1676 1676 1676 1676 1676 1676	LIGHTING TONER			£					6		61		13	33							-		:			5-1
CRAME A.10  PROMIENT 226 450  STITON 0 4698 3349 241 0 0 2646 2431 2437 2431 2196 6629 1467	EDEC 1710% 1920		S										278							٠						38
ER CRAME 1576 1104 AID 1871 ERBANATENT 226 1871 ERBANATENT 226 1891 2191 2191 2196 6629 1467	3REAKWATER										٠	٠.														٠.
1676   1676   1676   1676   1676   1676   1676   1676   1676   1676   1676   1676   1676   1676   1676   1676   1676   1677   1676   1677	011525																									
NEMENT 220 450 IN 0 4698 3149 241 0 0 2646 2431 2137 2431 2196 6629 4467	CONTAINER CRANE			1676	- 1	:	:							1676												Six
ON 00 4698 3149 241 0 0 2646 2431 2437 2431 2196 6629 1467	KAVIGATION AID										-							. '								
0H 0 4698 3149 241 0 0 2646 2431 2437 2431 2196 6629 4467	TEMPORARY ENBANKINENT			228				55																		678
241 0 0 2646 2431 2437 2431 2196 6629 4467	LAND ACQUISITION		• :															4								¢3
		9	8697	3149	241	0	0	2646	2431	2437	2431	2196	6299	1467	242	0	0	0	0	0	0	0	0	0	0	31567

## CONSTRUCTION COST ( UNIT : MIL. PESO ) ##

SAM ANTONIO : ALTERNATIVE 2

H	1987 1988	8 1989	1990	<u>&amp;</u>	1992	1993	1994	1995	9661	1997	8661	6661	2000	2001		2003		2005 2	2006 20	2007 201	2008 2009	39 2010	•
	628								1560		586				1630		1622						157
	4231										1914												55
-		2862										2395					469					٠.	57.
RECLAMATION		1448						•				740											216
٠		1448										740			:								211
, e		-	695									348											ģ
			1046																				Ď.
NAFR		28								8		40				20		19	٠				r-4
DEMOLITION WORK	724									151													99
													4366	1434									ŝ
	٠.	739																					7
CONTAINER CRAME		1676										1676				:							R
AID	٠.													2									
ENPORARY ERBANKHENT	S	ניע		•																			105
SITION																							

0 11345 8587

\*\* COMSTRUCTION COST ( UNIT : MIL. PESO ) \*\*

	TOTAL	11490 0	& °	84.8 27.9	1561	829	<b>6</b> 5 C	13	တ္လ		18468		4,		TOTAL	5979 5979	7652	3630	1046	7 K	2008 2008 2008	% % %	22,	- S	53620
	2010 10	듸			•		-				0	÷			2010	:			: .			· ·			¢
	2003	•							٠		රා				5002				*		e.		·		¢
	2008										65				2008	•			: :	•					
		÷									8				, , , , , ,	.*					•				¢
	2006 - 2007										6				200%	٠		:	٠			!			·
	2005 20			24	543		•	٠			836		-		2002 2		694	. !	278	13	され		25		. 400
	2004 20		292	-		8					282				2004 2	729	1326	32		23		21.7	0		
		8	2								1520				2003 2	3041 1	•			67	•	.*	•		
	2003	1520									0	٠			2002	1630 3									
	1 2002										0	•			2001 20	=									
	2001	_		<b>p</b> -	3		-				193				2000- 20	: :				٠.					
	3 2000		<i>6</i> 5.	5		8									1999 20		654		278	19	53.				
	1999		1519			<b>™</b> 3		21.0	3		10 2386				61 8661	1622	*		~			-			
	1998	1930				. 61					1930	٠.			٠.	9	÷		٠.	61					
	1997	_	262	<i>:</i>			:				0 231				1997	9.									
	1996	1520									1520				2 1996	1559									
	1995				949					. •	\$449				1995					•					-
	1994	٠	262			61		. i .			38				1994	•								1 35	
:	1993	1520				ţ	382				1903				1993								<b>~</b>		
	1992		262		193	61		÷.			1118				1992			55		8		217	1676		+
	1661	2500									2500				1661	Ŕ	3								-
	1990		-	• . •			• *				0				<u>%</u>					96					
	1989		362	٠		13					8	# C			1989			1442				ន្ត	1676		
	1988	2500		<b>8</b>	:		246		٠		2794	ŭ.			1988	\$\$ \$\$	2863	,		, or	Ž			S 82	
,,	1987			*	• '			. 1		•	0	7 1887 Y	1110	14E 3	1987				•	٠.				•	
30,1,176,00	CARAILT		,			÷		:		ILECHT.	1	) Loue 4	200	LIERKAT.				:		*	<u>.</u>		w	WENT GR	
7 JULIEROST III CONTRACTOR	를  궁	-	<u>.                                    </u>	蹇		10463	TON MORY	ğ.	CONTAINER CRAKE	TEMPORARY EMBANIMENT		## DEGO   IN . HIT . HE DEGO . ##	180010	SAN ANTONIO : ALIERNATIVE 3			×=	1104	P	SWED TOSTING TIMES	DENOK ITTOK BORT	<u></u>	CONTAINER CRAKE	TENPORAT ENGANTERI	
	LPARAL.	BERTH	REVETIENT	RECLAMATION DREPS INS	8049	LIGHTING TOWER	DEPOLITION NORK	OTHERS	MYTSATT	TERFORMS		2	2	11.54 TS		EXE	REVETIGAT	ECLAMATICS.	900		ECHOLITY CO.	SREATHATER OTHERS	CONTAIN	100 S	

\$259

Appendix XII-2 Construction Costs in Economic Price

es constituentes (son el constituentes el con el constituentes es

CAPABAISO : ALTERATIVE :

			37	- 4					ź.	35844		٠.						**	1 35 31				٠,	:	٠.
•	1	\$800	S	388	1	200	7	70.	396	905	3	27.7	200	865	2001	2005	363	38	1	133,	169	Sec	å	310	1014
							•				٠.			;									:,		
SEETH	ূল <u>ে</u>	1353	5	*.7	3		-	28.60	876	:	6	0	Ð	8278	·	6	3792	473	o	()	<b>63</b>	c	¢3	e3	22:101
1834,13638	en.	❖		ς.	9		C	c s	c	0	ల	es	£	0	0	c)			es	62	<b>G</b>	40	5)	<b>\$</b>	<>
PAVENENT	Ð		33	5.0	c	_	c	۵	0	67	516	0	-		<del>.</del>	ţ		•	Q	13	9	Ċ	e.)	6	eş,
NECL AND TION	c	***	<3	.0	0		G	0	35	27.7	O	2.5	~	O	O	9			ç	Ģ	c	es	Ċ	æ	S.
00000000	<b>*</b> 3		3	د>.	0		0	¢,		-	0	c	0	0		6			Ö	o	ဓ	ÇЭ	O	5	:0
CT UA	0	co.	53	٠,	ø		2	0	0	<7	220	œ.	<b>(</b> =	0	Φ				?;	Ö	¢)	F,3	63	9	ö
5%5	Ð	429	0				ca	¢3		(2)	.00	7	C QQ	c	ပ	9			0	ę	C	ø	123	¢	37
SENTING TONER	es	53	77	0	Ç		, Ca	0	6	Ş	ę,	60	•	57	دع	•			ro	65	c	r(t	co	ė	ž.
55.HOL 17 TOX WORK	<b>c</b>	G	•	o	¢3			0	a	477	C)	<b>~</b>	4	c		eo			යා	E0	t>	43	G	ćs	570
346417447ER	e)	0	(0)	C.S			0		0	m	'n	ò	3	0	-	0			ç	0	O	Ċ.	0	ç۵	a
O FAE P.S.	0	41	40	0	G		C)	-		9	0	0	ပ	<u>ပ</u>	0	0			c	13	0	<b>57</b>	G	0	හ
CONTA THER CRANE	<b>C</b>	· <3	60	, co	0	- 49		•	<b>⇒</b>	0	C	a	c	a	0	9	5	36.	20	¢	63	e'o	7	D	33
MANTSATTON ALD	-	C)		æ	0		۲,	0		0	ca	Ď	0	G	୍ଦ				e>	0	Ġ	63	Ö	¢	ė
TENPORARY ERBANGMENT	c	· >	. ·	0	0			0	Ē,	9	5	<b>c</b> 3	co	0	-	cə			ķs	ဗ	0	452	c	C	ą.
HOTLISTED A COLLSTA	O	6	0	C:	<b>D</b>		0	0	0	<b>~</b>	•	0	¢.7	c	•	٥.			₹>:	₽.	<b>t</b> a	53	6	က	0
101AL	6	474.	2877	0	190	2495	\$	20.39	2002	2.5	38	190	999	5376	9		7,005	7.5%	£6	6	6	0	43		48542
	. •	9775	1039	~	· ਜੋ	1845	2	1638	3334	1028	215	173	:\$:	23	0	c:	816	Ş		'n	Ф	· co	6)	0	7.55
107AL						13584							17001											388	\$8342
<b>3</b>						3982					•		5833			•								388	1367

\*\* COMSTRUCTION COST ~ ECONOMIC PRICE ~ ( OMIT : MIL. PESO ) \*\*

SAN ANTONIO : AL FERNATIVE L

			PHASE			-			Ė	PHASE - 2			-					<u> </u>	PH4SE - 3	r) .	;			-	
	1987	856°	687.1	0.66.1	[66]	1992	1983	494	<b>36</b> 0	1991	1402	1128	6001	2000	2001	2002	2003	2000	2002	250%	7667	3008	<b>26</b>	2310	1014
K2838	•	1658	æ	. 55	æ	0	0	0.	دن	25.23	છ	2983	6	:33	1970	•	1391	'n	ç,	0	c	0	ć	0	\$6517
REVE THEN T	6	0	rs	795	c	ల	0	0	C	¢	c	0	0	O	0	0	0	E	Đ	0	9	C3	c	c	3
PAVENER	•	0	17	C	17	0	63	0	c	÷	0	Ü	E)	Ö	0	1385	0	13	Ç	0	0	0	c	ÇD	Ž.
RECLAMATION	0	c	552	Đ	162	0	0	cs	Ø	ω.	¢5	0	0	ø	0	•	0	0	0	0	9	۵	c;	Φ	8
DREDGIME	0	0	291	c	873	0	9	c	တ	0	9	0	0	0	O	0	o	63	c	ಲ	0	¢	ç	C)	183
0000	o	0	C	<u>a</u>	0	57.9		0	<b>-</b>	c	279	0	67	3/2	c	c	ප		6.		0	C	0	C3	8
2	0	0	.00	5	-	255	Û	0	3	÷	69	0	0	0	0	O	0	0	0	o	o	0	<b>©</b>	to	1973
LIGHTING 108ER	· c	0	. 25	-	55	0	9	0	د>	0	71	0	ņ	Ö	Ç,3	유	0	8	9	c	0	43	Đ	O	ŝ
DEMOLITION WORK	٥	0	<b>-</b>	238	0	¢>	0	0	0	0	¢	-	9	<u>a</u>	149	0	C7	0	0	0	C1	ь	ల	0	Ŕ
ASEALUATER		0	0.	0			0	6	0	6	9	9	9	0	0	4	Ċ	0	10	o	0	0	0	o	0
OTHERS		. [4]	. 0	163	. 0	. 0	0		-	e	- 13	Ç	•	0	0		ō	0	¢	c,	0	Ç	0	<b>63</b>	ES
CONTAINER CRAME		6	C	9	· (2)	ers.	0	10	6	0	0	0	. 0	0	ò	E.	0	0	0	ė	Ċ	లు	9	5	5
NAVIGATION ALD	0	0	0		D	0	0	=	9	Ö	D	c	0	9	0	<b>=</b>	45	0	0	0	e	Ç,	0	0	<b>.</b>
TEMPOSTON EMBANEMENT	<b>C</b>	103	0	0	0	<b></b>	9	0	c	6	خ	0	0	çs	0	0	o,	6	c)	¢3	9	62	63	0	103
LAMB ACQUISITION		0	0	c	c	0	0	0	0	e	ø	0	0	ė	es		0	0	0	6	-	0	6	ဌာ	-
10741	0	1920	1034	2959	1617	816	D	0	0	1623	ş	274.3	472	273	2119	2240	1654	626	0	0	В	0	to	Ö	20902
٧.٩	0	1533	736	1381	416	514	Đ	Ð,	•	523	98	755	801		387	365	241	:5	O	ပ	0	0	O	0	8087
701AL						3346							5333											8169	20602
P.V.						5478				•			22,917											2011	8082

\*\* CHNSTRUCTON COST - ECHANIC PRICE - ( UNIT ; MIL. PESO ) \*\*

۶4
47.75
H. I.S.RA.
ŝ
N.FARATSO
5

		PHAS	PHASE	7			1		Z :	PHASE - 2			-					. 6.	PHASE - 3			;			
	186	887.	- Se	6	3	Gr.	25.7	24.5	<u>8</u>	1796	(96.)	F\$	660	2660	3003	2002	2003	300	2005	39,056	2007	2008	3604	2	T0174
8ER7H	ca.	9	.=	Ġ	C1	į.	2240	0	978	0	2240	60+	Ģ	9	c.	ca		0		0	ಎ	<.	~	6	9677
REVETACES :	0	0	9	c	3	-	0	9	0	=	O	•=	es	¢	2	6)	c			(D	7.5	c	en	0	Ċ
INSKSAY .		٥	1148	0	0	9	o	303	0	303	0		Š	•	=	0		co			47	6.7	· 67	e e	107
RECL AND LOS	0	ಎ	to	*3	ø	0	<b>ć</b> 2	28	Ö	762	0	394	0	9	0	3	0	9		د .	ದ	ن د	e es		(83)
DAED6146	o	26	;	0	13	0	ß	b	င	¢	0		==	(2)	c	G	0	C?	6		¢,	0	E3	0	3
ROAD	\$		O	6	0	⇔	ņ	G	23	0	0	228	<b>6</b>	225	Ð	6		0	0	Ö		ca :	0	c	716
925 225	0	Ç	0	<b>_</b>	ņ	0	÷	. 06]	C	199	0	0	\$	0	0	0	د.	<del>111</del>	6	œ	ç	45	6	. ←>	2005
LIGHTING TONES	÷	ca	9	n	0	cs	0	8	0	2	0	£	40	0	e :	6	->	<u>-</u>	ς,	c)	٥	n	ea	c	ř
DENOLITION LORK	G	233	0	çı	(3)	0	9	13	0	0	Ь	275	0	ల	c>			6	0	ť,	ç,	(B)	C)	Q	555
BREATHATER.	<b>c3</b>	Ç	0	9	_	•	0	-		€3	0	٥	0	0	0	=	0	0	6	0	6	9	c,p	en	de
OTHERS	Û	લ્ઝ	<b>-</b>	0	9	0	23	:	0	5	6.3	v	Ġ	0	<b>~&gt;</b>	0	63	<b>e</b> si	C3	Ö	co	(T)	¢	c:	က
CONTAINER DRANE		Û	38	-	=	0	=	_	<b>4</b> >	0	0	0	186	0	0	C.	છ	5	دء	es	(7)	es	en.	c)	27.72
MAY TGAT TON A TO	9	0			0		ವ	0	ç.	-	53	47	63	c	دء '	9	G	53		c»	e,	6.3	o	<b>23</b>	မ
TENPORARY EMBANDENT	0	c	333	O	e,	3	7	Ð	9	æ	9	0	0		_	G		9		<b>.</b>	O	ø	¢)	c	658
LAKO ACKUTSTITOR	္	c3	2	· • · ·	0	co	0	•	co :	ės .	<b>c</b>	ē	0	<b>ت</b> ا	c:	<b>5</b>			ප	c»	4.5	es-	co.	e	Ç
Tr10.1	a a	9	1265	ā	U	<b>⇔</b>	2881	2377	200	<u>(22</u>	33.40	T <sub>Q</sub>	(556	22,	0	40	9	0		67	60	43	E)	0	£83
***	9	2003	\$17.8°	545	6	7	T1.23	<b>9</b> 68	668	2,45	444	1.07	1044		o	0	¢	5.	0	0	ω	a	623	es	1887
נפנא	٠.		,			9270							23326											133	1787
in de						.275							7217											47	3
	٠.							٠.																	
		*		1						:															

\*\* CONSTRUCTION COST - SCONONIC PRICE - ( UNIT : MIL. PESD ) 14

SAN ANTONIO : ALTERNATIVE 2

1951 1959 1959 1959 1959 1959 1959 1959	1844   1847   1847   1848   1844   1848				3557						P. P								357%						
		•	2.	8.				iden.	) <del>(</del> 40)	o.		į							}		200		83	30.00	
				61			. 69	* *3		:3							S	. 23 - co	3		41.7	67		2035	
2.50		EN3			147	~		8.9	es	<.										 *>		E)*	e)	Z,	
	1724 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	×	•	£3	(2)	0		=	c	6							0			(CA			¢x	3	
	132	35. Y			1351			-	Ç	9							co	P					63	8	
20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	173   174   175	æ		0	350			£.3		5													¢;15	E	
13. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10	13. 18. 18. 18. 18. 18. 18. 18. 18. 18. 18	:			c)	C5"		-3	2.5	0					•								to :		
1983   1983	17. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19				0	(6)		हरू	법	e,7													:	1073	
0 17	0 17	20 CD CE			°2			43	÷	<b>5</b> 2													O	10.	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1971 1970 1970 1970 1970 1970 1970 1970	The west		e)	ς.; Σ.	•		<b>\$2</b>	12	?			-										ξį	33	
1981 1991 1992 1991 1992 1991 1992 1991 1992 1992 1993 1993	1900 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	# P		æ	0	£3	6.3	C	-	~					-								£23	23 .X	
	156.1   156.2   156.3   156.			115	7.	43	£3	103	rs	· -													kit s	7.	
We will be a control of control	WRENT         0 <td>ER CRANE</td> <td></td> <td>ta.</td> <td>1631</td> <td>0</td> <td>ප</td> <td>~</td> <td>r:&gt;</td> <td>473</td> <td></td> <td>47</td> <td></td> <td></td>	ER CRANE		ta.	1631	0	ප	~	r:>	473													47		
NY 6 103 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	NHEST G 103 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	04.80		**	53	٠	40	45	Ü	=													to	11	
6 B 3 S C 2 D 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6 B B B C E B D O O O O O O O O O O O O O O O O O O	ENSANTRENT IN		9	· · ·		42	c	0	12		Ġ	÷								٠.		ī	8	
600° 1100 0 0 0 0 159° 170° 574° 140° 140° 140° 21° 2° 2° 2° 9° 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6559 1731 3 0 0 0 0 1581 178 5/49 1924 4259 1402 21 2579 20 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	- MICE 2550M			6	6	Ç	era	63	<b>E</b>		٥.	6	1.								٠.	دع	c3	
1100 0 0 0 0 0 512 49 (476 1258 871 256 271 7 273 2 5 5 6 6 9 8 21663 13434 1359	1100 0 0 0 0 0 152 49 1476 1238 871 240 271 7 273 2 5 5 6 0 0 0 2 2455 21543 21543 21543 21543 21543 21543 21543 21543 21543 21543 215444 21544 21544 21544 21544 21544 21544 21544 21544 21544 21544 21544 21544 21544			THE &			-	e)	0	e		1										0	eni	14.55.7	
See	2868		•	ĝ	3 60%2			co	0	 E1	ပ	512	\$				27			(*)	e	0	63	21124	100
					•			21863		٠				<u>:</u>	77	:	: *						24.35	28577	
						. '		\$6291						ri	134								54	ž	

AN CONSTRUCTION COST - ECONOMIC PRICE - FONT | MILL PROFILE

इ अमेलको हा । धराहार गाउ

			300%	7."	. :	₩,			Ž.	· *			• •					₹	· ·	:	:			!
-	182	F	Ē	3	<b>X</b>	<u>\$</u>	(06)	70 c	. š	ş			3		100	200	E 2002	1224			Die E		2	1
7.1.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.	ω.	25	€\$	69	2550		333	5	¢.s	883		144.		es		,			0				E) (	22.5
35.00 TROAT	્	9	٠	es.	<b>⇔</b>		o ·	۰,	י כל:	ro j				ري. ا	φ,									
38383A76	ca	9	9	4.5	9		c .	95 I	<b>5</b>	æ. €		•		Eà 6	φ.				:					
RECT ANALTON	etta -	•=>	< <b>⇒</b> •	en 1	0		Φ €	cs e	٠.	<b>~</b>				sa t	ى د									
085061m8	Ö	ş (	e e		es, e		e	<u> </u>	90	- C			:	> £	3 6									
and the second	e.	(3 ec	9 19	5 C	5 ೮	7 F	<b>.</b>	<b>,</b> 0	7 49	, es			, e)	2 62	9 6	· C	* 4,3	, <del>(</del> 3						
LANCE TOWNS	ت د	9 49	2	, c				8	0	es.				Ç.										
1580, [1194 well	- (3)	2	c		10		37.	0	en.	0				D	ن									
8514WATES	¢3	20	ä	٠	co		53	-5	a	123					<b>2</b>									
OTHERS	>	67	:23	e's	0		۲-	C?	ta	÷				↔ .	en i									
CONTAINER CRANE	6	<b>~</b> 3	0	9	8		( <u>n</u>	င	9.	<i>a</i>				0	<b>c</b>									
KANTSAFTON ATT	O	O	6.7	0	o		e)	9	⋺	239				Ģ.	ري ا									
TERPORARY EXSLANABLE	eris	<b>c</b> >	.>	æ	÷		c)	0	e e	·				G :	<u>.</u>									
LAND ACQUISSISM	<b>C</b>	₹⊃	ج.	ده	es-		-	0	0	-	į	3		e> }	0	•	:	- }				1		- í
(B) AL		3339	7.55	0	1230	1111	ŝ	38	48	1550	142	0961	2397	163	9	6	3553	Sec. 253	342	Đ	<b>t</b> 5	Ca.	: :-	18981
a.	~	2264	Ģ.	¢	144.	R	377	<u>s</u>	\$6. 6.7	0	æ	瓷	25	s	63	c•	200	:- :	₹′	676	40	٠.,	69	Side 1
77 (0)				٠.		6/63		- 2					3040										1345	88
į.																					٠		j	
, y,						404							(1872)										ř,	g El
** Construction cost - Edonomis Price	SEONON.	33(55.2)	tim ; ,	M.L.	8530 i •	<u>.</u>									-									
S BATTERN STERMITTEE S	1176.3										,						•							
			ž	-		-			70	25 July 20								Æ.	Presse - 3					
			TOWN		.,	,						**********					ļ	í					,	
	1383	35	ABS:	340.	8	36.	566	1944	500	<b>€</b>	100	504	1,661	2000	2001	2002	2002 2	200x	2002 2003	23 28	<u> </u>	30.	2000	. 1845 1945 1945
SERTH	G	1149	0	0	3103	9	G f	0.0	G (	0.51	9.	1654		<i>a</i> ·	9 (	1691	1102	.65	⇔.ರ	<b>5</b> 6	¢> ⊂	r.s. «	i ra n	6/35 - 1917a
REVETHENT	φ:	555	<b>c</b> 3 (	·	<u>;</u> `	<u>-</u>		0 0	9 0	, s	9 9	c	2 3	o e	9 6					• c			1 1/3	100
PAYENCH!		/D/7	7 22 7	2 K	<b>-</b> C	2261	> <b>c</b>	<b>-</b> -		5 0	, (	0				. 0				. 0				
APE 05 745	9,00	9 0	2785		. 0	260	9	· <>	0	φ.		ري	23	C	0	D				0				
ROAD	\$	0	0	25)	0	5	0	0	0	9	0	0	262	6		0				s				
5HED	8	0	c	1073	0	CT.	<u>-</u>	<b>6</b>	0	e2 ·	ې ت	<b>.</b>	<b>e</b> ;	o:	٥,	0 4				30				
LIGHTING TONES	0 (	<b>9</b> 5	co r	æ	÷.	7; 6	ಶಕ	<u>~</u> :	es 6	<del>-</del> -	2	<u>۽ ڊ</u>	7 9	. t. c.						o ⇔			٠	. 6
DERUG ELLON MORE	<b>-</b> -	3 6		<b>.</b>			a e	• =	• =		. 0		E	6	•	ď				0				
DAZANGALEA OTUSBA	· c	9 0	\$50	, 0	~ ~	5,5	. 0		0	•	0	13	9	0	C	0				es.				
CONTAINER CRAME			1881	0	-	1881	0	0	0	0	Đ	<b>5</b>	0	0	0	0			٠	9				
NAVIGATION ALD	0	0	e3	0	0	6	0	0	Б.	0	₽:	<b>.</b>	<b>~</b> (		<b>.</b>	0 :								
TERPORARY EMBANKMENT LAND ACQUISITION	o <b>o</b>	32 52	c	00	<b>5</b> \$	~ O	ල <b>ා</b>	00	0.0	20	<b>-</b>	⊃ <del>c</del>	<b>3</b> 0	3 D	- ·	<b>.</b> .	<b>.</b>	3	כים	. 0	, es			- 1
TOTAL		1444	1459	(400	3742	555	a	0	0	0651	æ	\$591	37.8	. 0	٥	1543	1121	11562 2	. 2512	0	=	()	G	0 SJA10
5	. =		1691	1017	2124	2358	0	0	ĵ	512		425	100	0	ဗ	271	\$\$	1503	223		Ð	•	(3)	0 2532
	,																							

18497 53665

1143

31032 21705

107.AL 2.9.

