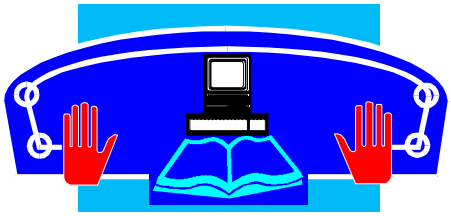


Pangnirtung Winter Turbot Fishery
Type of Study: Analysis/review Fisheries, Baffin General
Date of Report: 1988
Author: Canadian Fishery Consultants Limited
Catalogue Number: 3-3-9

3-3-9
CS

REPORT

ON

PANGNIRTUNG WINTER TURBOT FISHERY

FOR

THE GOVERNMENT OF THE NORTHWEST TERRITORIES

ECONOMIC DEVELOPMENT AND TOURISM

IQALUIT, N.W.T.

BY

CANADIAN FISHERY CONSULTANTS LIMITED

MAY 1988

CANADIAN FISHERY CONSULTANTS LIMITED

P.O. BOX 8732, STATION A - HALIFAX, NOVA SCOTIA, CANADA B3K 5M4
(902) 422-4698 TELEX 019-21839 (CANMAR HFX.) FAX (902) 422-8147

May 25, 1988

Government of Northwest Territories
Economic Development & Tourism
P.O. Box 1000
Iqaluit, Northwest Territories
X0A 0H0

Attention: Mr. Larry Simpson, Economic Development Officer

Re: Contract No, SC257450

Dear Mr. Simpson:

We are pleased to enclose five copies of our Final Report on the Pangnirtung Winter Turbot Fishery.

We have included data collected on the fishery through to 14 April 1988.

The total catch in 1988 exceeded 30,000 lbs. (round weight).

As a trial fishery, the project was a success in that substantial gains were made in productivity and in improved methods in the plant and on the ice. In addition, products received excellent reports in the markets in terms of quality.

Our analysis of a proposed new plant uses assumptions based on further increased productivity in the fishing operation and a more suitable processing facility located in Pangnirtung. The plant will have a capacity of 6,000 lbs. per day of raw material (head off and gutted weight).

We thank you for the opportunity of working with you.

Yours very truly,

CANADIAN FISHERY CONSULTANTS LIMITED

Donald A. Fraser, P.Eng.
President
/ap
Enclosures
Cc. Mr. Syd Kirwan

PANGNIRTUNG WINTER TURBOT FISHERY

TABLE OF CONTENTS

	PAGE
FOREWORD	
1.0 INTRODUCTION	1
2.0 BACKGROUND	3
2.1 Resource Size and Quotas	4
2.2 Existing Processing Infrastructure	4
3.0 TERMS OF REFERENCE	5
4.0 WORK PROGRAM	6
5.0 DISCUSSIONS	10
5.1 Existing HTA Processing Plant	10
5.1.1 Description	11
5.1.2 Recommended Improvements	12
5.2 Fishing Operations	16
5.3 Processing Operations	20
5.3.1 Methods Used	20
5.3.2 Products	27
5.3.3 Quality Control	29
5.4 Turbot Markets	30
5.5 "Micro" Economic Evaluation	33
5.5.1 Harvesting	34
5.5.2 Processing	39
5.5.3 Assumptions	
5.6 Economic Viability	43
5.6.1 General	43
5.6.2 Cost Estimate (1988 Values)	46
5.6.3 Economic Evaluation	46
6.0 CONCLUSIONS and RECOMMENDATIONS	49
6.1 Proposed Improved Fishing Method	50
6.2 Other Recommendations	53

PANGNIRTUNG WINTER TURBOT FISHERY

TABLE OF CONTENTS (cent'd.)

APPENDICES

APPENDIX A - TERMS OF REFERENCE
APPENDIX B - LIST OF PEOPLE CONTACTED
APPENDIX C - FIRST DFO PLANT INSPECTION REPORT
APPENDIX D - APPLICATION FOR DFO PLANT REGISTRATION & RELATED CORRESPONDENCE
APPENDIX E - 1988 DFO PLANT INSPECTION REPORT
APPENDIX F - INVENTORY OF EXISTING PLANT
APPENDIX G - PLANT UTILITIES AND COSTS
APPENDIX H - MARKET PRICES FOR FROZEN TURBOT 1983-1988
APPENDIX I - LETTER FROM "LES ALIMENTS AUFFREY FOODS" DATED APRIL 22, 1988
APPENDIX J - SITE LOCATION PLAN - PROPOSED NEW FISH PLANT

FOREWORD

The 1988 winter turbot fishery did not proceed exactly according to plan. The Fishery was late starting (not until March) and quantities caught were less than anticipated due to unusual ice conditions; which changed the fishing grounds. (The best fishing grounds which were identified in previous years were not accessible in 1988.)

As of 31 March 1988 the HTA processing facility had not worked one full day processing fish. The largest quantity of fish landed at the plant for one day was 2565 pounds (head off and gutted weight). This was all processed by 2:00 p.m. Incentive system standards were impossible to set due to spasmatic and inadequate landings.

Other problems prevented the collection of meaningful productivity rates. The skinning machine which was ordered as one of the measures to improve productivity was late arriving on site. Once on site, an electrician could not be hired in time to make the necessary electrical connections before the end of the fishery. Use of the skinning machine is expected to increase productivity and yield for the plant; both very important factors in determining viability.

Training of plant workers began on 3 March 1988, with the first landings of fish. Trials on a motorized hydraulic hauler were carried out by the fishermen during the project. New methods and

new processes require time for the fishermen and plant workers to learn. productivity was increasing throughout the period. Average landings at the plant were less than 500 lbs. per day for the first two weeks of March and for the period of March 31 to April 14, average landings increased to 1335 pounds per day.

Interest and fishing productivity increased as the project proceeded. Initially only six fishermen (three groups of two fishermen) were fishing. Towards the end of the project (early April. 1988) the number of fishermen had increased to fourteen. Other training programs were running concurrent with the turbot fishery such as survival training and traditional hunting methods. These programs are designed to encourage the traditional skills and culture to be passed on to the younger generations of Inuit. Some of the potential fishermen were engaged in these programs.

In spite of a few initial problems, however, the 1988 trial fishery was a success. Improvements were made in the fishing operations, plant workers were trained and perhaps most important, markets were penetrated with favorable results.

