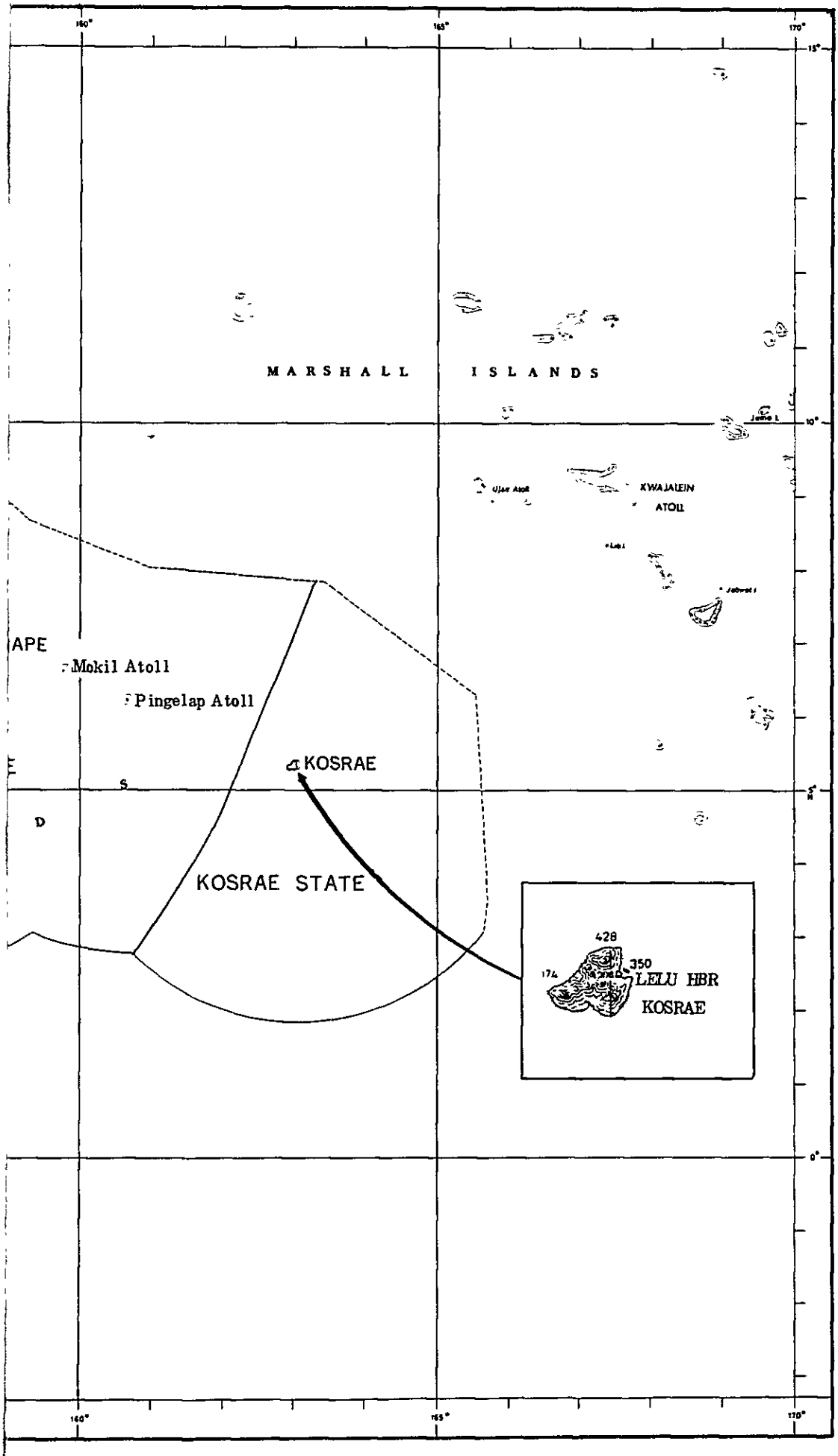
BASIC DESIGN STUDY
ON
THE PROJECT OF THE TRADITIONAL FISHING AND NUTRITION IMPROVEMENT
IN
THE FEDERATED STATES OF MICRONESIA

MARCH 1982

JAPAN INTERNATIONAL COOPERATION AGENCY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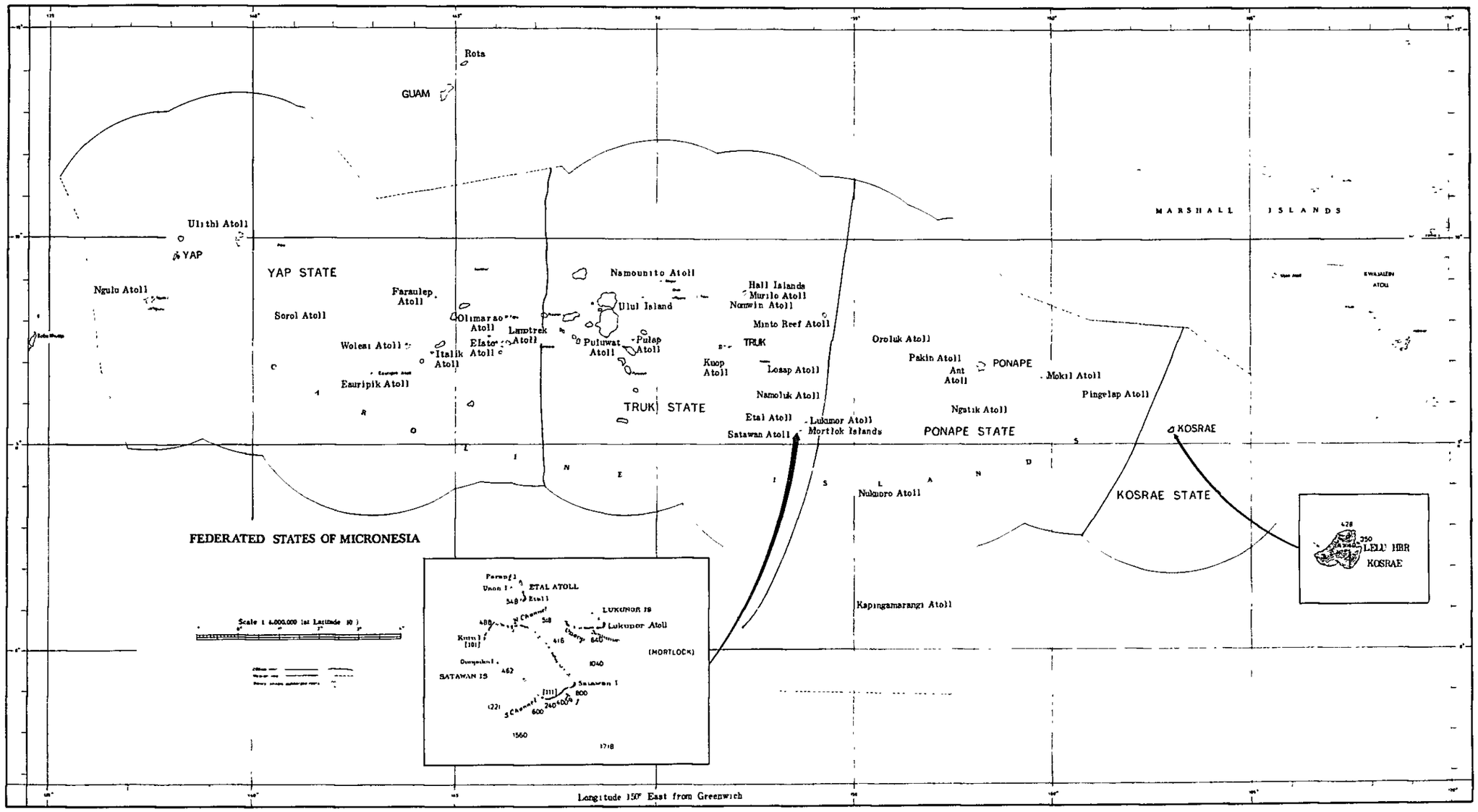
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TRUK STATE
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PREFACE

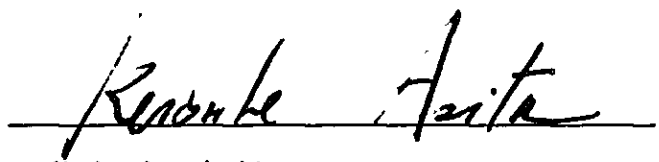
In response to the request of the Government of the Federated States of Micronesia, the Japanese Government decided to conduct a survey on the Project of the Traditional Fishing and Nutrition Improvement and entrusted the survey to the Japan International Cooperation Agency. The J.I.C.A. sent to Micronesia a survey team headed by Mr. Noriharu Nakamura from December 7 to December 22, 1981.

The team had discussions with the officials concerned of the Government of Micronesia and conducted a field survey in Kosrae, Ponape and Truk. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Federated States of Micronesia for their close cooperation extended to the team.

March, 1982



Keisuke Arita
President
Japan International Cooperation Agency

SUMMARY

The Federated States of Micronesia is the country which consists of four main islands and many outlying islands and atolls in the Western Pacific Ocean.

At present in the outlying islands and atolls, only marine products and a few kind of agricultural products are self-supporting and most of the consumer goods are provided from the main islands. In those area only copra producing industry has been established. Meanwhile, in the main islands, rice and marine products are in short supply and large quantities of those items are being imported.

Under the circumstances, the National Government has launched a policy to increase agricultural production in the main islands for self-sufficiency in food supply, and also to improve the traditional fishing in the outlying islands by making effective use of marine resources which will improve their standard of living.

In view of the above, the Government of the Federated States of Micronesia requested the cooperation of the Government of Japan in attaining goal of improving the traditional fishing and nutrition, by such means as the installation of cold storage facilities on the cargo vessels now operated by each State Government and also those in the outlying islands by which the marine products are transported to the main islands.

The Government of Japan decided to study the request for grant-aid cooperation, and dispatched basic design survey team through the Japan International Cooperation Agency.

This mission, during the period from December 7 through December 22, 1981, observed the projected cargo vessels and project area, made a survey on the local conditions, and held consultation talks with the National and State

authorities of the Federated States of Micronesia concerned. As a result, the mission concluded that it is essential to establish a transportation network for marine products in order to develop commercial fishing. They appraised the requested project and then drafted a basic design plan for the cooperation of the Government of Japan.

An outline of the facilities to be granted is as follows:-

(1) Refrigerating facilities for vessels:
Cold storage and freezer: : 1 unit
Planned vessel: 2 vessels(M/S "Micro Glory" and M/S "Micro Trader")

(2) Refrigerating facilities on land:
Cold storage : 1 unit
Ice maker and ice storage : 1 unit
Generator : 1 unit
Insulated fish box :30 boxes
Others: Spare parts for 2 years, tools for operation and repair : 1 unit
Planned area: 2 areas (Lelu and Tainiang)

(3) Truck : 1 unit
Planned area : Lelu

In designing the facilities, social and technical standards in the local areas were considered and special attention was given to high practicality and easy maintenance of the facilities. At the same time, studies were made on the economic effects resulting from the granting of the facilities from the viewpoints of increasing productivity and creation of fisherman's income.

The balance sheets of the refrigerating facilities on land and also of the fishing vessels are estimated on the assumption that the facilities to be granted are effectively used and operated in full scale. In the case of the fishermen, it is estimated they will have an income of U.S.$ 210,average per month, after deducting the cost of fuel oil, fishing tackle, and depreciation. Therefore their income will be a little higher than that of the general public.

Under the present economic condition for subsistence, the dietary life of the island people is limited. However, it is expected that their level of nutrition and standard of living will be improved in accordance with the increase of their income by fishing. A pervasive effect is further expected in the saving of foreign currency resulting from a decrease in marine products import and in the promotion of agricultural development in the main islands which will increase the purchasing power in the outlying islands accordingly.

CONTENTS

Chapter I: Introduction

I-1. Motive of Survey

The Federated States of Micronesia has various plans to improve the traditional fishing and nutrition, such as installing refrigerating facilities for the existing cargo vessels and the outlying islands.

The Government of the Federated States of Micronesia requested the Government of Japan for grant aid in implementing the above project.

The Government of Japan decided to study the feasibility of such a project as a subject of cooperation

I-2. Object of Survey

The Government of Japan dispatched a survey mission through the Japan International Cooperation Agency to make a field survey necessary in studying the request, to discuss with the government officials of the Federated States of Micronesia, to study the feasibility of the grant aid and its effect and to draft the most appropriate basic plan.

I-3. Implementation of Survey

1) Member of mission

Members of the mission are as follows:-

Leader	: Noriharu Nakamura	Fishing Division, Oceanic Fishery Department, Fisheries Agency, Ministry of Agriculture, Forestry and Fisheries.

Coordinator	: Kazuo Senga	Kanagawa International Fisheries Training Center, Japan International Cooperation Agency(JICA).
Freezing & Cold storage	: Nobuhide Kondo	Hoko Fishing Co.,Ltd.
Fishing Vessel	: Yôichiro Hida	Hoko Fishing Co.,Ltd.
Fishing gear & Technology	: Kenji Tomita	Hoko Fishing Co.,Ltd.

2) Schedule of Survey

The survey mission made the field survey of the cargo vessels ar the outlying islands under the Project of the Traditional Fishi and Nutrition Improvement and discussed this with the government officlas in both the Naticnal and State levels from December 7 to December 22. 1981. (Details of schedule are attached in Appendix 1).

Chapter II: Outline of Fishery

II-1. Outline of Fishery

The Federated States of Micronesia is located in the West Pacific Ocean and its oceanic area is over 2.6 million km². The skipjack resources in this area are abundant and the area is one of the most important fishing grounds in the world. A large number of fishing vessels from Japan, Korea, Taiwan, etc. are operating in this area. It is estimated that 500,000 tons of skipjack are caught in the West Pacific Ocean every year.

1) Administration in charge of fishery

Within the National Government, the Division of International Affairs,Department of External Affairs, and Office of Planning & Statistics take charge of all aid for projects including fishery from foreign countries, and the Department of Resources & Development is in charge of fishing itself. Each state government also has a Department of Resources and Development, which is in charge of fishery. There are also quasi-governmental entities for fishery development, like the Fishing Authority and Economic Development Authority.

2) Foreign fishing

From the end of World War I to the end of World War II, Micronesia was under Japanese mandate entrusted by the League of Nations. Approximately 50,000 Japanese lived there, with many Japanese engaged in fishing and the fishing industry being one of the more important industries at that time. From 1930 to 1940 an average of about 6,000 tons of skipjack were caught annually in Yap and Ponape as well as in Truk, and were mainly produced into dried bonito. The dried bonito made in Micronesia amounted to 40 percent of all dried bonito

consumption in Japan at that time. However, skipjack fishing was suspended after Micronesia came under the mandate of the United States of America.