### 1. Calculation Formula

Conversion Factors = A/100 x E.R. + B/100 x 9/10 + C/100 x 7/10 x 1/2 + D/100 x 8.5/10 x E/100 x 9/10

Whereass: A = Percentage of Imported Materials Costs

B = Percentage of Skilled Workers Costs

C = Percentage of Semi-skilled and Unskilled Workers Costs

D = Percentage of Domestic Materials

B = Percentage of Other Domestic Costs

E.R. = Exchange Rate Adjustment Factor (1.13)

### 2. Conversion Factors

Estimated	rercentage in rii	nanciai Costs
er and the state of		
Skilled	Semi-skilled and	Domestic

Cor		aterials	Workers	Unskilled		Materials	Others	Factors
1	Berth	60	4	2		20	14	1.0200
2	Revetment	45	2	1		40	12	0.9795
3	Pavement	35	7	3		45	10	0.9460
4	Reclamation	35	3	2	•	20	40	0.9625
5	Dredging	35	3	2		15	45	0.9650
6	Road	35	7	3		45	10	0.9460
7	Shed	65	11	4		15	5	1.0260
8	Lighting Tower	65	4	2		23	6	1.0300
9	Demolition Work	45	4	2		15	34	0.9880
10	Breakwater	45	4	2		40	9	0.9755
11	Others -	45	3	2	•	30	30	1.0705
12	Container Crane	95	0	2		0	3	1.1105
13	Navigation Aid	95	0	2		0	3	1.1105
14	Temporary Enbankment	45	2	. 1		40	12	0.9795
15	Land Acquisition	0 . 0	0	0		0	100	0.9000

18 3	mJ2	VALL	1HG	COSIS	) t
------	-----	------	-----	-------	-----

			4 1																						
4			i. !					1.								_									
		:				App	end	ix	XII	4		Sh	ip	Wai	tin	g C	tao	S							
ship walling c	:0513	31																							
9.1			4.7	, .																				•	
ARPARAISO : ALTE	RNAT	IVE I			1, 1.																				
SHIP WALTING HO					1.100	LDSI	1660	toda	1861	's sot	10	15.33	e state.	1665	4500		****		0001	4445			0000	4040	
		1987	1900	1937	1390	1991	:	1993	1994	1771	1996	1997	1998	1999	2000	2001	5003	\$007	2004	2005	2006	2007	2003 .	2009	20
SEHERAL: `S S 10		237 250	135 -205	241 316	165. 276	165 276	16\$ . 276 :	165 276 -	165 276	141 189	141 - 138	20 36	36	20 36	63 84	63 48	63 48	43 .48	63 18	63 56	63 86	63 86	63 86	63 86	1
10 29	)	1440	.1247	1873	1365	1362	1362	1,762	1362	1426	1126	281 38	231	281	469	169	469	169	469	40)	603	603	603	693	. 9
50,10	•••	117	125	165	119	119	1}9	112	113	130	130				50 	. 30	30	JØ		67	67		67	67	
\$101 802	k <u>t</u>	2046	1713	2575	1922 :	1922	1922	1955	1922	1885 -	1835	375	375	375	411	611	ы	611	611	817	813	819	819	819	12
REFER : 10°20		350 30	792 114	1357 157	822 100	\$22 180	322 180	322 180	422 180	356 303	203 203	175	175 78	1/5	20¢	204 72	206 72	206 72	206 72	275 115	276 115	276 115	276 115	276 115	5
				*****										• • • • • • • •											
SUB TOTA		920	906	1513	1002	1002	1005	1002	1002	1064	1064	253	253	253	279	278	278	278	278	391	391	391	391	391	6
WHEAT : 19720 20130		0	0	9	0	0	. 0	0	: g	: <u>0</u> 8	0 0	0	9	0	Ď O	9	() ()	. 0	. 0	. O	. 9	Đ Đ	0	9 6	
10,40		9	0	0	Ø.	a	0	ò	9	0	0	9	ò	ĝ	ð	8	à	ō	0	9	Đ	9	Ğ	j	
SUB 101A	ŧL.	ŋ	G	0	Ú	. 0	ø	g	ij	8.	ď.	ij	ø	ű	Û	0	ď	ĵ	Ġ	G	0	a	0	ø	
CONTAINER 1160	)	340	526	1051	1163	1183	1183	616	615	616	616	616	616	616	1917	1917	1017	1017	1917	263	263	263	263	263	ì
10~20 20~30		201 56	417 114	526 207	303 202	303 203	802 103	497 291	197 291	497	. 497 291	497 291	497 291	1)? 291	909 766	209 766	909 . 766	96) 766	707 755	286 243	296 243	286 243	236 243	286 243	2
										;														791	
SUB 1014		600	1060	1883	2288	2286	2288	1404	[404	1404	1404	{ <b>40</b> 4	1494	[464	2693	2693	2693	2693	2693	791	791	791	791 -		
OTAL		3566	3679 (*******	\$991 *******		2012	5212 *******	4327 :::::::	. 4329 ::::::::	1353	4353 	2032 	5035	2032 	3581	3581 ******	3581	3581 2022:22	3591 :::::::	12021	3601	200}	2091 	2091 	25
100	•																								
E-SHIP COST / DAY	) (U3		10.50	1000	Inon	1001	1063	1003	1201	Leat	100		inno	1500	2650	2001	2500	2003	2004	2005	2004	2007	2008	2009	20
•		1787	1988	1989	1390	[99]	1992	1993	1324	1995	1976	197)	1998	. 1699			2002	2003					:		
GEHERAL . Refer		5200 5200	5200 5200	5200 5200	5200 5200	\$300 5300	5300 5300	5300 5300	5300 5300	\$100	5400 5400	5400° 5400	\$400 \$400	5400 5400	5400 5400	5500 5500	5500 5500	5500 5500	5500 5500	5\$08 5\$00	\$600 \$600	5600 5600	5600 5600	5600 5600	56 56
iheat Container		9700 6009	8700 6000	8700 6000	9700 6000	8300 8500	6369 6369	8500 8500	8300 8300	6200 4500	8709 7000	8700 7000	8900 7000	8700 7000	8900 7000	9000 7500	9000 2500	9000 2500	9000 7560	9000 7500	9190 9000	9100 8000	9100 9008	9100 8000	31
NAME OF STREET		0600	00VV	9000		9394	(*)(*)	8350	0200	*100	1000	7090	.900	7.00	7003	7705		, 220		7952		0000	2000	5545	-
( WAITING COST ()	MEC.	PESO)	)				:																		
		1997	1980	[589	1970	1991	1392	1393	1331	1995	1336	1997	1998	1939	2000	1025	2002	2003 <sub>.</sub>	2004	2005	2006	2007	2006	2009	20
EKERAL		89.	74	112	- 33	a5	35	85	35	83	85	17	17	17	. 27	23	28	23	28	38	38	33	58 18	58 18	
HEAT :		40	39	66 0	43	16	4.4 0	- 6 44	. 44	47	49 0	11	11 0	}1 0	13 0	13 Q	0 12.	13	13 0	18 0	18 G	91	8	9	
CONTAINER		30	- 53	41	114	124	324		76	76	\$2	8?	82	\$Ž	157	851	188	163	168	49	53	53	53	\$3 	
		259	186	: 272	241	253	253	203	205	286	215	110	110	110	197	209	203	209	299	105	199	109	109	109	
WATTING COST :				IE. PES 1989		1991	1992	[59 <u>]</u>	1334	1995	1995	1997	1998	1400	2000	<i>1</i> 001	2602	2003	2001	2015	2005	2007	2008	2009	2
ENERAL		79	59		53	48	43	39	31	30	27	5	1	ŧ		5	5	4		4	. 4	4	3	. 3	
ieren	•	40	19	66	17	14	4.6	44	441	47	48	11	11	- 11	13	13.	. 13	13	13	18	is	18	18	18	
iheal Contaener		0 30	0 53	0 74	ù D	124	ð g	9 76	75	9	0 \$2	0 82	9 '\$2	0 0	0 157	9 169	0 168	6 159	0 149	†3 6	0 53	9 53	a 53	0 53	
							->															 75	74	74	
		149	151	210	76	216	87	159	155	27	157	၁ခု	ગ્હ	15	175	184	185	185	135	?2	. 3	/3	. 24		

VALPARA ISO	:	ALTERNATIVE	2

LISHIP NA	ATTES ROOF	IS FOR E	ACH YEAI	( )																					
		1997	1988	1989	1990	1991	1992	1993	1994	1975	1996	1993	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
												••••					****			:					
SENERAL :	. `5	239	135	241	140	140	140	140	140	88	33	843	. 43	- 83	17	1)	12	17	1.7	65		63	63	65	31
	\$*10	250	205	316	225	225	225	225	225	155	155	155	155	155	34	34	34	34	34	86	66	36	85	86	123
	10,50	1440	1247	1973	1314	1311			1344			1155	1155	1155	279	219	229						60 5113		
							1311	3344		1155	1155							273	279	803	603	603		603	921
	59,39	117	125	165	181	183	183	183	183	161	161	151	161	161	37	37	37	37	. 37	57	6)	-67	67	63	103
				-,	•																				
	SUB TOTAL	5046	1713	5595	1845	1895	1855	1335	1995	1559	1559	1223	1559	1558	365	366	166	365	خدد	814	819	819	310	813	1571
•																									
REFER	,10	830	792	1357	334	385	835	886	688	332	752	:325	752	752	ls3	163	153	163	lol	276	276	276	276	6	526
	10~20	90	111	157	255	215	255	353	255	300	320	300	390	300	83	63	1.5	83	8.1	115	115	315	113	115	113
																									~
	SUB TOTAL	926	906	1513	3140	1149	3240	1140	2140	1052	1052	1052	1057	1952	245	246	243	245	216	391	391	291	331	321	673
								***			.,				-,-						*				
S(q,1)	10,720	ß	0	0	ŋ	. 0	Đ	, D	. 0		ŋ	9	ė	0	9	9	0	ŋ	. 0	, D	. 0	- 0	. 6	. 9	ø
	20,30	. 0	,	ũ	ő	. 0	. 0	. 0	8	ŋ	ē	0	ð	0	: 8	0	j	0	Ù	. 0	e	Ď	ū	Ö	. 6
	70,10	n	ũ	0	· 9			.: 0	a		a a		1 0		4	-	0	0		. 0		9	. 13	e e	()
	20 12	9			ď	. 0	. 0	ų	G	0	q	0	ij	0	Q	. 0	Ų	V	. 0	· U	. 0	9	ų,	u	9
	JOB 7551																								
	SES TOTAL	Ü	D)	. 13	Ð	Ø	Q.	Ġ	. 4	Đ,	S.	Ų.	. 0	ŋ	ø	. 13	Q.	ð	. 6	Ü	(3	0	0	0	6
															100	1.				:					
Container		79.3	1099	1591	624	514	5(4.	614	584	1039	1959	1039	1659	1059	321	121	121	121	121	125	123	123	123	123	- 121
	10,26	987	1359	2054	703	308	703	708	708	1417	1417	1417	1417	1117	- 131	191	191	-121	171	215	245	246	246	246	301
	20130	533	358 .	1316	434	134	434	434	434	1273	1273	1273	1273	1273	226	226	326	726	226	339	337	139	339	539	183
	SUR TOTAL	2346	5316	4993	1757	1757	1757	1757	1757	3748	3748	3745	3748	3748	533	538	538	538	538	708	708	708	708	703	311
											-			Ţ.									100		
19740		\$312	5935	9101	1770	1773	1793	4793	4799	6359	6353	5359	555%	8559	(150	£150	1150	1159	1154	(7()	1917	1919	1919	903	2413
.,,,,	1																								
-																									
t sura car	SF / DAT (	ozel s																							
s Shir Co	on last t		Léga	1000	1000	1007	1000	16.5	613.44			.0			2200					Mar		1653	2222	44.50	
		1997	1983	1989	1990	1301	1992	14.)	1994	1302	1175	1977	1508	1999	2010	2001	2002	2003	2004	2005	2005	2007	2008	1004	2019
																	3. 1								
SENERAL		\$200	\$200	5200	\$200	5500	5300		\$20.25	\$300	5400	5403	2400	2400.	24.40	55.03	3500	2203	3500	\$500	5400	5600	5403 .	2600	5600
REFER		5200	2500	5200	\$200	5300	\$300	\$100					5400 -	5460	5100								26(4)	รื่อนปั	5500
¥8€AT		3763	9700						5300	\$300	5:03	5400				5500	2200	5500	5500	\$500	5000	\$600	2009		
CONTAINER			,,,,,	8760	1/09	8800	8305	\$300	5603 5700	3300 2300	5+00 3900	5400 8900	37(9)	3760	3500	2300 2300	3000 2000	3200	3000	5500 19000	5600 1100	3100 3100	9100	2100	9169
		\$000	6000	6000 6000	9709 9709	8800 8500	8303 8303																	8699 3109	9100 900
		\$900						\$300	2603	3300	3300	89W	$S_{J}(z)$	3760	3500	90.0	2000	200	3000	9903	1100	3100	9163		
		\$000						\$300	2603	3300	3300	89W	$S_{J}(z)$	3760	3500	90.0	2000	200	3000	9903	1100	3100	9163		
( WATTING	cost (Mr.		6090					\$300	2603	3300	3300	89W	$S_{J}(z)$	3760	3500	90.0	2000	200	3000	9903	1100	3100	9163		
( WATTING	ogst (MIL	, PES0)	.6090 ; )	6908		<b>6500</b>		\$300	2603	3300 6500	2900 2000	89W	3769) 7000	3760	0246 0905	9360 7500	9996 9500	2500 2500	7500	3000 2500	1169 2001	9100 3000	9163	9998 -	594 <b>0</b>
( BATTING			6090		6000		6500	4200 4200	88118 5580	3300	3300	8900 7900	$S_{J}(z)$	3700 7000	3500	90.0	2000	200	3000	9903	1100	3100	9166 3690		
		, PES9) - 1997	6 <b>000</b> . } 1988	1593	6000 13%	5560 1991	6500	3300 4500 1993	8618 6500	3830 6900 1905	3900 7000 1278	8900 7900 1997	379) 7036 1778	1970 1926 1977	950 7000 2000	7500 7500 7501	7500 7500 7500	2500 2500 2500	7000 7500 2501	7008 7500 7500	1100 2001 2003	9180 3000 2007	9169 5699 2009	8000 7009	3948 2010
GENERAL		, PESO) 1997 39	6090 ; 1983 74	113	\$990 13% 82	\$560 1991 34	6500 1392	3300 4500 1993	3600 5500 1994	\$\$60 \$500 1995 83	3900 7000 1976 19	8900 7900 1997 70	379) 7036 1178 1178	3700 7000 1977 1977	3730 2009 2009	7520 7520 7521 17	7500 7500 7502	2500 2500 2001	7000 7500 2001	7903 7500 7905	2000	9100 3000 2007	2009 2009	7007	2010 \$8
GENERAL REFER		. PESO) 1997 39 40	6090 ; 1983 74 37	1933 112 66	5000 13% 82 49	\$500 1991 34 50	6500 1392 31 50	2300 4500 1993 94 50	34 50 50 1994 34 50	\$363 8500 1905 89 46	3900 7000 1975 10 17	8900 7900 1997 70 47	1976 1036 1976 1976 47	3700 7000 1977 70	2000 16 11	7500 7500 7501 17	7500 7500 7500 17	2500 2500 2601 17	2004 17 17	3903 2500 2005 38 18	18 2902 2003 1169	7100 3000 2007	9169 5699 2009 19 13	7007 78 18	2010 \$8 31
GENERAL REFER WHEAT		. PES91 1997 39 40 0	6090   1983   24   37   0	1987 1112 66	6090 1390 82 49	5500 1991 34 50	6500 1392 31 50 6	\$300 \$500 1593 94 50 0	\$800 \$580 1994 34 50	5360 6500 1995 89 46 0	2000 2000 1275 10 47	3900 7900 1997 70 47	1778 1978 1978	1979 1977 70 0	9540 7000 2000 16 11	7500 7500 7501 17 11	7500 7500 17 17	7500 7500 11 11	2000 2500 2001 17 11 0	3908 3500 3905 38 40 0	2006 2006 38 18 180 180	9100) 3000 2007 2007	2009 2009 2009 39 13	7009 33 18 0	2010 \$8 31 0
GENERAL REFER		. PESO) 1997 39 40	6090 ; 1983 74 37	1933 112 66	5000 13% 82 49	\$500 1991 34 50	6500 1392 31 50	2300 4500 1993 94 50	34 50 50 1994 34 50	\$363 8500 1905 89 46	3900 7000 1975 10 17	8900 7900 1997 70 47	1976 1036 1976 1976 47	3700 7000 1977 70	2000 16 11	7500 7500 7501 17	7500 7500 7500 17	2500 2500 2601 17	2004 17 17	3903 2500 2005 38 18	18 2902 2003 1169	7100 3000 2007	9169 5699 2009 19 13	7007 78 18	2010 \$8 31
GENERAL REFER WHEAT		. PESO) 1997 39 40 9 117	\$990 1983 24 37 0 166	1983 112 66 0 259	8090 1750 82 49 0 83	\$500 1991 84 50 6 95	6500 1392 94 50 6	3300 4500 1993 94 50 0	3800 5500 1994 38 50 0 95	5900 6500 1905 89 46 0	1976 1976 1976 10 17 10 17	3900 7900 1997 70 47 0 219	1978 1978 1978 1978 1979	1979 7000 1979 70 17 0 219	3550 7000 2000 16 11	7500 7500 17 17 11 0	7500 7500 7500 17 11 11	2000 2500 17 11 0 31	2000 2001 17 11 0 14	2500 2500 2500 39 10 0 44	2006	710) 3000 2007 38 18 0	9169 6600 2008 39 13 0	7007 7007 38 18 0	2010 \$8 31 0 61
GENERAL REFER WHEAT		. PES91 1997 39 40 0	6090   1983   24   37   0	1987 1112 66	6090 1390 82 49	5500 1991 34 50	6500 1392 31 50 6	\$300 \$500 1593 94 50 0	\$800 \$580 1994 34 50	5360 6500 1995 89 46 0	2000 2000 1275 10 47	3900 7900 1997 70 47	1778 1978 1978	1979 1977 70 0	9540 7000 2000 16 11	7500 7500 7501 17 11	7500 7500 17 17	7500 7500 11 11	2000 2500 2001 17 11 0	3908 3500 3905 38 40 0	2006 2006 38 18 180 180	9100) 3000 2007 2007	2009 2009 2009 39 13	7009 33 18 0	2010 \$8 31 0
GENERAL REFER WHEAT		. PESO) 1997 39 40 9 117	\$990 1983 24 37 0 166	1983 112 66 0 259	8090 1750 82 49 0 83	\$500 1991 84 50 6 95	6500 1392 94 50 6	3300 4500 1993 94 50 0	3800 5500 1994 38 50 0 95	5900 6500 1905 89 46 0	1976 1976 1976 10 17 10 17	3900 7900 1997 70 47 0 219	1978 1978 1978 1978 1979	1979 7000 1979 70 17 0 219	3550 7000 2000 16 11	7500 7500 17 17 11 0	7500 7500 7500 17 11 11	2000 2500 17 11 0 31	2000 2001 17 11 0 14	2500 2500 2500 39 10 0 44	2006	710) 3000 2007 33 18 0	9169 6600 2008 39 13 0	7007 7007 38 18 0	2010 \$8 31 0 61
GENERAL REFER WHEAT		. PESO) 1997 39 40 9 117	\$990 1983 24 37 0 166	1983 112 66 0 259	8090 1750 82 49 0 83	\$500 1991 84 50 6 95	6500 1392 94 50 6	3300 4500 1993 94 50 0	3800 5500 1994 38 50 0 95	5900 6500 1905 89 46 0	1976 1976 100 1776 17 0 219	3900 7900 1997 70 47 0 219	1978 1978 1978 1978 1979	1979 7000 1979 70 17 0 219	3550 7000 2000 16 11	7500 7500 17 17 11 0	7500 7500 7500 17 11 11	2000 2500 17 11 0 31	2000 2001 17 11 0 14	2500 2500 2500 39 10 0 44	2006	710) 3000 2007 33 18 0	9169 6600 2008 39 13 0	7007 7007 38 18 0	2010 \$8 31 0 61
GENERAL REFER WHEAT CONTAINER		, PES9) 1997 40 9 117 246	\$690   1983   24   37   9   166   279	1983 112 66 0 250	\$090 1750 82 49 0 83	\$500 1991 84 50 6 95	6500 1392 94 50 6	3300 4500 1993 94 50 0	3800 5500 1994 38 50 0 95	5900 6500 1905 89 46 0	1976 1976 100 1776 17 0 219	7900 7900 1997 70 47 0 219	1978 1978 1978 1978 1979	1979 7000 1979 70 17 0 219	3550 7000 2000 16 11	7500 7500 17 17 11 0	7500 7500 7500 17 11 11	2000 2500 17 11 0 31	2000 2001 17 11 0 14	2500 2500 2500 39 10 0 44	2006	710) 3000 2007 33 18 0	9169 6600 2008 39 13 0	7007 7007 38 18 0	2010 58 31 0 61
GENERAL REFER WHEAT CONTAINER		, PES9) 1997 40 9 117 246	\$690   1983   24   37   9   166   279	1983 112 66 0 250	\$090 1750 82 49 0 83	\$500 1991 84 50 6 95	6500 1392 94 50 6	3300 4500 1993 94 50 0	3800 5500 1994 38 50 0 95	5900 6500 1905 89 46 0	1976 1976 100 1776 17 0 219	3900 7900 1997 70 47 0 219	1978 1978 1978 1978 1979	1979 7000 1979 70 17 0 219	3550 7000 2000 16 11	7500 7500 17 17 11 0	7500 7500 7500 17 11 11	2000 2500 17 11 0 31	2000 2001 17 11 0 14	2500 2500 2500 39 10 0 44	2006	710) 3000 2007 33 18 0	9169 6690 2009 39 13 6 47	7007 7007 38 18 0	2010 \$8 31 0 61
GENERAL REFER WHEAT CONTAINER		. PESO) - 1997 - 1997 - 40 - 0 - 117 - 246	6090   1985   24   37   0   166   279   LBE (XI	1983 112 66 0 250 128	\$990 1750 82 49 0 83	\$500 1391 34 50 4 35 229	6500 1992 94 50 6 95	2300 4500 1993 94 50 9 95	3800 5500 1994 38 50 0 95	\$300 6500 19°5 87 46 0 70'3	2000 2000 1276 70 47 0 219	7900 7900 1997 70 47 0 219	1978 1978 10 47 47 119	1979 1979 1979 17 0 219 338	2009 2009 16 11 9 31	7520 7520 7520 7521 17 11 0 34	7500 7500 7500 7500 17 11 9 34	7001 7001 17 11 0 31	2004 2500 17 11 0 14	7500 7500 38 19 0 44 100	700 200 200 38 18 5 47	2007 2007 2007 2007 18 0 17	9169 6690 2009 39 13 6 47	7007 7007 38 18 0 47	2010 58 31 0 61
GENERAL REFER WHEAT CONTACHER ( RATEING		. PES9) 1997 39 40 0 117 246 ESENT VA	6090   1985   24   37   0   166   279   LBE (XI	1983 112 66 0 259 128 1. 7850 1783	6090 1356 82 49 0 63 219	\$500 1991 84 50 9 35 229	6500 1392 34 50 95 723	3300 4500 1993 94 90 95 223	3818 5580 1994 38 50 0 95 229	\$100 \$500 1905 \$1 \$4 \$0 \$23 \$1\$	2000 2000 1278 10 47 0 219 128	7900 7900 1997 70 47 0 219 324	7000 7000 1778 70 47 47 47 119	3960 3006 1979 70 17 0 219 358	2000 2000 16 11 9 31	7520 7520 7520 7521 17 11 0 34	2002 2500 2002 17 11 9 24 52	2003 2003 2003	2004 2500 17 11 0 14	7500 7500 38 19 0 44 100	700 200 200 38 18 5 47	2007 2007 2007 2007 18 0 17	9166 6690 2008 39 13 6 47 104	7007 7007 38 18 0 47	2010 58 31 0 61
GENERAL REFER WHEAT CONTAINER ( WALFING SENERAL		. PES91 1997 39 40 0 117 246 ESENT VA	6090   1988   74   39   0   166   279   LUE (M) 1988   59	1983 112 66 0 250 128 1. 2550	6090 1350 82 49 0 63 219	\$500 1991 84 50 9 75 229	6500 1392 14 50 95 223 1392	\$300 \$500 1993 34 50 9 95 229	3810 5580 1994 34 50 0 95 223	3860 6500 1905 87 46 0 203 318	2390 2000 1278 47 0 219 134 1376	7900 7900 1997 70 47 0 219 374	2000 2000 1978 70 47 47 219 134	3960 3000 1977 70 17 0 217 338	2000 2000 16 11 9 31 59	7500 7500 7500 17 11 0 34 22 2001	2502 17 11 11 14 15 25 25 25 25 25 25 25 25 25 25 25 25 25	2003 2500 27500 17 11 0 34 42 2003	2004 17500 17 11 10 14 62 2004	3005 3005 3005 44 100 2005	7000 2000 2006 38 19 0 47 104	2007 2007 28 18 0 17 101	9166 6600 2009 39 13 67 47 104	7007 7007 78 18 0 47 104	2016 58 31 0 61 150
GENERAL REFER WEEAT CONTAINER ( NATEINS GENERAL REFER		PES9) 1997 40 9 117 246 ESERT VA 1997 79 40	6090 ) 1983 74 37 9 166 279 LBE (XI 1923 59 39	1983 112 66 0 250 128 1 7850 1983	1356 82 49 0 63 219 1370 52 47	\$500 1991 34 50 9 35 229 1991 47 50	6500 1392 34 50 95 223 1392 42 50	\$300 \$500 1993 84 50 9 95 229 229	3808 5500 1994 38 50 95 229 1394 34 50	\$360 6500 1995 89 44 6 703 318	2347	7903 7903 1997 70 47 0 219 324 1997 20 47	1978 7000 1978 70 47 47 219 134	3960 7006 1979 70 17 0 217 338 1999	2000 2000 16 11 9 31 59	7500 7500 7500 17 11 0 34 22 2001	2002 17 11 10 14 52	2003 2500 2500 17 11 0 34 62 2003	2004 17500 17 11 12 14 62 2004	7500 7500 2005 32 10 0 44 100 2005	7100 2000 2006 38 18 5 47 104	2007 2007 28 18 0 17 104	2009 2009 39 13 67 104 2003	7007 38 18 0 47 104 200°	2016 58 31 0 61 150 2019 1
GENERAL NEFER WEGAT CONTACHER  ( XALTING EENERAL SLEEP WEGAT		. PESO) 1997 40 9 117 246 ESERT VA 1997 79 40 9	6090 ) 1983 24 37 0 166 279 LUE (MI 1983 59 39 0	1983 112 66 0 259 128 1. 7650 1383 30 66	6000 1393 82 49 0 83 219 1390 52 49 0	\$500 1991 84 50 9 95 229 1991 47 50 0	6500 1392 34 50 6 95 223 1792 42 50 0	2300 4500 1593 94 50 0 95 223 223	3818 5500 1994 38 50 95 229 1994 31 50 0	\$360 6500 1995 87 46 0 203 318 1995 25 46 0	1976 1976 17 17 17 17 17 17 17 17 17 17 17 17 17	7903 7903 1997 70 47 0 219 374 1997 20 47	1976 1976 1976 1977 1136 1992 1992	3900 7000 1979 70 17 0 219 338	3950 2000 16 11 9 11 59 2000 3 11 p	7500 7500 7500 17 11 0 34 22 2001	2502 2502 17 11 0 32 3502	2003 2003 2003 27 11 8 42 2003 2003	2004 17 11 5 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	3003 3003 3003 100 0 44 100 2005	7000 2000 2006 38 18 5 47 104 2006 4 10	2007 2007 2007 2007 104 2007	2009 2009 39 13 6 47 104 2003	7007  38 18 0 47 104 200° 3 18	2010 58 31 0 61 150 2019 1
GENERAL REFER WEEAT CONTAINER ( NATEINS GENERAL REFER		PES9) 1997 40 9 117 246 ESERT VA 1997 79 40	6090 ) 1983 74 37 9 166 279 LBE (XI 1923 59 39	1983 112 66 0 250 128 1 7850 1983	1356 82 49 0 63 219 1370 52 47	\$500 1991 34 50 9 35 229 1991 47 50	6500 1392 34 50 95 223 1392 42 50	\$300 \$500 1993 84 50 9 95 229 229	3808 5500 1994 38 50 95 229 1394 34 50	\$360 6500 1995 89 44 6 703 318	2347	7903 7903 1997 70 47 0 219 324 1997 20 47	1978 7000 1978 70 47 47 219 134	3960 7006 1979 70 17 0 217 338 1999	2000 2000 16 11 9 31 59	7500 7500 7500 17 11 0 34 22 2001	2002 17 11 10 14 52	2003 2500 2500 17 11 0 34 62 2003	2004 17500 17 11 12 14 62 2004	7500 7500 2005 32 10 0 44 100 2005	7100 2000 2006 38 18 5 47 104	2007 2007 28 18 0 17 104	2009 2009 39 13 67 104 2003	7007 38 18 0 47 104 200°	2016 58 31 0 61 150 2019 1
GENERAL NEFER WEGAT CONTACHER  ( XALTING EENERAL SLEEP WEGAT		. PESO) 1997 40 9 117 246 ESERT VA 1997 79 40 9	6090 ) 1983 24 37 0 166 279 LUE (MI 1983 59 39 0	1983 112 66 0 259 128 1. 7650 1383 30 66	6000 1393 82 49 0 83 219 1390 52 49 0	\$500 1991 84 50 9 95 229 1991 47 50 0	6500 1392 34 50 6 95 223 1792 42 50 0	2300 4500 1593 94 50 0 95 223 223	3818 5500 1994 38 50 95 229 1994 31 50 0	\$360 6500 1995 87 46 0 203 318 1995 25 46 0	1976 1976 17 17 17 17 17 17 17 17 17 17 17 17 17	7903 7903 1997 70 47 0 219 374 1997 20 47	1976 1976 1976 1977 1136 1992 1992	3900 7000 1979 70 17 0 219 338	3950 2000 16 11 9 11 59 2000 3 11 p	7500 7500 7500 17 11 0 34 22 2001	2502 2502 17 11 0 32 3502	2003 2003 2003 27 11 8 42 2003 2003	2004 17 11 5 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	3003 3003 3003 100 0 44 100 2005	7000 2000 2006 38 18 5 47 104 2006 4 10	2007 2007 2007 2007 104 2007	2009 2009 39 13 6 47 104 2003	7007  38 18 0 47 104 200° 3 18	2010 58 31 0 61 150 2019 1