REPORT

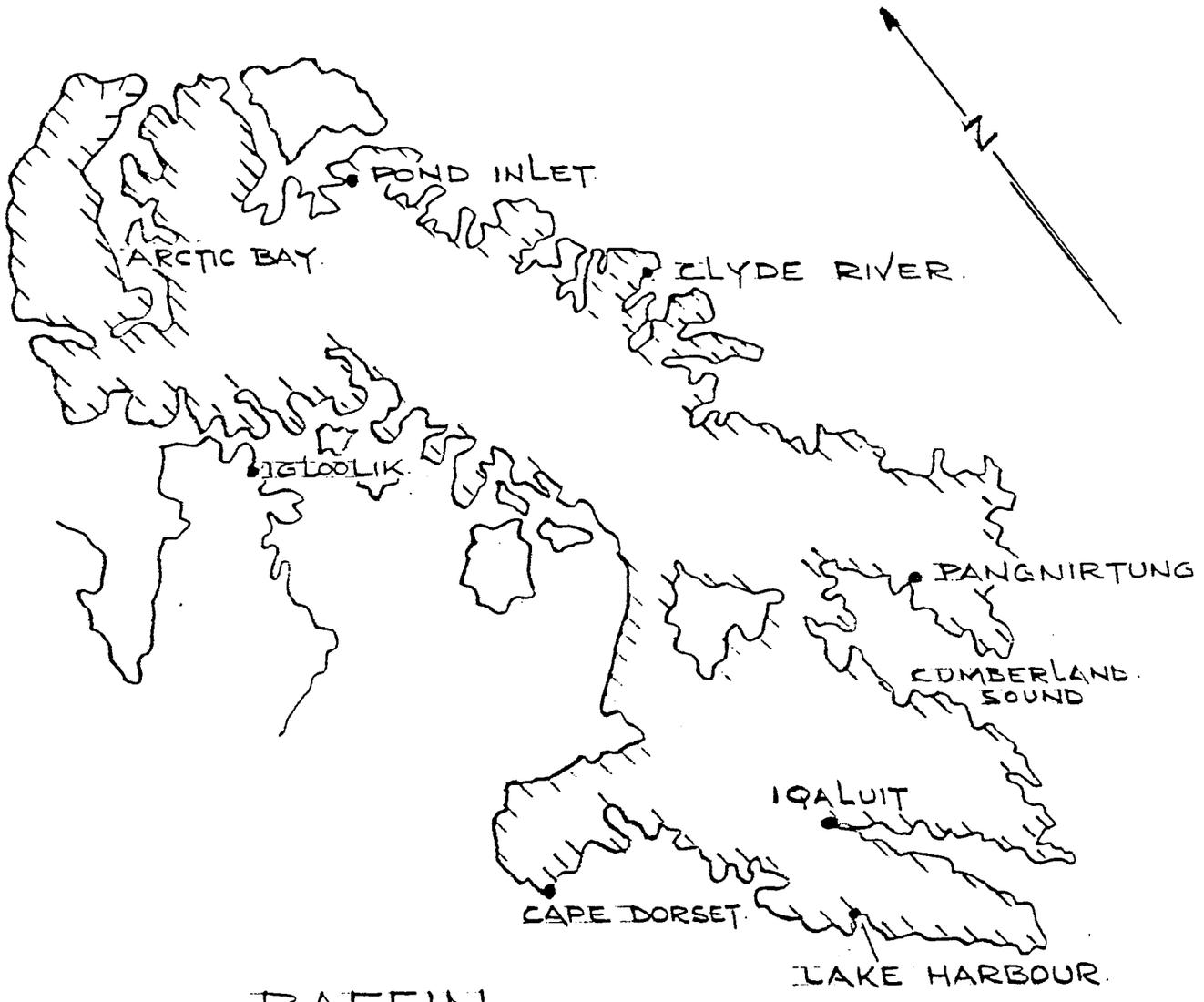
PANGNIRTUNG WINTER TURBOT **FISHERY**

1.0 INTRODUCTION

The Department of Economic Development and Tourism has assumed the lead role in the conservation of cultural traditions and the provision of alternative economic development of the Eastern Arctic. One of the objectives in sustainable development of renewable resources is to "Enhance present and future cultural and economic benefits through the sustainable use and development of renewable resources."

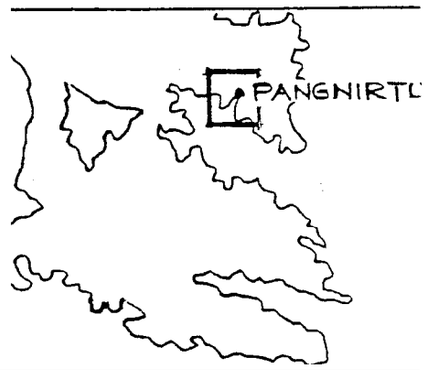
The 1988 winter turbot fishery is one component of this objective and is the third consecutive year that **GNWT** has focused on the establishment of a winter fishery in Cumberland Sound and Pangnirtung.

This report outlines activities during the 1988 fishing season and some preliminary conclusions.



BAFFIN ISLAND

N.T.S.



SITE LOCATION AND AREA MAP.

2.0 BACKGROUND

Test fishing, sponsored by the Pangnirtung Hunters and Trappers Association (HTA) in Cumberland sound began in 1985. Results indicated that the turbot (Reinhardtius Hippoglossoides) fishery was migratory and would best be developed as a winter fishery. Turbot from the Newfoundland and Gulf of St. Lawrence fisheries are not available until April or later. Supplies of fresh turbot are limited, therefore, during the months of January to April. Higher prices for the fresh product are prevalent during this period. A commercial winter fishery for this specie, has been practiced in Greenland for several years. It should be possible to convert the success in Greenland to success in Cumberland Sound.

Accordingly in March 1986, two Greenlandic fishermen were brought to Pangnirtung (Mr. Lars Nielsen and Mr. Niels Nathenueksen) to demonstrate ice-fishing techniques. The results were promising and interests were high in expanding the effort for future years. Also, during the summer of 1986, test fishing continued using a variety of gear/methods and seeking data on several species. The results of this trial fishing are outlined in a report dated December 1986 by Captain Curtis W. MacKay. His results indicated good potential for a summer fishery based on scallops and a winter fishery based on Turbot.

Captain MacKay continued, in 1987 with the development of the turbot fishery by using the long line methods demonstrated by the fishermen from Greenland. Approximately 12,000 pounds of turbot were caught over the 10 week period beginning in late January. Catch rates were 60% higher than in 1986.

2.1 Resource Size and Quotas

The "Atlantic Groundfish Management Plan" assigned 12,500 tons of TAC for area "O" of the **NAFO** convention in 1982. Of this amount 3000 tons was assigned to Canada and 9500 tons to foreign countries. Area "O" includes Cumberland Sound.

DFO iS, for 1988, allocated 100 tons TAC for the test fishery in Cumberland Sound. In discussions with DFO officials increases in the TAC for the Pangnirtung operation would be possible should the fishery prove to be a commercial success.

2.2 Existing Processing Infrastructure

The Pangnirtung HTA operate a small cold storage and processing facility in the Hamlet. This is one of a series of prefabricated panel construction "freezers" installed at several locations around Baffin Island. This facility, described in more detail later in this report, was borrowed from the HTA to process the turbot and provide a base for measuring productivity, operating costs and testing the markets.

3.0 TERMS OF REFERENCE

Canadian Fishery Consultants Limited (CFCL) in December 1987 responded to a call for Proposals to assist the plant manager in setting up and operating the fishery for 1988. Included in the activities would be to "develop and monitor productivity measures including incentive systems." Once established, these productivity rates will be used to undertake an economic assessment of the fishery in the existing small-scale plant. Preliminary feasibility of a larger fish plant in Pangnirtung would also be investigated.

Notice of Contract award to, CFCL was sent by letter dated 30 December 1988 and a contract signed on 29 February 1988.

The detailed terms of reference, as they appear in the contract, are attached as Appendix A.

4.0 WORK PROGRAM

The plant manager was recruited in early January 1988. He made a three day reconnaissance visit to Pangnirtung 6 to 8 January. This visit provided him with first hand knowledge of the size, layout of the HTA plant and the general nature of the fishery.

Upon return the plant manager in consultation with CFCL prepared a list of equipment needs for the 1988 project. This list, together with a report and recommendations was submitted to the Department of Economic Development and Tourism, Iqaluit on 11 January 1988.

Responsibility for ordering the equipment was taken by the Department. Most of the items were ordered and some began to arrive at the plant in February.

The plant manager returned to Pangnirtung to begin operations in late February 1988. CFCL's representative arrived on site on 2 March 1988.

Trials on a new motorized hydraulic long line hauler were carried out during late February and March 1988 and the first fish was landed (145 lbs.) at the plant on 3 March 1988.

Four plant workers and one supervisor were recruited and "hands-on" training began in all operations of the plant.