Since the Federated States of Micronesia established a 200 mile fishing zone in 1979, fishing vessels of Japan, the U.S.A., Korea, etc. have been catching tuna and skipjack in these waters by paying license fees.

Table II-1: Estimates of tuna and skipjack caught by Japanese fishing vessels in the 200 mile fishing zone of the Federated States of Micronesia

(unit:MT)

Year	Long line	Pole & line	Purse seine	Total
1973	12,011	56,854	-	68,865
1974	10,903	40,225	1,063	52,191
1975	14,691	24,437	1,612	40,740
1976	13,193	22,813	1,494	37,500
1977	24,378	34,013	643	59,036
1978	28,520	33,788	4,516	66,824
1979	11,000	20,650	2,950	34,600

(Source: "1980 T.T.P.I. Report" issued by the State Department of the U.S.A.)

3) Domestic fishing

Compared with active foreign fishing in the 200 mile fishing zone of the Federated States of Micronesia, domestic commercial fishing has not yet been developed, except for the fishing

in part of the main island like the State of Truk. Domestic fishing is still in the self-sufficiency stage.

Present fishing can be classified roughly into skipjack pole and line fishing with 15-25 ton type fishing boats, troll fishing using small boats and canoes with outboard engines or sailing canoes, cast net fishing using ordinary canoes without engines, surrounding fishing, drive-in net fishing, basket trap fishing, and etc. Of these, canoe fishing is the most popular. Species of fish mainly caught are skipjack, yellowfin tuna, spanish mackerel, dorado, rainbow runner, reef fish like spine venomous fish, lobster, mangrove crab, etc.

4) Consumption of marine products

Since Micronesia imports many canned products of mackerel, sardine, etc., every year, demand for marine products is considered to be large. Many canned fish are imported in spite of the abundant fish resources in the area because the means of transporting fresh fish from the fishing base to the center of consumption is lacking, there are no storage facilities like ice storage except on some of the main islands, and because the related infrastructure is insufficient. It is estimated that approximately 900 tons of fish is caught and consumed at present in the coutry.

5) Refrigeration and processing facilites

Although each main island has facilities such as cold storage and ice makers, none of the outlying islands, except Ulithi Atoll in Yap State, has these facilities. A pier has been newly constructed at Dublon in Truk State, so that the Dublon district will become a large fishing base in the future.

6) Export of marine products

In November 1981, Truk State exported approximately 14 tons of frozen skipjack for canned goods to Hawaii, in a first trial for the Federated States of Micronesia. Truk State also airlifts approximately 5 tons of reef fish to Guam every year. Exports of high price marine products such as mangrove crabs and lobster can also be expected in the future.

7) Aid from foreign countries

Harbor facilities are being constructed or reformed with the aid of U.S.A. on each main island. Japan has been giving technical aid to the Federated States of Micronesia since it first granted the fishery development fund when the "Agreement between Japan and U.S.A. concerning the Trust Territory of the Pacific Islands" was signed in 1969. In Truk State, the Pacific Tuna Development Foundation (PTDF) and the South Pacific Commission (SPC) have been technically cooperating with and providing funds for the resource exploitation of skipjack, tuna, and bait and to the training of local fishermen.

II-2. Present Situation of Fishery in Each State

1) State of Yap

Yap Islands consist of four main islands called "Gagil", "Tomil", "Map" and "Rumung" being a population of about 5,000 people. The main outlying islands and atolls are Ulithi Atoll with 720 people, Woleai Atoll with 659 people and Lamotrek Atoll with 243 people. The total population of the State is 8,172, according to the Quarterly Bulletin of Statistic, Trust Territory of the Pacific Islands, Vol.III No.2,1980. The people are mainly engaged in agriculture,

like copra production, and fishing. The State maintains the most traditional social customs among the four States in the country and the village chiefs still have a strong influence on the society.

There are two organizations in charge of fishery. One is the Department of Resources and Development (R & D) within the State Government and the other is the Fishing Authority which was established in 1979 and which is a quasi-governmental entity. The R & D is responsible for basic research required for commercial utilization of marine resources, conservation, keeping statistics and controlling the 12 mile fishing zone under the State Jurisdiction. The Fishing Authority is responsible for carrying out various fishery projects and programs.

According to the results of experimental fishing using Samoan reels, one reel can fish 5 kg/hr. in waters around Yap Islands, 10 kg/hr. in Ulithi Atoll and 11 kg/hr. in Ngulu Atoll. Therefore, it seems that marine resources are richer in the outlying islands and atolls than in the main islands.

The Fishing Authority has a 30 ft. fishing vessel, a modified whale catcher boat, and one additional 28 ft. fishing vessel suitable for trolling and bottom fishing. In Lamotrek Atoll, there is a 28 ft. F.A.O. design fishing vessel. There are also some outboard motorboats and sailing canoes in the main islands and outlying islands.

Regarding cold storage and other facilities related to the fishery, the Fishing Authority has one unit of cold storage and two units of ice maker in Colonia, the center of the Yap Islands. There are no such facilities in the outlying islands and atolls except in Ulithi Atoll where there is one unit of cold storage of 10 tons capacity. Under the circum-

stances, it is rare for marine products to be transported among the islands. Therefore,except in some areas of the Yap Islands, caught products such as skipjack tuna and reef fish are consumed by the fishermen themselves and only the surplus are given to their neighbours.

At Colonia in the Yap Islands, about 27-36 tons of fish per year are marketed. The fisherman's price and consumer's price are about U.S.$ 1.45 and U.S.$ 1.90 respectively. There are fishing cooperatives, but they are not very active.

The State of Yap imports canned fish of about U.S. $200,000 per year. At present, the State Government is drafting its National 5-year Economic Plan in which fishery promotion is considered to be one of the most important sectors in improving the present trade balance. Under the circumstances, the State Government has requested grant aid of fishing vessels and gear and especially for receiving of technical experts for training in fishing operations and maintenance of fishing vessels and refrigerating facilities.

2) State of Truk

The total population of the State is 37,742 people. And Truk Islands consist of 11 main islands. Among them are Moen with 10,373 people, Dublon with 3,233 people, Fefan with 3,096 people and Toll with 6,781 people. Mortlock Islands are located in the southeast of the State with the population of about 11,000 people and consist of about 17-18 islands and atolls which are relatively populated. Among them are Oneop Island with 485 people, Satawan Atoll and Lukunor Atoll. Ulul Island is located in the northwest of Truk Islands and its population is 446 people. The State of Truk has the largest population among the four states in the country and the fishery is relatively well-developed mainly in the waters around the main islands.

Before World War II, about 60 Japanese pole and line fishing vessels of the 10-15 ton type operated in the waters around Truk Island and landed about 5,000 tons of skipjack per year.

At present, the Division of Marine Resources, Department of Resources and Development takes charge of the fishery within the State Government and its main activities are as follows:

(1) Operation of skipjack fishing by three pole and line fishing vessels granted by Japan and management of two units of cold storage of 100 tons capacity.

(2) Technical training to local fishermen through the guidance of Japan, South Pacific Commission (S.P.C.), etc.

(3) Dublon Fisheries Complex Project.

The Division has 23 staff members and seems to be quite active.

The private enterprises have one fishing vessel of 19 meters, three vessels of the 15 ton type and one vessel of the 5 ton type. Their fishing base is the main islands. The Municipality of Ulul district has also one fishing vessel of the 5 ton type. Besides the above fishing vessels, other vessels include outboard motorboats of 25-40 hp. or sailing canoe. It is estimated that about 1,000 fishermen are engaged in traditional fishing within the State. Some fresh fish is transported to the main islands from the adjacent outlying islands. However, among other islands, marine products are not transported due to the long distances and lack of cold storage and other related facilities.

Out of three fishing vessels above mentioned, two vessels of the 15 ton type are owned and operated by Japanese natives. Those vessels catch the bait for skipjack at daylight and after navigating for about 3 hours, start fishing for skipjack living around the islands. The average catch is about 1-3 tons per day per vessel and about 365 tons per year for two vessels.

The three fishing vessels owned by the State Government caught 76.3 tons of skipjack, 9.4 tons of yellowfin, 3.9 tons of black skipjack and 2 tons of rainbow runner in 1980.

Although there is no data available on fish catch by private enterprises, it is estimated that about 700 tons of skipjack are caught every year in the waters around the Truk Islands.

As a marketing organization, the Truk Federation of Fishing Cooperative has a market near the Public Water Pools. This cooperative marketed 28 tons of skipjack, 1.5 tons of spine venomous fish, 28 tons of reef fish, 6 tons of octopus and shell fish, 1.8 tons of mackerel, 1.5 tons of lobster and 1 ton of other species for a total of 68 tons. The fish products are also sold directly to hotels, restaurants, schools, etc. The big catch season for skipjack is from June to September and its price fluctuates according to the season and place of marketing. However, in the State of Truk, because the State Government engages itself in fishing, the prices are relatively cheaper than in other States of the country. For example, the retail price of skipjack is U.S.$1.10-1.45/kg and reef fish is 1.75/kg in average, but sometimes it soars up to U.S.$3.50/kg.

About 14 tons of frozen skipjack were exported from the State of Truk to Hawaii for the materials of cannery in November,

1981. That was the first bulk export of marine products since the National Government was established in 1979, although 5 tons of reef fish per year are exported by air from the State to Guam.

Regarding cold storage and other related facilities, there are two units of the 100 ton type of cold storage, one air blast freezer unit of 5 tons capacity and one ice maker unit in Moen which are owned by the State Government. The Truk Federation of Fishing Cooperative has also one ice maker unit but there are no such facilities in the outlying islands and atolls.

Dublon Fisheries Complex Project:

Feasibility studies were made by private American companies and the construction of the dock has been already completed at a cost of U.S.$2,200,000 of U.S.A. aid. In the near future, cold storage, repair workshops and dry dock facilities are to be constructed. The Complex is intended as a replenishing base for foreign fishing fleets and as a transshipment base for their catch. In the future, a cannery will be constructed if found profitable and the Dublon Island will become the fishery center of the country.

Mortlock Islands:

The Mortlock Islands suffered serious agricultural product disaster from a typhoon attack in 1976. The State Government has set up the "Development Authority for Mortlocks" and is doing its best to aid in the recovery of the islands. In the southern area of the Mortlock Islands, several islands and atolls are located within relatively short distance of each other. Among those islands and atolls, the fishing is flourishing the most on Oneop Island. At present,

foreign fishing fleets are operating for skipjack in the southern waters off the islands. In the islands, no electric power and water supply systems are available, which is the same case for other outlying islands and atolls.

3) State of Ponape

The total population of the State is 22,968 people. Ponape Island is the largest island in the country. The National Government of the country is located in Kolonia district, the center of the island, and the population of the area is 5,500 people. The main outlying islands are Mokil with 289 people, Pingelap with 369 people and Kapingamarangi with 510 people.

In the State of Ponape, the organizations in charge of fishery are the Department of Resources and Development within the State Government (R & D) and the Economic Development Authority (E.D.A.), which is a quasi-governmental entity and is doing mainly ship's agent business and selling ice at present.

In the waters around Ponape Island, some 40-60 boats are engaged in fishing operations, of which over half are canoes either with 6-12 hp. outboard engines or without engines. The other boat types consist of some 16-20 ft. wooden boats with outboard engines of 12-35 hp. At present, trolling with such lures as coconut leaves and oyster shells, and pole and line fishing using sardine bait, are predominant. The big catch season is from April to June. Besides the skipjack, other main species of fish are dorado, spanish mackerel and reef fish like spine venomous fish. It is estimated that some 100-150 people are engaged in fishing in Ponape Island, out of which only 20-25 people are engaged in commercial fishing. The situation of the outlying islands and atolls is almost the same

as those of other States. The people in Kapingamarangi Atoll are famous for their high fishing techniques.

The State Government operates one unit of cold storage of some 70-80 tons capacity in Takatic Dock. That cold storage is equipped with an air blast freezer. The E.D.A. operates one unit of ice maker but no any other facilities related with fishery are installed in the State.

There is one fish market near the E.D.A. and the following fish are marketed as follows:

Skipjack & spanish mackerel : Fisherman's price U.S.$1.54/kg, Consumer's price U.S.$1.90/kg

Mangrove crab : Fisherman's price U.S.$2.43/kg, Consumer's price U.S.$2.98/kg

This fish market is playing an active role as the fishing base, with about 9-10 wooden boats of the 4 meter-type(with outboard engines) and canoes operating. Their average catch is 10-15 kg per boat.

Estimated fish caught by species around Kolonia in 1979 are 16 tons of skipjack, 13 tons of yellowfin tuna, 2 tons of other pelagic fish, 64 tons of reef fish and 12 tons of other species, for a total of 107 tons.

4) State of Kosrae

Total population of the State is 5,522 people. The State has neither outlying islands nor atolls and consists of only Kosrae Island. The island is divided into 4 districts, namely Lelu, Malem, Utwe and Tafunsak. The State Government is located in Lelu district, which is the political and economic center of the State. From the standpoint of its geographical location and history, the State had stronger economic rela-

tions with the Marshall Islands than with other States of the country. Even nowadays, the State exports citrus fruits and so on to the Marshall Islands. Agricultural and fruit resources are relatively richer but such infrastructures as roads, dock facilities, etc. are less developed than in other main islands.

At present the Department of Resources and Development (R & D) within the State Government is in charge of fisheries. The Fishing Authority was established in 1981 and is a quasi-governmental entity and it will begin its activities soon. The objectives for establishing the Authority are as follows:

(1) To provide guide to the State Government for establishing marine resources development policy.

(2) To make regulations concerning the exploitation of living marine resources.

(3) To establish and support program to promote and to guide fishermen's cooperative society and other related ventures.

(4) To serve as a conduit for public funds to establish and operate facilities required for commercial fisheries development.

(5) To conduct pilot fishing operations and to participate in large scale commercial fishing and relative activities which are not suitable for investment by the private sector.

At present, the fishery within the State is at the intermediate stage between commercial fishing and subsistence fishing.

The R & D has several fishing vessels with engines and is demonstrating fishing operations and training fishing techniques. It is estimated that there are also some 25-30 fishing boats of wooden make with outboard engines, 20 outrigger canoes and 15 paddling canoes.

There is a Fishermen's Cooperative Society which consists of 156 members. However, it is estimated that the number of fishermen engaged on a full time basis is less than the number of cooperative members. Regarding the fishing method, trolling by canoe with outboard engines and drive-in fishing are predominant.

There is no data regarding fish catch but it is estimated that some 30 tons of skipjack and yellowfin tuna, 10 tons of reef fish and 20 tons of other species for a total of 60 tons of fish are caught per year within the State.