VALPARA (SU ; ALTER	ryi f	<b>EYE</b>	í
---------------------	-------	------------	---

C SHIP W	TITHE HO	JRS FOR E	ACH YEA	e F																					
		1987	1988	1989	1790	1991	1992	1993	1994	1995	1996	1997	1998	1237	2006	2891	2902	2003	2001	2005	3006	2007	2003	2009	2010
1.1												-		•				,		1 190	, ,,,,,			. 757	
GENERAL		249	. 273	. 281	~ 207	707	267	207	207	183	193	163	168	163	5.5	22	56	(17)	ii	4.5	63	5.5	63	61	81
	5 10		423	444	133	133	133	337	337:	137	(33	187	137	139	14	14	46	44	44	26	86	35	- 86	85	123
	10,20	2189	2361	2517	1770	1990	1990	1240	1979	1401	1401	1401	1401	1401	161	161	161	2.3	341	603	603	603	503	603	921
	20" 30	295	116	353	276	271	271	271	2/1	135	195	175	195	195	48	16	4:3	43	48	67	67	67	67	67	107
		,		*****				,																	
	SUB TOTAL	1162	J379	3610	2001	2691	2391	2801	2801	1894	1874	1894	1894	1694	475	475	175	1/5	475	819	317	815	319	819	123#
																-				. •••	••				•
68.1.8 6	. 10	1451	1576	1716	1132	1432	1132	1432	1432	941	941	241	241	941	201	201	29!	291	201	276	276	275	276	276	526
	10*20		160	128	327	177	177	311	577	176	376	376	176	376	102	102	102	102	152	115	115	115	115	115	149
	SUS TOTAL	1749	1956	21/4	1809	1909	1809	1009	1869	1318	1318	1318	1318	1318	203	10.5	793	.03	. 101	391	391	391	191	371	673
															• • • • • • • • • • • • • • • • • • • •							,			
WHEAT :	19*29	1)	ŋ	0	. 0	Ď	. 0	9	0		. 0	D.	f)	n	0	9	0	D:	0	ŋ	Ð	. O	D	. 0	G
	20100	9	,)	2	Đ	9	. 0	2	Ð	9	9	a	ò	0	ō	ŋ	ė	- 4	ŋ	.9		9	. 9	õ	9
	30,40	Û	8	ú	Ü	0	0	B	0	6	9	6	0	0	e g	a	ē	0	6	9	8	. 0	0	0	ū
																					·				
	Cua fella	£ Û	ŋ	ı)	ŋ	. ()	1}	1)	ß	9	0	9	į.	ij	0	ð	Ð	. 9	Û	ij.	9	9	0	0	Û
							-																		
COMPAINE	10	171	164	151	110	-110	110	110	110	20	. 90	. 98	99	30	193	193	193	193	193	202	202	202	292	202	189
	10,50	202	129	192	. 145	145	145	145	165	141	. 141	141	14}	353	362	362	362	362	362	160	160	160	169	160	539
	20150	102	109	124	193	103	103	163	105	139	139	139	137	139	457	459	459	459	459	686	586	665	565	585	324
						• • • • • •					~														<del>-</del>
	SUB TOTAL	L 425	472	170	358	553	158	359	158	370	370	170	370	379	1014	1014	1614	1014	1014	1518	1348	1348	1348	1548	1652
TOTAL		5386	5807	6274	1368	4969	1753	1753	4756	1591	3581	3581	3531	3281	1792	1792	1792	1792	1792	2559	2559	2559	2559	2559	3553
		-1011111	:::::::	1125,171		2424223	1221227	,,,,,,,,		::::::	::::::	(::::::		::::::		;::::::;	::::::	==:1::::		******	:::::::	=======================================	:::::::	12:11:1:	*****
																		-							
R SHEP C	IST / DAT																								
		1987	1983	1739	1990	1391	1992	1993	1331	1995	1976	1997	1998	1999	2000	5691	2002	5093	2004	2995	2096	2007	2008	2007	2010
25115411																									
GENERAL		\$200	5250	\$200	5200	\$300	5300	3330	5360	5360	5100	\$400	5100	3400	-5400	5500	5569	\$193	5500	5599	5600	5600	5600	5600	2500
REFER	· .	5200	5200		5200	\$300	5360	5380	5.00	5300	5400	\$450	5400	2400	5490	5599	5590	\$500	5500	5500	5600	5600	5600	5600	5600
WHEAT		3700	9760	3700	8700	\$300	3,300	3397	2860	(40)	3209	6990	3900	9700	3900	2009	4003	2000	9000	3003	9100	9100	9166	9100	9100
CONTAINED	٠.	6000	6000	6000	6000	6500	6500	4500	6590	5500	700 <u>0</u>	7000	7000	2000	7000	7500	7500	7500	7500	7500	8000	3000	8000	8000	\$000
/ diritu	coat is	u ereni																							
1 PAILING	i tan tu	lt. PESO) 1987	1988	1989	1990	1991	1992	1993	1994	1995	1775	1997	1993	1999	2009	2001	2002	2003	2004	2005	2006	2007	2008	2003	2010
		. 2707	1 (22	1707	\$770	1771	1772	1973	1774	1172	1179	1777	1770	1,877	2000	2031	2002	2003	2004	2003	2000	6932	2020	2000	2010
GENERAL		137	116	157	121	124	124	124	124	31	. 35	<b>35</b>	85	35	21	22	22	. 22	22	33	38	33	38	38	28
REFER		76	35	24		80	40	80	80	53	59	59	59	25	14	14	14	14	14	19	18	18	18	13	31
MAGENT.		4	8	Ō	o. O	Û	i)	0	. 0	13	9	ı, ıj	1)	ş	- 6	9	14	. 9	9	9	10	10	12	9	4
CONTAINE	, .	24	24	23	18	17	19	19	19	20	22	22	22	32	59	63	26	53	63	34	90	აც	99	90	110
Southful	-	****			*	·							• • • • • • • • • • • • • • • • • • • •												
		237	255	275	213	373	223	225	223	152	166	166	165	156	91	99	:9	92	49	119	146	145	146	146	199
		•••			,,,		•••			•	.,,,		,			,,					.,,	* 1.			• • •
-		4.																							
CHARTING	: 1200	PRESENT Y	ALUE IN	IL, RES	33 )																				*-
	•	1937		1989	1990	1991	1992	1993	144	1995	1946	1997	1738	19-39	2900	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
				- '					-																
GENERAL		122	117	115	77	70	63	56	50	30	27	21	. 22	20	4	1	ŧ	3	3	4	4	4	. 3	3	4
REFER		76	85	2.1	. 18	90	80	36	. 89	58	59	57	59	59	14	7.8	1	14	R	31	18	18	18	18	Ĵi
<b>VHEAT</b>		9	ij	ð	- 8	ù	0	. <b>Ç</b>	0	9	9	· G	9	ij	Û	ij	0	Ü	0	ð	9	.0	0	Q	Û
CONTAINS	!	- 24	24	23	19	19	. 0	12	19	29	22	22	22	9	59	63	53	53	63	34	90	90	20	30	Ð
					• • • • • • • • • • • • • • • • • • • •																				
		222	225	230	123	157	143	155	. 119	168	163	185	103	79	77	81	31	30	<i>5</i> 9	107	112	112	111	111	35

SAN ANTONIO : ALTERNATIVE 1

( SHEP W	ITINS HOU	RS FOR E	ACH YEA	R }						* *														1.	
		1987	1988	1989	1990	1991	1992	1993	1994	1995	1796	1997	1979	1999	2000	2001	5005	2003	2001	2005	2006	2007	2000	2009	2010
GENERAL :	. 3	606	139	180	152	152	152	152	152	30	30	80	35	35	10	. 32	80	32	32	- 11		41	4.		1 20
or he had	2,10	1010	301	301	369	369	369	369	369	116	116	116	33 37	39	\$2 \$5	35	72 25	35	32 }}	21-	21 73	21 23	21 73	21	\$1 123
	10,50	5112	139)	1397	2019	- 2019	2019	2019	2019	685	695	885	342	362	231	231	231	231	231	523	523	529	528	523	827
	20130	- 819	199	199	298	298	298	798	298	15	75	75	ьl	61	37	37	37	17	: 37	29	29	29	29	29	114
	SUB TOTAL	7847	2079	2078	2839	2839	2839	2939	2839	957	957	957	198	478	335	335	335	135	335	451	651	651	651	651	1154
REFER :	`10	399	115	115	130	133	130	130	130	38	. 38	38	21	21	14	14	14	14	н	2)	27	27	27	27	32
	10,20	150	- 37		15	46	16	. 45	46	11	11	11	19	19	5	5	\$	Š	5	0	0	. 0.	0	Ü	12
	SUB FOLAL	548	152	152	176	- 176	176	176	176	19	19	13	40	10	19	jÿ	13	19	Į9	27	27	2)	27	27	14
VISEAL :	10`20	937	228	228	213	213	213	213	213	214	244	214	205	205	205	205	205	205	126	126	126	126	125	-126	201
	20,30	732	501	501	4.54	434	434	134	434	433	438	138	115	16	116	. 116	116	116	197	127	197.	197	197	197	118
	30`40	1250	794	794	536	536	536	536	556	1190	1139	1190	200	50)	509	500	509	509	233	239	523	239	239	239	317
	SUS TOTAL	2918	1523	1523	1184	1184	1181	1181	1184	1871	1071	1871	829	829	829	829	829	329	562	557	562	562	562	567	641
CONTAINER	10	696	543	563	701	701	701	701	701	785	785	785	653	659	314	314	514	314	314	348	369	368	168	368	- 342
	10 20	1043	\$13	512	658	653	659	\$58	658	303	593	503	452	652	580	389	380	180	380	129	127	123	129	129	597
	30, 30	402	151	. 154	231	231	231	531	231	685	288	288	453	433	265	5	265	265	265	375	375	375	375	3/\$	633
	JATOT BUR	2143	1209	1209	1590	1590	1590	1590	1596	1576	1576	1576	1743	1713	958	958	959	958	958	1172	1172	1172	1172	1172	1564
TOTAL		13455	1952	4762	5788	\$788	5,88	\$783	5788	1453	1153	1453	3110	3110	2142	2142	2142	2142	1875	2412	2412	2412	2412	2412	5403
-	. =	******	222223	:::::::	:::::::		i errrei	*******																	
													•	1.50											• •
C SHIP CO	SF / DAY I	US\$) 1								· ·															
		(987	1988	1939	1790	1991	1992	1993	1994	1995	1996	1997	1973	1999	2000	2001	2002	2603	30%	2005	2006	2007	2003	2003	2010
GENERAL		5200	5200	5200	5269	5300	5300	5300	\$300	5300	5400	5400	5400	\$400	5400	5500	5500	5500	5590	5593	5600	5600	Sa00	5800	5620
REFER		5200	5200	\$200	5200	5300	5300	5300	5330	5300	5400	5400	5400	5100	\$100	5500	5500	\$500	5500	\$500	5600	\$600	5600	5540	5600
WHEAT		8700	8700	9700	9700	9800	3800	3800	8800	8300	\$908	3900	\$900	\$900	8500	200	9500	9000	9000	90.00	1160	7100	2100	9100	*160
CONTAINER		9500	6000	6000	6000	6500	6500	6500	6500	6560	7000	7000)	7000	7000	7000	7500	7500	7500	7500	7500	8000	3000	8000	3000	6000
								- 1							:					•			-		
( WALLING	COST (BIL	. PES0)	}					- 1										j.	100					. 3	
	. !	1937	1538	1989	1990	1971	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2682	2003	2004	2005	2003	2007	2008	2009	2010
SENERAL		340	70	90	123	125	125	125	125	12	13	13	27	22	15	15	.15	15	35	,Q	:30	30	30	30	Si
REFER		-24	7 -	7	ĝ	3	3	ş	Ŕ	2	2	2	2	2	1	3 · 3		1	. 1	1	- T	4	1	1	2
29EA1		212	119	110	35	82	37	27	37	137	137	111	62	. 62	52	62	52	ŧΖ	12	12	43	13	43	4.5	49
CONTAINER		107	50	40	79	86	. 88	36	. 85	95	92	-45	102	102	. 54	50	<b>69</b>	. 50	60	- 73	:28	. 78	. 73	78	184
	4.	687	267	267	295	305	306	306	104	267	275	276	137	187	133	139	438	138	113	146	152	15?	152	152	207
							٠.																	٠.	,
( WALLIES	COST : PR	1997 1997					A42.1		1004																
		1737	1783	1999	1390	1991	1992	1921	1794	1995	177e	1997	1399	1333	2000	2301	2002	2003	2004	2005	2038	2007	2008	2003	2010
SENERAL. Refer		364	72	64	18	$H_{\epsilon}$	- 54	şį.	Si	15	Щ	12	. 6	5	ì	3	3	\$	7	1	3	3	3	2	. 4
MEAT .		24 212	<i>]</i> i10	7 110	8 88	3)	8 \$7	2 0.7	đ	2	2	2	3	2	1	1	1	1	1	1	J	1		1	. 2
CONTAINER		10/	70 im	90 110	79	36	57 0	- 37 - 86	97	137 -25	139	239	62 192	62	52 56	42 40	62 60	42 20	12	** 12 23	- 3	43	43 73	43 28	19 0
	•	646	249	212	251	252	158	237	231	248	247	245	171	 68	121	126	125	175	105	120	125	125	125	124	54
										~ 1 -	- "	413									14.5			*4.1	,,

414	AMFORTO	,	áΙ	LERKATIVE	. 3

		÷	:																							
ee skie y	ALTING C	0515	н.,			٠																				
SAN ANTON	ro ili	FRHATI	VF 2							٠												:				
C SHIP WA					ì				:																	
1 2017 84	[7]NG 10.		37	1388	1989	1990.	1991	1393	1971	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	5006	2007	2008	2009	2010
SENERAL :	5`11 10`2( 20`3(	) 13 ) }}	177 - 144 139 179	273 494 2486 281	2/7 419 2725 397	152 369 2019 298	152 369 2019 278	369 2019 298	152 169 2017 278	152 369 2019 298	148 335 2074 169	168 335 2074 169	168 335 2074 169	310 2122 461	92 310 2422 461	35 41 276 43	35 41 276 43	15 41 276 43	35 41 276 43	21 73 528 27	21 73 523 29	21 13 528 29	21 73 528 29	21 - 73 528 29	21 73 523 29	54 129 827 144
-	SUB TOTA	LL 146	333	3530	3820	2839	2839	2837	2839	2839	2746	2746	2746	3275	5215	396	396	396	396	<b>651</b>	651	651	651	651	651	1154
REFFR :	10,5		776 750	227 59	225 78	130 46	130 46	150 130	130 16	16 130	147 38	147 38	117 38	155 93	155 . 73	17 6	17 6	17 6	17 6	2) 0	27 . 0	27 · 0	27 0	27 0	27 . 0	32 12
	SUB 101.	AL 10	326	286	305	116	176	176	176	176	181	184	184	248	218	23	23	. 23	23	27	27	27	27	27	27	44
VREAT :	10120 2013 3014	9 7	237 232 250	229 501 774	228 501 724	213 454 536	213 43# 536	213 434 536	213 434 536	213 434 536	244 438 1170	244 439 1190	244 439 1190	20\$ 114 509	205 116 509	20S 116 509	205 116 509	205 116 509	205 116 509	126 197 239	126 197 239	(26 197 239	126 197 239	126 197 239	126 197 239	204° 118 319
,	sue tot		))))	£523	1523	1131	1131	1184	1184	1134	Į971	1971	1871	929	829	329	329	329	929	562	562	562	562	562	562	643
CONTAINER			351	702	630	662	662	662	662	562	1527	1527	1527	1527	1527	212	212	212	212	212	107	107	107	107	107	103
	10 7 20 3	0 (	148 165	195 195	413 271	763 478	76J 476	76] 178	763 478	763 478	1292 618	1272 618	1292. 618	1232 618	1272 618	224 176	224 170	224 170	224 170	224 170	213 292	213 292	213 292	213 292	213 292	257 416
	508 101	At 2	756	(344	1/11	190?	1902	1902	1702	1902	1117	343?	3117	3437	-3437	805	<b>605</b>	805	405	805	612	615	£12	613	612	775
TOTAL		20:	) 59	6691	7362	6190	6100	6100	6100	5100 555555	8239	8239		7770		-1884 -1884	1851	1854 222222	1854 222222	1845	1825	1852	1852	1852	1652	2614
( SHIP CO	)S[		j ) 987	1983	1999	1990	1991	1992	1993	1994	1995	1996	1997	1993	1999	2000	2091	2002	2053	2004	2005	2006	2007	2003	2009	2010
GENERAL REFER VINCAT CONTAINET		5. 3	200 200 700 000	5200 5200 8700 6000	5200 5200 3700 6000	5200 5200 9700 6000	5309 5300 8300 6500	5309 5308 8800 6500	6500 5300 5300 5300	5360 5360 6360 6560	5300 5300 8300 6500	5400 5400 6300 7000	\$499 \$490 8900 7000	5100 5100 3900 7000	5400 5400 8900 7000	5400 5400 8900 7000	5500 5500 9000 7500	5500 5500 9000 7500	5500 5500 9000 7500	7500 7500 7500 7500	5500 5500 7000 7500	5600 5600 9100 6000	5600 5600 9100 8000	5600 5600 9100 8000	5600 5600 9100 9060	5600 5600 9100 8000
( VAITES	i 6951 (		(50) 987	1988	1989	1990	1971	1992	1993	1991	1995	1996	1397	1998	1939	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
GENERAL REFER WEAT			608 #4 212	15] 12 110	164 13 110 26	123 3 36 95	125 37 103	125 3 3) 193	125 37 103	125 3 37 103	121 3 137	124 \$ 139 201	124 2 139 201	147 13 52 201	147 11 62 201	18 1 62 35	18 1 62 38	13 1 62 38	18 1 52 38	30 .1 42 33	38 1 42 38	50 1 43 41	30 1 43 41	30 1 43	30 1 43 41	54 2 49 52
CONTAINE	`. :		148 012	6/ 543 .	375	312	323	251	353	323	153	471	171	421	171	1{5	119	119	119	111	111	115	115	115	115	156
ERATTU	s cost ;	PRESE					1991	1992	1993	1974	1995	1996	1997	1993	1399	2000	2001	2002	2003	2004	2005	2006	2007	2008	2007	2010
CENERAL REFER WHEAT			513 11 212	122 12 110	113 13 110	78 8 45	71 e 87	61 9 3/	57 - 87	\$1 8 87	117 137	425 8 10	36 9 139		31 11 62	1 62	; 1 62	3 1 62	3 ! #2	12	3 1 42	3 1 #3	3 1 43	3 1 43	2 1 43	49 49
CONTAINS	?		148  947		151	267	103 269	0 158	103 154	103 103	186 375	201 387	201 333	201 311	0 106	102	\$6 \$01	161 161	184 38	38 85	33 85	88	41 87	41 37	37	