Handling and storage of roundfish
Quality control
Filleting
Skinning
Yield measurements
Freezing
Pack ing
Icing
Glazing
Marketing
Shipping
Plant Clean up
Waste disposal

The second fish landing (182 lbs.) arrived at the plant on 4 March 1988. The consultant assisted with all aspects of the plant operations. New master cartons were designed to suit the plastic packing pans. The existing, larger master cartons were used to make new cartons. Measurements were made of initial manual cutting and skinning rates. (The skinning machine had not arrived on site by 9 March 1988.) Yields were also measured.

The first sales were made to the "Navigator Inn" in Iqaluit - 100 lbs. of fresh fillets were flown out on 5 March 1988.

Ice used in packing fresh fish was made from blocks frozen in pans in the cold storage, pre-crushed into 2" cubes, then crushed using the motorized ice crusher.

Representatives from DFO Winnipeg and Iqaluit visited the facilities on 8 March 1988. They witnessed the first batch of fillets

being glazed and packed.

A second lot of 52 lbs. of fresh fillets were shipped by air to Iqaluit Enterprises on 6 March 1988. The price ex-plant for both sales was $4.00 per lb.

The third landing (165 lbs) of fish arrived at the plant on 6 March 1988.

The consultant held discussions with several people from the Pangnirtung Hamlet offices and contracting firms. Information on utility costs and construction costs was collected. Municipal development regulations were reviewed.

with a total of 492 lbs. of turbot for the first week 'f operation, the landings were disappointingly low. Accordingly, at a meeting with the Pangnirtung HTA on 8 March 1988, the members of the Association were asked for their advice. They explained that the price of $0.60 per lb. paid to the fishermen was too low. The fishermen wanted a price landed at the plant (in lieu of a separate price for transporting the fish to the plant) . A meeting was arranged with the fishermen on 9 March 1988 at which time it was agreed to pay $0.90 per lb. delivered to the plant.

The consultant departed Pangnirtung on 9 March 1988. During the period 9-10 March he held discussions with Mr. Larry Simpson and other officials of GNWT in Iqaluit. He also met with several people from the private sector,

Contractors for additional construction cost data,

Engineers/architects for data on construction designs

Turbot buyers for feed back on the initial shipment of fillets from Pangnirtung.

Returning to Halifax on 10 March 1988, the consultant maintained liaison with the plant manager by telephone. Information on landings was obtained weekly.

A list of people contacted during the field trip is included as Appendix B.

5.0 DISCUSSIONS

The development of a new fishery normally requires 5 to 10 years from the time exploratory fishing indicates commercial stocks, to the time the Fishery is fully developed. During this time, all parties involved in the development are on a "learning curve." The 1988 Pangnirtung winter turbot fishery is still in the early years of development. Turbot stocks are a source of a thriving fishery in Greenland. Some conditions differ in the socio-economic regions between the Cumberland Sound and Greenland fisheries. The indications are positive, however, that the Pangnirtung operation can become viable with further improvements in productivity. The resource size and sustainable yield are more than adequate, the methods of harvesting and processing are known and the markets are established.

5.1 Existing HTA Processing Plant

The project is fortunate to have a small processing facility to carry out the pilot project. This plant is located' in Pangnirtung reasonably close to Pangnirtung Fiord. Although not designed specifically to process fish, it has the components to provide a base of operations, i.e. fish landings/receiving, processing (including freezing) frozen storage and shipping"

The facility has been inspected by DFO plant inspection officials. Originally the plant had a number of areas where it did not conform to the requirements of the code of practice for

fresh and frozen fish handling establishments. Many of the deficiencies were corrected. Those deficiencies which were very difficult to correct, (e.g. low ceiling, open trusses, non-sloping floor), were granted an exemption for the purposes of the test fishery.

The first official inspection was carried out on 14 January 1987. The inspection report is attached as Appendix "C". The application for registration and related correspondence are included as Appendix 'D".

A plant inspection was carried out for the 1988 fishery on 25 February 1988. This report is attached as Appendix E.

5.1.1 Description

The HTA plant is one of a series installed a few years ago in the eastern Arctic. It is a Bally type (prefabricated, insulated panel) freezer unit with outside dimensions of 30' x 38'. It is equipped with a 20'x30' cold storage, compressor/pump room, processing room and toilet facilities. It lacks a holding area for roundfish, a shipping area, a freezing unit (separate from the cold storage), and an office. It is mounted on a foundation of timber blocks which can be adjusted for height. Each year as the top few feet of perma-frost thaw and re-freeze the foundation blocks shift. The blocks have not been adjusted to suit the movement in the foundation. As a result the exterior walls have

developed gaps between the doors and door frame. One gap which is approximately 1/2" wide was observed in the cold storage exterior door.

Other than these deficiencies, the facility is in excellent condition and it provided a good base for the test fishery.

A more detailed description is provided in Appendix D and Figure I, Plant Layout, provides a floor plan showing equipment locations. Appendix F gives a detailed inventory of plant furnishings and equipment as existing in January 1988.

5.1.2 Recommended Improvements

The plant required minor changes to layout, some processing supplies, (i.e. trays, pans, cutting boards, knives, etc.) and additional equipment to improve productivity. A list of these items was submitted by the Plant Manager to Economic Development and Tourism with his report of 11 January 1988.

Two items on the list are worthy of note. A skinning machine (Steen Model III) was ordered to Increase productivity and yield. Hand skinning of turbot fillets is slow and costly. A machine will remove less flesh than manual skinning - thus increasing the yield.