Fishing is flourishing relatively well in Utwe district and some 10 canoes are fishing in the district. It is estimated that one canoe catches 10-20 pieces of skipjack per day by trolling and they catch some 200 kg of skipjack by drive-in fishing per one operation.

In Lelu district, some 10 boats operate trolling and the State Government has a plan to change the area beside the present air strip to a commercial fishery center by land-filling.

At present there is not much difference in price according to fish species, the market price being between U.S.$ 1.54 and 1.76/kg.

The State Government has one unit of cold storage of 50 tons capacity for imported meat and an additional one unit of cold storage of 3 tons capacity.

Chapter III: Background and Outline of Request

III-1. Background of Request

Since the country consists of islands scattered in a large area, it is indispensable to establish a means of transportation between the main islands and the outlying islands in order to exchange goods and make good use of resources.

Cargo vessels are now operated for this purpose, which transport rice and groceries from the main islands to the outlying islands and copra for export almost exclusively from the outlying islands to the main islands. These vessels cannot transport fresh food like vegetables and fruits or frozen goods because of the lack of refrigerating facilities on board.

On the one hand, the country imports a large quantity of provisions like rice every year and has worked out a policy to increase crop production such as taro, vegetables and fruits in the main islands with a view to attaining self-sufficiency and nutritional improvement. However, agricultural development will be limited if these crops are only consumed within each island. It is also necessary to supply provisions to the outlying islands in which these commodities are in short of supply.

On the other hand, marine resources around the outlying islands are plentiful enough to be supplied to the main islands. However, it is not possible to supply them to the main islands at present, because there is no storage or transportation means.

Under such a background, the Government of the Federated States of Micronesia has requested the Government of Japan to implement

the Project of the Traditional Fishing and Nutrition Improvement under which it is intended that fishing in the outlying islands will be promoted and transportation of goods between the main islands and outlying islands will also be promoted. This will contribute to the improvement of the living standard and an increase in income for the people in the outlying islands people who are far outside the economic development compared with the people of main islands.

III-2. Outline of Request

The facilities requested by the Government of the Federated States of Micronesia to the Government of Japan for the improvement of the traditional fishery are as follows:

1) Refrigerating facilities for vessels

The vessels in which refrigerating facilities are requested to be installed (hereinafter called "the cargo vessels") are as follows:

(1) M/S Micro Glory (Ponape State)
(2) M/S Micro Spirit (Yap State)
(3) M/S Micro Dawn (Truk State)
(4) M/S Micro Trader (Truk State)
(5) M/S Kaselehlia (Kosrae State)

Each state government operates a cruise service by the above vessels which belong to the National Government, and these vessels transport the goods between the main islands and the outlying islands. This project is to install refrigerating facilities on these vessels so that frozen marine products can be transported from the outlying islands to the main islands. Vegetables and fruits can be carried from the main islands to the outlying islands in order to

make good use of the resources and to improve the economic disparity. This request will be given the first priority in the Project.

2) Small-sized cold storages of 10-20 ton capacity.

3) Middle-sized cold storages of 100-150 ton capacity.

The projected sites for setting up these storages are shown below.

Yap State	: Woleai Atoll
	Lamotrek Atoll
Truk State	: Ulul Island
	Mortlock Islands
Ponape State	: Kapingamarangi Atoll
	Mokil or Pingelap Atoll
Kosrae State	: Kosrae Island

Cold storages for marine products will be installed at the above seven islands and main islands of atolls in order to store the marine products caught during the fishing season for effective utilization of the products. As a result, the idle labor force can be directed to agriculture such as copra production during the lean season so that exports can be increased.

4) Fishing vessels and accessories

Three vessels (30-40 feet) will be distributed to each of the seven projected sites shown in the foregoing paragraph for the purpose of increasing the catch of fish to supply to the main islands.

5) Supplementary facilities on land

Since the said outlying islands, except Kosrae, have a poor infrastructure, generators and other supplementary facilities must be provided in order to secure the electric power.

6) Fish aggregating devices (Payao)

Although the fish resources are decreasing inside the reefs, the demand for marine products is increasing because of the population growth in the country. Thus it is an urgent need to increse the catch in offshore waters. Installation of the Payao off the above projected sites for cold storages is requested in order to improve the catch efficiency outside the reefs.

7) Ice makers

Ice makers will be installed at seven projected sites for cold storages to supply the nearby islands with ice and to collect the ice-preserved fish, as well as for the purpose of encouraging fishing activities near the projected sites and increasing the supply of fish to the main islands.

Chapter IV: Outline of Survey Results

IV-1. Outline of Discussion and Minutes of Discussion

The survey mission held discussions with the government officials of the Federated States of Micronesia on the contents of the request in respect to the Project of the Traditional Fishing and Nutrition Improvement, its background, the superiority of projects and the maintenance and management plans after implementation of the Project, etc. Both parties signed the Minutes of Discussions attached in Appendix 2 in consideration of the survey results. The list of government officials of the Federated States of Micronesia is attached in Appendix 3.

IV-2. Outline of Field Survey

1) Cargo vessels in which refrigerating facilities are installed:

M/S Micro Spirit and M/S Micro Glory were built at the same shipyard in Japan in 1978 and are of the same type. Their principal specifications are as follows:-

Length over all		56.40 m
Breadth		10.10 m
Depth		4.60 m
Gross tonnage		789 tons
Service speed		11.0 knot
Cargo hold capacity	No.1	114 m^3
	No.2	325 m^3
	No.3	399 m^3
	Total	838 m^3
Storage(for vegetable)		Approx.5 m^3
Storage(for meat)		Approx.7 m^3
Main engine		455 BHP x 2 units
Generator		AC 450V, 60 HZ, 115 kw x 2 units

Freezer for storage:		
Compressor	Vertical, open type 3.7 kw x 2 units	
Refrigerant	R-22	
Vessel class	A.B.S.(American Bureau of Shipping)	
Complements	Crew	27
	Passenger in cabin	12
	Passenger on deck	100
	Total	139

M/S Micro Spirit is operated by Yap State and M/S Micro Glory is operated by Ponape State, respectively. These vessels transport consumer goods from the main island to the outlying islands and copra from the outlying islands to the main island once or twice a month. Volume of cargo is approximately 20 tons per voyage.

While cargo vessels moor at the outlying islands, small carriers with outboard engines are used for transporting goods between the cargo vessel and the outlying islands. The cargo vessel has three such carriers and the loading capacity per carrier is approx. 500 kg. The cargo vessel are operated by local crews only,and the repair of pipes, cleaning of cooler tubes, exchange of articles of consumption and etc. are conducted by the crew themselves. During the inspection which is conducted every two years at a dockyard in a foreign country, the equipment and instruments of the cargo vessels are overhauled, and are therefore in good operating condition.

2) Project sites for installing refrigerating facilities on land:

A) Lelu, Kosrae Island

The site is situated in part of a pool of two meters in depth beside the airstrip. Its bottom is made of coral reef and the pool is to be filled with igneo rock, in the same case

as the international airport now under construction. On the road to the north of the site, electric power of 240V and 60 Hz and the water supply pipe have already been installed. The State has a dock at which a ten thousand ton type vessel can be moored. The State also has a large scale truck and crane.

The peoples' houses on the island are built of wood or concrete blocks in general, but large-scale public buildings are built of reinforced concrete with walls of concrete block and with roofs of iron frame. There are some buildings but large scale construc to build mainly public buildings but large scale construction such as harbour and airport projects are carried out by foreign building contractors. All building materials are imported from overseas except sand and crushed stone, which are available locally.

B) Tainiang, Oneop Island

The site is situated at the center of the island and adjacent to the dock. The Oneop Island is one of the islands called Mortlock Islands. It is made of coral sand on the coral reef. The waters near the dock are shallow and only small boats can come alongside. Therefore, the landing craft should be used when the materials and machinery for the facilities are carried from the main island to Oneop Island. No vehicles or heavy machinery are locally available.
The peoples's houses are built of wood or concrete blocks and are built by themselves. There is no building contractor on the island, but the people of the island themselves constructed the dock of about 100 meters in length and 5 meters wide. Only coral sand is available locally as a building material and other materials must be transported from the Truk Islands.
There is no systematic water supply service on the island but, drinking water is available from rain water catchments.

There is one electric generator to supply electric power to the Magistrate's office but electric power is not supplied to the peoples' home yet.

Chapter V: Basic Design

V-1. Evaluation of Request

1) Refrigerating facilities for vessels

It is undeniably necessary to provide a means of transporting marine products in order to improve the traditional fishery and to facilitate commercial fishing activities in this area. In this sense, the request of the Government of the Federated States of Micronesia is justifiable.

(1) All the cargo vessels were built in 1978 in Japan and are of the same type, except for the M/S Kaselehlia. Since it has not been long since construction, they may be used over a long period of time in the future.

(2) The cargo vessels transport daily commodities from the main islands to the outlying islands once or twice a month. These existing vessels may be effectively utilized if the marine products are transported using the vessels' return trip to the main islands.

(3) Two 115 kw generator units are installed on the cargo vessels. Generally, one of them is operated at a time, and the power requirement is estimated at about 40 kw. Even if a cold storage is installed, it can be operated with the surplus power from one generator. The increase in fuel consumption of these vessels will be almost negative.

(4) As the cargo vessels have small freezers for provisions installed, engineers on board can operate and maintain these freezers.

In consideration of the above facts, the request of the Government of the Federated States of Micronesia is considered to be reasonable from both economic and technical view points.

Among the four states forming the Federated States of Micronesia, Kosrae State consists of a main island only. Therefore transportation between the main island and the outlying islands is not necessary. Since the M/S Micro Dawn, operated by the Truk State already, has a cold storage installed, it was decided appropriate to equip the M/S Micro Glory of Ponape State and the M/S Micro Spirit of Yap State with cold storages also.

The temperature of the cold storages will be kept +5℃ or -15℃ so that both fresh vegetables and frozen foods can be stored. In consideration of collecting marine products from the outlying islands not having cold storage facilities, it is necessary to install freezers in the cold storages on board.

2) Capacity of cold storages on land: 10-20 tons

3) Capacity of cold storages on land: 100-150 tons

After consulting with the Government of the Federated States of Micronesia, the following two places were selected as sites for cold storages: Tainiang of Oneop Island in Truk State and Lelu in Kosrae State. Tainiang is located nearly in the center of the South Mortlock Islands and has a small pier. After completion of the cold storages at Tainiang, the advantages will be distributed widely among the South Mortlock Islands. The site for cold storage in Lelu is adjacent to the projected site for urbanization and construction of the new port, and is appropriate for the collection and sales of marine products

in the island. In view of the above, the selection of projected sites for constructing cold storages is considered to be proper.

Fishery in these islands has only been in the traditional and subsistant stages for a long period of time. Therefore, it is not practical at the moment for these islands to introduce higher and complicated fishing techniques such as fishing by purse seine. Since cold storages to be constructed in the outlying islands are chiefly aimed at temporarily storing marine products which will be transported to the main islands, within a short period of time, these storages should be as small as possible to minimize the running expenses. In Tainiang it requires much time from the catching of marine products to selling them at Truk Island. It is, therefore, necessary to set up semi air blast freezer in order to preserve the good quality of the products.

4) Fishing vessels and accessories

As a result of consultation with the Government of the Federated States of Micronesia, the first priority of the project is placed on the establishment of the basis of fish marketing system. Therefore the request on fishing vessels was eliminated. In order to exploit migratory offshore resources and to improve the catch efficiency, it will be required to extend the fishing area by introducing larger size of vessels and to modernize fishing gears in the future. Even if larger types of vessels are not introduced, establishment of the basis of distribution system will generate the income opportunity through fishing activities which enhances the people's desire toward fishing and existing vessels can supply the main islands with marine products.

5) Supplementary facilities on land

Oneop, where the refrigerating facility on land is to be constructed, has no surplus electric power at the moment. Therefore, when installing cold storages at the site, generators of adequate capacity(with one unit for stand-by) will be required.

On Kosrae Island, electric power can be supplied from a local power station. However, it will be necessary to install a generator in case of power failure.

6) Fish aggregating devices (Payao)

The method of aggregating the migrating fish school by Payao and catching skipjack by pole and line is becoming recognized as an efficient and energy-saving fishing method, and the small trolling boats, which are now being used locally, may also be used. In comparison with trolling, the catch efficiency of Payao fishing will be higher with less fuel consumption. Therefore, installation of Payao will greatly contribute to the fishery in Micronesia.

Since Payao can easily be made from locally available materials, it is reasonable that this request can be eliminated from the cooperation of Japan. For this reason, respective administrative governments on each island should provide Payao by themselves.

7) Ice makers

Marine products will quickly lose their freshness in the climates of high temperature and humidity.

Since fishing vessels on the outlying islands do not have refrigerating facilities, in order to ship and sell marine products to the main islands in the future it will be necessary to preserve fish in ice on the vessels immediately after catch. This will prevent degradation of freshness before putting them in the cold storages, and enable products of good quality to be shipped.
Also by supplying ice to the nearby islands,ice-preserved fish of fine quality can be collected from these islands. Installing ice makers at Tainiang and Lelu where the refrigerating facilities on land are constructed is considered proper.

V-2. Outline of Basic Design

1) Basic policy

In preparing the basic design, an evaluation has been made of the present production situation, distribution and consumption of fish, future prospects, maintenance and management systems for facilities to be granted, etc., and the establishment of a most suitable production and transportation system has been considered to implement the Project of the Traditional Fishing and Nutrition Improvement of the Federated States of Micronesia.

2) Basic design

Based on the above policy and the strong request made by the Federated States of Micronesia that the grant would be given equally to each state, the following basic design has been planned.

The administrative government of Oneop Island and the Kosrae State government will install Payao offshore Tainiang and Lelu so that the catch may be increased.

Refrigerating facilities on land supply ice to the fishing vessels in order to preserve the freshness of the marine products on board, and also to freeze and stock the fish received from fishing vessels. Installing refrigerating facilities on the cargo vessels facilitates the transportation of marine products among the main islands and outlying islands. Later the marine products are carried to the existing cold storages on the main islands for sale. This Project is to improve the traditional fishery and marine products distribution system as well as to develop the commercial fishery in the country. In this Project, the target will be set to increase the catch by approximately 230 tons annually at each refrigerating facility site on land.

The catch increase plan and the scale of facilities to fulfill this plan are as follows:

(1) Catch increase plan

Payao will be installed in the offshore waters of each projected site for constructing refrigerating facilities on land, enabling the existing fishing vessels to increase the catch.
Payao shall be installed by each administrative government of the site.