O TOPE AND TO		AL LES	341148	7																						
																	:									
SHIP	ALELN	is hour	S FOR E	ICH REA	<b>(</b> )																:					
			1987	1388	1989	1440	1991	1992	1993	1991	1995	1998	150	1398	1944	2000	2001	1007	1003	2001	5002	2004	5Ú9)	.100A	2007	2010
ERERAL		^5	3370	318	191	152	152	152	152	152	168	168	i AN	92 -	<b>š</b> 2	-35	35	35	35	- 21	21:	-21	21	121	21	54
-ME AME		5 10	5112	630	815	169	369	369	789	369	335	335	335	310	310	41	41	11	11	- 73	- 73	73	75	?3	73	125
		0,50	30350	3316	5139	2019	2019	2014	2019	2017	2074	2074	2074	2422	2422	276	27.	276	276	528	528	528	578	529	528	32)
		0.30	4156	365	549	298	298	298	298	298	169	159	167	461	461	13	43	43	<b>43</b>	- 23	- 29	29	29	29	29	144
	51:9	Totas	43287	4629	7025	2839	2839	2819	2859	2839	2716	2746	2746	3275	<b>3275</b>	396	396	378	336	551	651	651	651	651	651	1151
	,					- 1														- '-						
FER :		*10 10**01	1952 949	163 102	. 392 119	130 48	. 130	130 46	130	130 46	147 58	.167 EE	147 . 38	155 33	(55 93	17	17	17	17	27 0	27 0	27	?7 9	<i>21</i>	?7 0	- 53 - 12
	1		747	102		46	16		46	. 40				,		. 0			٠			*******	· · · · · · ·			
	SUR	10147	2901	265	. 121	176	176	174	176	176	181	181	184	248	246	23	. 23	. 23	23	27	21	27	22	27,	27	11
EAT :	. 1	10 20	937	228	228	213	213	213	215	213	244	244	244	205	205	205	205	205.	205	126	126	128	175	126	126	204
	. 3	0.0	232	501	501	434	434	434	434	4.34	438	438	4 58	115	111	116	fis	. 116	116	147	197	197	1377	197	197	118
	3	10, 10	1250	794	794	535	535	536	\$38	536	1190	1(%)	1190	509	507	509	\$07	507	584	414	239	239	239	237	759	311 
	313	MIGI	2918	1523	1523	1184	1184	1184	1181	1131	1871	1371	1371	827	\$29	829	322	829	329	263	562	387	562	552	562	611
ONTAIKS	Ð	10	23320	1469	1879	3888	3885	3888	108	<b>1</b> 28	<b>#2</b> 0	420	428	129	\$2B	223	. 223	723	723	- 723	99	00	iya	- 99	vy -	96
MINING		10,50	19417	1134	1356	1482	1482	4482	521	371	574	574	574	574	571	1115	116	1115	1115	1115	197	197	197	197	197	231
		20, 10	6807	103	-513	2698	2598	7598	520	520	520	520	520	520	520	1354	1354	1351	1354	1354	271	- 271	271	271	271	3/3
		-				;					:	٠ ، .				*	- / 4									
	SUS	TOTAL	49544	3006	5749	11068	11068	11068	1523	1523	1523	1523	1523	1553	1523	3223	3273	3553	3223	3223	567	567	567	567	567	: 707
ATA)			93551	7423	12717	15286	15266	15256	5721	5721	6325	5323	8375	3675	:375	4471	1271	1471	1137	1463	1867	1807	19)	1807	1837	2546
				::::::	1111111	1111111	222222	1111111	*****		::::::	5132722	******	102222	raabaar.	1007702	*******	******	: : : : : : : :	:::::::	0000000	1211241	******	:::::::	1722173	1250
																		:								
SHIP	0ST /	/ DAY (	US\$1 3																							
			1.500	180	(939	1220	1991	1992	993	1.00	1995		1997	1993	14:24	2600	3001	2002	2003	7604	2005	2006	2007	2008	2009	2010
			[78]	1780	1202	1,710	****	1772	1320	1994	, 1274	1776	17**!	1.770								2000	2507	10,00		1010
ENERAL			5200	5200	-5200	5200	5300	5300	5300	5390	5300	5400	-5400	5400	5400	5100 -	5500	5500	\$500	5100	\$300	5600	5569	\$600	\$660	
					-				•			- '			5400 5400	5100 - 5400	5500 5500	5500 5500	550g 550g	5500 3560	5500 5500		-			5600
EFES		٠.	5200	5200	-5200	5200	5300	5300	5300	5390	5300	5400	-5400	5400		-						5600	5660	\$600	\$460	5600 5600
EFES	X	•.	5200 5200	5200 5200	5200 5200	5200 5200	5300 5300	5300 5300	5.300 5.300	5396 5380	5300 5300	5400 5400	-5400 -5400	5400 5400	5100	5480	5500	5500	5507	3500	\$500	5600 5609	5660 5668	\$600 \$600	\$660 5660	5600 5600 9100 9000
EFES HEAT ONTAINE			5200 5200 8700 6000	5200 5200 3700 5000	5200 5200 8700	5200 5200 8700	5300 5300 8800	5300 5300 8850	5300 5300 8300	5390 5300 9900	5300 5300 8800	5400 5400 8900	-\$400 5400 8700	\$400 5400 8900	5100 5900	5400 3700	5500 7000	5520 9000	5500 1000	3500 3000	5500 9960	5600 5609 9100	5600 5600 9100	\$600 \$600 \$100	\$600 \$600 \$100	5600 5600 9100
efer Heat Ontaine		SE (MIL	\$200 \$200 \$700 6020	5200 5200 3700 5000	5200 5200 8700 6000	\$290 \$200 \$790 8000	\$300 \$300 \$300 \$500	\$300 \$300 8850 6300	5300 5300 8300 6500	5100 5300 5900 6500	5300 5300 8860 6560	5400 5400 8700 2800	5400 5400 8700 7600	5400 5400 8900 7600	5100 6900 7900	5400 3700 7900	5500 7000 7500	5520 1000 7500	5500 1000 7500	3500 3000 7500	5500 9960 7590	5400 5409 9100 8000	5560 5560 9100 9100	\$600 \$100 \$100	\$660 \$660 9100 \$600	\$600 \$600 \$100
EFES HEAT ONTAINE		se (MIL	5200 5200 8700 6000	5200 5200 3700 5000	5200 5200 8700	5200 5200 8700	5300 5300 8800	5300 5300 8850	5300 5300 8300	5390 5300 9900	5300 5300 8800	5400 5400 8900	-\$400 5400 8700	\$400 5400 8900	5100 5900	5400 3700	5500 7000	5520 9000	5500 1000	3500 3000	5500 9960	5600 5609 9100	5600 5600 9100	\$600 \$600 \$100	\$600 \$600 \$100	5600 5600 9100 9000
EFER HEAT ONTAINE VALUE ENERAL		SE (MIL	5200 5200 8700 6000 7E591 1997	5200 5200 3700 5000 5000	5200 5200 8700 6050	\$290 \$200 \$790 8000	\$300 \$300 \$300 \$500	\$300 \$300 8850 6300	5300 5300 8300 6500	5350 5350 5960 6526	5300 5300 8860 6560	5400 5400 8700 2800	5400 5400 8700 7600	5400 5400 8900 7600	5100 6900 7900	5400 3700 7900	5500 7000 7500	5500 9000 7500 2007	5500 1000 7500	3500 3000 7500	5500 9960 7599 2905	5400 5409 9100 8000	5600 5600 9100 5640 5640 2000	\$600 \$100 \$100	\$660 \$660 9100 \$600	\$600 \$600 9100 9000
EFER HEAT ONTAINE VALUEN ENERAL EFER		SE (MIL	\$200 \$200 \$700 6000 \$E\$91 1997 1876 126	5200 5200 3700 5000 1989 201	5200 5200 8200 6060 1969 394	\$200 \$200 \$700 \$000 1790	\$300 \$300 \$300 \$500 \$500	\$300 \$300 8800 6500 1792 125	5300 5300 8300 6500 1993	5350 5350 5360 6566 1391	\$300 \$300 \$300 \$300 \$500 \$500 \$300 \$300	5400 5400 8900 7000 1996	\$400 5400 8700 7600 1997	\$490 \$490 8900 7000 1999	\$100 \$200 \$200 \$200 \$200 \$200 \$200 \$200	5400 3700 7600 2000	5500 7000 7500 1001	5500 9000 7500 2007	2003 133 133	3500 9000 7500 7500 1000 1000	5500 9600 7500 2005	\$400 \$409 \$100 \$000 \$2006	5600 5600 9100 5600 56007 20007	\$600 \$600 \$600 \$600 \$200 \$200 \$10	\$600 \$100 \$100 \$100 \$100 \$100 \$100 \$100	5400 3600 3100 3000 2010
EFER WALLEN ENERAL EFER HEAT	e cos	SE (MIL	\$200 \$200 \$700 6000 \$E\$91 1997 1876 126 212	5200 5200 8700 6000 1989 201 12	5200 5200 8700 6050 1989 394 18	\$290 \$200 \$790 \$000 1790 123 3	\$300 \$300 \$300 \$500 \$500 \$7	\$300 \$300 8800 6500 1792 125 9	5300 5300 8300 6500 1993 125 8	\$190 \$300 \$900 \$500 \$7	\$300 \$300 \$300 \$300 \$300 \$300 \$300 \$300	5400 5400 8900 7600 1996 124 8	134 134 1341 1341 3400 2400	\$400 5400 8900 7000 1979 147 11	\$100 \$900 7000 1997 147 11 52	5400 3700 7000 2000 13	5500 7000 7500 1001 13 1 62	5520 9000 7500 2007 18	2500 7500 7500 2500 13 13	3500 3800 7500 2004 2004 10	5500 9900 7500 2005	\$600 \$600 \$000 \$000 \$000	5600 5600 9100 5600 5600 2001	10 2008 100 2008 100 2008 1100 1100 1100	2009 2009 2009 130 143	5600 5600 9100 9000 2010
EFER HEAT ONTAINE VALUEN ENERAL EFER HEAT	e cos	SE (MEL	\$200 \$200 \$700 6000 \$E\$91 1997 1876 126	5200 5200 3700 5000 1989 201	5200 5200 8200 6060 1969 394	\$200 \$200 \$700 \$000 1790	\$300 \$300 \$300 \$500 \$500	\$300 \$300 8800 6500 1792 125	5300 5300 8300 6500 1993	5350 5350 5360 6566 1391	\$300 \$300 \$300 \$300 \$500 \$500 \$300 \$300	5400 5400 8900 7000 1996	\$400 5400 8700 7600 1997	\$490 \$490 8900 7000 1999	\$100 \$200 \$200 \$200 \$200 \$200 \$200 \$200	5400 3700 7600 2000	5500 7000 7500 1001	5500 9000 7500 2007	2003 133 133	3500 9000 7500 7500 1000 1000	5500 9600 7500 2005	\$400 \$409 \$100 \$000 \$2006	5600 5600 9100 5690 2007	\$600 \$600 \$600 \$600 \$200 \$200 \$10	\$600 \$100 \$100 \$100 \$100 \$100 \$100 \$100	5400 3600 3100 3000 2010
EFER HEAT ONTAINE VALUEN ENERAL EFER HEAT	e cos	SE (MIL	\$200 \$200 \$700 6000 \$E\$91 1997 1876 126 212	5200 5200 8700 6000 1989 201 12	5200 5200 8700 6050 1989 394 18	\$290 \$200 \$790 \$000 1790 123 3	\$300 \$300 \$300 \$500 \$500 \$7	\$300 \$300 8800 6500 1792 125 9	5300 5300 8300 6500 1993 125 8	\$190 \$300 \$900 \$500 \$7	\$300 \$300 \$300 \$300 \$300 \$300 \$300 \$300	5400 5400 8900 7600 1996 124 8	134 134 1341 1341 3400 2400	\$400 5400 8900 7000 1979 147 11	\$100 \$900 7000 1997 147 11 52	5400 3700 7000 2000 13	5500 7000 7500 1001 13 1 62	5520 9000 7500 2007 18	2500 7500 7500 2500 13 13	3500 3800 7500 2004 2004 10	5500 9900 7500 2005	\$600 \$600 \$000 \$000 \$000	5600 5600 9100 5600 5600 2001	10 2008 100 2008 100 2008 1100 1100 1100	2009 2009 2009 130 143	5600 5600 9100 9000 2010
EFER HEAT ONTAINE VALUEN ENERAL EFER HEAT	e cos	SE (MEL	\$200 \$200 \$200 \$200 \$000 \$6000 \$6591 1987 1876 126 212 2477	5200 5200 5200 5000 5000 1989 201 12 110 150	5200 5200 8200 6060 1969 394 18 110 187	\$290 \$200 \$700 \$000 1790 123 3 88 \$553	\$300 \$300 \$300 \$500 \$500 1971 125 \$ \$ \$	\$380 5300 8860 6500 1792 125 9 87 680	5300 5300 8300 6500 1993 125 8	\$190 \$300 \$900 \$500 \$500 1991 125 8 97 33	\$300 \$300 \$300 \$300 \$500 1795 121 \$ 137 \$5	5400 5400 8700 2600 1996 124 119	139 139 139 1397 1397 1397	\$400 \$400 8900 7600 1993 147 11 62 39	5100 6900 2000 1997 117 62 89	5400 3700 7600 2000 13 16 52 183	5500 7000 7500 2001 13 1 62 201	5520 9000 7500 9007 18 1 52 201	2003 7503 13 13 1 201	3500 2001 7502 2004 10 11 42 201	5590 9000 7590 2005 36 42 235	\$600 \$409 \$100 8000 \$2006 \$3 \$3	\$660 \$660 9100 \$660 2007 \$6 1 43	\$600 \$600 \$660 \$660 \$10 \$1 \$1 \$3	\$600 \$600 \$100 \$000 \$000 \$100 \$100 \$100	5600 3600 9100 9000 2010 54 2
EFER HEAT ONTAINE VALUEN ENERAL EFER HEAT ONTAINE	e cos		\$200 \$200 \$700 \$000 \$E\$93 1997 1876 125 212 2477 4690	5200 5200 3700 5000 1989 201 12 110 150 473	5200 5200 8700 8000 1987 394 18 110 187 520	\$290 \$200 \$700 \$000 1990 123 3 85 553 770	\$300 \$300 \$300 \$500 \$500 1971 125 8 97 \$600	\$300 \$300 8000 \$500 1792 125 9 87 680	5300 5300 8300 6570 1993 125 8 97 31	5390 5300 5900 6500 6500 1394 125 8 37 33	\$300 \$300 \$300 \$300 \$500 \$300 \$37 \$37 \$3	5400 5400 8900 2000 1996 124 8 119 33	\$490 \$490 \$490 \$490 \$490 \$490	\$490 5480 8900 7600 1993 147 11 62 39	\$100 \$900 7000 1997 147 11 52 89	\$400 \$700 7000 2000 13 163 263	5500 7000 7500 7500 2001 13 62 201	5520 9000 7500 2007 18 1 52 201	2003 2003 2003 13 13 1 52 201	3500 3000 7500 2004 30 42 701 275	5500 9900 7590 2005 30 42 435 109	\$600 \$409 \$100 \$000 \$2006 \$3 \$3 \$3 \$3	5600 5600 9100 9100 5000 2007 2007 43 43 112	\$600 \$260 \$100 \$660 \$100 \$1 \$3 \$12	\$600 \$100 \$100 \$000 \$2009 \$30 \$43 \$36	\$600 \$600 \$100 \$000 \$44 \$4 \$47
EFER HEAT ONTAINE VALUEN ENERAL EFER HEAT ONTAINE	e cos		\$200 \$200 \$700 6000 8ES91 1987 1876 126 212 2477	\$200 \$200 \$700 \$000 \$000 } \$1989 201 \$12 \$10 \$50 473	5200 5200 8700 6060 1989 394 110 187	\$290 \$200 \$700 \$000 1990 123 3 88 \$53	\$300 \$300 \$300 \$500 \$500 1971 125 \$ \$ \$	\$380 5300 8860 6500 1792 125 9 87 680	5300 5300 8300 6500 1993 125 8	\$190 \$300 \$900 \$500 \$500 1991 125 8 97 33	\$300 \$300 \$300 \$300 \$500 1795 121 \$ 137 \$5	5400 5400 8700 2600 1996 124 119	139 139 139 1397 1397 1397	\$400 \$400 8900 7600 1993 147 11 62 39	5100 6900 2000 1997 117 62 89	5400 3700 7600 2000 13 16 52 183	5500 7000 7500 2001 13 1 62 201	5520 9000 7500 9007 18 1 52 201	2003 7503 13 13 1 201	3500 2001 7502 2004 10 11 42 201	5590 9000 7590 2005 36 42 235	\$600 \$409 \$100 8000 \$2006 \$3 \$3	\$660 \$660 9100 \$660 2007 \$6 1 43	\$600 \$600 \$660 \$660 \$10 \$1 \$1 \$3	\$600 \$600 \$100 \$000 \$000 \$100 \$100 \$100	\$6000 \$1000 \$9000 \$44 47 152
EFER HEAT ONTAINE  VALUE  (NERAL EFER HEAT ONTAINE  WALLEN  WALLEN	e cos		5200 5200 8700 6000 7ES91 1987 1876 126 212 2477 4690 ESEMI VA 1987 1675	5200 5200 3700 5000 1989 201 12 110 150 473	5200 5200 8700 6050 1987 394 110 187 520 12. PES 1989	\$200 \$200 \$700 \$600 1290 123 3 85 \$53 770	\$300 \$300 \$300 \$500 \$500 1971 125 8 97 \$600	\$300 \$300 \$500 \$500 \$500 1792 125 9 87 680 813	5300 5300 8300 6570 1993 125 8 97 31	5350 5360 5960 6566 1994 125 37 37 337 357	5300 5300 3860 5502 1795 121 3137 313 313	5400 5400 8900 2000 1996 124 8 119 33	769 769 769 769 769 769 769 769 769 769	\$400 \$100 8700 8700 1973 147 11 62 33	\$100 \$900 7000 1997 147 11 52 89	\$400 \$700 7000 2000 13 163 263	5500 7000 7500 7500 2001 13 62 201	2500 2500 2500 2607 18, 1, 52, 201 273	2003 2003 2003 13 13 1 52 201	3500 3000 7500 2004 30 42 701 275	5500 9900 7590 2005 30 42 435 109	\$600 \$409 \$100 \$000 \$2006 \$3 \$3 \$3 \$3	5600 5600 9100 9100 5000 2007 2007 43 43 112	\$600 \$260 \$100 \$660 \$100 \$1 \$3 \$12	\$600 \$100 \$100 \$000 \$2009 \$30 \$43 \$36	\$6000 \$1000 \$9000 \$44 47 152
EFER WALLEN ENERAL EFER HEAT ONTAINE WALLEN WALLEN ENERAL EFER	e cos		5200 5200 8700 8700 6000 7ES91 1997 1876 126 212 2477 4690 ESEMI VA 1997 1675	\$200 \$200 \$700 \$000 \$000 \$1989 201 12 110 150 473 473	5200 5200 5200 5700 6000 1987 394 187 520 187 520	\$290 \$200 \$700 \$700 \$000 \$123 \$3 \$53 \$70 \$70 \$90 \$90 \$90 \$90 \$90 \$90 \$90 \$90 \$90 \$9	\$300 \$300 \$300 \$500 \$500 \$500 \$39 \$97 \$00 \$1991 \$3	\$300 \$300 \$600 \$500 \$500 1392 125 97 680 813	5300 5300 8300 6500 1593 125 9 37 31 162	5390 5390 5990 6590 1994 125 2 37 33 397	\$300 \$300 \$300 \$500 \$500 1795 121 3 137 83 149	\$400 \$400 \$700 7000 1996 124 8 119 \$7	369 1997 1997 1997 1997 1997 1997 1997 19	\$400 \$100 8900 1993 147 11 62 39	\$100 \$300 \$300 \$300 \$300 \$300 \$300 \$300	5400 9700 7600 2600 13 1 15 283 283	5500 7000 7500 7500 2001 13 1 62 201 233	5500 9000 7500 9000 18 1 501 273	2003 2003 2003 13 1 201 201 203	\$550 9000 7500 2004 30 1 42 201 275	5500 9900 7500 2005 30 42 -35 109	\$600 \$600 \$600 \$600 \$600 \$30 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3 \$3	5600 5600 9100 5600 2007 2007 45 38 412	\$600 \$1600 \$100 \$660 \$2000 \$32 \$112 \$2000 \$33 \$41	\$600 \$600 \$100 \$600 \$600 \$600 \$100 \$112 \$112 \$2001 \$2001	\$600 \$600 \$900 \$900 \$44 47 152 2010
ENERAL EFER HEAT ONTATHE	6 005 6 005		5200 5200 8700 6000 7ES91 1987 1876 126 212 2477 4690 ESEMI VA 1987 1675	5200 5200 3700 5000 1989 201 12 110 473 473	5200 5200 8700 6050 1987 394 110 187 520 12. PES 1989	\$200 \$200 \$700 \$600 1290 123 3 85 \$53 770	\$300 \$300 \$300 \$500 \$500 \$500 \$500 \$97 \$600 \$199	\$300 \$300 \$500 \$500 \$500 1792 125 9 87 680 813	5300 5300 8300 6500 1993 125 8 9 31 162	5350 5360 5960 6566 1994 125 37 37 337 357	5300 5300 3860 5502 1795 121 3137 313 313	5400 5400 8900 2009 1996 124 8 119 33 360	769 769 769 769 769 769 769 769 769 769	\$400 \$100 8700 8700 1973 147 11 62 33	\$100 8900 2000 1997 147 11 62 89 1000	5400 9700 7000 2000 13 ( 52 188 288	5500 7000 7500 7500 2001 13 1 62 201 203	2500 2500 2500 2607 18, 1, 52, 201 273	2003 1500 2003 13 14 52 201 203	3560 9800 7500 2004 30 1 42 201 275	5500 9900 7590 2905 30 1 12 235 109	\$600 \$600 \$100 \$000 \$2006 \$3 \$3 \$3 \$3 \$3 \$3	5600 5600 9100 9100 5000 2007 2007 43 43 112	\$600 \$400 \$100 \$660 \$200 \$10 \$10 \$10 \$10 \$10 \$10 \$10 \$10 \$10 \$	\$660 \$600 \$600 \$600 \$600 \$100 \$100 \$100	\$600 \$600 \$100 \$000 \$44 \$4 \$47

4489 412 533 725 765 158 234 228 272 275 271 129 166 254 759 266 767 749 87 85 34 84 84

### Fruit 1.

- (1) Per Shift Cost in Direct Transport
  - 1) Market Price

Labor Costs	Pesos 2,500 / man shift x 20 laborers	**	50,000
Crane	Pesos 12,600 / hour x 6 hours		75,600*
Forklift	Pesos 8,400 / shift x 5 units		42,000*
	·		167 600

Total

### \* Including fuel and materials

### 2) Economic Price

Lahor	Conversion Factor	Economic Price
Labor Crane Forklift	0.90 1.11 0.96	45,000 83,916 40,320
Total		169,236

(2) Handling Capacity

225 ton / shift

(3) Unit Cost in Economic Price

169,236/225 = Pesos 750

### 2. Copper

- (1) Per Shift Cost in Indirect Transport
  - 1) Market Price

Labor Costs	Pesos 2,500 / man shift x 22 laborers	= 55,000
Crane	Pesos 12,600 / hour x 6 hours	= 75,600
Forklift	Pesos 8,400 / shift x 3 units	= 25,200
Trailer	Pesos 25,200 / shift x 2 units	= 50,400
	Tatal.	206 200

### 2) Economic Price

Lahor	Conversion Factor	Economic Price
Labor Crane Forklift Trailer	0.90 1.11 0.96 0.90	49,500 83,916 24,192 45,360
Total		202,968

(2) Handling Capacity

675 ton / shift

(3) Unit Cost in Economic Price

202,968 / 675 = Pesos 300

### 3. Wheat

- (1) Per Shift Cost
  - 1) Market Price

Labor Costs Unloader Pesos 2,500 / man shift x 9 laborers =

22,500 98,000\*

Total

120,500

 Including fuel costs and ten years useful life is assumed based on the acquisition cost of Pesos 300,000 for an unloader

2) Economic Price

Conversion Factor Economic Price
Labor 0.90 20,250
Unloader 0.96 94,080

Total 114,330

(2) Handling Capacity

675 ton / shift

(3) Unit Cost in Economic Price

114,330/675 = Pesos 170

- 4. General Cargo (Non-Container)
  - (1) Per Shift Cost in Direct Transport
    - 1) Market Price

 Labor Costs
 Pesos 2,500 / man shift x 17 laborers
 = 42,500

 Crane
 U\$\$ 70 / hour x 6 hours x Pesos 180 / U\$\$
 = 75,600

 Forklift
 Pesos 8,400 / shift x 2 units
 = 16,800

Total

134,900

### 2) Economic Price

	Conversion Factor	Economic Price
Labor	0.90	38,250
Crane	1.11	83,916
Forklift	0.96	16,128
Total		138,294

- (2) Per Shift Cost in Indirect Transport
  - 1) Market Price

 Labor Costs
 Pesos 2,500 / man shift x 28 laborers
 = 70,000

 Crane
 US\$ 70 / hour x 6 hours x Pesos 180 / US\$ = 75,600

 Forklift
 Pesos 8,400 / shift x 4 units
 = 33,600

 Total
 179,200

2) Economic Price

	Conversion Factor	Economic Price
Labor Crane Forklift	0.90 1.11 0.96	63,000 83,916 32,256
Total		179,172

(3) Handling Capacity 150 ton / shift

(4) Unit Cost in Economic Price

Direct Transport 138,294 / 150 = Pesos 922 Indirect Transport 163,044 / 150 = Pesos 1,194

(5) Weighted Average Unit Cost

 $922 \times 0.7 + 1,194 \times 0.3 = Pesos 1,000$ 

- 5. General Cargo (Container)
  - (1) Total Cost for One Month Operation at One Berth
    - 1) Market Price

(Unit: '000 pesos)

Labor Costs 60,000 / man month x 104 laborers = 6,240

Material	(30% of Labor Cost)	25	1,872
Machine Transfer Crane	242,000 x 0.9 ÷ 12 years ÷ 12 months x 5 units	==	7,563
Chassis Tractor Forklift	3,800 x 0.9 ÷ 7 years ÷ 12 months x 55 units 20,400 x 0.9 ÷ 7 years ÷ 12 months x 10 units 2,400 x 0.9 ÷ 7 years ÷ 12 months x 4 units		2,239 2,186 103
	Sub Total		12,091
CFS	300,000 x 0.9 ÷ 30 years ÷ 12 months	===	750
Maintenance	(Annually 1.7% of Acquisition Cost of Machines and CFS)		2,738
Fuel			3,510
	Total	. :	27,201

### 2) Economic Price

	Conversion Factor	Economic Price (Unit: '000 pesos)
Labor Material	0.90 0.85	5,616 1,591
Machine	1.11	13,421
CFS Maintenance	0.96 0.89	720 2,437
Fuel	0.85	2,984
Total		26,769

## (3) Handling Capacity

1 million tons/berth - year ÷ 12 months = 83,333 tons/month

# (4) Unit Cost in Economic Price

26,769 thousand Pesos ÷ 83,333 = Pesos 320 / ton

Appendix XII-6 Cargo Handling Costs

\*\* CARBO HANDLING COSTS ( UNIT : MIL. PESG ) \*\*

VALPARAISO ; ALIERNATIVE !