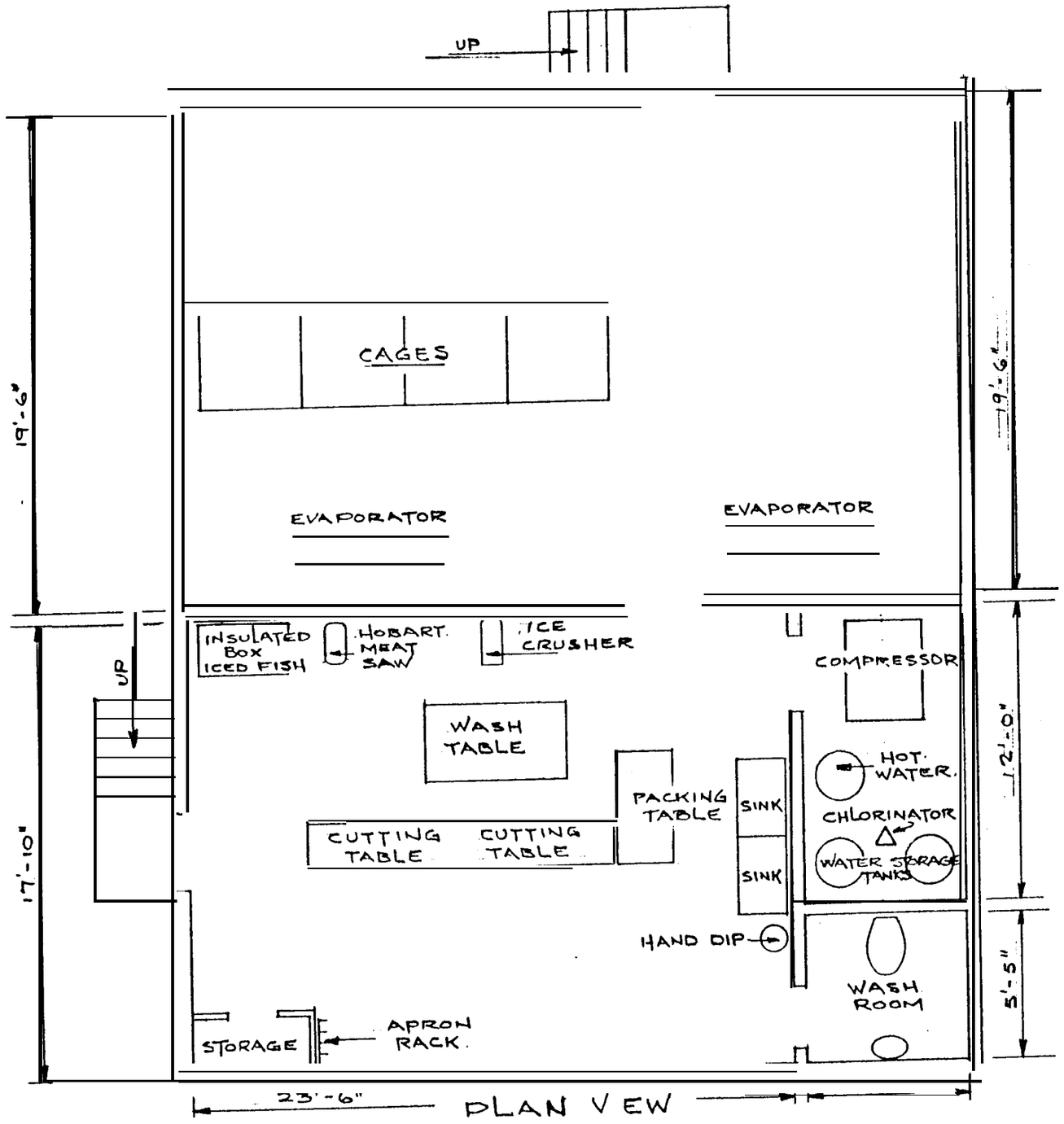


FIGURE I
PANGNIRTUNG FISH PLANT. LAYOUT
SCALE 3/16"=1'-0"

A larger ice crusher (500 lbs./hr.) was also recommended" A suitable machine could not be found which had a delivery which would be in time for the project and the order was cancelled.

Table I "Equipment Suggested for Pangnirtung Fish Plant" provides a list of items recommended together with a status report of their delivery as of 11 April 1988.

TABLE I EQUIPMENT PROPOSED FOR 1988 TRIALS FOR PANGNIRTUNG FISH PLANT

ITEM	STATUS OF EQUIPMENT AS OF APRIL 11, 1988
1 - 50 1/8" thick aluminum freezer trays - 18"x36"x2" deep	on site
2 - 100 plastic liners	on site
3 - 24 plastic fillet pans, capacity 20 lbs	not received
4 - 2 doz. hair nets	on site
5 - 2 doz. nylon gloves	on site
6 - 4 high density plastic cutting boards 20"x36"x1" thick	cancelled
7 - 1 sharpening steel 12"	on site
8 - 2 whet stones	on site
9 - 6 filleting knives 7" blade	on site
10 - 1 roll of 18" shrink film	on site
*11- 1 commercial ice crusher, capacity 500 lbs/hr	cancelled
**12-1 Steen skinning machine	on site (not installed)
13 - 1 dial scale with s.s. platform 50 lb. capacity metric/imperial	cancelled
14 - hand dip solution	on site
15 - chlorine solution for chlorinator	on site
16 - scouring pads	not received
17 - scrub brushes	not received
18 - marking pens	bought locally

5.2 Fishing Operations

Fishing was initially carried out by four groups of two fishermen each. The method used was a continuation of the longlining used in the 1987 fishery and demonstrated by the Greenland fishermen in 1986. The procedure involves setting camp on the ice, chopping a hole through the ice and feeding a long line with baited hooks through the hole. The line is fished approximately 2 hours then hauled. The line is fed through the ice using a 'kite' fabricated from sheet metal, weighted and tied to the line which consisted of 100 - 130 hooks.

For the first time, the 1988 project used a motorized hydraulic hauler to improve the productivity of the fishermen. To enhance the quality of the fish, the fisheries were asked to bleed them immediately after removing them from the line. The recommended method for' turbot is by cutting the tail. The fish is then allowed to bleed for 20-30 -minutes before the head and gut are removed. Sometimes parts of the waste and some of the by-catch are used to re-bait the hooks.

The napes were collected at the plant after filleting and given to the fishermen for bait.

Various types of hooks and hook sizes were tried along with different types of long line material. The types of hooks tested were :

J-Hooks

Semi-circle hooks

Circle hooks

In order of preference the following were preferred:

Semi-circle - J-Hooks and circle hooks.

Although the circle hook retained the catch better; the semi-circle was preferred because it was easier to bait. It is recommended that larger size hooks be used # 3 and even # 2 would be preferred.

It should be noted that productivity improvements in the harvesting have a much greater effect than productivity improvements in the processing, on product cost. A reduction of 10¢ per pound in landed cost at the processing plant will result In more than 20¢ per pound reduction in fillet cost (due to the yield factor of 0.45 - 0.55 of fillet weight to H and G weight).

There appears to be scope for increased productivity in the longlining method. Suggestions are discussed later in this report.

A major problem in the fishing side of the operation is the sharks . The Greenland shark feed on turbot. Sometimes the fishermen lose 80-100% of their fishing gear to this shark. On other occasions the shark stays on the hook and is landed. On

still other occasions, much of the turbot has been bitten and mutilated apparently by shark. The extent of lost gear and shark damage and other details are outlined in the report "Halibut 87" by Captain Curtis W. MacKay dated April 1987. Fishermen were given forms to fill out showing area fished, hooks used, turbot caught by date and hooks lost, etc. These data were useful in determining productivity rates.

Transportation from the fishing grounds to the processing plant was by snowmobile and komotics (type of sled). Using a technique developed in the 1987 fishery, the fish are transported in insulated containers in sea water. This will delay freezing and keeps the product in a super-chilled state. The boxed H and G fish are placed on a komotic and towed by snowmobile. Under these conditions, the quality of the fish on arrival at the plant is excellent.

As more fishermen became involved later in the 1988 season, there was a shortage of these boxes. If the trial fishery continues in 1989 with 14 or more fishermen, more insulated boxes will be required.

The project started on the assumption that the transportation of the fish would be done by separate individuals. Separate price structure was set up for paying the transporters on a per pound basis. After the first week of operation, it became evident that

both the fishermen and plant manager would prefer one price for fish landed at the plant. It 1s more convenient for the fishermen since they normally return to the Hamlet every 2-4 days and could bring their catch with them. They were, therefore paid more money for their catch. It is more convenient for the plant manager as it eliminates one step in the financial administration. He pays one price for the fish landed at the plant and does not need to negotiate and pay for transportation. A summary of the results of the 1988 fishing is given in Table 11 "Turbot Fishery - 1988."

TABLE II - SAMPLE OF TURBOT FISHERY - 1988

(MARCH 3 - 31)

No. of Fishermen - 2 groups of 2 each = 4 Fishermen

No. of Hooks used - 6485

No. of Hooks lost - 658

No. of fish caught - 1399

No. of sharks caught - 8

Average weight of H & G turbot - 7.9 lbs.

Average weight of whole fish using 28% head and gut wt.= 11 1 bs

*NOTE: Although earlier reports indicate a much lower head and gut weight, the DFO official conversion factor is 1:1.4 (H&G Wt.to Whole Wt.) A spot check on the ice confirmed this factor when 29 lbs. of whole turbot resulted in 21 lbs. of H&G turbot. (Approximately 72% yield.

Total whole weight of fish caught = 1399 x 11 = 15,389 lbs

5.3 Processing Operations

Due to the higher value product, processing concentrated on producing fillets both fresh and frozen. Since the product must be shipped out by air, the shipping costs are Proportionately lower for fillets (over whole dressed fish).