Catch : 2 men/vessel x 30 kg/man.day
x 24 vessels x 200 days/vessel
= 288,000 kg

Local consumption : 60,000 kg

Balance : 228,000 kg

As there are no accurate statistics available at present, the average catch per trolling vessel is assumed to be around 15 kg/man·day based on the inquiry made on the spot. The catch will be increased by installing Payao. Generation of income opportunity through fishing activity may encourage local fishermen to increase their fishing efforts, when the refrigerating facilities on land are constructed. Then it is supposed that the catch per fisherman will be increased to about 30 kg per day. Fishing vessels can be provided from nearby outlying islands.

(2) Scale of the facilities

Scale of the facilities necessary to attain the catch target is shown below.

Ice maker and ice storage:

Ice making capacity	1.5 tons/day
Ice storing capacity	2 tons

Freezer on land:

Freezer will be operated for 24 hr./day.

Required freezing capacity will be,

Annual supply/Ice storage operation days
= 228,000 kg/220 days = 1,036 kg/day
1,036 kg/day x 160% = 1,658 kg/day

Capacity of freezer will be,

1,658 kg/time x 7 hr/24 hr = 480 kg/6 hr

Note: It takes seven hours for freezing, including the time for carrying the products in and out of the freezer.

Cold storage on land:

The cargo vessels will operate between the main

islands and the outlying islands 18 times a year, excluding one month at dock. Their storage capacity is 20 tons.

231 tons/year ÷ 18 times x 160 % = 20 tons

Freezer for vessel:
Fresh fish collected each time from an outlying island not having refrigerating facilities on land will be approximately 500 kg. Freezing capacity is about 250 kg/6 hr.

Ice storage for vessel:
Ice will be used for storing both frozen marine products collected from cold storages on land and marine products frozen on board. Storing capacity is 25 tons.

(3) Specification of the principal facilities

Specification of the principal facilities are as follows:

1. Refrigerating facilities for the vessels
Principal facilities to be installed in the vessels are as follows:

1) Ice storage	2 units
Capacity (of 2 units)	Approx. 60 m^3
Cooling method	Direct expansion, grid coil type
Fixed temperature	+5°C and -15°C
Refrigerant	R-22
Compressor	Vertical,open type
Condenser	Horizontal, shell tube type Sea water cooling

Controlling method	Automatic control system

2) Freezer — 1 unit

Freezing method	Semi air blast
Freezing capacity	240 kg/6 hr (fish to be frozen shall be skipjack of approx. 3 kg)
Refrigerant	R-22
Compressor	Vertical, open type
Condenser	Horizontal, shell tube type
Controlling method	Automatic control system

3) Water supply and drainage facility — 1 unit

4) Air supply and exhaust facility — 1 set

5) Other facilities

Spare parts (for 2 years), repair tools, operation tools, fish boxes, etc. — 1 set

When designing above facilities, the biggest importance has been placed on the safe navigation of the cargo vessels, and the following considerations have been made; (1) These facilities can be controlled satisfactorily with the present operational techniques. (2) Ice storages and the freezer should be arranged efficiently in the cargo hold, so as not to disturb the cargo work other than frozen goods.

2. Facilities on land

Details of each refrigerating facility set at the two projected construction sites will be as follows:

1) Housing

House		1 unit
Floor space	Approx. 120 m^2	
Type	One floor prefabricated house	
Water supply and drainage facility, Sea water pump		
Water catchment, piping, etc.		1 unit
Lighting facility, etc.		1 unit

2) Electricity

Diesel generator		2 units
(Except Kosrae which shall have only one unit)		
Voltage	220 V	
Cycle	60 Hz	
Switchboard, etc.		1 unit

3) Freezer and refrigerator

Cold storage		1 unit
Capacity	Approx. 50 m^3	
Cooling method	Direct expansion	
Fixed temperature	-20°C	
Refrigerant	R-22	
Compressor	Vertical, open type	
Condenser	Horizontal, shell tube type	
Controlling method	Automatic control system	
Freezer (only for Tainiang)		1 unit
Freezing capacity	480 kg/6 hr (fish to be frozen shall be skipjack of approx. 3 kg)	

Freezing method	Semi air blast
Refrigerant	R-22
Compressor	Vertical, open type
Condenser	Horizontal, shell tube type
Controlling method	Automatic control system
Ice maker and ice storage	1 unit
Ice-making capacity	1.5 tons/day
Shape of ice	Flake ice
Material water	Sea water
Ice-storing capacity	2 tons
Ice storing method	Natural cooling
Refrigerant	R-22
Compressor	Vertical, open type
Condenser	Horizontal, shell tube type

4) Insulated fish box 30 boxes
   Inside capacity Approx. 100 liters
   Insulation method Polyurethane foam 50 m/m

5) Others
   Spare parts(for 2 years), repair tools, operation tools 1 set

On designing the above facilities, consideration has been made on such points as the relative easiness in obtaining the operational technology and on the low maintenance cost.

3. Truck

On Kosrae Island, the marine products will be collected from the coastal areas to Lelu. These

products will be later sold at inner areas. A truck will be used as a means of transportation.

Truck (only for Kosrae Island)		1 unit
Type	Diesel truck with hood, all-wheel drive	
Loadage		1 ton

Note: Since marine products are packed in insulated fish boxes and the transportation time is short, refrigerating cars are not necessary.

V-3. Plan of Basic Design

1) Cargo Vessel:General Arrangement Plan 1/2

2) Cargo Vessel:General Arrangement Plan 2/2

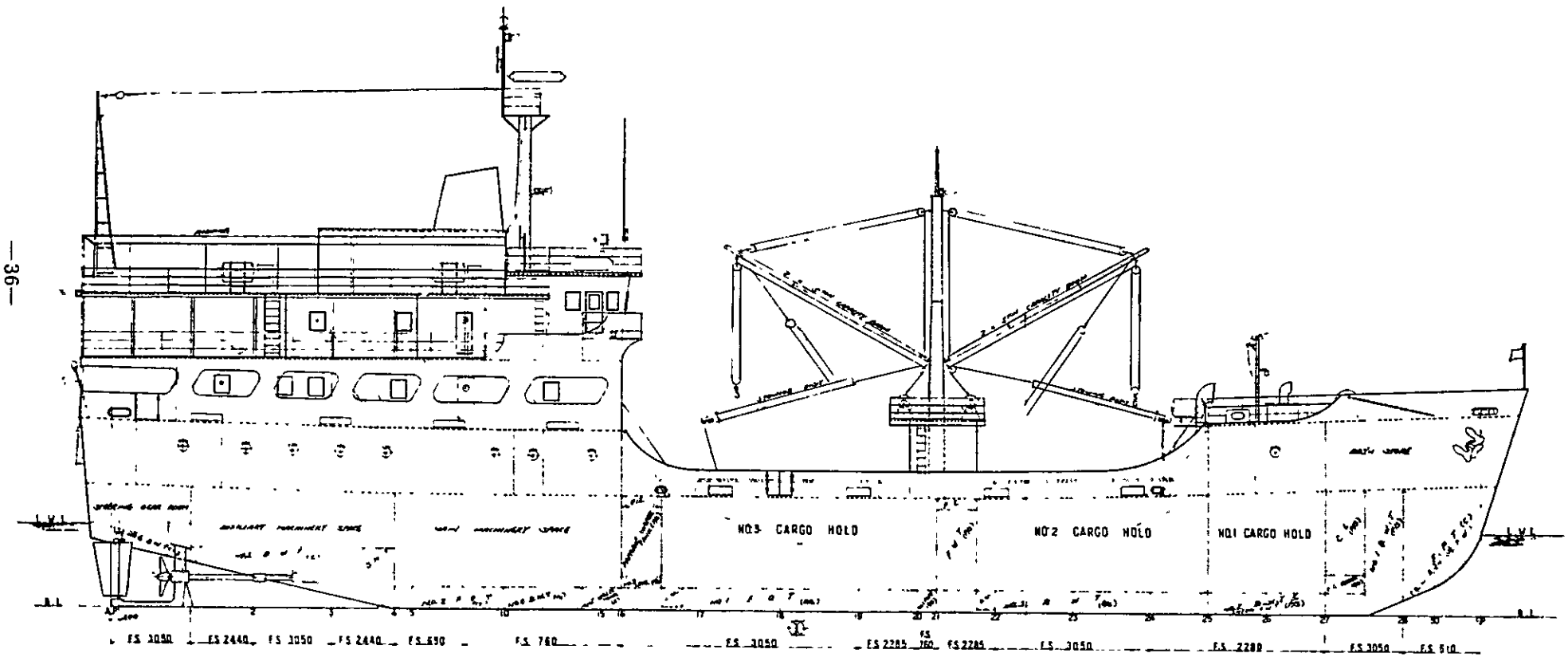
3) Refrigerating Facilities for the Cargo Vessel:Plan Port Side

4) Refrigerating Facilities for the Cargo Vessel:Plan Starboard Side

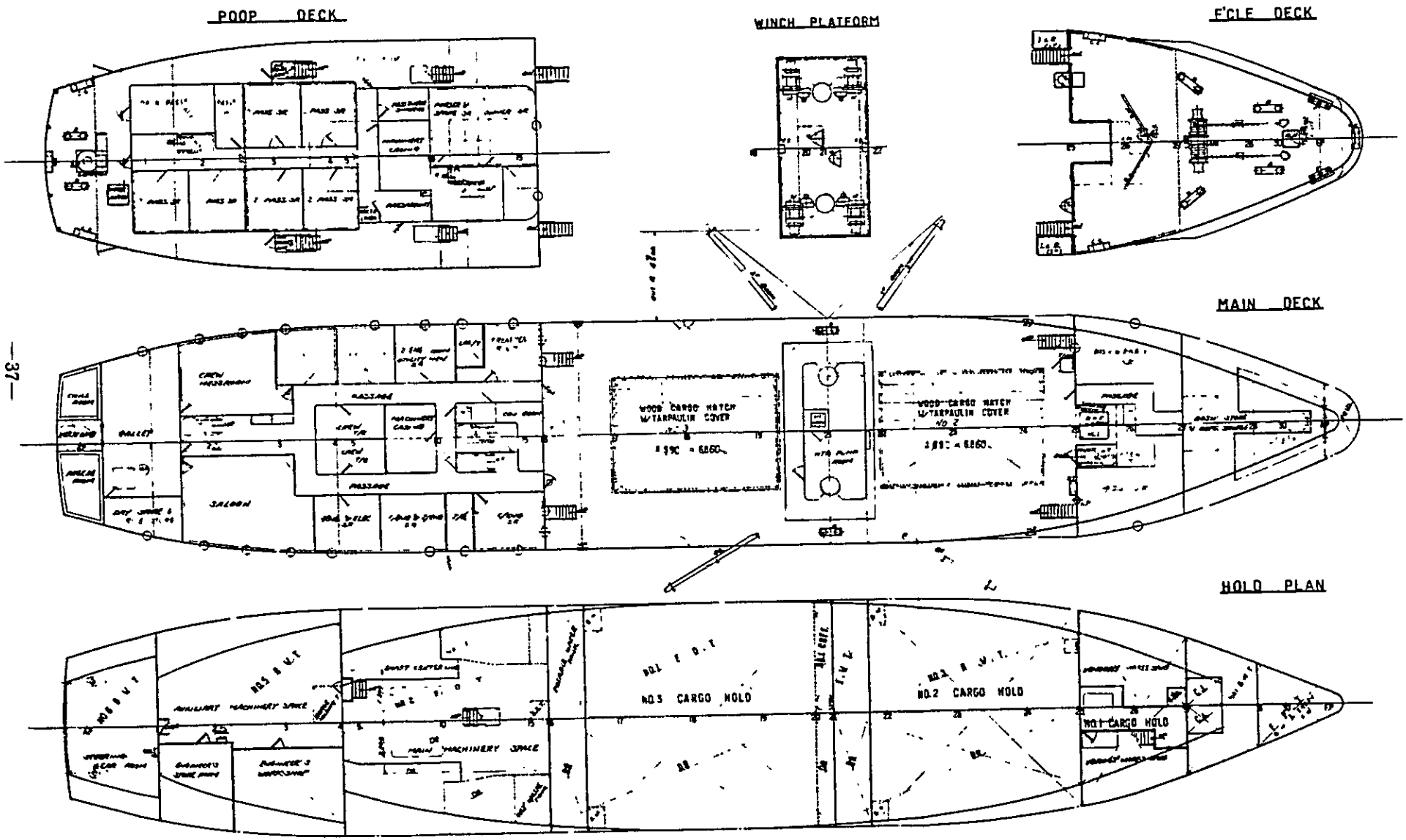
5) Refrigerating Facilities on Land:General Arrangement Plan

Tainian area
Lelu area

(1) Cargo vessel: General Arrangement Plan 1/2



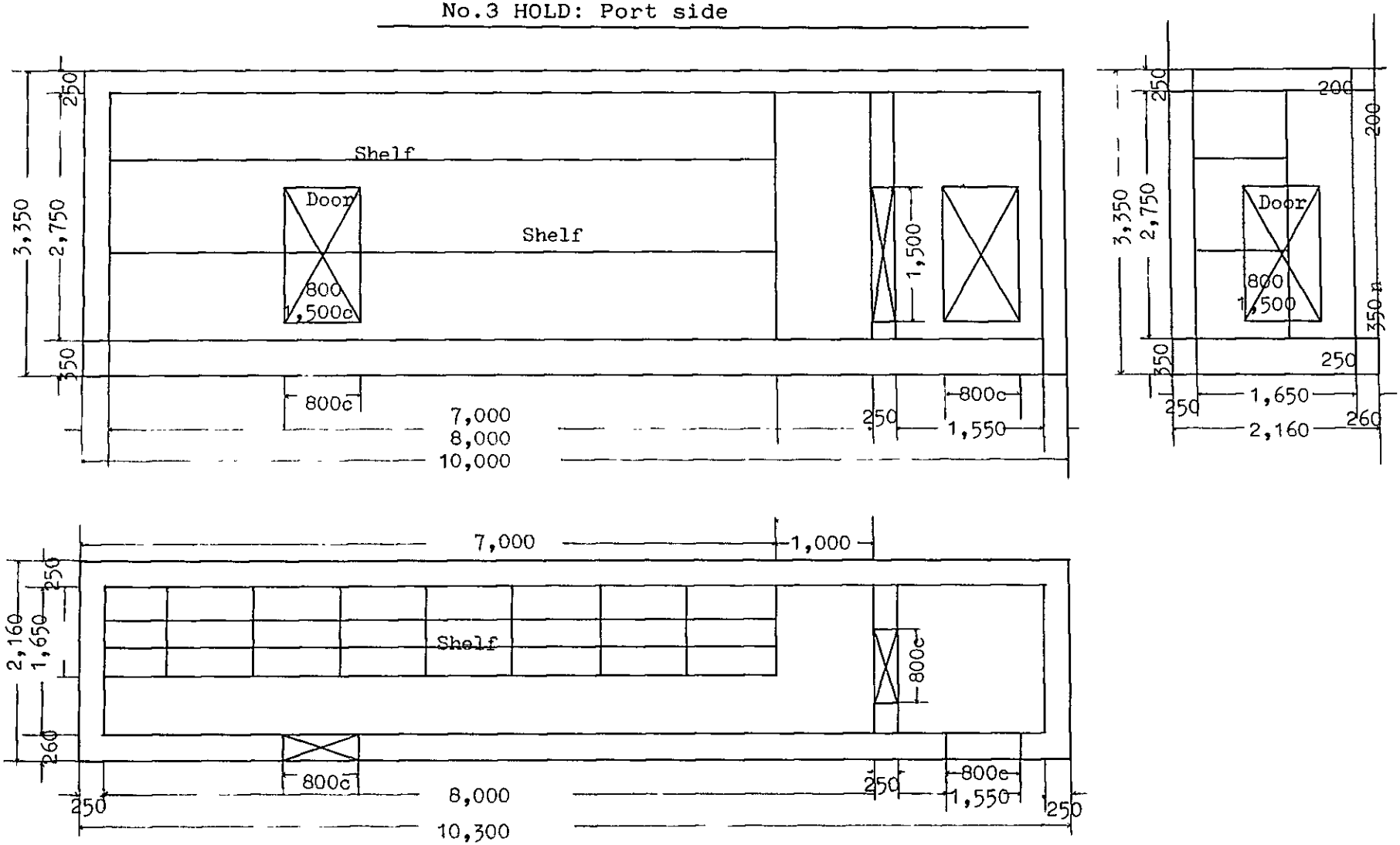
(2) Cargo vessel: General Arrangement Plan 2/2