		٠	PHASE			Н			Æ	PHASE - 2			₩.						PHASE - 3						***************************************	
	1987	8861	6861	1990	1661 0661 6861	1992	1993	1661	1995	9661	1997	8661	1999	2000	2001	2002	2003	2004	2002	2006	2007	2008	2003	2010	TOTAL	
CUSTS: WHEAT WOM-CONTAINER CONTAINER	93.7 254	307	978 361	333	0 1000 4.50	0 1902 485	0 1003 521	0 1004 556	0 1006 591	0 1023 629	0 1040 666	0 1058 703	0 1075 741	0 1092 778	0 1114 800	0 1135 823	0 11.57 845	0 1178 867	1200 889	0 1216 909	0 1231 928	0 1247 948		272.	0 26193 16419	
1014	1191	1265	1539	1413	1450	1487	1524	1560	1597	1652	1,706	1761	1816	1870	1914	356	2001	2045	5002	2124	2159	2195	2230	2266	(251)	
A	1063			398	323	753	689	059	57.6	\$32	164	452	416	283	320	319	291	587	545	_ 022	580	181	165	557	12051	
						3144						•	11616						•					22851	42611	
7 A G						5499							3736											2767	15021	
HON-CONTAINER P. V.	837	763	969	533	268	207	454	106	363	129	299	23.1	246	Siz	202	383	163	153	æ. 13 1	128	**	103	<u>.</u>	S4.	7967	
CONTAINER P.V.		245		263	255	4006 246 1493	235	225	213	202	0	181	2363 170 1413	651	146	134	123	23	103	20	\$8	82	71	12.75 13.75 1	4084	

\*\* CARSO HANDLING COSTS ( UNIT : MIL. PESO ) \*\*

SAN ANTONIO : ALTERNATIVE 1

	-			PHASE -						폾	PHASE - 2			-						PHASE -	· 3		1	; ; ;	٠, ا	1
	,	1987	1688	1989	0661	1991	1992	2663	1994	1995	1996	2661	8661	6661	1999 2000 2001	2001	2002	2903	2004	2005	2006	2007	2098	5002	2010.	1014
COSTS: WHEAT WOM-CONTAINER			25. 25.	92 994		81 1037 81	91 1049 87	1061 93	61 1073 99	30 1085 106	82 1107 112	83 1130 119	85 1152 126	86 1174 132	. 88 1197 139	92 1226 143	96 1256 147	99 1286 151	103 1316 155	107 1346 159	110 13% 162	113 1446 166	11.7 149.7 169	120 1547 173	123 1597 2 176	2298 29892 2986
TOTAL	-		1137	1159		1199		1235	1253	1271	1302	1332	1363	1393	1424	1461	1499	1536	1574	1611	1668	1725	1782	1839	1896	34177
		<b>76</b> 6	206	325	75.	189	617	559	206	458	419	283	380	313	162	267	244	224	208	187	173	160	[*]	8.	125	6266
		<u>:</u>	ŧ				2810						•	9149											18017	34177
10131		•		•			A774							2994						:					2159	620
9.9	o -	920	989	773	704	635	573	517	466	420	383	349	317	289	263	243	221	202	185	691	156	144	133	123	113	9156
CONTAINER P.V.		. 25	88	25	74	46	44 44 310	45	40	38	19	34	32	2741 30 253	58	56	24	22	20	22	-	15	***	2	21 82	27.7 25.7.7

\*\* CARGO HANDLING COSTS ( UNIT : MIL. PESO ) \*\*

									٠.		1		:			1		·			
. :	107.01	26193 9715	35908	10407	35908	10407	7967	745) 2439 2439	(643)	٠		* *	TOTAL	22598 28892 9490	1881	11575	1880	11575	9156	2418	
<b>j.</b> -	0306		1881	123	18821	2882	80	<u> </u>	1/0		b .	H	2010	1597	2302	152	22017	2641	113	88.69	
	2000	1263 570	1833	135			56	42					2003	120 1547 578	2237	33			123	5	
	2000	0 1247 559	1806	149			703	97			- : : : : : : : : : : : : : : : : : : :		2008	117 1497 559	21.72	173			155	46	
	2000	0 1231 547	1778	165			114	23					2007	1113	2107	26:			*	M	
	7006	1216 535	1751	183			126	%				M3	2006	110 1396 535	2042	212			156	83	
257.00	TRAJE	1200	1724	290	-		139	61				- 384496	2002	1346	161	622			565		
	1 200	0 11.78 51.1	1589	220			153	99			:		2004	103 1316 511	1930	251			507	99	
	7006	1157	1654	241			188	72		1.4			2003	66 738 768	1883	574			202	72	
	9000	1135 485	1620	264			185	52			٠.	٠	2002	96 1256 485	1836	330			121	35	
	1000	1114 472	1585	290			202	<b>%</b>	:				2003	42 1226 472	1790	327	٠.		241	88	
	0000	1092	1551-	317	٠		223	34					2000	88 11.97 45.9	1743	35)		: -	263	학 강·	
•	1000	1075 437	1511	346	3806	3204	246	25 E	3			. ***	1999	86 1174 437	1697	88	10958	357.6	289	100 100 835	
	000	1050 415	1472	378		٠.	271	907	-				8661	85 1152 415	1651	<b>4</b> 24			317	106	
	1007	0 1640 393	1433	412			299	111			1.		2661	33 1130 393	1606	162			549	113	•
5 y nd	1697	1023	1393	449			229	119	•			HASE - 2	9661	52 1107 370	1560	205			383	<del></del>	
ž	796i	1006 348	1354	88	. 5		363	126				₹.	1995	80 1085 348	1514	546	٠.	•	420	22	
	1098	1004 328	1332	533			406	132	· ·				1994	81 1073 328	1481	593			165	132	
	603	1003 307	1310	593		: .	454	139					1993	1861	1449	655			5	139	
	600	1002	1288	652	7251	4913	207	55. 25.				- <del>* *</del> *	1992	18.49 286	1417	23	2902	5357	573	34.3	
	1691	000 1000 265	1265	718		•	568	151			. ***		1661	.8. 28.	1384	785			635	TS1	
	0661	999	1243	-86			83	155			٠	. <b>.</b>	9561	28 1025 244	1352	. 326			90	155	
357Hd	1080	978 219	1197	325			69	156		6536		PHASE	8	25. 215.	層	33			773	153	
	886-	0 953 194	1152	918	 		763	155		MIT - M			\$867	3 3 8	1251	266			88.8	66 86	
ATIVE 2	1997	937	1106	787			253	151		usts ( u	NATIVE 2		1987	10 m 0	1201	1672	٠		332	0.41	
VALPARAISO : ALTERNATIVE 2		COSTS: NHEAT NON-CONTAINER CONTAINER	TOTAL	<b>.</b>	TOTAL	, y. q	NON-CONTAINER P. V.	CONTAINER P. V.	3	** CARGO HANDLING COSTS ( UNIT : HILL PESU ) **	SAN ANTONIO : ALTERNATIVE 2	<b>P-4</b>	, 	KHEAT NON-CONTAINER CONTAINER	TOTAL	'n.c.	וטואן	26	NON-CONTAINES P.Y.	CONTAINER P.V.	

\*\* CARGO HANDLING COSTS ( UNIT : MIL. PESO ) \*\*

186   186	PALPARAISO : ALTERNATIVE 3	F1W 3	et.								:			•											
1486   1586   1586   1586   1586   1596	<b>H</b>			PHASE -	4					PH	ISE - 2		13	₩					-						f
Figure 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	·	1987	1958	1989	1940	1661	1992	1993	1994	1995	1996	1997	866!	1999	2000	2001	2002	2003				100	٠	1 4	0188
11   12   12   12   12   12   12   12	COSTS: HHEAT NON-COMTAINER CONTAINER	937 84	0 8% E	978 77	0 %	0 (090) 31	0 1002 87	0 1003 93	7001 0	.005 1006 106	0 1023 112	0 1040 119	0 1058 126	0 1075 132	0 1092 139	0 1114 143	0 1135 147	0 1157 151							0 176 176
1   1   1   1   1   1   1   1   1   1	TOTAL	1021	1038	1056	1073	1081	1088	1096	1104	1111	1135	1159	1183	1207	1231	1257	1282	1308						1	\$55
1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,	5- 0-	116	923	751	682	613	\$51	496	416	102	366	333	304	277	252	230	200	061	173	158		55	117	93	.36
ST   NG   696   635   546   547   454   648   345   329   279   289   271   246   251   249   271   246   251   249   271   246   251   249   271   246   251   249   271   246   251   249   271   249   271   249   271   249   271   249   271   249   271	10121						6356							7996										~1	4851
1			•		:		4337							1292			:								1303
DOSTS ( BWIT : MIL. PCSO ) ***    131	NON-CONTAINER P. 9.	837	763	969	635	568	507	454	404	363	. 329	299	271	246	223	202	8	168	123	139	126	114	101	16	చే గ్ర
1	CONTAINER P.V.	75	. 79	જ	47	45	6006 331	42	තී	8	35	Ã	25	85 85 85 85 85 85 85 85 85 85 85 85 85 8	82	2%	2	23	50	22	11	SZ.	**	ដ	23.62
1 PHASE - 2  1 PHASE - 2  1 PHASE - 2  1 PHASE - 3  1 PHA																									
1968   1989   1990   1991   1797   1993   1974   1995   1996   1997   2000   2001   2002   2003   2004   2005   2006   2007   2008   2009	** CARGO HAMBLING C	in ) 51500	NIT : MIL	L. PS30	## (										•										
1988   1989   1990   1991   1992   1994   1995   1996   1997   1998   1999   2000   2001   2002   2003   2004   2005   2006   2007   2008   2005	SAM ANTONIO : ALTER	HATIVE 3																							
1987   1988   1989   1990   1991   1992   1993   1994   1995   1996   1999   1999   1990   2000   2001   2002   2003   2004   2005   2005   2009	<b></b> '			PHASE	ا ا		<b>H</b>			唟	IASE - 2			b-4						, ;	מן	1			
MILINER P.V. 215 238 254 255 255 255 215 215 215 215 215 215 215		1987	1988	1989	1990	1661	1992	1993	1994	1995	9661	1997	1998	6661	2000	2001	2002	2003	2004		3006	2007	2008	2005	2010
1285 1364 1445 1522 1569 1616 1663 1710 1757 1818 1879 1940 2002 2063 2119 2174 2230 2286 2342 2415 2488 2361 2634 2634 263 1369 1616 1663 1710 1757 1818 1879 4458 245 245 245 245 245 2415 2415 2415 2415	COSTS: WHEAT NON-CONTAINER CONTAINER	113 931 241	103 963 299	92 934 357	82 1025 414	81 1037 450	81 1049 485	81 1061 521	91 1073 556	80 1085 591	82 1107 629	83 1130 666	85 11.52 703	86 1174 741	88 1197 778	92 1226 800	% 1256 823	99 1286 845	103 1316 367	107 1346 889	110	113 1446 928	117	120 1547 967	123 1597 787
1148 1088 1027 967 390 319 752 691 634 585 540 498 459 422 387 355 325 297 272 250 230 212 194  212768  31268  31268  31268  4158  31268  4158  31268  4158	T0TAL	1285	1364	1443	1522	1569	1616	1663	1710	1757	1818	6281	1940	2002	2063	2119	2174	2230	2286	2342	2415	2488	2561	2634	2707
201768 5938 50176	<u>م</u>	1148	\$801	1027	296	390	919	752	169	634	585	540	<b>\$63</b>	459	422	387	355	325	297	272	520	230	212	<b>*61</b>	8
4158  NHAINER P.V. 932 849 773 704 635 873 817 466 420 383 349 317 289 263 241 221 202 135 169 156 144 153 125  NHER P.V. 215 238 254 265 255 225 213 202 191 181 170 159 146 134 123 113 103 94 86 78 71 1418	TOTAL						8799							12768											1093
CONTAINER P.V. 932 849 773 704 635 573 517 466 420 383 349 317 289 263 241 221 202 135 169 156 144 133 123 123 113 113 113 113 123 123 113 11	>						5938							<b>*</b> 1.58				٠.				•			3123
215 238 254 263 255 246 235 225 213 202 191 181 170 159 146 134 123 113 103 94 86 78 71 143	NOM-CONTAINER R.V.		849	773	704	635	573	517	466	420	383	349	317	289	263	241	221	202	135	169	156	***	100 100 100	123	11.3
	COMTAINER P.V.		238				4466 246 1472	235	225	213	202	191	181	2/41 170 1413	159	146	134	123	113	103	94	98	78	. 17	\$\$ 1173

# Maintenance & Administration Costs

Appendix XII-7

\*\* MAINTEMANCE & ADMINISTRATION COST ( UNIT : MIL. PESO ) \*\*

VALPARAISO : ALTERNATIVE 1

	<b>-</b> (		PHASE	<del>.</del>					ã.	PHASE - 2		٠.	ь. <b>н</b>				. :		PHASE - 3	PHASE:-: 3				Port.	1
	1981	1988	7 7661 1661 0661 6861 8861 6861	0661	1661	7661		1994	1995	1996	1997	1998	6661	2000	2001	2002	2003	2004	2005	2002	2097	2008	2003	2010	T01AL
NUMBER OF LABORER	100	991	100	001	901	100	100	100	100	a01	001	001	100	100	001	100	100	001	100	100	961	002	100	007	2400
LABOR GOST		88.8	801	801	용 %	108 901	108	. 801	881	103	803 %	108	801 80	108 108	801	801	807	. 801 36	83 %	103	85. 85.	10%	901	83 %	2572
ADMINISTRATION COST	ిక్ట	304	* **	3 2	3 <del>0</del> · 3	₹ ₹	ਵੱਲ	<b>10</b> 2	? \$	25	30.	504	38.7	204	204	204	204	204	₹8	88	ेहर	20%	20.5		398
CONSTRUCTION COST ACCURICATED	J.	4741	2837	7578	2363	3642- 13584	92	2689	7805	3194	1903	19952	660 70586	5376 35963	15963	35963	4902	7358	319	0 48542	3 48542	9	48542	9 48542 7	. 48542 703000
MAINTENANCE COST	-	7	<b>38</b>	40	99	811	113	142	210	239	255	260	266	313	313	313	356	120	422	422	452	455	422	55	9119
TOTAL MAINT, & ADMIN.	204	245	270	270	95 25	322	323	346	=	442	\$3	<b>7</b> 94	470	\$17	517.	\$17	560	624	929	526	626	626	929	•	11012
PRESENT VALUE	182	963	261	172	53	163	146	140	149	145	132	119	801	901	<b>3</b> .	4	81	18	12	\$3	×	83	e er	7	2738
1014					:	2091				•			2919							:				26,625	1,012
<del>3.</del>						1069							916											733	2788

\*\* MAINTENANCE & ADMINISTRATION COST & UNIT : MIL. PESO ) \*\*

SAN ANTONIO : ALTERNATIVE 1

	•-4		35774						₹.	PHASE - 2			r-4					-	PHASE -	۲٠٦				h-d	
	1981	\$861	1389	1990	1661	1992	1993	¥661	\$661	1996	1997	1998	1999	2000	2001	2002	2003	2004	2002	2005	2007	2008	2003	2010	1674
NUMBER OF LABORER	8	283	100	160	8	100	100	901	100	81	100	100	100	8	100	091	100	305	3	90	8	8	188	5	2450
LASOR COST	83.5	8.	85 à	<b>8</b>	82 3	851	85	807	86	801	: 801	88	88.7	85	901 1	891	133	S 3	<u>शु</u>	50 20 20 20 20 20 20 20 20 20 20 20 20 20	윉	8 8	305		2592
ADMINISTRATION COST	8 <b>2</b>	នី	2 %	8	8 8 8	25.5	8 %	36.2	204	\$ %		75	ž,	201	? <b>5</b>	\$0 <b>2</b>	Z0₹ ?	75.	30.		ğ	25	204	20.	\$9°
CONSTRUCTION COST	ස ස	1820	38	2959	1517 7530	87.8	8346	3746	9346	1623 9968	300	2943	13683	279	2119	2240	1654		20902	20902	20902	20902	20902	29952	20602
MAINTENANCE COST			23	51	**	52	R	ĸ	7.7	87	65	115	119	121	<u>3</u>	159	174	1	179	6/1	173	8	173	179	2739
TOTAL BACKT. 3 ADMIN.	762	3	83	255	270	277	277	112	23.)	Ę.	292	313	323	325	775	138	278	23	33	283	्ट्र	123	×	1387	3665
PRESENT VALUE	E	176	ã	. 162	ន	148	53	21	100	*	. ₹	Z	. ス.	2)	13	o,	55	\$	7	ě¥	B	83	83	Ø	5778
1974			÷			1456							2056	: :		:								1893	7605
7.						110	٠	٠.					670					٠.						8	21.86

\*\* MAINTEMAKOE & ADMINISTRATION COST ( CHIT : MIL. PESO ) 3:

1927   1946   1949	VALPARAISO : MIERNATIVE 2	 61 W																	;						
1957   1968   1989   1990   1991   1992   1993   1994   1995   1994   1995   1994   1995   1999				15. 15.	-		•••			£.	4SE - 2	•			1					PH 525 -	,,				
105   106   108   108   108   106		2861	894	1989	0661	1661	1992	1993	466	3667	667	2661	8661	6561	2000	2001	2005	2002			2005	7387		2003	2010
1105 1008 1103 1103 1103 1103 1103 1103 1103	NIMSER OF LABORES	951	100	8	001	189	100	100	001	190	001	991	100	83	99.	001	831	36	헍	81	981	8	801	100	8
61 0 4776 3265 229 0 0 2681 2177 2462 2277 2240 6629 4556 229 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	LABOR COST MATERIAL COST ADMINISTRATION COST	108 96 801	8 f <b>5</b>	108 204 204	20 % S	88. 85. 25.	851 862	88 55 <b>5</b> 5	108 204 204	80 % pp	103 204 204	103 95 204	108 35 204	108 96 204	108 9.8 20.4	168 36 204	108 96 204	103 96 204	861 861 801	103 % 264	88 %		85 gr 45	96 36 36 36	E & E
0 42 70 72 72 72 72 93 116 117 1159 178 235 277 277 277 277 277 277 277 277 277 27	CONSTRUCTION COST	୍ କଟ	4776	3265	229	6278	0 8270	2681 18958	2377	2468	2377	2240	6623 27040	4556 31596											31825
MIN. 204 2A6 274 275 276 276 370 341 362 332 439 479 481 481 481 481 481 481 481 481 481 481	TOUGHOUSE NAME OF THE PROPERTY	• •		. 2	53	22	7.2	36	911	133	153	178	235	275	277	277	22.5	277	27.2	27.7	27.7	237	277	7.2	13
102 196 195 175 157 140 135 129 123 117 110 115 116 98 88 78 70 6.5 56 59 45 40 1551 1551 856 100 1551 836	TOTAL MAINT & SINCE	1 70%	246	27.4	275	276	276	662	320	341	362	382	ţ	479	181	3	183	481	182		£5.		32	37	184
155.1	POSTCRIPT VALUE	182	•	285	175	157	94:	55	129	123	117	110		116	82	88	20	70	F-7	æ	R	\$7	£0.	13	32
1045	107A			, <del></del>			1551							2622	2										5290
	2			•			1045							836											\$\$

TOTAL

2304 4896

\*\* MAINTENANCE & AUMINISTRATION COST ( UNIT : MIL, PESO ) \*\*

 \*\* MAINIENANCE & ADMINISTRATION COST ( UNIT : MIL. PESO ) \*\*

VALPARAISO : ALIERNATIVE 3

	::. :		PHASE -			, <del>,</del>	٠		£.	PHASE ~ 2	•		· 🛏					-	PHASE - 3	<b>P3</b>				b-4	!
	1987	8861	6861	1990	1661	1992	1993	1994	1995	1996	1997	8461	1999	2000	1002	2002 2	2003 2	2004	2005	2008	2907 21	2068 24	2009 2	2010 TO	TOTAL
NUKBER OF LABURER	100	106	100	100		803	. 8	99	100	· 400	100	- 8	100	901	100	100	8	100	001	007	700	001	001	100 2	907
LABOR COST NATERIAL COST ADMINISTRATION COST	108	108 96 204	108 96 204	108 96 204	801 ° 802	108 96 204	108 96 204	80 80 80 80 80 80 80 80 80 80 80 80 80 8	108 96 204	108 96 204	108 96 204	108 26.	108 96 204	108 96 204	108 204 204	103 96 204	108 96 294	108 96 204	96 801	108 96 204	108 204 204	20%	108 96 204	108 2 96 2 204 4	2592 2304 4896
CONSTRUCTION COST ACCURULATED	00	2839	3107	3107	2550	1111	8698 8698	267 8963	199	1550	267	1969	2397		0 15990 11	1 0 15991	1550 17540 17	268 17809 15	842 13651 18	0 18651 13	0 18651 18	0 18651 188	0 18651 19	0 18 19651 295	0 55 g 316 g
MAINTENANCE COST	0	25	23	27	*	S	7,6	Z	₹.	- 46	8	1117					53	155	791	162	162	162	791	162 2	574
TOTAL MAINT, & ADMIN.	204	339	231	231	252	263	290	282	288	301	304	321	342	33	343	272	357	359	366	346	366	366	366	% %	470
PRESENT VALUE	182	182	<u> 3</u>	147	**	123	126	*11	·. •01	97	- 83	83	29	202	. 13	**	: . 83	17	13	38	\$	23	27.	24 2	2125
ነህን ሒ		\$	* .			1411							2116										,,	3942 7	7470
₹.						953							689	-										.83	2125

\*\* MAINTENANCE & ADMINISTRATION COST ( UNIT : HIL. PESO ) \*\*

SAN ANTONIO : ALTERNATIVE 3

	H.		PHASE - 1	<del>-</del>					۰.	PHASE - 2-			; ·	٠.					PHASE -	*3					
	1987	. 886	1989	1990	1661 0661	1992	1661	1364	1995	9661	1997	866 1	1366	2000	2001	2002	2007	2004	2002	2006	2007	2002	2002	2010	1914
KUNBER OF LABORER	8	001	8	801	99	8	160	8	100	001	903	100	001	001	8	130	8	903	99	E	100	8	83	196	2400
LABOR COST PATERIAL COST	88 %		108 96	8 3	108 86	901 801	95	80. 36	801	88.88	108	103 96	108	108 94	98 %	9,8	8 %	96	8 %	23.8	55 %	103 %	8 %	85 %	2382
ADMENISTRATION COST	ž	ź	ž	\$0°	ę	50%	204	304	8	ž	204	204	ž	204	<u></u>	30 <del>1</del>	204	ž.	204	ž	ž	<b>30</b> 5	Ř		\$832
COMSTRUCTION COST ACCUMILATED	<b>&amp;</b> O	1444	6591 21035	1600	3742	4655	11032	31032	31032	1590	20 32642	1654	875 35172	35172	6 35172	1663	39956	11562 51518	2152	0 53669	52669	53,669	69925		53669
MAINTENANCE COST	G)	126	183	261	197 229	270	279	270	9/2	234	234	238	366	306	308	320	348	643	297	467	199	299	199	194	7317
FOLG MAINT, & ADRIN,	25	330	337	401	5	274	17.7	47.4	1/4	438	488	205	\$10	310	510	324	25	652	:19	671	179	25	671	ij.	12413
PRESENT VALUE	ä	33	275	552	ž	240	214	2	171	157	110	123	21	104	33	8	æ	\$	78	F?	23	æ	S	#	2133
נסדער				٠		5256				•			3410											7229	12413
2.			1.			1351							1129								1.			88	3388

\*\* INLAND TRANSPORTATION COST \*\* ( UNIT : MIL. PESO ).

VALPARAISO : ALTERMATIVE 1

	<del></del>		PHASE - 3	una F			P= 4		a.	PHASE - 2									- 3SAH4	rs'				1-4	1
	1987	1988	1989	1990	1661	1992	1993	1994	1995	9661	1997	8661	1999	2000	2001	2002	2003	2004	2002		2002	2008		2010 TOTAL	TAL
WHEAT FRUIT COPPER GENERAL COMTATMER	2,253 2,253 2,392 2,926	2,347 269 2,413 3,543	2,441 276 2,433 4,161	2,534 283 2,454 4,773	2,534 283 2,460 5,186	2,534 233 2,466 5,594	2,534 283 2,473 6,803	2,534 283 2,479 6,411	2,534 283 2,485 6,319	2,543 279 2,562 7,250	2,552 275 2,638 7,681	2,561 271 2,715 8,112	2,569 2,569 2,791 8,543	2,578 2,578 2,868 3,973	2,606 2,606 2,946 9,229	2,634 2,634 3,024 9,484	2,662 264 3,103 9,739	2,696 2,696 3,131 9,995 1	2,719 2 264 3,259 10,250 10	2,753 2 264 3,307 3 10,476 10	2,788 2 264 3,354 3	2,823 2 264 3,401 3 10,928 11	2,858 2 264 3,449 3	2,893 62,479 264 6,501 3,496 68,149 11,379 189,314	0 62,479 6,501 68,149 59,314
	í	3,572	9.311	10,049	10.049 10,464	10,378	11,292	111,787	12,121	12,634 13,146	13,146	13,659	14,171	14,683	15,045	15,407 1	15,769	16,130 1	16,492 10	16,800 17,108 17,416	7,108 17	i	17,724 18	18,032 326,444	444
	6,995	6.834	6.627	6,386	5,937		5,108	4,728	4,371	4,068	3,779	3,506	3,248	3,004	2,749	2,513	2,297	860,2	1,915	1,915 1,742 1,584		1,439	1,308	1,138 88,934	934
TOTAL		•			•	57,108	:	:				٠	33,730							٠			88	80,606 326,444	<b>*</b>
8.						38,291		:					28,808			٠							23	21,836 88,	88,934
		, u	-										-												
SAN AND	SAN ARIONIU : ALIERNATIVE I	EKNA! IVE	PHASE	m + →			ы		•	PHASE -	2								PHASE	ا د در				h-4	1
:	1987	1988	6861 8	1990	1661 0	1 1992	2 1993	3 1994	1995	9661	2661	8661	6661	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	16TAL
WHEAT FRUIT COPPER GENERAL	2 -15	~	2 -16	1,973 758 1,941 7,3,436	3 1,966 8 763 1 1,988 6 3,467	6 1,958 3 767 8 2,036 7 3,498	3 1,951 7 772 6 2,083 8 3,529 9 1,106	1 1,943 2 776 3 2,131 9 3,560 6 1,81	3 1,936 5 781 7 2,179 0 3,591	784 784 784 3,762	2,012 787 1,886 3,933	2,049	2,087 794 1,593 4,275	2,125 797 1,446 4,446 1,655	2,216 805 1,446 4,581 1,701	2,307 813 1,446 4,717 1,748	2,393 821 1,446 4,852 1,794	2,489 1,446 4,987 1,841	2,580 837 1,445 5,123	2,658 845 1,446 5,354 1,929	2,736 853 1,446 5,585 1,971	2,314 860 1,445 5,815 2,013	2,892 868 1,446 6,048 2,054	2,970 55 876 19 1,446 40 6,279 104 2,096 35	55,458 19,038 40,609 104,838 35,499
114		1	1	, 00		į.		5	1		-		! ~	1 -	10,750	11,031	11,312	11,592	11,873	12,232	12,591	12,950	13,309	13,667 255,443	5,445
	8,062						7 4,271	1 3,874		3,183		2,613	2,366	2,142	1,964	1,799	1,647	1,507	1.379	1,268	1,165	1,070	385	900 7	75,793
TOTAL			:			54,470	0						69,196							:				31,777 255,443	5,443
<b>&gt;</b> 6.						37,264	<u>-4</u>						22,703											15,825 7	75,793
																							•		

\*\* INLAND TRANSPORTATION COST \*\* ( UNIT : MIL., PESO )