Due to the low volumes processed, past experience indicates that equipping the plant to produce minced product or surimi would not be viable. These products have high equipment costs which must be amortized with very large volumes. They also require large quantities of clean water.

5.3.1 Methods Used

The fish landed at the plant are first removed from the insulated containers and placed in smaller fish boxes for weighing. The tally is then used to pay the fishermen. Weighing the fish in smaller lots is also necessary before production incentive systems are Instituted.

After weighing, the fish are carried to the washing table for washing then to the filleting table. Four or five cutters fillet then remove the skin manually. Weights of fillets, skins and waste are measured. Fillets are packed in 10 or 15 lb. lots in plastic pans. Full plastic pans are placed in master cartons with ice. The carton is fitted with a poly liner to prevent leakage of melt water. These 50 lb. rester cartons are now ready

for shipping as fresh fillets. The lot number and day processed are marked on the outside.

If the fillets are destined for the frozen market, they are placed on poly liners, on freezer trays and individually frozen in the cold storage. Freezing in a cold storage is not recommended. A separate freezer should be used to minimize dehydration of the product (fluctuation of the cold storage temperatures can cause dehydration of the stored product).

After, freezing, these IQF fillets are ready for glazing. One or two plastic pans are filled with about 3 inches of water and placed in the cold storage for about 1-2 hours. This chilled water is then used for glazing. The frozen fillets are pre-weighed in 10 lb. lots and individually dipped in the chilled water. After 10-15 seconds the fillet is removed and is uniformly coated with a thin layer of ice which will prevent dehydration during frozen storage and transportation.

The following photographs of the various operations and training procedures illustrate the above.

Yields were relatively low in the beginning due to the inexperience of the cutters. Some of the fish arrived at the plant partially frozen. Cutting and skinning frozen fish also produced lower yields. As the staff gained experience, yields

improved to the 45-48% of the H and G weight. With machine skinning coupled with more experience this yield is expected to increase to 53-55%.

5.3.2 Products

The driving engine for viability in any project is the market place. Market prices are determined by factors completely beyond the control of the Pangnirtung plant management. The quantity of product is far too small to have any effect on market prices one way or the other.

Fresh fillets have the highest value and have lower unit shipping costs compared to other products. Fresh fillets are less costly to produce than frozen fillets due to additional energy costs in the freezing process and extra labour in the glazing and handling. The price for fresh fillets is often 30% higher than frozen fillets which in turn is much higher than other products. The emphasis, therefore was on fresh fillets production.

Other products marketed were frozen fillets, frozen dressed (head and gutted) and fresh H&G. Information on the production and product sales is provided in Table III - "Turbot Production-1988."

START OF FISHING 2 MARCH 1988

Total landings at plant(H&G Wt.) - Mar. 3 - Apr.14 23,359 lbs.*

*An unresolved discrepancyexisted between the fishermen's tally and the plant tally.)

No. of days landed = 24

Average landing per day = 973 lbs.

Landing March 28-April 14 = 17070 lbs.

No. of days landed = 12

Average landings per day = 1423 lbs.

TABLE III - TURBOT PRODUCTION - 1988

MARKET	PRODUCT	QUANTITY	EX-PLANT PRICE
Northwest Territories	Fresh Fillets	400 lbs.	$4.00/lb
Northwest Territories	Frozen Dressed*	287 lbs	$1.80/lb
Ottawa	Fresh Fillets	648 lbs	$3.00/lb
Ottawa	Frozen Dressed*	1162 lbs	$1.50/lb
Ottawa	Whole Shark	250 lbs	$0.40/lb
Montreal	Fresh Fillets	2641 lbs	$2.70/lb**
Montreal	Frozen Dressed*	63 lbs	$1.10/lb**
Montreal	Fresh H&G*	557 lbs	$1.70/lb**

* Headed and gutted (H&G)
** Prices for Montreal are delivered prices.

5.3.3 Quality Control

Emphasis was placed on quality control from the point of fishing through to delivery to the customer. If exceptional quality can be maintained over a long period, a premium will eventually be available for product which can be identified as from a superior source. To this end, marketing under a label such as "Baffin Halibut" might assist In obtaining better prices. Discussions with DFO inspection branch (which approves the use of common names for marketing purposes) indicated that the turbot fished for Pangnirtung ("Reinhardtius hippoglosoides") cannot be marketed under the name Greenland Halibut. Marketing this turbot under the name" "Baffin Island Halibut" may be possible. A proposal must be submitted to DFO for consideration.

Measures which were practiced this year which contribute to top quality are:

fish bled immediately after catching,

stored and transported to the plant in a super chilled condition,

held no more than 3 or 4 days before delivery to the plant

headed and gutted within an hour of being caught,

same or next day processing in the plant,

in-plant intermediate storage on ice,

plant handling practices meet or exceed requirements of the Code of Practice,

Production of IQF fillets,

glazing immediately after freezing,

after sales follow-up with airlines and customers to ensure no mishandling in shipping,

final storage of finished product held in chill condition pending shipment.

The above quality control measures resulted in favorable feedback from the buyers in Montreal and Ottawa. (See Appendix I)

5.4 Turbot Markets

The turbot products produced so far in 1988 by this project (including fresh and frozen fillets and fresh and frozen round products, headed and gutted) have been marketed with success in the Northwest Territories, Montreal and Ottawa. The highest prices are paid in the northern market with a reported $4.00/lb at the plant gate for fresh fillets. The Montreal market has taken the greatest volume of product but pays lower prices than other markets at $2.70/lb for fresh fillets delivered. All buyers, are reported to be very happy with the product quality to date. (See Table III, Page 28)

Turbot markets were weak during the 1988 trial fishery with light trading in all frozen packs in the American markets. Prices have been moving down since January; when substantial offshore landings were moved on the American markets. These conditions -- also affected the Canadian markets in a similar way. Another factor affecting the turbot market was the Russian trawlers catching turbot to supply the Resource Short Program for inshore

fish processing plants in Newfoundland during January and February 1988.

With a general slow down in fish sales due to consumer resistant to high prices, turbot prices were hit particularly hard with falling prices and little or no movement. See Appendix H for charts showing the current trends in the markets.

Fresh turbot fillets are in a different category. Fresh fillets or whole fish command a higher price than frozen. During the winter months January, February and March, there are few fresh turbot fillets in the market place excePt for Greenland, which ships fresh turbot fillets by air via Iqaluit to the Toronto and Montreal markets.

In the winter of 1987, prices for fresh turbot fillets delivered to Montreal were $3.85 per pound with strong demand. However, with a soft market in the winter of 1988 where prices were $2.70 per pound delivered to Montreal, Greenland stopped shipping to the Canadian market and focused their attention to Northern Europe markets.

One of the larger Brokers in Montreal was paying $2.70 delivered to Montreal for fresh turbot up until April 5 when the Gaspé fishery commenced turbot fishing and started offering their product on the Montreal market at prices in the range of $2.25/lb

delivered.

With this Gaspé product on the Montreal market the original broker was not interested in handling Pangnirtung turbot. However, we were successful in moving our product through a smaller broker at $2.35/lb delivered to Montreal.

The Ottawa market offered much better prices than the Montreal market and we received $3.00/lb. FOB Airport Pangnirtung. However, this is a limited market and will not take the volumes the Montreal market would take.

The New England market may have good potential in the long run. Fish buyers of both fresh and frozen product report that, under normal market circumstances, they would be interested in securing a supply of turbot product during the months of January through April., At this time of year, there are no other significant supplies of fresh turbot available and under normal circumstances a 25 to 50 cents per pound price premium is available to suppliers. This premium disappears when the Gaspé fishery starts during the first half of April.