(3) Cargo vessel:

Refrigerating facilities to be installed

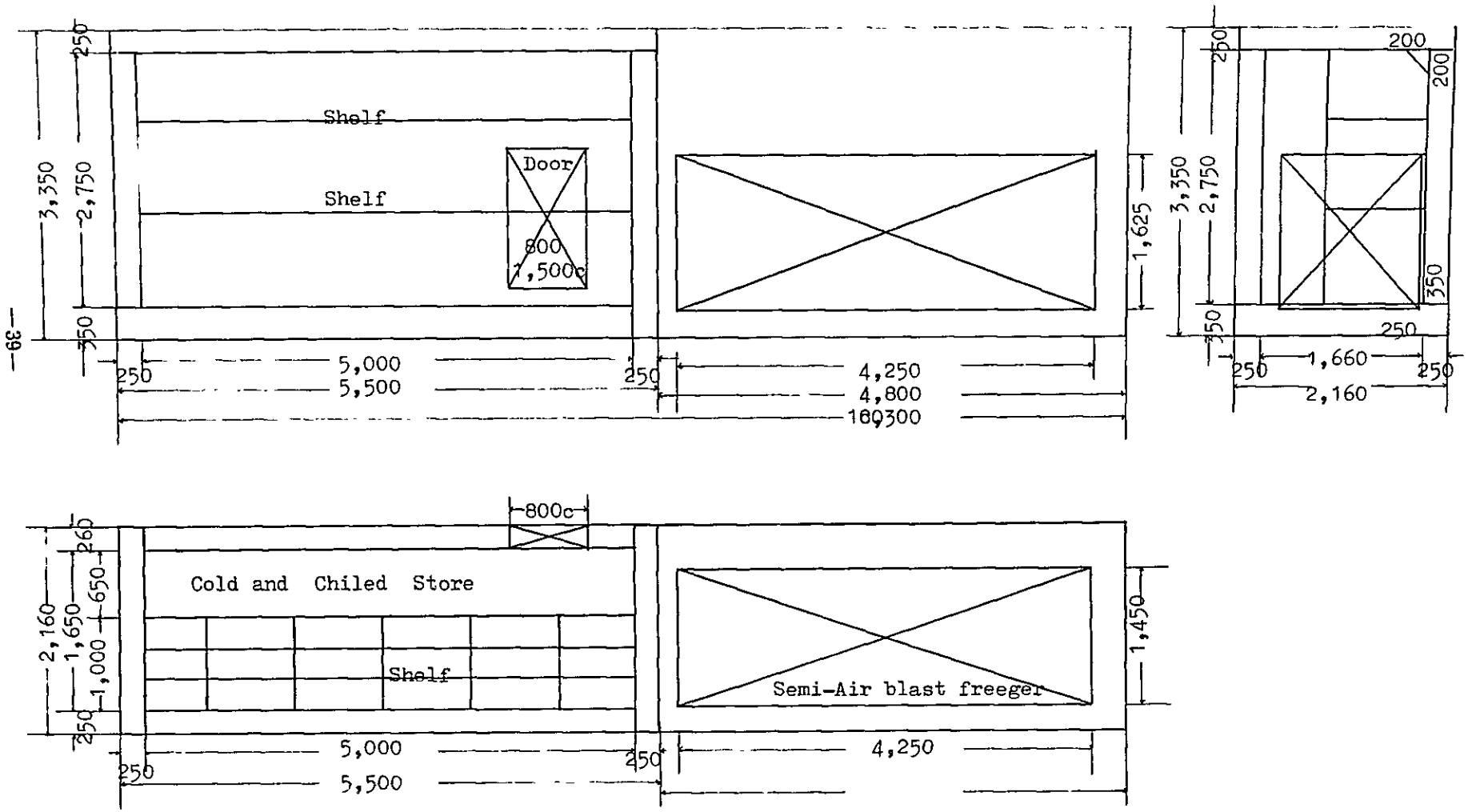
No.3 HOLD: Port side



(4) Cargo vessel:

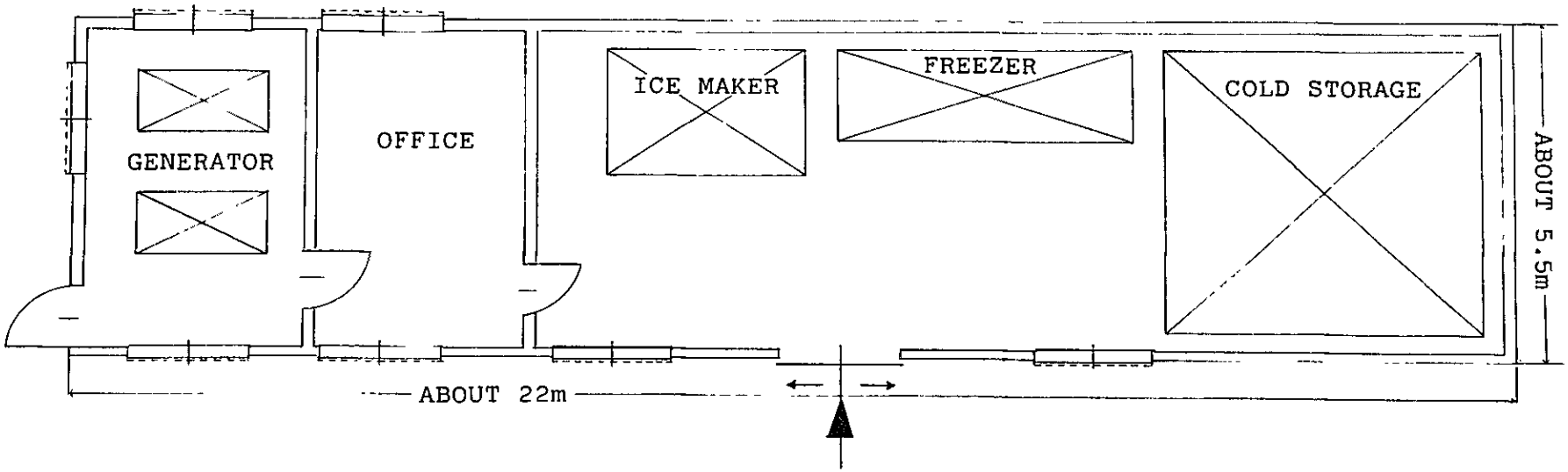
Refrigerating facilities to be installed