VALPARAISO : ALIERARIIVE 2

	<b>3-4</b>		PHASE	-ruj Į		<b></b>			<u>a.</u>	PHASE - 2		: .	s=4						PKASE -	m	,÷			₩4	
	1987	1988	1989	0661	1991	7661	1993	1994	1995	1996	1997	1998	6661	2000	2001	2002	2003	2004	2002	2006	2002	2008	2003	2010 TOTAL	0.T.K.
WHEAT ERUIT COPPER SEWERAL CONTAINER	2,253 2,392 1,945	2,347 269 2,413 2,237	2,441 276 2,433 2,528	2,534 283 2,454 2,819	2,534 2,534 2,460 3,059	2,534 283 2,466 3,299	2,534 283 2,473 3,538	2,534 283 2,479 3,778	2,534 283 2,485 4,018	2,543 2,543 2,562 4,272	2,552 275 2,638 4,526	2,561 271 2,715 4,780	2,569 268 2,791 5,034	2,578 2,84 2,868 5,287	2,606 2,606 2,946 5,438	2,634 264 3,024 5,589	2,662 264 3,103 5,739	2,690 264 3,181 5,890	2,719 2,719 3,259 6,040	2,753 264 3,307 6,174	2,788 264 3,354 6,307	2,823 2 2,823 2 3,401 3 6,441 6	2,858 2 264 3,449 3 6,574 6	2,893 62 264 62 3,496 68 6,708 112	62,479 6,501 68,149 112,921
	6,855	7,266	7,678	8,090	8,336	3,582	8,328	9,075	9,321	9,656	1 166'6	10,327	10,662	10,997	11,254 1	11,511	11,768 1	12,025 1	12,282	12,498	12,714 12	12,929 13	13,145 13	13,361 249,151	151
	6,120	5,793	5,465	5,141	4,730	4, 348	3,994	3,665	3,361	3,109	2,872	2,651	2,443	2,250	2,056	1,878	1,714	1,564	1,426	1,296	1,177	1,069	970	69 1888	126,69
TOTAL			٠.	•		46,807							098,79	•									134	34,484 249,151	132
à.						31, 597					:		22,095	•							1		. 16	16,279 69	69,971
	•				,			٠.															•	:	
SAH ANTONIO: ALTERNATIVE 2	10 : ALTE	RNATIVE 2				•	٠. `				÷		. :												
			PHASE		1			-	On.	PHASE - 2			-				. •		PHASE -	ris '				344	
	1987	1988	1389	1990	1861	1992	1993	1994	1995	386	1997	1998.	6661	2000	2001	2002	2003	2004	2002	2006.	2807	2068	2002	2010	TOTAL
RREAT FRUIT CUPPER SENERAL CONTAINER	2,728 6,821 2,578 1,578 1,578 1,588	2,473	2,22 7,23 3,367 2,557	1,973 758 1,941 3,436 2,907	1,966 765 3,467 3,154	1,953 767 2,038 3,498 3,491	1,951 772 2,083 3,529 3,648	1,943 776 2,131 3,560 3,896	2,173	1,974 784 2,032 3,762 4,405	2,012 737 1,386 3,933 4,666	2,049 791 1,739 4,104 4,928	2,637 794 1,593 4,275 5,190	2,125 797 1,446 4,446 5,452	2,216 205 1,446 4,581 5,607	2,307 813 1,446 4,717 5,762	2,398 821 1,446 4,852 5,917	2,433 829 1,446 4,987 6,073	2,580 837 1,446 5,123 6,223	2,658 2,845 5,354 5,354	2,736 853 1,446 5,585	2,314 260 1,446 5,315 6,641	2,852	2,970 SS 876 19 1,446 40 6,279 104 6,916 115	55,458 19,038 40,609 104,838
	10,041	10,365	10,690	11.014 11.337	ŧ	11,660	11.983	12,306	12,629	12.957	13,284	13,611	13,939	14,266	!			1	· [ ·	16,669 1	1	!	"	18,488 335	335,149
	8,965	8,263	7.609	7,000	6,433	5.907	5.421	4,970	4.554	4.172	3,819	3,494	3,194	2,919	2,678	2,454	2,248	2,058	1,883	i 728	1,585	1.453	in in	1,218 95	95,354
10121						65,107	٠.					:	90,709								-		138	179, 332, 335, 149	671
¥.						44 177							29,624				A .						83	21,554 95	35,354

\*\* INLAND IRANSPORTATION COST \*\* ( UNIT : MIL. PESO )

VALPARAISO : ALTERNATIVE 3	. A. T. S.	>							٠															
*		:	PHASE -	<b>1</b>		auri4			₹	PHASE - 2								1	- 354HS	22	1	1		
,	1987	1988	1989	1990	1991	1992	1993	1994	1995	9661	1897	8661	1999	2000	2001	2002	2003	2004	2002	2006	٠.	2008	5002	2010 T0TAL
WHEAT FRUTT COPPER SENERAL	2,253	2,347 269 2,413		1.1		2,534 283 2,466	2,534 283 2,473	1.1	2,534 283 2,485	2,543 279 2,562	2,552 275 275 2,638	2,561 271 2,715	2,569 268 2,791	2,578 264 2,368	2,506 2,546 2,946	2,634 3,024	2,662 2	2,590 2	2,719 2 254 3,259 3	2,753	2,788 264 3,354	6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	2,858 2,858 3,264 1,449 200	2,893-62,479 264-6,501 3,496-68,149
CONTAINER	965	\$26	268	328	826	1,001	1,073	;		. !					1		1.0				1	3,445		
	5,244	5,358 4,749	3,062	3,894	3,521	3,184	2,878	2,602	2,351													869	4.7	572 56,999
TOTAL													46,995			٠.								e-41 ,
à.						24,893						· .	15,383	÷										10,725 DC,737
			• .										٠					•	•			•		
SAN ANTONIO : ALTERNATIVE 3	O : ALTER	NATIVE 3					÷				-							:						
	· 🛏		PHASE -	1					ã.	PHASE - 2			<b>H</b>						PHASE	10		i i i i i	i ; ; ;	<b>→</b>
٠	1987	1988	1989	1990	1991	1992	1993	1994	1995	9661	1997	1998	6661	2000	2003	2002	2003	2004	2005	2008	2007	2008	5002	2010 TOTAL
MEAT	2,726	2,475	2,224	1,973	1.966	1,958	1,351	1,943	1,936	1,974	2,012	2,049	2,087	2,125	2,216	2 307				2,653	2,736	2,314	2,892	2,970 55,458 876 19,838
FRUIT COPPER	575	1,697	1.819	1,941	. 788	2,036	2,083	2,131	2,179	,032 2,032	1,386	1.739	1,593	1,446	1,466	1,446	100			1,446	1,446	1.446	1,446	
SEMERAL CONTAINER	3,231	3,299	3,367	3,436	3,467 5,347	3,498.	3,529	3,560 6,610	3,591 7,031	3,762	3,933 7,919	4,104 3,364	4,275	4,446	4,581 9,516	4,717	4,852	4,987	5,125	5,354	5,585 11,054	5,816	5,048	
	11,051	11,712	12,373	13.034	13,531	14,027	14,524 15,020	15,020	15,517	16,027	16,537	17,047	17,557	18,067	18,565	19,062	19,560	20,057 2	20,555 2	21,165 2	21,654	22,204	22,754	23,304 414,843
	9,867	9,337	8,807	8,283	7,678	7,107	6,570	990,9	5,595	5,160	4,754	4,376	4,024	3,697	3,392	3,109	2,849	2,608	2,387	2,138	2,004	1,835	1,679	1,535 114,907
TOTAL						75,729						<del></del>	112,228										17	226,887 414,845

27,283 114,907

36,545

ð.

Appendix XII-9 Number of Aseismic Berth and Costs Involved

(CASE 1)	87	88	99	90	91	92
Cargo Demand	*****				***	
Copper		٠		869	885	901
Fruits				658	659	.659
General Export		•		699	734	768
General laport				2098	2202	2305
Wheat			. 4	481	479	477
total	4200	4400	4600	4805	4959	5110
Cap. at Alt. Ports	2200	2200	2200	2000	0081	1600
			1 :			1000
Existing						6 8 T 1 L
Capacity	5200	5200	5200	400	400	400
				1400	1400	1400
_						
	5200	5200	5700	1800	1800	1800
Ton. at Alt. Ports	0	. 0	0	3005	3159	3310
	0	. 0	. 0	2000	1800	1600
	* :					
Trade suspended	0	0	. 0	1005	1359	1710
W. a. L				*0*		
Wheat				481	479	477
General Import				524	880	1233
General Export		:		0 -	) ·	0
Fruits				0	0	. 0
Copper				. 0	0	0
Additional Inland						
Transportation Costs		. 0		0015	0477	0014
ii ansportation costs	0	. ช	0	9015	9477	9930
rade suspension Loss						
*heat	0	. 0	0	1634	1627	1620
General Import	ő	. 0	Ô	10325	17340	24295
General Export	0	0	0	10323	100	100
Fruits	0	Ů	0	0	0	0
Copper	0	Ō	0	. 0	0	0
Total	0	0	·····	11959	18966	25915
		•				
Construction Costs		0	ther Cost	<b>S</b>	85262	
Container	7500	er trouble Trouble		:		
Non-container	4200			: .		
••••••••••••••••••••••••••••••••••••••	11700				•	**
* · ·	* * * * * *					

(CASE 2)	87	88	89	90	91	92
Cargo Demand Copper				869	885	901
Fruits -				658	659	659
General Export				699	734	768
General Import				2098	2202	2305
Wheat				481	479	477
total	4200	4400	4600	4805	4959	5110
Cap. at Alt. Ports	2200	2200	2200	2000	1800	1600
Existing						
Capacity	4800	4600	4800	400	400	400
, ,		٠.		1800	1900	1800
	4800	4800	4800	2200	2200	2200
To al All Dools	0	. 0	0	2605	2759	2910
Ton. at Alt. Ports	0	0	Û	2000	1800	1600
Trade suspended	0	0	0	605	959	1310
Wheal				491	479	477
General Import				124	480	833
Seneral Export				0	. 0	0
Fruits				0	Û	0
Copper	•			0	0	0
Additional Inland Transportation Costs	0	0	0	7815	8277	8730
Trado cuenoscian loss				•		
Trade suspension Loss Wheat	0	0	Ú	1634	1627	1620
General Import	Ú,	0	õ	9478	9438	9399
General Export	0	0	. 0	0	0	0
Fruits	0	0	0	0	0	0
Copper	0	0	0	0	0	0
Total	0	0	. 0	11111	11065	11019
Construction Costs			Other Cos	ts	58017	
Container	7500					
Non-container	8400		r			
•	15900				•	

(CASE 3)	87	88	89	90	91	92
Cargo Demand			~~~~~~			
Copper				.889	885	901
Fruits				658	659	659
General Export				699	734	768
General Import				2098	2202	2305
Wheat	s .			481	479	477
total	4200	1400	4600	4805	4959	5110
Cap. at Alt. Ports	2200	2200	2200	2000	1800	1600
Existing			•			
Capacity	4400	4400	4400	400	400	400
				2200	2200	2200
•	4400	4400	4400	2600	2600	2600
Ton. at Alt Ports	0	. 0	200	2205	2359	2510
	Û	0	200	2000	1800	1600
Trade suspended	. 0	0	0.	205	559	910
Wheat				205	479	477
General Import				0	80	433
General Export		-		. 0	0.	0
Fruits				, O	0	Đ
Copper				0	0	0
Additional Inland						
Transportation Costs	0	0	600	8615	7077	7530
Trade suspension Loss						
Mheat	Û	0	0	696	1627	1620
General laport	0	0	)	0	1576	8532
General Export	0	0	0	0	0	0
Fruits	Ð	0	Ú	0	. 0	0
Copper	0	0	0	0	0	
Total	0	0	0	698	3203	10152
Construction Costs		:	Other Cost	· ·	35873	
Container	7500	-				
Non-container	12600					
	20100					

(CASE 4)	87	66	89	90	91	92
Cargo Demand				615	nar	501
Copper				869	885	901
Fruits				658	659	659
General Export				699	734	768
General Import Wheat				209B 481	2202 479	2305 477
total	4200	4400	4600	4805	4759	5110
Cap, at Alt. Ports	2200	2200	2200	2000	1800	1600
Existing			5000	100	400	. 460
Capacity	4000	4000	4000	400 2600	400 2600	400 2600
<b></b>	4000	4000	4000	3000	3000	3000
Ton. at Alt. Ports	200	400	600	1805	1959	2110
	200	400	600	1805	1800	1600
Trade suspended	0	0	Û	0	159	510
Wheat				0	159	477
General laport				0	0	33
General Export				0	0	0
Fruits				0	0	0
Copper				0	0	0
Additional Inland				. :		
Transportation Costs	960	1200	1800	5415	5877	P230
Trade suspension Loss		÷				4400
Xheat	Û	0	0 -	0	540	1620
General laport		0	0	0	0	650
General Export	0	0	0	0	0	Ď A
Fruits	0	0	0	0	Û	. 0
Copper	0	0	0	0	0	0
Total	Û	0	0	0	540	2270
Construction Costs			Other Cost	5	24032	
Container Non-container	7500 16800					
	24300					

⟨CASE 5⟩	87	88	89	90	91	:92 :
Cargo Demand						
Copper				869	985	901
Fruits				658	659	659
General Export	•		•	699	734	768
General Import				2098	2202	2305
Wheat				481	479	477
total	4200	4400	4600	4805	4959	5110
Cap. at Alt. Ports	2200	2200	2200	2000	1800	1600
Existing						
Capacity	3800	3800	3600	400	400	400
			: '	3000	3000	3000
	3800	3600	3600	3400	3400	3400
	2000	2000	3000	3470	4	
Ton. at Alt. Ports	600	800	1000	1405	1559	1710
	600	800	1000	1405	1559	1600
Trade suspended	0	0	0 .	0	0	110
Wheat	:			. 0	0	110
General Import				0	0	0
General Export				0	. 0	0
Fruits				0	0	. 0
Copper				0	0	0
cohher						• .
Additional Inland					·	
Transportation Costs	1800	2400	3000	4215	4677	5130
Trade suspension Loss				•		
Wheat	. 0	. 0	0	. 0	0	374
General Laport	0	0	. 0	0	0	2167
General Export	. 0	0	0	0	0	. 0
Fruits	- 0	0	0	0	0	0
Copper	0	0	0	0	0;	0
Total	0	0	0	Ú	Ú	2541
Construction Costs			Other Cos	ts	23763	
Container	7500			1.		
Non-container	21000	•			+ 1	
	28500	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
	78300					

(CASE 6)	87	88	87	90	91	92
Cargo Demand			**************************************			
Copper				859	885	901
Fruits				<i>6</i> 58	659	659
General Export	4.		÷ .	699	734	768
General Import				2098	2202	2305
kheat				4B1	479	477
total	4200	4400	4600	4805	4959	5110
Cap. at Alt. Ports	2200	2200	2200	2000	1800	1600
Existing						•
Capacity	3200	3200	3200	400	400	400
		~ <b>~~~</b> ~~~		3400	3400	3400
	3200	3200	3200	3800	3800	3800
Ton: at Alt Ports	1000	1200	1400	1005	1159	1310
	1000	1200	1400	1005	1159	1310
Trade suspended	0	0	0.	0	0	0
Kheat				0	0	. 0
General laport			*	0	0	0
General Export		•	-	0	. 0	0
Fruits				0	0	0
Copper				0	0	0
Additional Inland		-				
Transportation Costs	3000 -	3600	4200	3015	3477	3930
Irade suspension Loss				٠		i
Wheat	0	0	0	0	0	0
General laport	0	0	9	Û	Û	. 0
General Export	Û -	0	Û	0	0	0
Fruits	0	0	0	0	0	0
Copper	0	. 0	Û	0	0	0
Total	0	0	0	0	0	0
Construction Costs			Other Costs		21222	
Container	7500					
Non-container	25200		•			
·	32700					

Appendix XII-10 Output of Cost/Benefit Analysis with Consideration Given to Earthquake Probability

1990 1991 1992 1993 1994 1995 1996 1997 1998 1 400 400 400 400 400 400 400 400 400 400				'.	90 400 90 90 90 90	500 400	400	966							
1990 1991 1992 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2006 2006 2007 2008 2009 400 400 400 400 400 400 400 400 400			0001	'		56 50 50	္ မရွိ မွ	966							
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2005 2007 2008 1990 190 190 100 100 100 100 100 100 10				Ş Ş	중 운 후		_ var	\$ \$ \$	1900	2610	00 <del>3</del> 000 <del>3</del>	0009	26 0.7572 0.5537	0.0724	0.5252
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2006 2007 400 400 400 400 400 400 400 400 400 400			00000		<b>\$</b> \$ \$	8 3	\$ <b>\$</b>	8 9 9 9 9	7900	2002	665 665 667	9669	25 0.7654 0.5679 0.5679	0.627 0	0.5394 0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2006 400 400 400 400 400 400 400 400 400				§ §	004 004 004	995 904	400	9 9 9	7900	2008	6009 1500 400	9009	24 0.7736 0.5825	0.4932 0	0.5529 0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2005 400 400 400 400 400 400 400 400 400		and the second second	1800	S S	8 9 9 9 9	5 5 5	904	994	7900	2967	4000 400 400	0009	23 0.7819 0.5970	0,7039 6	9.5667 0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2003 2004 2005 400 400 400 400 400 400 400 400 400 400			1000	000	2 2 3 2 3 3	55 50 50 50	\$ <b>\$</b>	3 8 8 8 8 8	7900	2005	4900 1500 430	6000	22 0.7763 0 0.6119 0	0.7147 0	0.5809 0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2003 2003 2004 400 400 400 400 400 400 400 400 400 400 400			1006 1000 1000	00	90 90 90 90 90 90 90 90 90 90 90 90 90 9	000	<b>§</b> §	00 <del>1</del> 000 004	7800	2005	4000 1600 400	5005	21 0.7988 0. 0.6273 0	0.5257 0.0.5024 0.	0.5954 0
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2004 2002 2203 400 400 400 400 400 400 400 400 400 400		90*	1000	904	96 9 90 9	9 9	3	004 004	6700	2004	4000 1500 600	6009	20 6.9074 0 0.6425 0	0.7389 0.	0.6103 0.
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 +00 +00 +00 +00 +00 +00 +00 +00 +00 +00		400	1000	004	00 <del>1</del>	9 9 9 9 9 9	8	490 400 400	.0669	2002	4060 1690 400	0009	19 0,8161 0. 9,8382 0.	0.7482 0. 0.5410 0.	0.5255 0.
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 +00 +00 +00 +00 +00 +00 +00 +00 +00	400	\$0 <b>\$</b>	1000	400	004	004	004	00 <del>1</del>	6400	2062	4000 400	0000	18 0.8249 0.5745	0.7597 0. 0.2510 0.	0.5412 0.
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 400 400 400 400 400 400 400 400 400 400 400	400	\$00	1000	\$00 <del>\$</del>	¢00	00+	004	400 400 400	9400	2001	4000 1660 400	9900	0.8338 0. 0.8935 0.	6.7714 0. 6.5815 0.	0.4572 9.
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 400 400 400 400 400 400 400 400 400 400	400	\$00 \$	0003	400	400	400	400	400 400 400	5400	2000	4000 1600 460	9009	16 0.8427 0.7068	0.7835 0. 0.6025 0.	0.6/36 0.
1990 1991 1992 1993 1994 1995 1996 1997 1998 400 400 400 400 400 400 400 400 400 400	004	400	1000	00 <del>1</del>		00		400 405	0009	éééi	4000 400 400	9009	0.8518 0.7236 0.7236	0.7953 0.0.5246 0.	0.6905 0.
1990 1991 1992 1993 1994 1995 1996 1997 400 400 400 400 400 400 400 400 400 400	404 400 400	00+	0001	400		001	:	400	0000	1998	4060 1500 400	9009	14 0.8609 0.7406 0.	0.8076 0. 0.6460 0.	0.7077. 0.
1990 1991 1992 1993 1994 1995 1996 400 400 400 400 400 400 400 400 400	400 400 000	400 400 400	0001	400			00	400 400	400	1661	4000 1600 400	9009	13 8-8702 6 0.7579 6	0.8200 0. 0.6686 0.	0.7254 0.
1990 1991 1992 1993 1994 1995 400 400 400 400 400 400 400 400	\$00 \$00 \$00	400 400 400	1000	00+			084	400	0007	9663	4600 1500 466	0009	12 0.8796 0.7755 0.	0.8326 0. 0.8917 0.	0.7436 0.
1990 1991 1992 1993 1994 400 400 400 400 400 400	400 400 400	400 400 400 400	0001	90 <b>\$</b>			400	400 400	0009	5661	\$000 \$000 \$000	9009	11 0.8890 0. 0.7934 0.	0.8454 9. 0.7153 0.	0.7621 0.
1990 1991 1992 1993 400 400 400 400	400	400 400 400 400	0001	400			001	400	9460	1001	4000 1500 440	9009	10 0.5988 0. 0.3116 9.	0.8584 0. 0.7396 0.	0.7812 0.
1990 1991 1992 400 400 400	400 400 400	400 400 400 400 400	0001	904		*. 1 :	40¢	00 <del>1</del>	5400	1993	4000 1600 400	9009	9 0.9032 0. 0.8301 0.	0.8716 0. 6.7643 0.	0.8607 0.
005 005 005	400 400 400	004	0001	994	:		306	004	5400	1,092	\$600 \$600 \$00	0009	8 0.9180 o. 0.8489 p.	0.5850 0. 0.7897 6.	0.8207 0
1990 400	400 400 400	000	1000	004			600	400	2000	1661	400 400	0009	7 0.9279 0.8850 0.	0.5988 0. 0.8157 0.	0.5413 0.
	00 00 00 00 00 00 00 00 00 00 00 00 00	004 000 000 000 000	0001	004		٠.	004	00 <b>4</b>	2400	0.661	\$000 1,600 \$00	0009	6 8778.0 9 8874	0.5125 0. 0.8423 0.	0.8623 0.
	004	400 400 400 400 400	•				400		4400	6883	4000 1600 170	9009	5 9.9479 9.9578	0.9265 0. 0.8895 0.	9.5879 0.
1588 400 400 400	004 004 004 004	400 400 400 400 400					00+		4100	8961	4000 4000 400	6009	0,9581 p. 8,9272 p.	0.9408 0. 0.8973 0.	0.9060 9.
1987 400 400 400 400	000000	*00 400 400 400			14 14 1				2004	1987	\$000 \$00 \$00	9009	3 0.9684 0.9474 c.	0.9352 0.	0, 5284 0.
(Kh=0, 1S) (Kh=0, 1S) (Kh=0, 1S)	(Kh=0, LS) (Kh=0, LS) (Kh=0, LS) (Kh=0, LS) (Kh=0, LS)	(Kh=0, 15) (Kh=0, 15) (Kh=0, 25) (Kh=0, 15)	(Kh=0.20) (Kh=0.20) (Kh=0.20)	(Kh=0.25)	(Kh=0.20) (Kh=0.20) (Kh=0.20)	(Kh=0, 20)	(Kh=0.20)	(Kh=0, 25) (Kh=0, 20) (Kh=0, 20)	<b>.</b>		(the) 151 (the) 153 (the) 251		6. (ke=6.25) 0.	0. (kh=0,20) 0.	4855.46
(Capacities) With: Existing Valparaiso 3 (	_	San Antonio + 1	~ ~ ~ ~		-0 I~ 00		17 -	· Vo do t~	Total	Without :	Eristing Valparaiso San Antonio	[ota]	Probability Valparaiso		