Unfortunately when the consultant spoke with the buyers in Boston (late March), the market for frozen turbot was reported to be very soft. Prices, at that time, for frozen fillets were approximately $1.65 to $1.90 per pound ($US) and $2.00 to 2.25 for

fresh fillets. The poor market for turbot is attributed to large inventories of frozen turbot and a general softening of most seafood markets. In March 1987 buyers were paying spot prices of almost $3.00 (US) per pound for frozen fillets. The Boston Blue sheet (Fishery Market News Report B-153) reports Canadian frozen turbot prices have dropped from $2.20 - 2.30 in December 1987 to $1.85 to 1.90 in March and they term the current markets us unstable. market sources In Montreal also noted prices a year ago were approximately $1.00 a pound higher than is presently being reported.

Market observers generally conclude current turbot prices are on the low side of what may be expected in a more stable market. In turn, last years significantly higher prices were probably too high and in fact may have contributed to the current price depression. Observers suggest a reasonable price range for turbot in a stable New England market will range from $2.25 to 2.50 per pound ($US) for frozen fillets and $2.50 to $2.75 for fresh fillets. (Can. $2.80 to $3.12 and Can. $3.12 to $3.44 respectively)

5.5 Micro Economic Evaluation (Existing HTA Scale of Operation)

Sufficient information was collected in order to investigate operating costs of the harvesting and processing components separately. Some assumptions have been made regarding productivity rates which were not necessarily achieved but which are

attainable based on 'observations during the 1988 trail fishery.

5.5.1 Harvesting and Transportation to the Plant

Information on the productivity and cost of catching the fish and transporting it to the plant was derived from several sources- fishermen, snowmobile dealers, repair shops, publications and personal observations. Costs to the fishermen consist of operating costs for:

snowmobile
motorized line hauler
komotic
fishing gear
bait

APPENDIX A

TERMS OF REFERENCE

CONTRACT PURPOSE

To develop productivity systems to maximize production efficiency of the Pangnirtung plant and to undertake an overall economic assessment of the Pangnirtung winter turbot fishery.

CONTRACT DUTIES

1. The contractor will advise on methods to increase productivity of the Pangnirtung winter turbot fishery. This advice will include, but not be limited to, the following:

1.1 advice with respect to the design and setup of incentive systems for fishermen, transporters, plant processors, and local management.

1.2 advice on equipment needs and layout as well as plant design factors which will impact on plant efficiency.

1.3 measures to improve quality-control.

2. The consultant will work in cooperation with the Plant Manager to implement productivity measures and to monitor their effectiveness. This will entail workshops and dialogue with all components of the fisheries work force from primary producers to shippers.

3. Once productivity measures have been implemented and efficiency standards have been established, the consultant will undertake a "micro" economic evaluation of the fishery by:

3.1 assessing the viability of the component operations. of 'the fishery: harvesting, transport from site to plant, and processing. This evaluation will assess the economics of viability from both the individual producer/worker's perspective and from the point of view of the fishery's viability taken as a business entity; e.g. what are equitable and viable unit costs/piece rates in the fishery?

4. The contractor will then assess the overall economic viability of the Pangnirtung winter turbot fishery **as a** whole based upon the established guidelines and assumptions that are articulated in the foregoing. This economic evaluation will include 3 year operating forecasts to reflect:

4.1 operations using the exiting plant infrastructure with specified improvements and a ceiling of 50 tonnes (50% of Baffin's current "inshore" allocation)

Revenues for a recommended product mix should be forecast and projected costs should reflect all fixed, variable and semi-variable expenses including, but not limited to: fish

purchases, plant wages, management, utilities, freight, depreciation, and maintenance and repairs.

A break-even analysis will be presented by the contractor.

4.2 operations which assume a new plant facility in Pangnirtung assuming greater processing capacity and larger commercial quotas . This financial information will follow the same format as in 4.1. Furthermore, the contractor will provide additional information with respect to requirements for community services including water, power, and sewage treatment for a new plant.

This information will not be detailed to the extent required in a feasibility study for a new fish plant, but sufficiently detailed for purposes of comparative economic evaluation of **a** new plant scenario as opposed to the existing one.

Economic Development and Tourism will provide information on general construction cost estimates and on grants funding available.

5. Based upon the evaluation done thus far, the contractor will present recommendations for subsequent development of the fishery.

A. RAW-DATA AND ASSUMPTIONS (Fishing and Transport to Plant)

A.1 SNOWMOBILE

Capital costs	$5,000
Life Expectancy (years)	3
Residual value	$500
Depreciation - Straight Method	
Gasoline Cost	$2.63/gal.
Oil cost	$16/gal.
Gasoline Consumption	2.3 gal/hr.
Oil mixture ratio 50:1	
Drive Belt replacement	every 1000 miles
Drive belt replacement cost	$50.
Skis Replacement	annually
Skis cost	$70
Track replacement	annually
Track cost	$600
Plugs, bearings and misc. repairs	$50
Travel time to grounds	1.5 Hr.
Travel time return to Hamlet	2.0 hrs.
Fishing Season	12 wks.
Fishing trips	2 per wk.
Snowmobile use	8 months per year
Snowmobile use for fishing	3 months per year
Distance to fishing grounds.	40 miles

A.2 MOTORIZED LINE HAULER

Capital cost	$5,000
Life Expectancy	10 yr.
Gasoline Consumption	2 Gal./Day
Operating Period	8 hrs./day, 6days/wk.12/wks/yr
Repairs and Maintenance	$320/yr
Hydraulic Fluid and Misc.	$300/yr.

A.3 KOMOTIC

Capital Cost	$300
Life Expectancy	5 yrs.

A.4 FISHING

Gear depreciation and loss	$500/yr
Production	500 lbs/day/2 man-team (250 lbs/man/day)

A.5 BAIT

cost	$0.06/lb

B. ANNUAL OPERATING COSTS

B.1 SNOWMOBILE COSTS (One machine required for each fisherman)

Depreciation (5000 - 500) ÷ 3 = $1,500/yr
Financing @ 12%, 0.12 x 4500 = $540/yr

Financing sub-total $2,040/yr
Amount Applicable to fishery = $\frac{3 \text{ Mo.}}{8 \text{ Mo.}} \times 2040 =$ $765

Repairs and Maintenance

Skis	$70
Track	$600
Plugs, bearings, misc	$50
	$720

Amount applicable to fishing $\frac{3\text{mo}}{8\text{ mo}} \times 720 =$ $270

Mileage used for fishing
40m x 2 (rd.trip) x 2 trips/wk = 160 m/wk
+ Mileage to plant for supplies etc.= 40 m/wk
200 m/wk

200 m/wk x 12 wks = 2400 m

Operating hours = 3.5hr x 2 + 4 hrs. (on shore) = 11 hrs/wk

Cost of Drive belt = $\frac{2400}{1000} \times 50 =$ $120

Gasoline costs (11 hrs x 12 wks x 2.3 gal x $2.63) = $798

Oil Costs (11 hrs x 12 x 2.3÷50 x $16/gal $97

Snowmobile total costs per fishing season = $2050/yr

For one two man fishing team = $4100/yr

B.2 LINE HAULER

Depreciation $5000 ÷ 10 =	$500/yr	
Financing @ 12% =	$600/yr	
Gasoline 2 g/dayx5 x12x $2.63 =	$315/yr	
Repairs and Maintenance	$320/yr	
Hydraulic Fluid and Misc.	$300/yr	
TOTAL	$2035/yr	$2035/yr

B.3 KOMOTICS

Depreciation	$20/yr	
Financing @ 12%	$36/yr	
Repairs & Maintenance	$64/yr	
TOTAL	$120/yr	$120

B,4 FISHING GEAR

Depreciation and loss $500

B.5 BAIT

300 lbs/wk x 12 wks x $0.06 $216

TOTAL ANNUAL FISHING COSTS (For one two man team) $6,971

Total Catch per Two-Man fishing team =
500 lbs/day x 5 days /wk x 10* wks = 25,000 lbs.