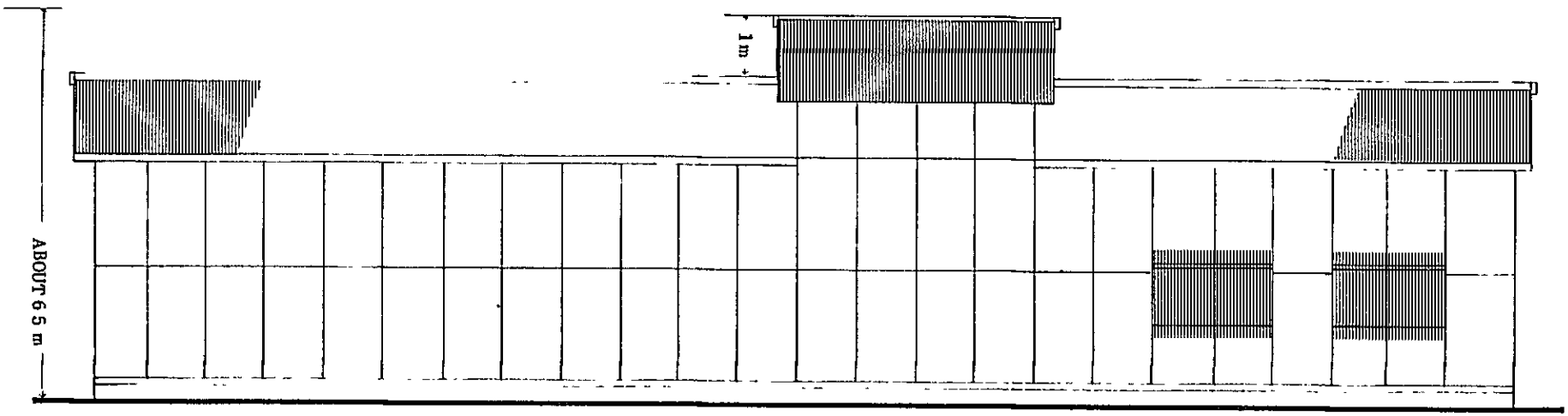
No.3 Hold: Starboard side



(5) Refrigerating facilities on land

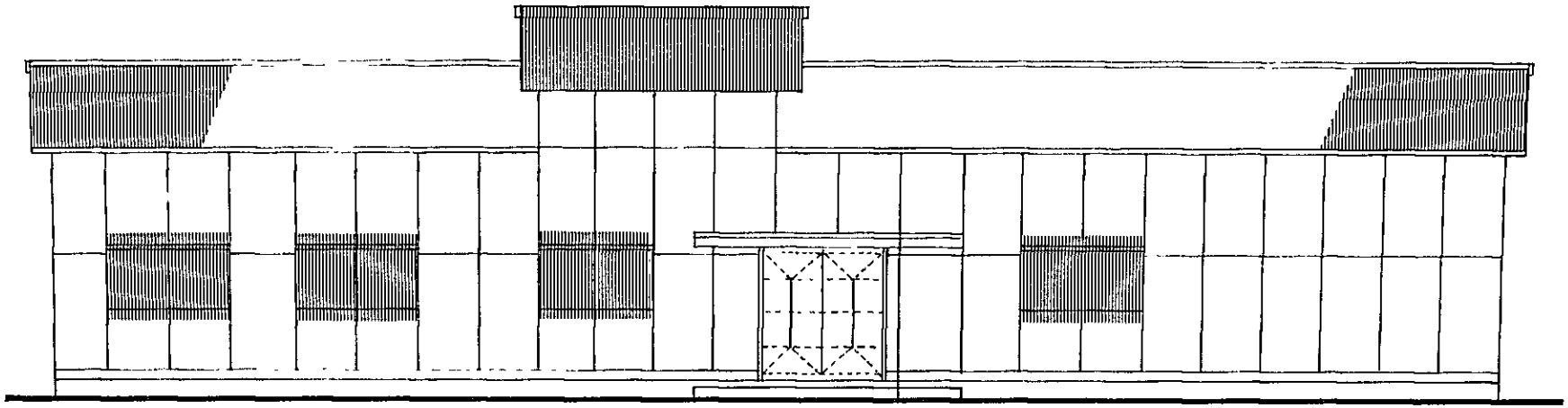
Tainiang

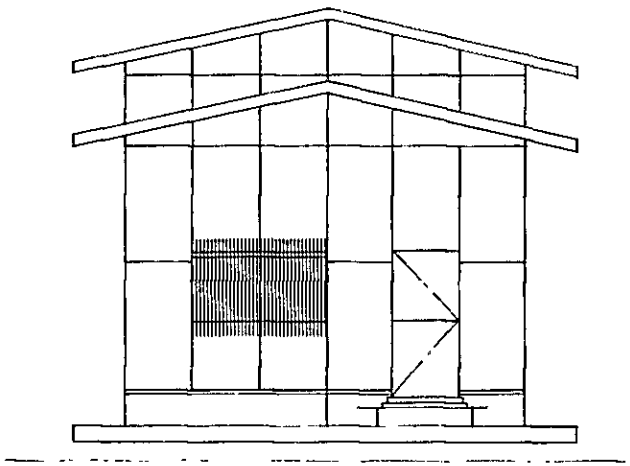


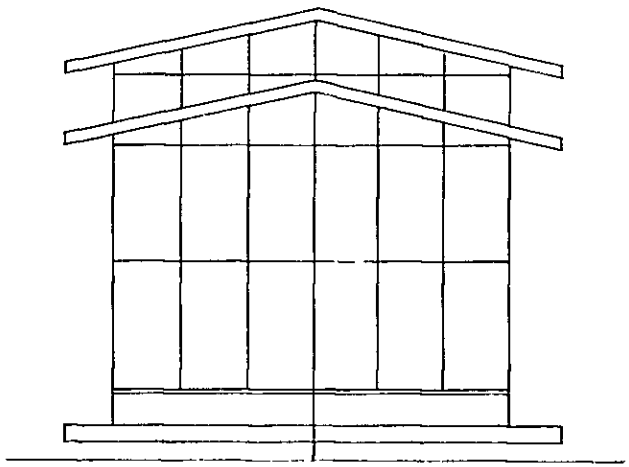


Refrigerating facilities on land

Tainiang:Plan of Elevation

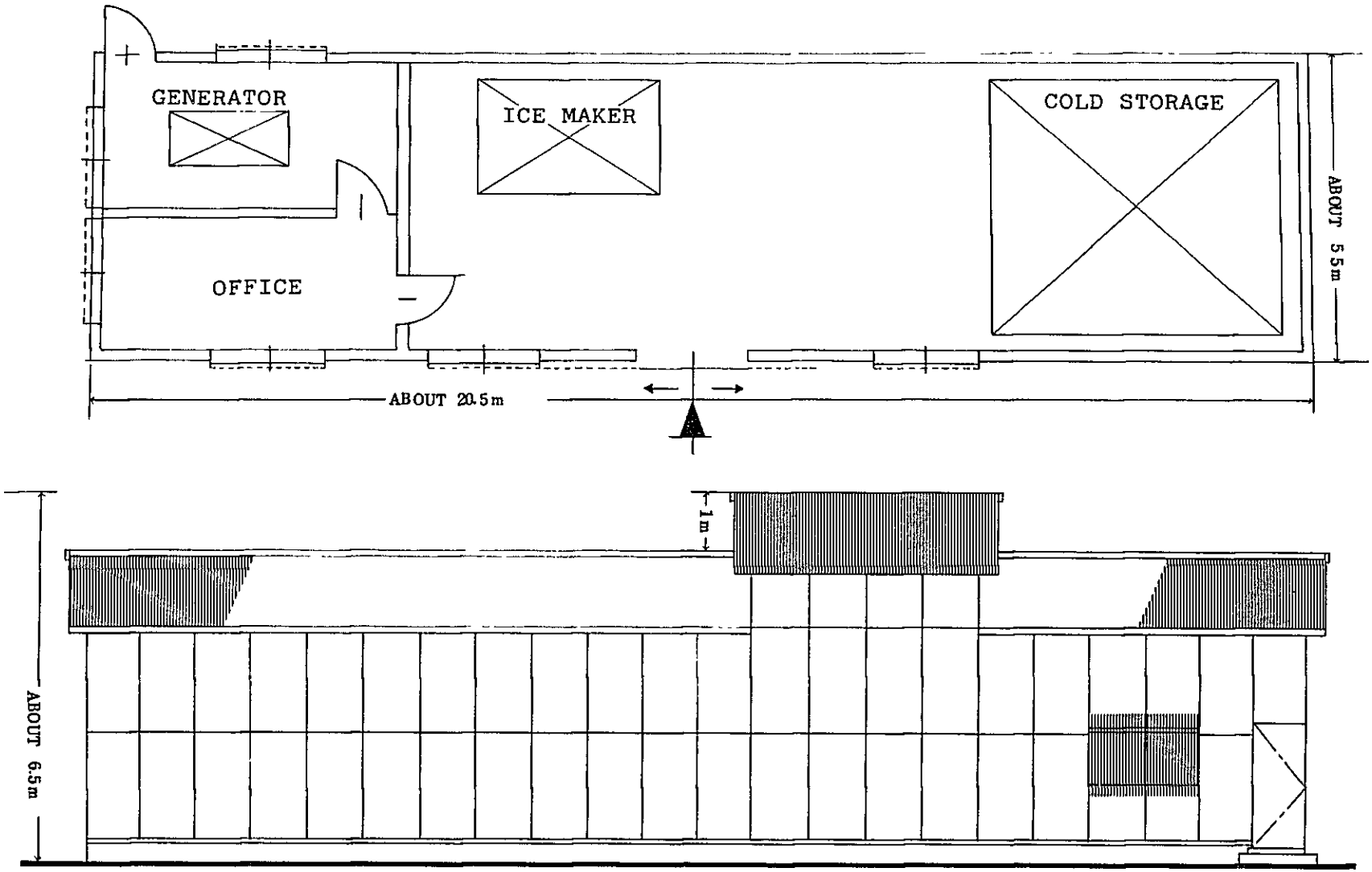






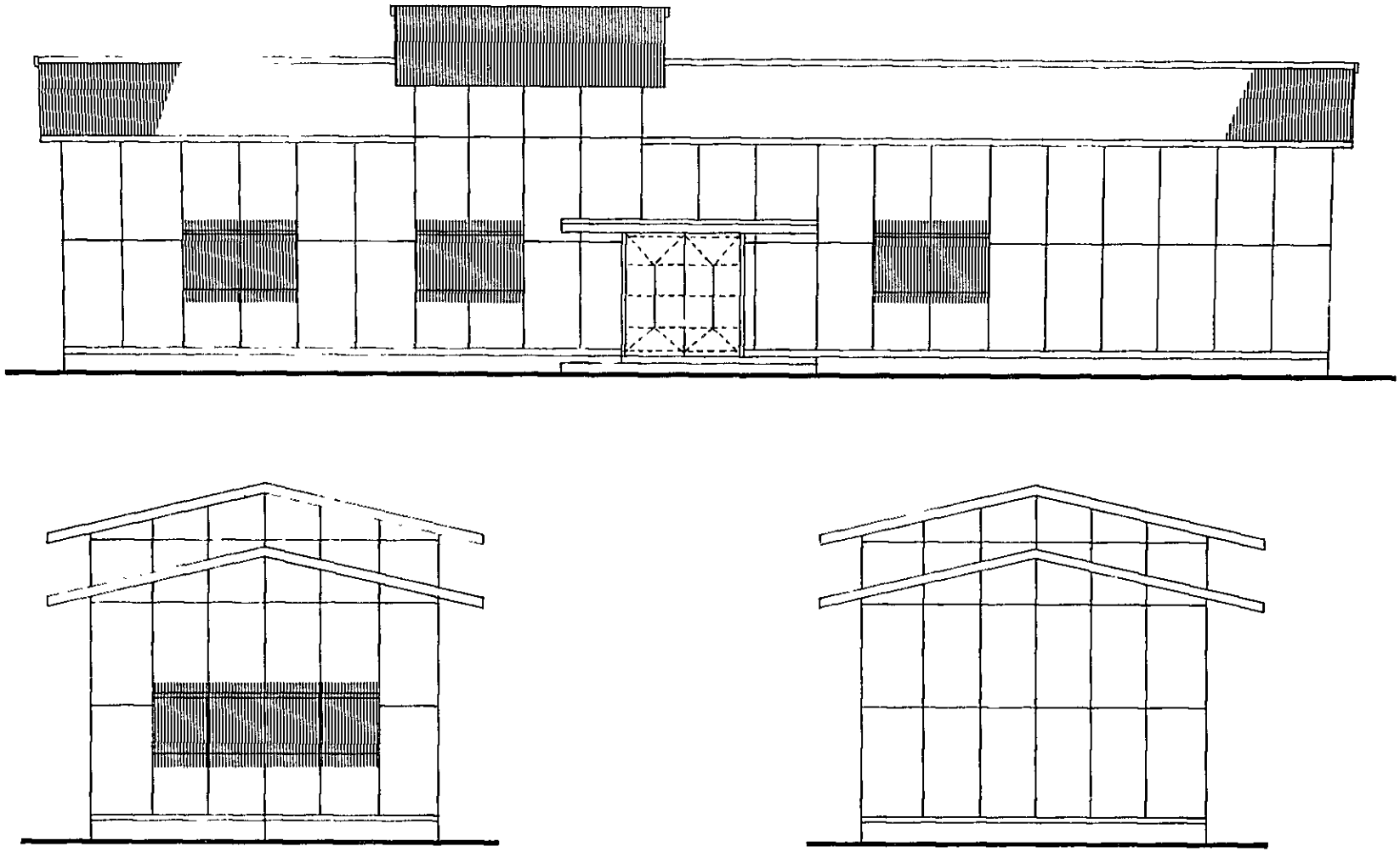
Refrigerating facilities on land

Lelu



Refrigerating facilities on land

Lelu:Plan of Elevation



V-4. Estimate of Expenses

1) Condition of estimation

(1) Estimate as of January, 1982.

(2) Ice storages for vessels are installed while the cargo vessels are docked and repaired in Japan. The Japanese side will bear the expenses necessary for installation, materials and parts.

(3) Materials and parts for refrigerating facilities on land, and the truck are all principally made in Japan. Their packing costs,shipping charges (from Japan to each main island) and freight insurance costs are included in the estimate of expenses. Import taxes in Micronesia on these materials, parts and truck are to be exempted.

(4) Truck will be delivered at the port of each main island.

(5) With regard to refrigerating facilities on land, construction expenses are included in the estimate. However, materials and parts are to be transported from each main island to each construction site by the Government of the Federated States of Micronesia.

2) Estimate of expenses

(thousand yen)

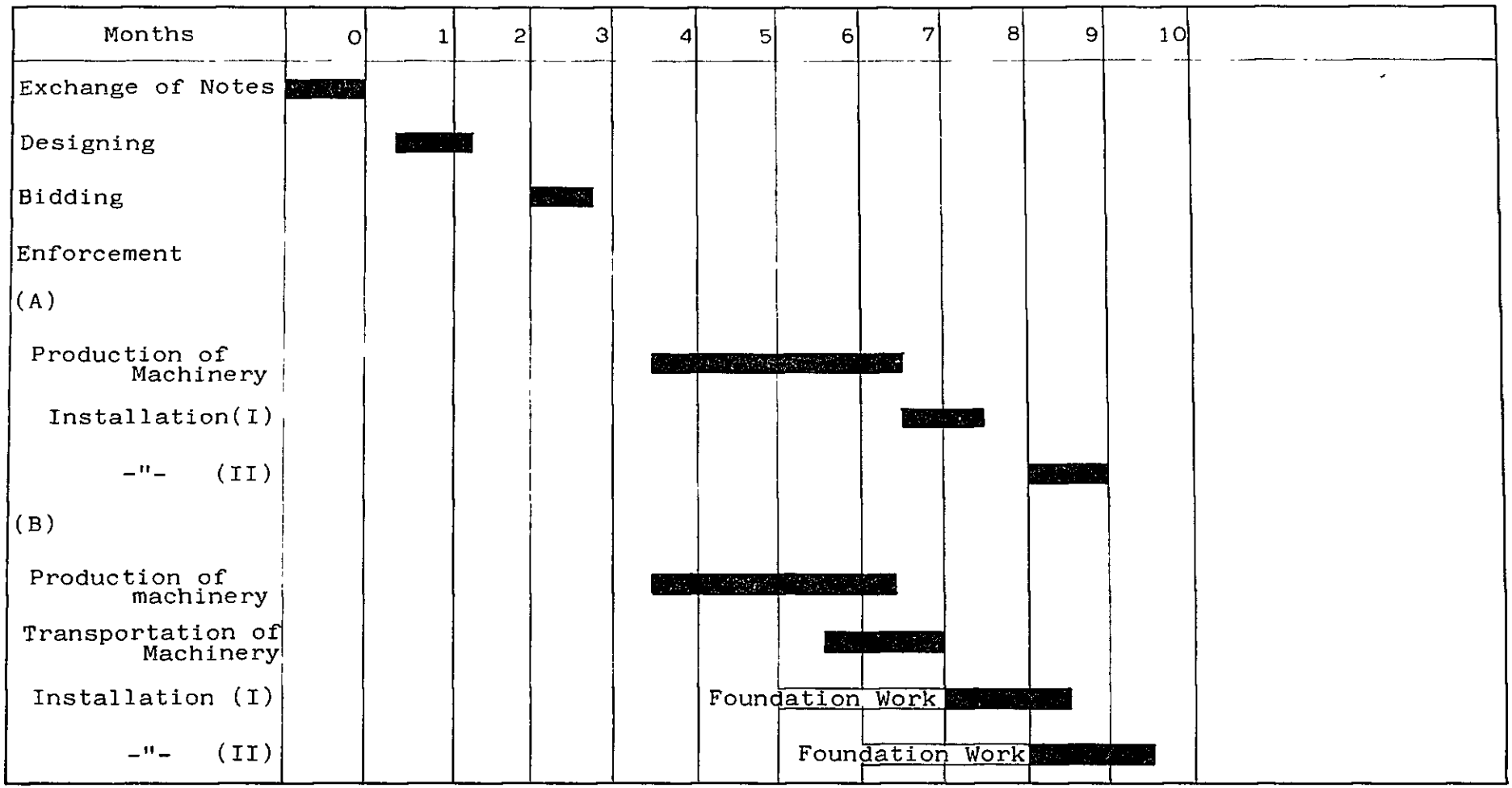
(1) Refrigerating facilities for vessels
(2) Refrigerating facilities on land
(3) Truck

Total of (1)-(3)
Designing fee and construction
supervising cost
Grand total

V-5. Process of Work

When this project is implemented, the following process of work may be planned:

Process of Work



Note : (A) indicates "Refrigerating facilities for cargo vessel".

(B) indicates "Refrigerating facilities on land".

Chapter VI: Maintenance and Management Plan

Maintenance and management plan of various materials and parts in this project is as follows:

1) Refrigerating facilities for vessels

Refrigerating facilities for vessels will be maintained and managed by each state government which operates the service by these vessels at present. The vessels run between the main islands and the outlying islands about once or twice a month to transport daily commodities. During this run, small freezers for provisions are always operated, so installation to be no problem technologically. These facilities can be satisfactorily operated under the present vessel maintenance and management system of each state government.

2) Refrigerating facilities on land, and truck

In Oneop Island, commercial fishing does not exist and therefore fishermen's union has not been organized, due to the small population and lack of proper transport facilities. Therefore the administrative organization on Oneop Island will take charge of the management of the refrigerating facilities under the guidance of either the National government or the State government.

Kosrae has a fishermen's union but it is not very active at moment. Therefore, these facilities will be managed by the state government for the time being. The Government of the Federated States of Micronesia has a plan to hire engineers trained in the United States of America or to shift the skillful crew of the vessels to be engineers for operating the refrigerating facilities. It would be more effective

if Japan is able to receive trainees and send technical experts.

3) The estimated balance regarding management of the facilities.

The administrative organization of Oneop Island and the Kosrae State Government will manage the refrigerating facilities on land, buy marine products from the fishing vessels and sell these products.

The State government will collect the marine products from the outlying islands and sell these products on the main island.

Estimation of income and expenditure for each refrigerating facilities is as follows:

1) Refrigerating facility on land (for each site per year)

	Item	Amount($)	Calculation Basis
Income	Sales of the products	278,160	Catch 60 kg x 200 days x 24 vessels =288,000kg (288,000kg - 60,000kg) x $1.22 = 278,160 Excluding the local consumption of 60,000kg
Expenditure	Cost of fish bought	159,600	228,000kg x $0.70
	Fuel cost	39,865	For generators on land 254 liter/day x 365days x $0.43
	Other oil	2,410	254 liter/day x 2 % x 365 days x $ 1.30
	Fishing gear cost	8,000	Cost for installing Payao
	Articles of consumption cost	4,000	
	Labor cost	21,000	7 men x $250/day x 12 months
	Repairing cost	12,500	Approx. 15% of main machinery price
	Depreciation	30,000	Equal rate of depreciation for 12 years $360,000 x 1/12 year
	Total	277,375	
Balance		785	

Note: Administrative organization in each island will bear the cost for setting and installing Payao.