3928		000 000 000 000 000 000 000 000 000 00		9 7900 9 2030 0 4000 0 1500 0 400	00 6000 45 46 80 0.6114 57 0.757	
3 2326	· · · · · · · · · · · · · · · · · · ·	1000 1000 1000 1000 1000 1000 1000 100		6 7900 8 2029 0 4000 0 1600	60 0,41	
2023		0001		7906 2028 6000 1600 400	6000 6000 6000 6000	
2027		0001 0001 0004 0004 0004 0004 0004 0004		7900 2027 4000 1500 400	6000 6313 0.6313	
2625		and suggested	005 004 004 004 004 004	7900 2026 4000 1600 400	6000 42 0.6381	
2025		0001	000 000 000	7900 2025 4000 1600 406	6000 6000 60.6450	
2024		0001 0001 0004 0004 0004 0004 0004	500 400 400 400 400 400 400	7900 2024 4000 1600 400	6000 6000 6000 6000 6000 6000 6000 600	0.5430
2023		0001 0001 0004 0004 0004 0004 0004 0004	000 000 000 000 000 000 000 000 000 00	7900 2023 4000 1600 400	6000 6000 39 0.6589	0.5513
2072		0001 0001 0004 0004 0004 0004	8 9 9 9 9 9	7906 2022 400 400	38	0.5598
2021		1000 1000 1000 400 400 400 400 400 400 4	55 60 60 60 60 60 60 60 60 60 60 60 60 60	7900 2021 4000 1600 400	6000 5737 0.6732	0,5684
2020		1000 1000 1000 1000 1000 1000 1000 100	99 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	7906 2020 4006 1600 400	36	0.2664
5102		1000 1000 1000 400 400 400 400	\$55 400 400 400 400 400 400	7900 2019 400 400	35 35 0.6877	0.5340
2018		1000 1000 1000 400 400 400 400 400	500 +00 +00 +00 +00 +00 +00	7900 2018 4000 1600 400	6000	
3617		1000 1000 1000 004 400 400 400 400	500 4 4 00 4 4 00 00 00 00 00 00 00 00 00 00	7900 4000 4000 400	6000 33 33 6.7026	
2016		0000 0000 0000 0000 0000 0000 0000 0000 0000	002 003 003 003 003 003 003 003 003 003	7960 2015 4060 1600 400	6000	
2015		0001 0000 0004 0004 0004 0004 0004	000 000 000 000 000 000 000	7900 2015 4000 1600 400	31 31 31 31 32 31 32 31 32 31 32 31 32 31 32 31 31 31 31 31 31 31 31 31 31 31 31 31	
2014		1000 1000 1000 400 400 400 400	000 4 4 6 00 00 00 00 00 00 00 00 00 00 00 00 0	7900 2014 4000 400 400	30 30 00 00 00 00 00 00 00 00 00 00 00 0	
2913		1000 1000 1000 400 400 400 400 400 400	150 150 150 150 150 150 150 150 150 150	7900 2013 4000 1600 400	6200 29 0.7333 0	
2012		0001 0001 0001 0001 0001 0001 0001 000	260 004 004 004 004 004 004 004	7900 4000 1600 400	28 0.7412 0	
3011		1000 1000 1000 1000 1000 1000 1000 100	50 40 40 40 40 40 40 40 40 40 40 40	7900 2011 4000 1600 400		
	6 (\$5.00	(Kh = 0, 20) (Kh = 0, 20)	(Kh=0.20) (Kh=0.20) (Kh=0.20) (Kh=0.25) (Kh=0.25) (Kh=0.20)	(kh=0.15) (kh=0.15) (kh=0.15)	6000 27 27 0.1472 0.7472	(kh=0.20) 0.
(Capacities) With :	Valparaiso C. Valparaiso C. San Antonio 4 San Antonio 4 San		San Antonio 1 2 5 5 6 6	Total Without : Existing Valparaiso San Antonio	Total Probability Valparaiso	

		t ji si si								:					٠.			4. 3.5						
25 0.2504 0.7176	0.7886 0.4078	0.6764	2010	•		S & S	<b>.</b>	O O .	<b>-</b>	£13 £13	****	13	9 9	381 341	305	343	28,	343	3975	2010	35 15 38 15 15 38		1749	,
		0.4865	2009	0	5 <b>0</b> 0	5 <b>6</b> 3 6	<b>5</b>	a o .	•	<u> </u>	i ij	E) E	125	22	22	243	R: K	25.25	2607	2009	8 -9 C		18	:
and the second second	0.8032	0.6970	2008	0.	500	s o .	ତ୍ତ	ခ်ေတော	•	3	\$ \$ \$ \$ \$	13 8	179	179	12	8 13	£ %	<b>អ</b> អ	4214	2003	3 17 85		1961	
	0.8105	0.7076	2007	. 0	500	300	<b>.</b>	00	0	466	6 4 0 4	233	186	138 188 188 188	323	13 13	8 8	8.8	ij	2007	\$2 SE 85		2674	
	0.8180 0.6604 0.6604	0.7183 (0.4898 (	2005	•	3 G	တောင		ဓမ	0	£94	e de n es	242	767	et 16	230	25.4 25.4	19 5	384	1977	2006	754		2150	
	0.8255 0	0,7292 0	2005	0	<b>~ •</b> •	00		ထဓ	0	502	502	E S	30.5	201	ħ	27.0 27.0	107	270	4591	2005	1191 813 307		3321	
	0.8331 0 0.6878 0	0.7403 0	2064	. 0	00	00	00	00	211	221	H S	155	50 S	209	苦	22	0	333	4101	2694	1282 643		2436	•
1.0	0.8407 0 0.7019 0	0,7515 0	2003	. 0	၀ဝ	00	00	00	219	K	νη 	263	216	316	3 53	8 3	٠ <u>٠</u>	888	4219	2003	1576. 174 175		90	
4 12	0,8464 0	0.7629 0	2002	•	00	147	· •	c <b>c</b>	727	1361	, c	270	ព័ន	6 é	<b>,</b>	8 8	0 5	18 18	3827	2002	1475 966 778	;	2700	
	0.8562 0 0.7305 0	0.7744 0	2001	0	စစ	158	00	00	232	582	282	L.				29.2 29.2 29.2	0	252	3947	2001	5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5	,	2840	
0,9051 0	0,8641 0	0.7362 0	2000	o	<b>~</b> ~	168	00	00	243	109	603	. EE	13 E	6		8 8 8 8 8	0 6	20.00	4070	2000	1684 972	3	2984	
	0.8720 0 0.7600 0	0.7981 0	6661	်ဝ	130	180	00	° 22	252	624	\$ <u>7</u> 9	289	2 2 2 3	<b>0</b> (	<b>5</b>	304	0	7 60	3350	6661	2971	700	# in	
14 0.9165 0.8420	0.8800 0	0.8102 0	B661	ø	191	191	00	33 0	299	945	9 9 0	3 6	9 9 9	· • •	> 🗢	210	0	325	2974	0: 0:	15.1	i	3289	
13 0.9222 0.8530 0	0.8881 0 0.7903 0	0.8224 0	1997	0	203	203	ଚଚ	69 ES	269	590	699	393	150 0	0	<b>)</b>	6 A	2	7 17	4379	1661	2031	127	2449	:
12 0.9280 0.3642 0	0.8962 0	0.8349 0	1996	٥	316	216	• •	278	278	692	492	310	ခ် ခြ	. φ «	၁ ဇ	322	•	322	4233	160	1156	950	3615	•
11 0.9338 0 0.8754 0	0.9044 0	0.8475 0	1995	0	536	229	9 0	388	288	715	, 10. c	317	ဝင္	0	50	0 6 E	<b>6</b> 3'	226	4367	1995	151	207	3787	
10 0.9396 0.8867	0.9127 0	9604 7431	1994	٥	242	242 242	o (1	355	207	740	740	il e	00		э / <b>э</b>	o vi	0	25.55 25.55	4745	1001	545 525 535 535	2	3945	
9 0.9455 0.8982 0	0.9211 0 0.8535 0	0.8754 0.0.7675 0.	1993	0	256	256 256	256	359	307	764	704	P ES	ය. ස		သ ဆ	0 Cg	0	85 FF 0	4901	1993	2562	707	4150	
B 0.9514 0	0.9295 0	0.8947 0 0.7926 0	2661	0	27.1	271	271	715 718	317	790	ج د <u>ب</u>	. 9 9 9	ප ය	, 6	00	Θ α <u>α</u>		450 450 640 640 640	4270	666	27.03	400	4341	
7 0.9573 0 0.9214 0	0.9381 0	0.9001 0	1661	0	9 9 9 9 9	286 286	ი გ <u>ც</u>	327	123	916	0 0		<b>ာင</b>	 	ବ୍ୟ	6 P	3	6. S S	1653	00:	2860	a o	£5.55 80.55	
0.9633 0 0.9332 0	0.9467 0	0.9137 0	1990	302	302	302	203	1 E	823	9 Či	01	25. 25.	0 0	: • :::::	00	0 1	. 12	n c o	0557	0661	89 ES	, , , , , , , , , , , , , , , , , , ,	P 17	
5 0.9693 0 0.9451 0	0.9554 0	0.9276 0 0.8714 0	1989	318	613 13 13 13	318 318	E 0	8 E	ž		67 1	5 <del>5</del>	00	. ~	<del>-</del>	0 87	8	<b>000</b>	17.9%	6: 15: 5:	81.5	n ->	2 20 7	
6,9754.0 0.9571.0	0.9641 0 0.9376 0	0.8968.0	1988	335	23.53	n n	23.5	55 55 55 55 55 55	360	0	40.4	ခေ	<i>(</i> 2)	<b>&gt;</b>	60	0 4	2 0	000	35.3	8863	(4.83 (3.23	3	12.00	
3 0.9815 0.9692		.9559 U	1987	350	35 55 50 50 50 50 50 50 50 50 50 50 50 50 5	82 82 82 82	55.0	1	12	6	0	တက	ලාද	<b>,</b> 0	00	<u>د</u> • •		000	3581	000	19 to 10 to	89	55	
0 (kh=0,25) 0	0.9730 (kh=0.20) 0.9551	0,9559 (kh=0,15) 0,9259	(58)		4 (Xh=0.15) 5 (Xh=0.15)	(Kh=0, 15)	9 (Kh=0.15)	4 (Kh=6,15)	(Kh=0.15)	(Kh=0.20)	(32)=0, 20)	(8 - 6 - 13) (8 - 6 - 13)	(8) e (8)	(Kh=0,20)	(Khab, 28) (Khab, 28)	(Kh=6, 20)	(Kh=0, 75)	5 88-6 33 5 88-6 39 7 88-6 39	'		(Eh=0, 15)	(50-0-53)		
	=======================================	<del>5</del>	Capaci ti			6 CC	6 C		ρœ	~. <b>4</b>	ri i	10 H	.25 ≥ .v.	5 25 9 75 1	nta ~	141		0 C C		. :		-	7	:
San Antonio.		: -	<pre><expected capacities=""></expected></pre>	Existing Valoaraiso				San Antonio		Wew Berths Walderaiso					San Agento		eria Eria Erit		Total	Without:	Existing Valparziso San Antonio		Total	
ភើ			<b>☆</b> ≒	шъ	-			J,					-		٠,		4 %				•			
	÷ .					1		1,	• .	700	:	4.1	:	j						-	1			
			- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		· · ·					728		•												
	:					•		-							•				**	,			•	,

251 0.1072 0.3452 0.7215 0.6563 0.6663 1.59 0.4038 1.59 0.4038 1.50 0.4038	35 36 31 32 33 34 38 35 36 37 38 35 36 35 35 36 35 36 36 36 36 36 36 36 36 36 36 36 36 36	6.5555 0.6157 0.5667 0.6603 0.6513 0.6422 0.6512 0.6154 0.6164 0.3760 0.5807 0.2807 0.2623 0.2642 0.2577 0.257 8.7673 0.7604 6.7554 0.7466 0.7398 0.7331 0.7254 0.7198 0.7133 0.7068 0.7504 0.6940 0.4877 0.4814 0.6752 0.6691 0.6530 0. 8.5762 0.5521 0.5461 0.5343 0.5276 0.5111 0.4998 0.4897 0.4777 0.4664 0.4567 0.4357 0.4351 0.4151 0.4051 0.3954 0.	4564 0.5466 0.5359 0.5274 0.6188 0.5997 0.5908 0.5820 0.5733 0.5647 0.5563 0.5480 0.5388 0.5317 0.5238 0.5160 0.5083 0.5007 3578 0.3733 0.5007 0.3783	7812 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2024 2027 2029 2029 2030					344 756 375 321 307 293 279 286 254 241 229 217 206 194 184 173 165	356 356 357 377 293 279 286 254 241 229 217 206 194 184 173 163	366 350 355 321 307 293 279 286 284 241 229 217 206 194 184 173 165 36 36 36 36 384 173 165 36 36 379 378 378 378 378 378 378 378 378 378 378	146 146 154 128 127 117 112 107 101 96 92 87 82 78 75 65	146 146 134 128 123 117 112 107 101 96 92 27 27 73 73 69 65 138 138 139 137 101 96 92 87 82 78 73 69 65	146 140 154 129 127 117 112 107 101 96 92 87 82 78 75 69 65	285 279 273 267 261 256 250 294 255 253 228 223 216 213 208 203 278 279 278 278 278 208 200 195 191 187 182 178 176 166 162 158	228 223 218 214 209 204 200 195 151 187 182 178 174 170 166 162 158	275 272 268 264 264 257 253 250 246 243 239 236 232 239 229 226 232 219 222 213 219 222 213		3746 3635 3526 3420 3316 3214 3114 3016 2921 2827 2735 2646 2856 2472 2388 2306 2225 2146 2049	2012 2013 2014 2015 2016 2017 2019 2019 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030	631 586 524 465 408 354 302 253 206 160 117 76 37 9 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	丁爾子 的复数 电影子 化丁二烷 医多种 医二角红 医二角红 医二角红 医二角红 医二角虫 医二角虫 医二角虫虫 医二角虫虫虫虫虫虫虫虫虫虫虫虫虫虫虫虫虫虫虫虫
251 0.1072 0.0 0.3452 0.0 0.72752 0.0 0.6653 0.1 2511 2511 151 0 159 0 0 150 0	· 6	ခံ ဝံမံ	င် ဇံ			 ٠								·	28S	228	275	13.53	3635	2013	586 596 275	
ବ୍ର ବ୍ର ପ୍ରତ୍ନ ବ୍ରତ୍ନ ବ୍ରତ୍ନ ବ୍ରତ୍ମ ବ	0.8452			•	V (3)		>0(	o o :		762	397	651 159	•	126		238		238				

		;						: 5 .				
2010	7906	1600	3975	3931	1600	0	2331	222	59116	59116	0	51158 1159
2009	7758	1600	1653	3665 5905	1500	٥	2065	2240	59431	100 100 100 100 100 100 100 100 100 100	Φ.	53483
2008	7586	1600	4214 1951	3572 5425	1600	လ	4025	2253	59809	59909	Φ.	5885
2007	7429	1,600	4137	3092	1600	<b>O</b>	1492	2263	88009	86009	G	90068
2006	7268	1600	4463 2190	2805 5078	0091 0091	0	1205	2273	60346	60346	•	60346
2002	7:09	1600	2311	2518	1600	0	918 3198	2280	00550	60220	319	60231
2004	9952	1600	4101	2851	0091 1909	Ŷ	1251 2916	1665	0 4299	66171	7984	50215
2003	-6795	1600	4219 2566	2576	1600	O	976 2629	1655	43885	<b>43885</b>	6259	37286
2002	6639	1600	3827	2812	1600	0	1212	1127	0.2992	29920	2240	27.580
2001	5482	1600	3947 2840	2555	1600	0	935	1107	29403	29403	2119	27.284
2000	6325	1600	4070 2984	3341	1600	0	655	9B01	29829	28929	5833	22994
6661	6173	1600	3134	2323	1600	0	723	917	19019	61061	1132	178871
B651	6023	1600	3274	2049	1600	0	449	692	18195	18195	7095	14291
2661	5872	1600	4370	1502	1502	99	923	B23	294	22146	2203	19943
9651	5722	1600	4233 3615	1489	1489 1600	E	0 507	507	333 13457	13790	1181	3973
395	5570	0091	4367	1783	1203	397	5 581	183	1190	6044	7895	158
\$661	5417	1600	3745	1452	671 1452	781	00	خ	2343	2343	3778	155
1993	5264	1600	4901	363	263	751			2254	2254	ę. 61	2162
1992	5113	1600	4270	770	841 770	-20	00	0	-210	-210	817	-54344668
1661	4958	1800	4538	905	905 420	-48S	00	0	-1454	1454	3530	
0661	1805	2000	244 4743	315	315	-233	60	6	80 C	837 -	3009	-3767
. 0	4606	2200	3671	938	. 25	SE¢-	00	0	-2805	-2808	3871	-6877
2. 2.	4406	2200	3823	583	583	-593	60	0	-1748	-1748	55	-2643 -8983
1001	\$205	2200	3581 4205	\$24	624 0	-624	00	0	-1972	-1872	11	-2643
	Cargo Desand	Available capacity at Alternative Ports	Expected Handling Volume With:	Expected Decand Surplus With : Without :	Expected Volume Nandled at Alternative Ports With:	Difference	Trade Suspended Volume With 1.	Diference	(Tenefit) Inland Transport Cost Saving Trade Loss Saving	Total	(Costs)	(Net Benefit)
							-73	0				

1 (0502-2050)

23,40

2030	7906	1600	2069 471	5837	0091	0	4237 S835	oés:	0 4245	42443	&	42643
						0		•	1	, .	0	
1787	9062	1600	2146	5740	1600		1160 3818	555	42974	43574		43974
2	9062	1,600	2225 510	568: 73%	9097	c	4681 5795	1715	0 85538	45538	0	45538
(707	7906	1600	2306	5600	1600	<b>5</b>	1900 5775	1775	9 47135	47135		47135
\$707	7905	1500	2388	5518	1600	<>	3918 5755	1837	48747	48767		19767
30.	3906	1.500	2472	\$434 7333	1600	٥	1834 5733	óòB!	50433	50433	. o	50433
2024	7995	1600	2558	5348	1600	•	3748 5674	1926	9 21146	51146	۵.	51146
2023	906.	1909	2646 693	5260	1600	ය	3660	1953	0 51845	51845	0	51845
2022	7906	1600	2735 727	5171	1600	e	3573 3549	1978	0 52530	52530	0	52530
2021	7905	1600	2827	5079	1600 1600	o	3479 S482	2004	53199	53199	•	53199
2010	7906	1500	2921 893	4985 7013	1600	0	3385 5413	2028	53851	53851	0	53851
2014	7906	1600	3016 964	\$ 99.5 \$ 94.5	0091	0	3290 5342	2052	54485 5	54485	ထ	54485
2913	P062	1600	3114	4792	1500 1600	•	1192 5267	2075	55099	55099	٥	55099
2017	7906	2091	3214	4692	1600		3092 5190	2602	0 55691	1,4955	0	55691
2016	7905	1606	3316 1197	4590	1600	0	2990	2119	56262	56262	٠	58262
2015	7906	0091	1235	4456	0091 1800	Ģ	7885 5025	2140	0 0 25808	26808	6	S6808
*:02	7906	1600	3526	4380 6539	1800	0	2780 4939	2159	0 57328	57728	٥	57328
2013	7906	1600	3635	4271	1600	0	2671 4849	2178	0 57821	57821	•	
2015	7908	1,600	3746	4160	1600	0	2540	2195	56284 3	58284 5	۵	58284 57821
1102	906.	1900	65 55 65 55 65 65 65 65 65 65 65 65 65 65 65 65 6	4047 6258	1600	0	2447	2211	0 58717 5	58717 5	. ت	58717 5
	Cargo Semand	Available capacity at Alternative Ports	Expected Nandling Volume With:	1000	Expected Volume Handled at Alternative Ports With :	Difference	Trade Suspended Volume With : Without :	Difference	(Benefit) Inland Transport Cost Saving Trade Loss Saving	Total	(Costs)	(Net Benefit) 5

IRR (1987-2050) 1

Appendix XII-11 Output of Cost/Benefit Analysis without Consideration Given to the Occurrence of Earthquakes

Chilean Port Study

	1987	886	6861	1990	1661	66	1993	1001	1995	9663	1661	8661	1999	2000	2001	2002	2003	2004	2005	2006	U) 2007	(Unit : Mi 2008	Million Pesos> 2009 201	2010
(Cost)	1			, , , ,	1															1				
Construction Cost:WITH Walparaiso San Antonio	177.	4583	2837 1034	0 5165	2363	3642	77.0	2778 0	7895	3194	1903	661 2943	660	5556	2119	0 22 50	4945 1654	7358 626	319	<b>00</b> ,	00	<b>୦</b> ଚ	66	0 0
Total Cost	771	6229	3871	2615	2980	4458	5	2778	7895	4817	2203	3504	11.72	5835	2119	2240	6266	7986	319	0	0	0	0	0
Maintenance & Administration WITH WITHOUT	408 508	464 508	500	528 508	560	508	500 508	623 508	508	733 508	752 508	783	793 508	842 508	198	2880 506	937	1007	1010 508	1010 508	1010 508	1010	1010 508	1010
Balance	-100	4	æ	11	52	91	6	511	183	225	244	275	282	13.4	353	272	429	661	202	202	202	262	8	205
Cargo Handling WITH WITHOUT	2306	2428 2428	2498	2595	2649	27.04	2729	2813	786B 5464	2953 3816	3038 3665	3124 3835	3209 4005	3294	3375	3456 4485	3538	3519	3700 4873	3792 5002	3885	3977	4070 5238	4162
Sal ance	-3	ភូ	-73	581-	-253	-318	-385	191-	-538	-563	-627	111	-79.6	-687	-962	-1029	-1078	-1125	-1173	-1215	-1256	-1258	-116B	-1970
Total Cost	<b>†</b> + 9		3790	2447	3779	13.	-202	2432	7542	4479	1820	3168	621	5287	0121	1383	50.50	7358	-352	-713	+52-	-7 6á	999	-563
(Benefit)					•																			
(1)Ship Waiting (2)Inland Transport (3)Trade Suspension	300	1100	700 0 c	052	798	38 a a	950	1029	1231	1357 0 0	255 255 255 255 255 255 255 255 255 255	1465 760 9	1452 1186 0	1413	1490 2015	1527 2419 0	1520 2822 0	1507	1562 3630 9	1580 4051 0	1587 4472 0	1545 4890 928	555 500 535	1478 4960 8224
Total Generat	-25	뜵	92	780	65./	88	976	1079	1281	1367	1,928	22.25	26.76	3024	2505	3346	4342	6733	5192	5631	9029	71.73	10912	14562
Met Benefit	-670	-5479	-3081	1,567	85.7	-3380	1172	1255	1929-	-3112	ω	-943	2017	- SE	1995	29.52	-1507	-2625	5544	3350	*1B5	7939	11578	15130
178 (13	16.85					:						:			÷			:						

	2013	25	2012	2014	2015	3913	2017	39.00	5002	30.20	2021	2027	2023	\$200	2635	2026	2027	COLB 2029 2030	2023 2023	23.50
(Cast)																				
Construction Cost:#ITH Valparaiso San Antonio	90	6 6		49	90	00	00	60	60	00	00	୍ଚ ତ	සා <i>ය</i> ා	00	ଧର	୍ ବର	30	00	00	00
Total Cost	0	٥	0	0	0	0	0	0	0	0	0	0	0	0	o	0	.6	0	Đ	Ċ,
Aaintenance & Administration blim WITHOUT	1010	1010 508	1010	1010	508	1010	1010 508	5010	1010 508	1010 508	1010	1010 508	1010	1010	0101 208	1010 508	1010	1010	1010 508	508
and the same of th	202	302	502	205	502	205	505	202	202	202	202	502	205	205	502	205	202	205	203	203
Carço Handling MITH WITHOUF	4162	4162 5228	4162 5236	4162	4162 5226	£152 5226	41£2 5226	\$162 5226	4162 5226	4162 5226	4162 5226	4162 5226	4162 5226	41.62	4162 5226	4162 5226	4162 5226	4162 5226	4162	4162 5228
Balance	-1069	-1066	-1064	-1064	-1064	-1064	-1004	1991-	-1054	-1064	-1064	-1064	-1064	+901-	+901-	-1064	-1064	-1064	-1064	-1064
Total Cost	-567	-564	-562	-562	-582	-552	-362	-562	-562	-562	-562	-562	-552	-562	-562	-562	-562	-562	-562	-562
(Benefit)														:						
(1)Ship Walting (2)Inland fransport (3)Trade Suspension	1478 4800 8254	1478 4800 8284	1478 4800 3284	1478 4800 8284	1478 4800 8284	1478 4800 8284	1479 4800 8234	1478 4800 9284	1478 4800 8284	1479 4800 8284	1478 4800 8234	1478 4800 3284	1473 4800 8234	1478 4900 8284	1478 4800 8294	1478 4800 6284	1478 4890 8284	1478 4800 8284	1478 4900 8284	1478 4800 8234
Total Benefit	14562	14562	14562	14562	14562	14552	14562	14562	14562	14562	14562	14562	14562	14562	14562	14562	14562	14562	14562	14262
Net Benefit	12129	15127	15125	15125	15125	52151	15125	15125	15125	15125	5175	15125	15125	15125	15125	15125	15125	15125	15125	15125
IRR (I.)	-					. :						:			-					
:						÷								٠						

1589   1990   1991   1392   1994   1995   1390   1997   1998   2000   2001   2002   2003   2004   2005   2006   2007   2008   2009   2099   14	Chilean Port Study	(Ship Heiting) 1988	Without	Valparaiso Seneral Cargo Berths 7 7 Container Berth 53 105	ctal 70	Sam Antonio Seneral Cargo Bacths 631 954 Bulk Berth 108 73 Container Berth 6 6	Sub-total 745 1033	Total 815 1145	Mith Valparaiso 159 (66 San Antonio 682 267	Total 853	
1990   1991   1992   1994   1995   1994   1999   1998   1999   2000   2001   2002   2003   2004   2005   2004   2005   2004   2009		1588		, zoi	[1]				166 267	15	
1992         1993         1994         1994         1996         2000         2001         2002         2003         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2004         2006         2007         2006         2009 <td< td=""><td></td><td></td><td></td><td>16 [49</td><td>165</td><td>100</td><td>;</td><td></td><td>272 287</td><td>539</td><td></td></td<>				16 [49	165	100	;		272 287	539	
1992         1993         1994         1994         1994         1994         1994         1994         1999         2000         2001         2002         2003         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2006         2009         2009         200         2005         2005         2006         2005         2009         2005         2005         2006         2005         2006         2006         2006         2009         2006		1990		85 64	187	1039 45 46	1130	1317	C1 C1 55 Oc 60 60	557	
1993   1994   1995   1996   1997   1998   1999   2000   2001   2002   2003   2004   2005   2006   2007   2008   3   109   164   253   301   301   300   299   299   332   330   329   293   294   320   319   290   399   3		i		55 641	201	10 23 53 88	1156	1357	255	539	
1894         1995         1994         1999         2000         2001         2002         2003         2004         2005         2004         2005         2004         2005         2004         2005         2004         2005         2007         2008         2007         2008         2007         2008         2009         2009         332         330         329         2004         2009         332         330         329         2004         319         144         144         145         149         149         149         149         149         149         144         147         107         107         107         107         107         107         107         107         107         107         107         107 <td< td=""><td></td><td>1992</td><td></td><td>74</td><td>223</td><td>1051 45 91</td><td>1187</td><td>1410</td><td>305</td><td>559</td><td></td></td<>		1992		74	223	1051 45 91	1187	1410	305	559	
1955   1394   1997   1998   1999   2000   2001   2002   2063   2004   2065   2006   2007   2068   2   255   301   301   300   299   299   332   330   329   295   294   320   319   299   149		1993		109	258	1051 45 127	1223	1481	205 306	::	
1996   1997   1998   1999   2009   2001   2002   2003   2004   2005   2006   2007   2008   201		1994		691	318	1056 45 171	1272	1590	205 306	511	
1997   1998   1999   2000   2001   2002   2003   2004   2005   2006   2007   2008   201		1995		253	402	1062 45 245	1352	1754	206 267	473	
1998         1999         2000         2001         2002         2004         2005         2006         2007         2008         2         4 <t< td=""><td></td><td>1996</td><td>* .</td><td>301</td><td>450</td><td>1068 47 293</td><td>1408</td><td>1858</td><td>215 276</td><td>165</td><td></td></t<>		1996	* .	301	450	1068 47 293	1408	1858	215 276	165	
1999         2000         2001         2002         2003         2004         2005         2006         2007         2008         2         4 <t< td=""><td></td><td>1997</td><td></td><td>301</td><td>450</td><td>1068 49 312</td><td>1429</td><td>1879</td><td>276</td><td>388</td><td></td></t<>		1997		301	450	1068 49 312	1429	1879	276	388	
2090         2001         2002         2003         2904         2005         2004         2005         2007         2008         2           299         332         330         329         295         294         320         319         299           149         149         149         149         149         149         149         149           448         481         479         478         444         443         469         468         439           990         996         1008         1014         1025         1031         1037         1049         105         119           250         298         318         299         281         249         236         234         199           1775         1356         1399         1370         1372         1370         1377         1349         199           1743         1877         1878         1867         1867         1867         187         196         196         157           197         173         187         1841         1848         180         1         1         1         1         1         1         1         1		1998		300	449	784 51 278	1313	1762	110	297	
2001         2002         2003         2004         2005         2006         2007         2098         2           332         330         329         295         294         329         299           149         149         149         149         149         149         149           481         479         478         444         445         469         468         439           996         1008         1614         1025         1031         1037         1049         1055         1           1356         139         299         221         249         107         113           298         318         299         221         249         107         113           1356         1399         1370         1372         1380         1367         149           1637         1841         1849         149         199         107         117           1637         1876         1867         1867         1867         1866         156         156           163         184         184         184         186         109         109         109           163         13		1999	: ·	299	848	984 53 264	1201	1749	110	297	:
2002         2003         2004         2005         2006         2007         2098         2           330         329         295         294         320         319         290         149         110<		2000	ŧ	299	83	990 555 250	1295	1743	6 E	330	
2063 2004 2005 2006 2007 2008 3  229 295 294 320 319 290 149 149 149 149 149 149 478 444 443 469 468 439 1014 1025 1031 1037 1049 1055 1  298 281 248 236 236 1057 115 298 281 248 236 236 1367 1  206 209 105 199 109 109 1387 327 251 261 261 261 261		2001		132	184	867 798 966	1356	1837	203	745	
2904 2005 2006 2007 2008 2 295 294 320 319 299 149 149 149 149 149 444 443 469 468 459 1025 1031 1037 1049 1055 1 281 248 236 224 199 1390 11370 1372 1330 1367 1 1394 105 199 109 109 1209 105 199 109 109 1377 251 261 261 261		2002		330	474	1008 69 318	1395	1874	209	747	
2005 2006 2007 2008 2 294 320 319 290 149 149 149 149 143 1631 1037 1949 1055 1 1031 1037 1949 1055 1 1370 1372 1380 1367 1 105 159 109 109 105 159 109 109 146 152 152 261 261		2063		329	87.9	1014 77 298	85	1867	205	347	
2066 2007 2008 2 320 319 299 449 149 149 1037 1049 1055 1 99 107 113 236 224 199 1372 1330 1367 1 197 109 199 199 109 199 261 261 261 261		2004		295	44.6	162 28.192	1390	1934	209	327	
2007 2098 2 319 290 149 149 1049 1055 1 107 113 224 199 1348 1806 1 199 109 152 152 261 261		2005	+ 1 + +	294	243	1031 91 248	1370	1813	105	X	
299 299 299 149 149 149 1135 1135 1199 1299 299 299 1199 1199 1299 299 1299 299		2004	Ϊ,	320	694	1037 99 236	1372	1841	199	263	
		2007		319	33	107 224	1330	1348	5 23	755.1	
289 289 149 149 152 183 183 183 199 199 152 261		2008		299	439	200 111 89	1367	1806	109	261	
		2009		289	83	25 25 25 25 25 25 25 25 25 25 25 25 25 2	1579	1817	577	24.1	