Direct Costs = $\frac{\$6971}{25,000 \text{ lbs}}$ = $0.28/lb**

Allowance for salary,
2 men x $120/day x 6 days/wk x 10 wks = $14,400
= $\frac{17,280}{2s,000}$ = $0.58/lb

TOTAL $0.86/LB

*Although the season is 12 weeks, bad weather for a total of approximately 2 weeks will prevent fishing. Thus only a net 10 weeks of fishing is used for analysis of total catch.

** The normal procedure is for each of the two man team to use a snowmobile, only one machine is absolutely necessary. In this case direct operating costs would be reduced to $0.20/lb.

In 1988, the price paid to the fishermen at the plant was $0.90/ lb. (H&G weight). Using the above calculations for costs, this price would have paid each fishermen $155.00 Per day ($0~90 0.28 x 250 lbs./day) for each day his team landed 500 lbs at the plant. If his catch was only 150 lbs/day, (OK 300 lbs/day for two fishermen) his earnings would be (0.90 0.42 x 150 lbs. ay) $72.00 per day.

If the fishing productivity. is increased as discussed in Section 6.0, fish landings could increase to 800 - 1300 lbs per man per day (see Table VIII), the following would be the cost breakdown per three man fishing team.

cost of snowmobile (3) @ $2050/yr =	$6150/yr
cost of line haulers (2) @ $2035/yr =	$4070/yr
Cost of Komatic (1) =	$120/yr
Fishing gear loss $500 x 8 =	$4000/yr
Bait 300 lbs x 8 x 12 wks x $0.06/lb =	$1730/yr
TOTAL	$16,070/YR

or $16,070 ÷ 3 men = $5360/yr/man or 9268/day

AT $0.90/lb one fishermen would earn:

1300 lb/ x $0.90 - $268/day = $902/day (or $45,100 for the 12 week season)

AT $0.60/lb the same fishermen would earn,

1300 lb/day x $0.60/lb - $268/day = $512/day (or $25,600 for the 12 wk. season)

At 800 lbs/man/day and $0.60/lb. the fishermen would earn

800x 0.60 - $268/day = $212/day ($10,600 for the season)

It would appear from the above that a landed price at the plant of $0.60/lb to $0.70/lb (H&G Wt.) would be reasonable given the projected increase in fishing productivity.

5.5.2 Processing

operating costs per pound of fillet have been derived based on productivity rates and yields which appear to be attainable using the existing HTA plant. Although fish landings were not sufficient to prove these rates over long periods, random spot checks were used to establish both rates and yields.

Air freight to the market is subject to a Government subsidy of 50% of the cost of moving the product from the plant to the airport and from the airport (at Pangnirtung) to Iqaluit.

Trucking to Pangnirtung Airport	$0.07/lb.
Pangnirtung to Iqaluit	$0.28/lb.
Iqaluit to Montreal	$0.24/lb.
Total	$0.59/lb.
Less subsidy	$0.175
Net transportation cost to Montreal	$0.415/lb.

A comparison was made of the cost/benefit of selling frozen dressed fish as opposed to fillets. The following is a breakdown of costs and revenues for the dressed fish. Yield of dressed over H&G = 0.93%

Costs of Processing	
Cleaning and trimming	$0.10/lb
Fish cost $0.90 ÷ 0.93 =	$0.97
Freezing and trimming	$0.04
Packing	$0.04
Plant clean-up	$0.02
Supervision	$0.04
Packaging (materials)	$0.175
SUB-TOTAL	$1.385/lb.
Debt servicing, utilities and other overhead costs	$0.312
Transportation to Montreal	$0.415
	$2.11/lb.

Price Paid in Montreal $1.70/lb.

Using the existing HTA plant and existing fishing methods, (average catch per day of 1500 lbs.) the cost per pound of fillet at the plant is $3.49 (see Table IV for List of Assumptions and Table V for Three Year Projection) in the first year. The break even point for this year would occur if the fishermen were paid $0.56 per pound of H&G fish at the plant.

In year two, the cost of fillets decreases to $2.82/lb. and the break even point is $0.76/lb. to the fishermen. In year three at 3000 lbs. per day production, the plant is profitable paying the fishermen $0.90/lb. The break even point is reached when the fishermen are paid $1.04/lb. Results for all three years would improve if more than 50% of the production went to fresh fillets (as opposed to frozen fillets).

TABLE IV - LIST OF ASSUMPTIONS

Raw Data ● nd Assumptions (Existing HTA Plant)

Capital Costs

Original Capital Cost of Existing Plant	$180,000
Skinning machine, other equipment	$25,000
Life Expectancy of Plant(Years)	12
Life Expectancy of Equipment(Years)	s
Plant Use for Turbot (Month per year)	3
Depreciation - Straight Line Method	
Monthly Plant Depreciation	$1,250
Annual Plant Depreciation(Monthly *2.5)	$3,750
Annual Equipment Depreciation(1/5 total cost)	$5,000
Annual Capital Charge	S8,750
Training/Set Up Costs (Annual in years 1,2)	$25,000
Training/Set Up spread over period in years	10
Annual Start Up Charge	$2,500

Land Lease (annual for plant) 500
monthly $42
Processing Season $125

Labour Costs

Assume 5 workers and one manager
Work Time: 8 hours per day
5 days per week
10 weeks

Fishing season =12-14 week
20% allowance for bad
weather =2-4 weeks
Net fishing time =10 weeks

Hours Worked 400

Rate of Pay

	Year 1	Year 2	Year 3
Manager	$10.00	$12.00	$15.00
Workers	$8.00	$s.00	S8.00
Person Employed			
Manager	1	1	1
workers	4	5	5
Labour Costs	$16,S00	$20,800	$22,000

Raw Fish

	Year 1	Year 2	Year 3
Price Paid to Fishermen			
Landed at Plant(per pound)	$0.90	S0.80	$0.70
Pounds Landed at Plant(Average per Day)			
	Year 1	Year 2	Year 3
	1500	2000	3000
Total Plant Input(lbs)	75000	100000	150000
Cost of Raw Fish (includes transportation to plant)	$67.500	$80,003	s 105,000

Waler/Sewer Charges
Daily Charge $45.40
Total (50 days operation) $2,270

Garbage Collection
Daily Charge $25.00
Total (50 days operation) $1,250

Packaging Materials
For all product, per lb $0.25

	Year I	Year 2	Year 3
Yield	0.45	050	0.55
Cost	$8,438	$12,500	$20,625

Repair ● nd Maintenance
Assume 5 % of fixed capital and equipment
Pro rated to monthly average
Annual Charge $10,250
Monthly Charge $854
Yearly Charge to Fish Processing $2,563

Power/Heat
Average per month based on utility cost record
10 month average 2s33
Yearly Charge to Fish Processing $7,599

Transportation Cost
subsidized cost to Montreal (per lb) $0.42

Market Price
Assume Montreal Price ($/lb) $3.15
Based on $3.30 for fresh fillets
and S3.00 for frozen fillets

	Year 1	Year 2	Year 3
Groin Revenue	$106,313	$157,500	S259,87S

Last Revision 24/5/1

TABLE V

THREE YEAR PROJECTED OPERATING COSTS

Pangnirtung Winter Turbot Fishery
HTA Processing Plant

	Year 1	Year 2	Year 3
Start Up Costs	$2,500	$5,000	$5,000
Raw Fish	$67,500	$80,000	$105,000
Labour	$16,800	$20,800	$22,000
Packaging	$8,438	$12,500	$20,625
Heat/Power	$7,599	$7,599	$7,599
Land Lease *	$125	$125	$125
Water/Sewer*	$2,270	$2,270	$2,270
GarbageCollection	$1,250	$1,250	$1,250
RepairS andMaintenance	$2,563	$2,563	$2,563
. Capital Consumption	$8,750	$8,750	$8,750
Total Costs	$117,794	$140,857	$175,182
Fish Processed (lbs)	75000	100000	150000
Fillet Cost per Pound**	$3.49	$2.82	$2.12
Yield	0.45	0.5	0.55
Transportation Costs	$14,006	$20,750	$34,238
Gross Revenue	$106,313	$157,500	$259,875
Net Revenue	($25,488)	($4,107)	$50,456
Break Even Price to fishermen	$0.56	$0.76	$1.04

* GNWT continues to pay the heat/power and land lease costs.