2) Estimated income and expenditure (for each vessel per year)

	Item	Amount($)	Calculation Basis
Income	Sales of the products	8,400	30kg x 2 men x 200 days x $0.70
Expenditure	Fuel cost	980	3.8 liter/hr x 3hr/day x 200days x $0.43(main engine 25HP)
	Other oil	45	3.8 liter/hr x 3hr/day x 200days x 1.5% x $1.30
	Fishing gear and articles of consumption cost	400	Fishing gear for pole and line,etc.
	Repairing cost	1,000	Chiefly repairing cost of outboard engine
	Depreciation	700	$3,500 x 1/5 year
	Miscellaneous	200	
	Total	3,325	
*Fishery income produced		5,075	5,075 ÷ 2 ÷ 12 = $210

*Fishery income produced: Since the wages for household members cannot be decided, the balance after deducting the costs is called the fishery income produced.

3) Others

The cargo vessels run between the main islands and the outlying islands in order to transport the commodities. Marine products will be carried on these vessels on the way back to the main islands. In the main islands these marine products can be stored in the cold storage owned by public organizations.

If the cargo vessels buy the ice-preserved marine products from the outlying islands for $1.22 per kg and sell them for $1.44 per kg, the income per ton is $220 and the additional expenses such as land transportation cost and sales cost of marine products are considered to be fully recovered.

When this project is implemented effectively, the only expenses the Federated States of Micronesia has to bear are the expenses on internal transport of the materials for the facilities and foundation works. This project can be fully managed economically and technologically.

Chapter VII: Evaluation of the Project

The facilities to be provided this time have been designed to provide the basis of the general plan for fishery development and are considered to be practicable and economically effective. In order to improve the traditional fishery, it is indispensable to develop fishery in the outlying islands and to establish the transportation means so that marine products can be supplied to consuming areas. Installation of refrigerating facilities for vessels may produce satisfactory results for the outlying islands and consuming areas whether these islands and districts have refrigerating facilities or not. In other words even the outlying islands without these facilities can concentrate their fishing efforts according to the arrival of the cargo vessels and ship the fish cultured in the preserves. Assuming that 500 kg of marine products can be shipped each time, income at one site per year may be increased by U.S.$10,980.

500 kg x $1.22 x 18 times/year one site

Highly-valued marine products such as lobsters which are easy to preserve can also be shipped, and the income may be increased.

Annual copra export of the country (four main islands and about 70 outlying islands) amounts to approximately U.S. $3.0 million. Since the outlying islands have no other industry than copra production, the increase of income through fishing will greatly contribute to their economies. Although the income to be produced by refrigerating facilities on land is limited,(See Chapter VI, Table 1, Estimated balance of refrigerating facility on land), the installation of these facilities allows the establishment of commercial fishery on the outlying islands, the employment of 48 full-time

fishermen at each site of the facility, and the creation of a producers's income of approximately U.S.$ 120,000 per year. Consequently the nutrition and standard of living of the islanders may be improved. At present, the main islands import approximately U.S.$ 1.2 million of canned fish per year. However if the local fishing industry can replace the imported canned fish, foreign currency may be greatly saved. An increase of purchasing ability in the outlying islands also has an influence on other industries like agriculture. Since the Federated States of Micronesia has no other offshore resources than skipjack and tuna species, successful export of these marine products is the key to economic independence in the future. Success of this Project depends much on the efforts of the Federated States of Micronesia and at the same time affects the future economy of the country. In consideration of the above, a detailed plan should be made on the implementation of the project, and technical experts on freezing, electricity, fishery, etc. should be trained for the success of the project.

Chapter VIII: Recommendation and Proposal

Although the Federated States of Micronesia has an extensive water area with skipjack resources, commercial fishing activity is limited to the Truk State and several main islands. This is because fishing vessels and gear are insufficient, the outlying islands do not possess fishery- related facilities such as cold storages to store the catches in, and the means of transportation from outlying islands to consuming areas like the main islands are lacking. The Project of the Traditional Fishing and Nutrition Improvement in the Federated States of Micronesia is intended to improve such poor facility conditions and to develop the fishery.

At present, the country imports a lot of canned fish every year. Therefore, the fishery development is significant to attain self-sufficiency in marine products. Making fishing industry a key industry, fully independent, and later also an export industry may be meaningful to the Federated States of Micronesia.

Therefore it is desirable that Japan, which is a leading fishing nation and which has historically close relations with Micronesia, cooperate with that country to attain the Project of the Traditional Fishing and Nutrition Improvement. This would make the relations between the two countries even better.

In order to implement the Project more effectively, the Federated States of Micronesia should pay attention to the following points:

(1) Management of refrigerating facilities on land:

A fishing cooperative is already organized in the Lelu

area but it has not been functioning actively; at the Tainiang area a fishing cooperative has not yet been organized. It is necessary that a fishing cooperative is immediately organized and made active in order to ably manage the refrigerating facilities on land.
Three staff members at the clerical section and another three at the technical section will be required for the management of the facilities. In order to effectively manage the facilities and to make clear the responsibilities of each staff member it is necessary to detail the duty of each person so that the account books are properly kept and the stock of product and quality control are properly managed.

(2) Maintenance and repair of the refrigerating facilities on land:

Maintenance and operation techniques of the facilities to be granted are relatively easy to master. However, in order to operate the facilities more effectively, it is desirable to dispatch the trainees abroad, use the crew of existing cargo vessels, dispatch trainees to the main island of the Truk State, whose fishery is relatively active, and train them at the existing refrigerating facilities. Moreover, the invitation of technical experts from abroad to train the Micronesian people should be considered, until a system of maintenance for the facilities are established.

In the Federated States of Micronesia, especially in the outlying islands, it is difficult to obtain repair parts immediately because of geographical location. Therefore it is necessary to secure the spare parts and parts for repair and have them on hand at all times by taking inventory so as not to impede the operation of the facilities.

When giving aid to the Project, the Japanese side should have in mind the dispatch of technical experts and acceptance of trainees.

The Federated States of Micronesia is in short supply of technical experts. Therefore, in order to implement the Project effectively and make good use of the granted facilities, it is desirable to dispatch technical experts from Japan and accept trainees from the Federated States of Micronesia so that technical aid can be given continuously.

APPENDIX

1) Schedule of Survey

Month	Day	Day of Week	Outline of Activities
Dec.	7	Mon.	Arrived at Ponape 19:15 by CO Flight 618.
Dec.	8	Tues.	Discussed with the National Government's Officials. Visited Ponape Fish Market.
Dec.	9	Wed.	Left Ponape 07:30 and arrived at Kosrae 10:00. Paid courtesy call to the Governor of the Kosrae State. Discussed with the Government's Officials of the Kosrae State.
Dec.	10	Thurs.	Surveyed the site for the construction of the cold storage. Visited the cold storage and the power station owned by the Kosrae State Government. Discussed with the Government's Officials of the Kosrae State.
Dec.	11	Fri.	Discussed with the Government's Officials of the Kosrae State. Left Kosrae 10:30 and arrived at Ponape 12:00. Discussed with the Government's Officials of the Yap State.

Dec.	12	Sat.	Discussed with the Government's Officials of the Ponape State. Visited the Takatik Dock. Surveyed the fishing situation of the outlying island of the Ponape State. Visited M/S"Micro Glory".
Dec.	13	Sun.	Left Ponape 14:30 by CO Flight 617 and arrived at Truk 15:30. Boarded 17:05 on M/S "Micro Trader" for Oneop Island of Mortlock Islands.
Dec.	14	Mon.	Arrived at Oneop Island 15:00. Surveyed the site for the construction of the cold storage. Boarded on M/S "Micro Trader" and left Oneop Island 19:30.
Dec.	15	Tues.	Arrived at Truk 21:45.
Dec.	16	Wed.	Paid courtesy call to the Governor of the Truk State. Discussed with the Government's Officials of the Truk State. Visited the Public Water Pools and Fish Market. Left Truk 15:00 by CO Flight 616 and arrived at Ponape 17:30. Analyzed the result of survey and studied the facilities to be granted.

Dec.	17	Thurs.	Presented the Draft Minutes. Discussed with the National Government's Officials.
Dec.	18	Fri.	Exchanged the Minutes.
Dec.	19	Sat.	Surveyed the outlying islands of the Ponape State.
Dec.	20	Sun.	Surveyed the outlying islands of the Ponape State.
Dec.	21	Mon.	Analyzed the collected documents and information materials.
Dec.	22	Tues.	Left Ponape 14:55 by CO Flight 617.

2) MINUTES OF DISCUSSIONS

In response to the request made by the Government of the Federated States of Micronesia for the Project of the Traditional Fishing and Nutrition Improvement in the Federated States of Micronesia (hereinafter referred to as "the Project"), the Government of Japan has sent, through the Japan International Co-operation Agency (hereinafter referred to as "JICA"), a team headed by Mr. Noriharu Nakamura to conduct a basic design survey for 16 days from 7th December, 1981. The team had a series of discussions and exchanged views with the authorities concerned.

As the result of the study and discussions, both parties have agreed to recommend to their respective Governments to examine the results of the survey attached herewith towards the realization of the Project.

18th December 1981

Noriharu Nakamura

Mr. Noriharu Nakamura
Team Leader
The Japanese Survey Team

Mr. Pedro Harris
Chief of Planning
Office of Planning & Statistics
Federated States of Micronesia

MINUTES

1. The proposed ships of the Project will be "Micro Spirit and "Micro Glory". And the proposed sites of the Project will be Kosrae (Lelu) and Oneop (Tainiang) hereinafter referred to as "the Project Ships and Sites).

2. The object of the Project is to provide necessary cold storage facilities and equipment for the Traditional Fishing and Nutrition Improvement Program and in the Project Ships, and at the Project Sites.

3. The Japanese Survey Team will convey to the Government of Japan the desire of the Government of the Federated States of Micronesia that the former takes necessary measures to co-operate in implementing the Project and provides the cold storage facilities and equipment listed in Annex I within the scope of Japanese economic co-operation in grant form.

4. The Government of the Federated States of Micronesia will take necessary measures, in the event that the grant assistance by the Government of Japan is extended to the Project-

   (a) to provide data and information necessary for the design and the installation of the cold storage facilities.

   (b) 1. to secure space in the Ships necessary for the installation of the cold storage facilities.
       2. to secure land at the Site for the installation of the cold storage facilities.

   (c) 1. to clear and keep the safety condition in the Ships while the installation works are being conducted.
       2. to clear and level the Sites before the start of the installation.

   (d) to schedule the dry docking of the Micro Spirit and the Micro Glory in Japan to allow the installation of cold storage facilities on both ships. Such scheduling shall be between August 1982 and January 1983.

(e) to provide the other items listed in Annex II.

(f) to ensure prompt unloading and customs clearance in the Federated States of Micronesia of imported materials and equipment related to the installation of facilities, and to facilitate their internal transport from discharge points at Baker Dock, Moen, Truk State and at Lelu Dock, Kosrae State.

(g) to exempt the Japanese nationals concerned from customs duties, internal taxes and other fiscal levies imposed in the Federated States of Micronesia for the supply of goods and services for installations.

(h) to provide and accord necessary permissions, licenses and other authorization deemed advisable for carrying out the Project.

(i) to arrange lodgings for the Japanese nationals concerned for the supply of goods and services for installations.

ANNEX I

Items requested by the Government of the Federated States of Micronesia, the cost of which will be borne by the Government of Japan-

1) Ships (Micro Glory and Micro Spirit)
   (a) Cold and chilled storage.
   (b) Installation of said cold and chilled storage

2) Sites
   A. Kosrae (Lelu)
      (a) Cold storage
      (b) Ice Maker
      (c) Generator
      (d) Truck
      (e) Installation of said cold storage, ice maker, and generator
      (f) Others

   B. Oneop (Tainiang)
      (a) Cold storage
      (b) Freezer
      (c) Ice Maker
      (d) Generators
      (e) Installation of said cold storage, freezer, ice maker, and generator
      (f) Others

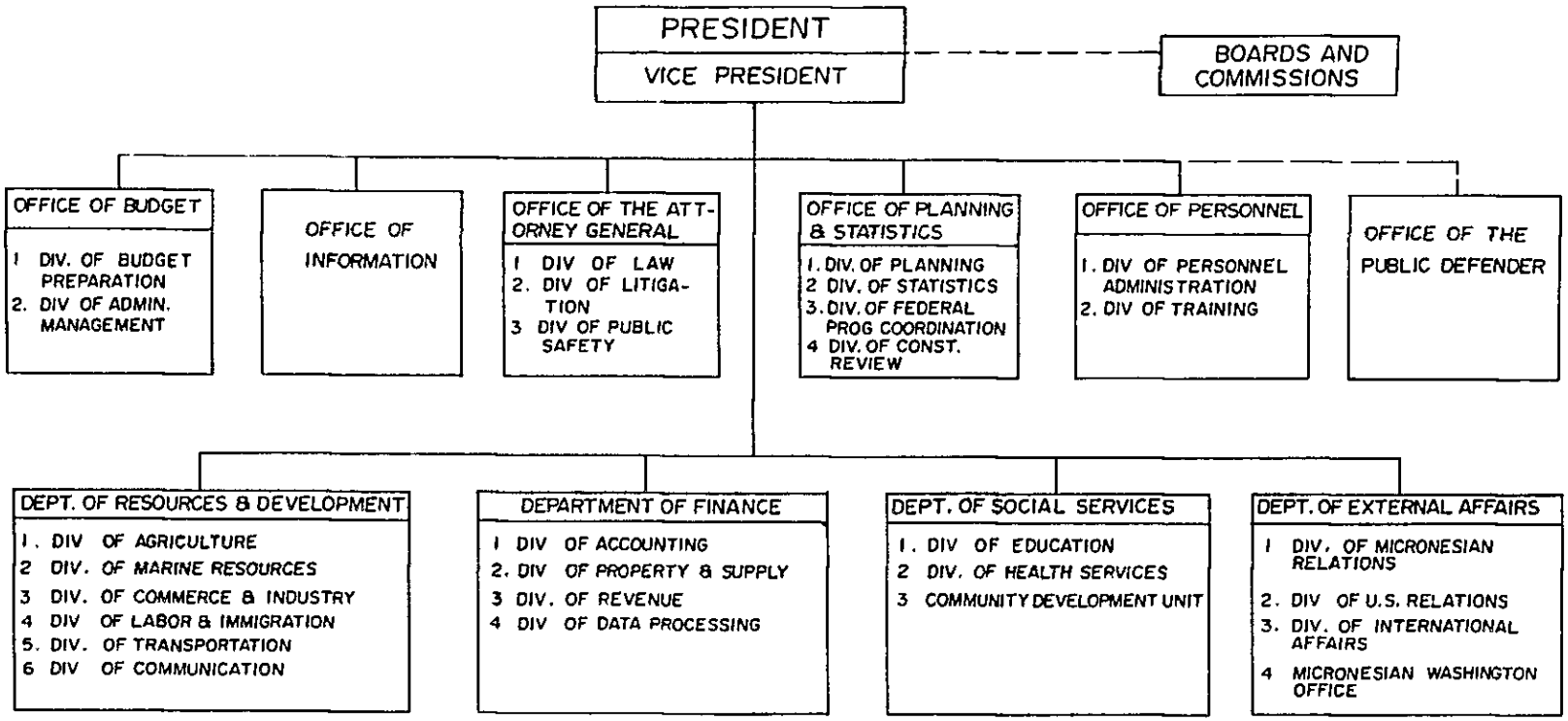
ANNEX II

Items the cost of which will be borne by the Government of the Federated States of Micronesia.