(Ship Wasting?		2012	22	3334	2015	2615	2017	201	2018	2020	2021	2022	2023	5024	2025	202a	2027	3702	3026	2020
		-		-		*******	-								j.					
Without Valoarasso Beneral Cargo Berths Container Berth	C4 ~	288	288	25. 4.	238	886	88 <del></del>	887 17.88	288 44.	158	288 149	298 149	289	298 64.	258 149	288 249	258 149	288 147	88 S-1 1-5-3	j
Sub-total	124	(37	437	123	124	427	437	437	437	159	Ð	£	+27	437	437	£	457	13	(3)	
San Antonia Beneral Cargo Berths Zuix Berth Container Berth	1072 132 178	101 111 118	1072 132 178	2551 223 873	1072 132 178	1072 132 178	1072 132 178	1072 132 178	1072 132 178	1072 1572 178	1072 132 178	1072 152 178	1072 132 178	1072 132 178	1572 1571 178	107 123 178	101 121 181	261 261 187	1972 152 178	111
Sub-total	1382	1382	1382	1382	1382	1362	1382	1382	1362	1382	1382	1382	1382	1382	1382	1382	1382	1387	1382	3
Total	9191	6161	1819	1819	6183	1819	1819	6363	6181	1819	6181	6161	610	6181	6161	5183	9.0	6.00	1939	
With Valparaiso San Antonio	252	132 269	132	132	132	122	132	152	132 209	132	132	132 209	132	132	132	132	55	132 269	អ្ន	,
Total	345	343	341	741	341	341	141	342	145	145	341	347	343	75	145	14.	3.4.1	35	<del>11</del> 5	
Jenefit (1)	1478	1478	1478	1478	1478	1478	1478	1478	1478	1478	83	1478	1478	1478	1478	1478	17.73	84	1478	

2010	1575	1972 724 551	7906	2140		5665		27,51 27,2		2140		420		670
2009	1557	1921 705 540	7747	2140	1406 724 670	5994		C. S.	8 8	21.40	डे हा	\$ K	880	67.6
2008	1540	1871 686 529	7587	2140	1400 724 670	7665		195 185	2 8	7140 1060	\$ 13 13	436 436	529	929
2007	1522	1820 567 518	7428	2140	1400 724 670	5994		552	0116	2140	1490	480 657	낊댔ㅇ	679
2006	1505	1776 648 507	7258	2140 1060	1400 724 670	599.4		505	2 13 13	2340	1400	480 448	507	929
2005	1487 2778	1719 629 496	7109	2140	1400. 724 570	\$665		5487	200	2140	1400	489	496 1,74	676
2004	1464 2709	1689 407	6952	2140	1400 724 670	766S		558	676	2140	1400	480	# S C	2.9
2003	1441 2640	1659 585 <b>47</b> 2	6795	2140	1400	2662		532	666	1960	1400	52 53 52 53	477 198	0.0
2002	1418	1628 562 459	6639	2140	1400 724 670	¥óáS		530	32	2140	1488 1458	460 562	23.5	ŝ
2001	1395	598 540 447	6482	2140 1060	1456 724 670	5994		578	7.55	2140	1466	. 480 540	\$ 8 X	676
2000	1372	1569 518 435	6325	2140	1400 724 670	5494		1372 527	7.63	0901	1400	518 518	55 to 12	070
6661	1356	1580 509 414	6174	2140	1400 724 670	5994		525	784	2140	1400	255 269	414 180 76	670
8661	1341 2198	1591 500 393	6023	2140	1400 724 670	2994	1. ·	1341 523	709	2140	1400	577 500	245	670
1997	1325 2082	1603 490 372	5872	2140	1400 724 670	\$66S		1325 825	812	2140	1400	626 490	252 25	670
1998	1310	1614 481 351	5721	2140	1400 724 670	2664	+ 1,	523	830	2140	1400	481 481	50 C1 50 C1 50 C1 50 C1 50 C1	9.50
1995	1294 1848	1626 472 330	5570	1140	1400 724 670	4966		523	788	2062	1400	22. 27.	8 2 °	253
Pó ó i	1293	1603 474 310	2145	2140	1460 724 670	2994		6. 71 C	1/0	1950	1460	707 474	25.55	513
1993	1291	1580 476 291	5264	2140	1490 724 670	2994		523	587	1858	1400	476	165	470
1992	1290	1556 172	5111	2140	2400 724 670	5994		1230 400 400 400	22.55	1746	1400	67.6	# 25°	22
1661	1288	1533 479 255	4958	2140	2.400 7.24 0.70	82 0.00		1283 484	94.5	1554	1400	624	82.53	383
1990	1287	1510 481 332	4805	2140	724 670	2504		1297	133	10.60	500	1 <del>4</del> 9	H 3 °	343
6861	1258	1450 542 729	4507	2140	1400 724 670	5654		355 364 665	r 00	1050	1400	53	ដូខ ១	279
1 953	1229	1387 503 226	4405	2140	1400 427 070	\$665		925 925 98	p 🗢	1229	題出	73 FG	Si e e	22.
1987	1200	1327 665 223	420B	2140	9575 47.50	2994	٠.	1200	20	1200	1327	\$523	E 0	ដ
(Cargo Handling in WITHDUT)	Cargo Deeand ('000 tons): Valparaiso Senerai Cargo Container	San Antonio Seneral Cargo Weat Container	Total	Handling Capa. ('000 tons): Valgaraiso Seneral Cargo Berth Container Serth	San Antonio Seneral Cargo Serth Bulk Serth Costainer Berth	Total	Tonnage Handled (1800 tons): Valparaiso	At General Berth Seneral Total (Fruit)	Others from Container	Sub-total Sub-total At Container Serth San Antonio	Received Section Seneral Section (Fruit)	(Copper)	M: Lontainer Jerth Sontainer Beneral Cargo Container from Val.	Spirit Carl

1572   1572	Chilean Port Study (Cargo Handing to #178007)	;	•		a g	<u>;</u>		,					r c	2600	7,00	, C. C.	7.00	8	7000		
1572   1572		162	다 위	2013	5014	g   1	916	/(07	918	307	2020	17.0	77.07	220				}			
1572   1572	Valoaras ( vov. cons). Valoaras so Seneral Cargo Container	3684	1575	27.25 148.05	1575	1575	1575	1575 3084	1575	1575	1575	1575	1575	1575	1575	1575	1575	1575 3084		3084	1575 1575 3084 3084
Trick   Tric	San Antonio Seneral Cargo Wheat Container	55. 15.	1972 724 551	1972 724 551	1972 724 SS1	1972 124 551	1972 724 551	1972 124 158	1972 724 551	1972 724 551	1972	1972 724 551	1972 124 551	1972 724 551	1972 724 551	1972 724 551	19.7 124 55.00	1972 724 551	1	1972 724 551	24 724 724 724 724 551 551
2140 2140 2140 2140 2140 2140 2140 2140	Total	7906	7906	1908	7906	7904	9062	7906	7906	7909	7062	7906	7906	7906	79.64	7906	7906	7908	11.	7906	7906 7906
1400	Handling Capa. ('000 tons): Valgaraiso	2	\$	Č	ć			6	57.52	9	0.00	. 64.80	6212	2140	7 181	. <b>9</b>	7140	. 0412		21.40	
1400   1400	teneral largo serti Container Berth	1090	1060	1060	1080	1080	0901	1060	0901	1060	1050	1060	1060	0901	0901	0901	1060	1080		1050	1050 1050
1575   1575	San Antonio Beneral Cargo Berth Bulk Berth Container Berth	1400 724 670	1406 724 670	1400 724 570	1400 724 670	1400 724 579	1400 724 570	1400 724 670	1450 1724 570	1400 724 670	1400 724 470	1400 724 570	1400 724 670	1400 724 670	1400 724 670	(400 724 670	1400 724 670	1400 724 670		1400 724 670	1400 1400 724 724 670 679
1575 1575 1575 1575 1575 1575 1575 1575	Total	2994	3994	2994	5994	5994	TeaS	2994	599.4	2664	2994	7005	Soot	5994	5994	200g	5904	2664		5665	5994 5994
Serth         1575 <t< td=""><td>Tonnage Handled ('000 tons):</td><td></td><td></td><td></td><td></td><td></td><td>٠</td><td></td><td>•</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Tonnage Handled ('000 tons):						٠		•												
1(t)         1575         1576         1576         1576 <th< td=""><td>Valparaiso At Georal Berth</td><td></td><td></td><td></td><td></td><td></td><td></td><td>:</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>٠.</td></th<>	Valparaiso At Georal Berth							:													٠.
Figure Container   545	General Total	1575	1575	575	1575	1575	573	1575	1575	1575	573	5751	575	575	. 1575	1575 597	1573 293	597		597	
ler Berth 1060 1060 1060 1060 1060 1060 1060 106	(Copper) (Chers from Container		210	240	210	210	210 565	210	355	210	210	210	22.5	210	210	210 S65	210 565	210 565		585	210 210 565 365
Serth         1060 <t< td=""><td>Q.:0-fab.2</td><td>ļ</td><td>2140</td><td>2140</td><td>2140</td><td>2140</td><td>2140</td><td>2140</td><td>21.40</td><td>21.40</td><td>2140</td><td>2140</td><td>2140</td><td>2140</td><td>2140</td><td>2140</td><td>2160</td><td>2140</td><td>•</td><td>2140</td><td>2140 2140</td></t<>	Q.:0-fab.2	ļ	2140	2140	2140	2140	2140	2140	21.40	21.40	2140	2140	2140	2140	2140	2140	2160	2140	•	2140	2140 2140
Serth         1400 <t< td=""><td>At Container Serth</td><td>1060</td><td>1060</td><td>1060</td><td>1060</td><td>1060</td><td>1040</td><td>1060</td><td>0901</td><td>1060</td><td>0901</td><td>1060</td><td>1060</td><td>1060</td><td>1060</td><td>1060</td><td>1060</td><td>1060</td><td></td><td>1060</td><td></td></t<>	At Container Serth	1060	1060	1060	1060	1060	1040	1060	0901	1060	0901	1060	1060	1060	1060	1060	1060	1060		1060	
1400 1400 1400 1400 1400 1400 1400 1400	San Antonio								2 1												
153 155 156 156 156 156 156 156 156 156 156	Seneral Total	1400	1400	1400	1400	1400	1400	1400	1400	1100	1400	1400	1 100	1400	1400	941	1,00	1400		150	
8erth 551 551 551 551 551 551 551 551 551 55	(Fruit) (Constr)	15. SE	55 55 56 56	450	3.8	64 64 64	5 G	5 g	2 8	6 8 °	5 g	8 S	5 S	68 83 84	8	5 <u>6</u>	8	48 S		89	480
551 551 551 551 551 551 551 551 551 551	At Bulk Berth	724	724	724	124	724	724	724	724	724	724	7.	724	754	724	7.7	724	724		724	
19 119 119 119 119 119 119 119 119 119	At Container Berth	8	ig.	551	10. 10.	551	47 67	551	551	551	55.	ij	551	551	551	551	551	551		551	
670 670 670 670 670 670 670 670 670 670	General Cargo	119	119	613	119	119	6.	917	119	611	611	611	611	911	6I.	119	61.0	119		61	
7005 7005 7000 FDD3 7003 FDD3 FDD3 FDD3 FDD3 FDD3 FDD3 FDD3 F		670	670	679	0.79	979	470	670	670	670	670	670	670	670	679	670	670	670	ì	679	
17 17 17 17 17 17 17 17 17 17 17 17 17 1							1000	002	600	7005	5002	4003	4007	¥800	2002	7005	5004	5094		5994	5994 5994

	2610	0 (459	<del>13</del> 00	1912	1660	0091	4800		535	828\$	· .	2 2	- 53 8	305		1284 904	27.77	176 056	2222
	5005	0021	100	1772	1400	1605	2500	:	172	4554	•	g 2	151 83	508	1 1	1268 922	11 S	173 1668	123
	2008	1301	00 0 00 0 00 0	1631	0091	1500	38		ñ	979		g R	23.05	502	*.	323	73.1 73.1	0093	22.65
	2007	0 1223	268 0	1591	1506	1491	4472	; ;	جه د	0	}	2,5	3 8 8	805		1236	11.78	on et on or or str	1485
	2006	0	207	1350	0091	1350	1021		٥	O	1	2 2	183	88		975	1190	1359	5607
	2005	1065	χ. Σ ο ο	1210	1600	1219	3630		Ö	0	Anna y	22.02	53 B	205	Jahr Hali	1204 992	1201	123	487.1
	2004	973	501	1075	1800	1075	3226		\$	0		9.8	33 8	508		1183	555	1575	17.13
	2003	831	800	041	1590	941	2822		0	• <b>•</b>		ខ្លួន	ន្ទន	208	2 - 1. 	1161 1038	3226	5 F	4c16
	2902	788		908	1500	908	2419		<b>6</b>	425		2 2	13 8	508	٠	1136	35	939	4.485
	2001	672	000	672	1500	6.72	2015	-	0	0		ភូខ	297	808		1112	25. 45.55	672	4337
:	2009	527	606	523	1600	537	1191		0	٥		S 2	29 88	200		1087	13.97 88	E là	4176
	666	393	000	395	1600	7.95 7.95	1186		0	•3		245	38	808		1070	37.7	E 8	500+
	B1	253	000	253	1,500	. K	7ëv		<b>3</b>	. <del>6</del>	: ' . '	g 2		. S08		1156	22.153 88	<b>3</b> 8	2835
	1597	112	000	112	9993	112	333		•	0	Ì	£ 2	<u>រិទ</u> ីន	Sos		1037	5 13	51.2	2002
	9001	0	000	0	1600	0			•	٥	}	g R	161 58	208		1621	1108 52	Ç1.0	9226
	1995	00	990	0	0091	3			o	· 🌣 :	•	<b>5</b> .2	163 30	8	4 14	1036	28. 99	901	1012
	1661	00	000	0	6691	9	ø		9	¢		2 92 2 92 2 92	.3 s	538		1004	15 E	g: 🗢	472
	1993	00	000	0	1600	8	õ		e '	?	,	2 2	13 8	B 25	•	1993 498	1852	20	3145
**	1992	00	000	0	1400	0	0		. 0	*	,	g 2	13 13	20g		0000 795	\$ FB	0	្តដូ
	1991	00	600	9	1800	. 🖘		. :	. 0	<b>\$</b>		g 2	33 39	203		1012	13 23	m -9	2902
	1990	00	,000	0	3000	3	0	-	3	0	;	g,R	35 25	805		574	10.75 32	. 6	2750
	0	0	000	0	2290	ø	9		0	5		g 2	13 8	208		1904	क्षेत्र हा	2 ခ	132
	8851	00	& O O	0	2200	9	2		٥	0		å s	3 3	355		707	អូឡូវ	ני יס	23.73
	1987	00	000	0	27.00	0	Φ		G	ð	a Kithol	星尺	13 B	8		3 5	( ) 1-7 1/2 1 1/2 1	1. O	33
7	Tonnage over Capa, ('900 tons!):	General Cargo Container	mncono General Cargo Mheat Container	Total	sue, at the Ports	oled at we Ports		ension?	រម្ភាជាជុំថ្		(Naintenance & Adainistration in WITHOUT) Valparaiso	HOME ALSO ACTOR MAINTENANCE	Antonio Administrallion Jaintepance	jota!	Clargo Handling in #ITHOUT?	Seneral Cargo Lontainer	Seneral Dargo Beneral Dargo Abeat	tentatore Alternative Ports	Jotal
	Tonnage over	Valparaiso General C Container	Seneral Car Meat Moeat Container		Available Capa, at Alternative Ports	Tonnage Mandled at Alternative Ports	Benefit (2)	(Trade Suspension)	Tonnage Suspended	Seaerit (5)	(Raintenance & Valparaiso	Tanan Tanan	Administro Administro Maintenam		(Cargo Handlin	General Lantainer	Constant Con	THE TREE THE THE	
								73	<sup>‡</sup> 8''							N .			

										39 <del>-</del> -		·					
	Chilean Fort Study	Tonnage over Capa, ( 000 tons):	Valcartiso Seneral Carso Container	San Antonio Seneral Cargo Wheat Container	fata.	Available Capa, at Alternative Ports	Johnage Handled at Alternative Ports	Benefit (2)	(Trade Suspension)	Tonnage Suspended	Benefit (3)	<pre></pre>	San Antonio Administration Maintenance		(Cargo Handling in WilHOUT) Valparaiso General Cargo Confainer	san Antonio General Cargo Wheat Container Alternative Ports	Total
	• .		654	55. 0 0	1912	1500	1663	1800		C:	8284	245	162	508	1282	1145 123 176 1600	5231
		2052	0.00	61 61	1912	1600 15	1660	9300		312	8284	245	53 05	508	1281	1144 123 176 1690	82Z8
		23.02	653	ය. 13 එ එ	1912	1600	1600	4500	:	512	8784	24S	29	508	1279	1144 123 176 1600	5226
		4.00	1459	1300	1912	1600	1400	1900		312	\$28	24.00	163	308	1279	1144 123 176 1600	5226
		- 500 - 600	1.5%	is o a	2161	1590	1600	1800	•	312	8284	50 C	30.	508	1279	1144 123 176 1600	5226
.t		2016	\$551	. 15 15 15 15 15 15 15 15 15 15 15 15 15 1	1912	1500	1500	3800	٠.	312	9284	245 70	3 8	508	1279	1144 123 176 1600	5226
	. * * * *	1.55	1459	134 0 0	1912	0091	1600	4800		312	8284	245	163 36	508	1279	123 174	5226
	÷	- E	-35 ps	ig o o	1912	0091	1600	0081		555	1878	245	153 30	50B	1279	1144 123 176 1600	5226
	-	6102	1459	2 12 0 0	1912	1690	1600	0084		22.2	6234	245 70	163	508	1279	1114 123 176 1600	5228
		0000	6. 55.1	55	1912	1500	0093	4800		212	4878	245	39	208	1279	1144 123 176 1800	5226
		. 2028	0 1459	55.0	1912	1600	1400	4800		312	8284	245 70	163	80,7	1279	1144 123 176 176	5226
·		2022	6 1459	ig o o	1912	1600	1600	008+		23.5	9284	245 70	56. S	208 208	1279	1144 123 176 1800	5228
		2023	0 01459	i G	1912	0093	1600	4800		312	+826	245	30	508	1279	1144 123 176 1600	5226
:		7024	° 55).	85 0 0 0 0	1912	0071	1600	+800		312	\$22 <del>8</del>	245 70	13 8	208	1279	1144 123 174 1600	5226
		22.00		တူ့ခမ မျာ	1912	1800	1500	4800		ä	8284	245 70	163 30	558	1279 904	13.44 123 173 1890	5228
		2028		. 88. 0 0	1912	999	1500	6630	:	313	8284	245	30	808	1279	1144 123 176 1800	5226
	· · · · · ·	2027	> 653	£5.	1912	1500	1600	0084	:	312	3284	245	33 88	瓷	1279	1154 123 176 1506	5226
		5023	9 83 1	K 0 0	1912	1500	1400	4800		515	8284	245 .	36.5	508	1279	1164 123 178 1600	522a
		2025		£ 0	1912	841	1500	4800		12 13	8284	245 70	25 25	88	904	1144 123 176 1600	5228
		30.30	659	55 50 50 50	116	1600	1650	4500		57	3754	70	33.05	88	1279 904	1144 123 176 1600	5226

## REPUBLICA DE CHILE

MINISTERIO DE TRANSPORTES Y TELECOMUNICACIONES

MINUTES OF MEETINGS

ON

THE INTERIM REPORT

FOR

THE STUDY ON THE DEVELOPMENT PLAN

OF

THE PORTS OF VALPARAISO AND SAN ANTONIO

IN

THE REPUBLIC OF CHILE

Santiago - Chile, March 6, 1986

Mr. Katsuhiro Suzunai

Leader,
JICA Study Team for the Development
Plan of the Ports of Valparaiso and
San Antonio in the Republic of Chile

Mr. Marcos Maraboli B. Planning Office Chief,

Ministry of Transport and Telecommunications (MTT)

President,

Plan Director Subcommission, Ports of V Region Reconstruction Commission

Mr. Hego de la Fuente R. Port Works Director,

Ministry of Public Works (MOP)

Member,

Plan Director Subcommission, Ports of V Region Reconstruction Commission

## MINISTERIO DE TRANSPORTES Y TELECOMUNICACIONES

The Study Team for the development plan of the Ports of Valparaiso and San Antonio in the Republic of Chile (hereinafter referred to as "the Study Team") headed by Mr. Katsuhiro Suzunai, and dispatched by Japan International Cooperation Agency (hereinafter referred to as "JICA"), stayed in Chile from February 25th to March 8th, 1986 and submitted the Interim Report to the Ports of V Region Reconstruction Commission (hereinafter referred to as "the Commission") on the basis of the "Scope of Work" signed on June 7th, 1985 by both JICA for the Government of Japan, and the Commission for the Government of Chile.

The Study Team had a series of discussions with the Commission, and the following items were agreed upon and confirmed by both sides.

- 1.- The Study Team presented and explained the Interim Report, and the Commission expressed their general agreement with the contents of the report.
- 2.- The basic concepts for the master plans of each port proposed in the report were approved by the Commission so that the Study Team could conduct its study works based upon the concepts.
- 3.- The Commission is in agreement with the methodology used in calculating berth throughput capacities; however, the data provided by the Commission for calculating these capacities will be reviewed further by both the Commission and the Study Team before the departure of the three Study Team members remaining in Chile.
- 4.- Other alternative port layouts may be suggested by the Commission before the departure of the three Study Team members remaining in Chile, and those layouts will be evaluated based on the criteria proposed in the report.
- 5.- The aseismic coefficients for design of port facilities will be given to the Study Team before the departure of the three Study Team members remaining in Chile.

## REPUBLICA DE CHILE MINISTERIO DE TRANSPORTES Y TELECOMUNICACIONES

TECHNICAL AGREEMENT

ON

THE INTERIM REPORT

FOR

THE STUDY ON THE DEVELOPMENT PLAN

OF

THE PORTS OF VALPARAISO AND SAN ANTONIO

IN

THE REPUBLIC OF CHILE

Santiago, Chile, March 21, 1986

Mr. Eiji Yasuda

JICA Study Team for the Development Plan of the Ports of Valparaiso and San Antonio in the Republic of Chile

Marcos Maraboli B. Planning Office Chief,

Ministry of Transport and Telecommunications (MTT)

President,

Plan Director Subcommission, Ports of V Region Reconstruction

Commission

Mr. Nobuo Ide

JICA Study Team for the Development Plan of the Ports of Valparaiso and San Antonio in the Republic of Chile

Mr. Miguel Valenzuela G. Acting Port Works Director Ministry of Public Works (MOP) Member,

Ports of V Region Reconstruction Commission

The Ports of V Region Reconstruction Commission and the Study Team for the Development Plan of the Ports of Valparaiso and San Antonio in the Republic of Chile dispatched by Japan International Cooperation Agency, had a series of discussions during the stay of three study team members in Chile and agreed upon the following as regards items 3, 4 and 5 set forth in the Minutes of Meetings on the Interim Report signed by both sides on March 6, 1986.

- 1.- New data on the berth throughput were given to the study team by the Commission. The study team will review the data to determine the berth throughput capacities to be adopted to the master plan.
- 2 .- Port Layout for Future Development

Other alternative port layouts for the ports were indicated by the Commission.

Through the evaluation on the alternative layouts based upon the criteria proposed in the interim report, the following port layout plan for each port was confirmed to be forwarded to the study works for the Draft Final Report.

- (1) The Port of Valparaiso: A port layout plan "Alternative C" proposed in the interim report but being subjected to the revision that the future development of the port area to be constructed across the hill behind the present berth N°1 is precluded.
- (2) The Port of San Antonio: A port layout plan "Alternative D" proposed by the Commission with the following revisions that:
  - The berth handling wheat is located at the waterfront on the South of berth  $N^{\circ}$  4.
  - The general cargo berth at berth N° 2 is subjected to further studies on berth throughput capacities by the study team in relation to the possible provision of a chemical berth which may be constructed at the waterfront of berth N° 1.

if 54 E.y. 49.

## 3.- Design Seismic Coefficient

Berthing facilities proposed in the framework of the master plan will be designed under the design seismic coefficients of 0.20 and 0.25 for those that require ordinary and high aseismicity respectively.

5of E.y. 419.