(1) Water supply mains to the Project Sites
(2) Electrical power main line to the Project Sites.
(3) Exterior facilities like access road, fencing, parking and landscaping.
(4) Provision of space necessary for such installation as working area, stock yards and others.
(5) Internal transport
(6) Mooring
(7) Foundation works at the Sites
(8) Taking the Ships to Japan and other related expenses while staying in Japan
(9) Item (1) and (2) shall be completed prior to the start of site works.
(10) Item (1) and (2) not applied for the site at Oneop

3) ORGANIZATION OF THE EXECUTIVE BRANCH

FEDERATED STATES OF MICRONESIA



REF: PRESIDENTIAL ORDER No 1, DATED JANUARY 9, 1980 AND PUBLIC LAW No 1-6

TOSIWO NAKAYAMA, PRESIDENT OF THE FEDERATED STATES OF MICRONESIA

4) List of Government Officials of the Federated States of Micronesia

National Government

1. Chief, Div. of International Affaires, Dept. of External Affaires:	Masao Nakayama
2. Chief of Planning, Office of Planning & Statistics:	Pedro Harris
3. Staff, Dept. of Resources & Development	Edgar Edwards
4. -ditto-	Robert Weilbacker
5. -ditto-	Mathias J. Ewarmai
6. Deputy Chief, Multilateral Affaires, Dept. of External Affaires:	Jess Raglamar

Yap State Government

General Manager, Yap State Fishing Authority:	Addison Hayes

Truk State Government

1. Director, Dept. of Resources & Development:	Redley Killion
2. Assistant Director & Project Analyst, Dept. of Resources & Development:	Roger Mori

3. Project Coordinator of Dublon Fisheries Complex, Dept. of Resources & Development: Stanley Weinberg

4. State Planner, Dept. of Resources & Development: Dean Berggren

Ponape State Government

1. Director, Dept. of Resources & Development: Herman Semes

2. Executive Director, Ponape Economic Development Authority: Elliot Rosenberg

Kosrae State Government

1. Director, Dept. of Resources & Development: Gerson Jackson

2. State Economic Director, Dept. of Resources & Development: Lewis S. Brooks

5) Bibliography

1. "Quarterly Bulletin of Statistics, Trust Territory of the Pacific Islands, Vol.III Number 2, 1980"
   Office of Planning & Statistics, Office of the High Commissioner, Saipan, Mariana Is. 96950

2. "1980 Trust Territory of the Pacific Islands, October 1, 1979 to September 30, 1980"
   Department of State, United States of America

3. "Political Development in Micronesia"
   Daniel T. Hughes, Ohio State University Press, Columbus, 1974

4. "Eastern Caroline"
   John L. Fischer, Human Relations Area Files Press, New Haven, Connecticut, 1970

5. "Development of a Tuna Fishing and Processing Complex, Dublon Island, Truk District, Eastern Caroline Island, Trust Territory of the Pacific Island: A Feasibility Study"
   Living Marine Resources Inc. Dec. 15, 1976

6. "Truk Fisheries Complex, Preliminary Design Report"
   Daniel, Mann, Johnson & Mendenhall, Los Angeles, California. March 1979

7. "Statistical Yearbook"
   Truk State,Federated States of Micronesia

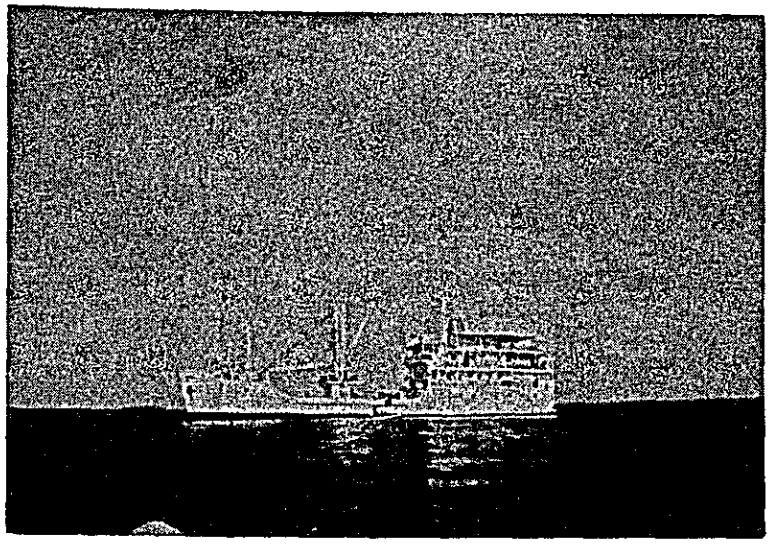
8. "L.B. No.382 & No.444"
   Ponape State Economic Development Authority

9. "Fisheries (Draft)"
Department of Resources & Development, Kosrae State,
Federated States of Micronesia

10. "The National Union"
Oct. 1, 1980 - Nov. 30, 1981

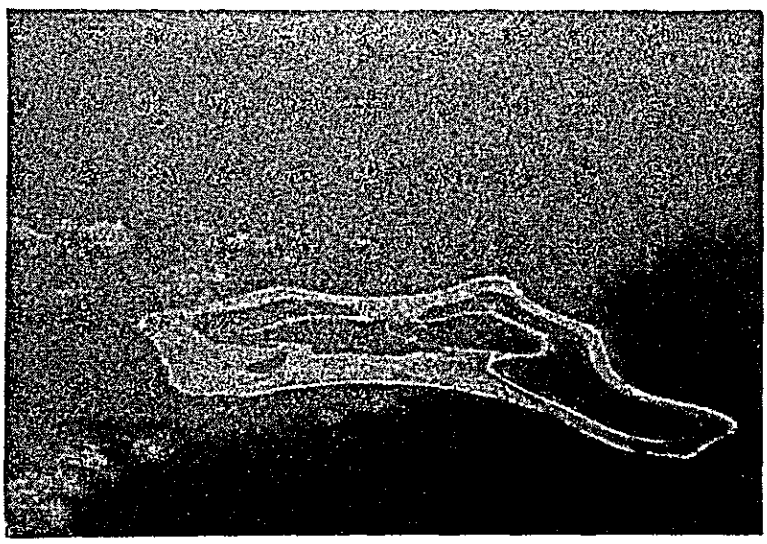
11. "Draft Compact of Free Association"

12. "Constitution of the Federated States of Micronesia"



Cargo vessel "M/S Micro Trader"

Port of Moen, Truk State

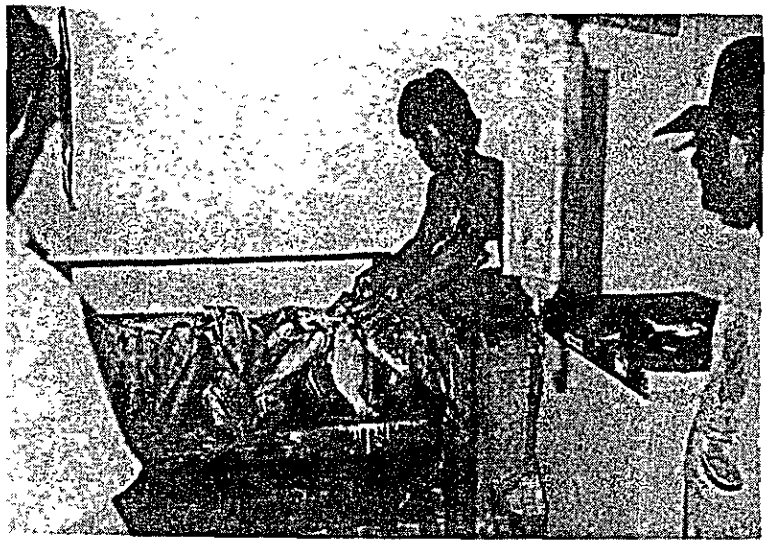


Pingelap Atoll, Ponape State

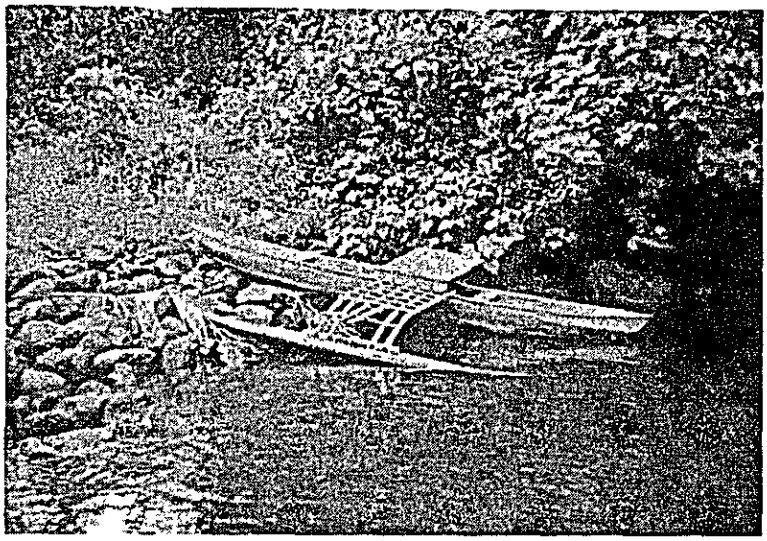
Project site for installing refrigerating facilities on land Lelu, Kosrae State(right in the middle, not reclaimed yet)

Outrigger canoe under construction(Oneop Island)

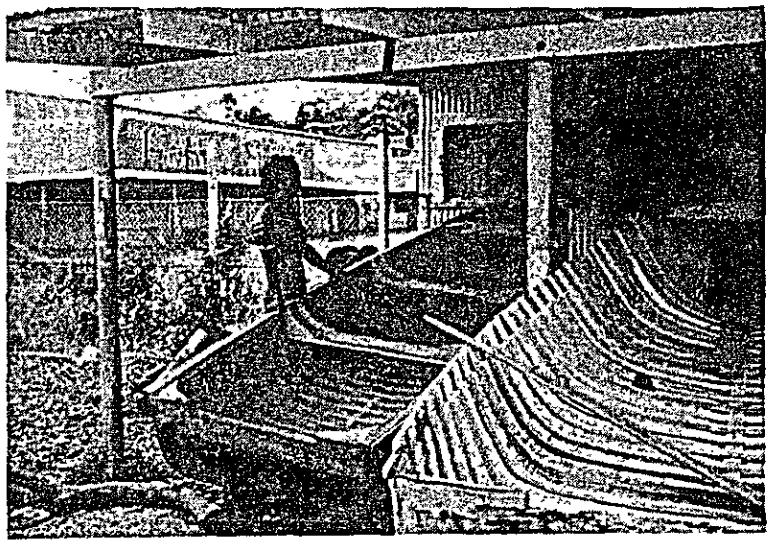
Project site for installing refrigerating facilities on land: Tainiang, Oneop Island, Truk State(right side in the middle)



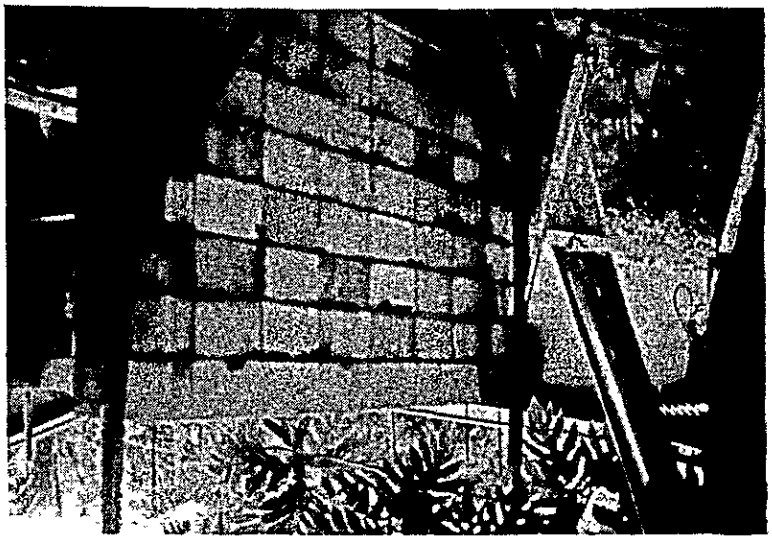
Fish market, Ponape State



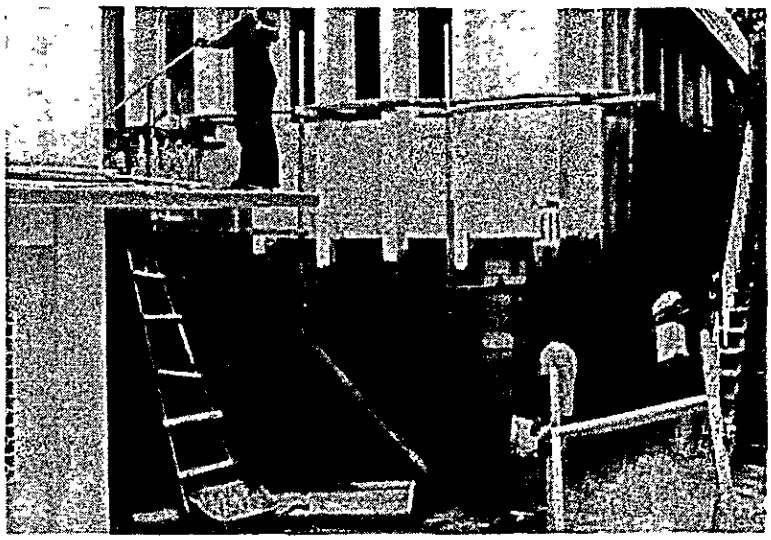
Outrigger canoe



Wooden boat under construction(Ponape State)



Private house under construction(Ponape State)



Building of the National Government
under construction(Ponape State)

Repair shop for outboard engine(Ponape State)