** Assuming all fish is processed into fillets.

5.6 ProDosed New Plant

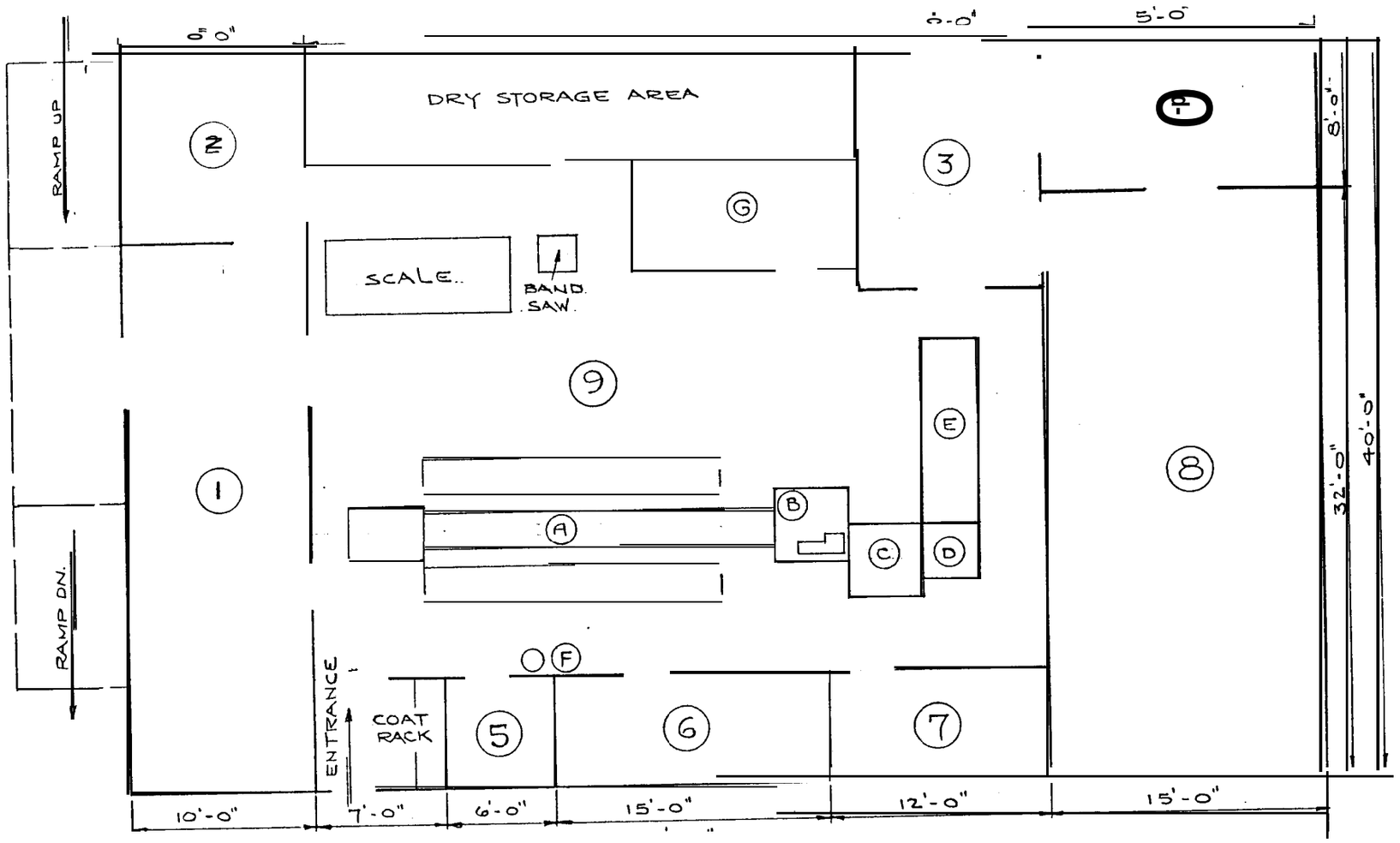
5.6.1 General

A new fish processing facility for Pangnirtung has been discussed by officials in the Hamlet and by the Government of the N.W.T. for some time. The approved Pangnirtung Community Plan has designated a specific site for the proposed plant (see Appendix J), Site Location Plan, Proposed New Plant).

A facility designed specifically to process turbot would have several advantages:

- It would conform to the requirements of DFO 's 'Code of Practice' for processing plants,
- it would be equipped with a holding room, freezer and other components lacking in the HTA facility,
- it would be more energy efficient by using some outside air to supplement refrigeration and by using condenser cooling air to heat the work areas,
- it would provide a more efficient product processing and handling flow,
- it would be provided with a concrete floor sloped to drain for easy clean-up.

In compliance with the terms of reference, therefore, an analysis follows of a 6,000 lbs/day plant (based on market feed back - see Appendix No. I) Figure 11 shows a plant layout and Figure III, a Process Flow Chart and Staffing Diagram.



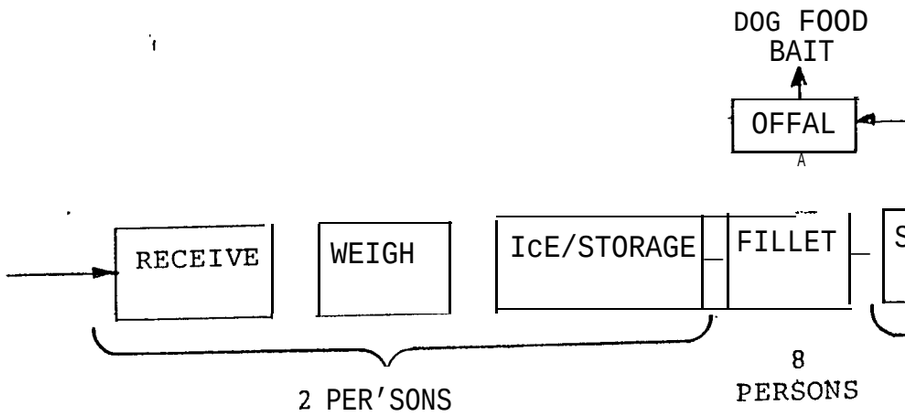
PLAN VIEW

SCALE — 0 FT. 5 FT. 10 FT.

LEGEND

1. RECEIVING & HOLDING RM.
2. ICE CRUSHING & STORAGE RM.
3. ANTI RM.
4. BLAST FREEZER
5. WASH ROOM
6. LUNCH & LOCKER RM.
7. MECHANICAL RM.
8. COLD STORAGE RM.
9. FISH PROCESSING RM.
- A - CUTTING STATIONS
- B - SKINNING MACHINE
- C - WASH TANK
- D - DRAIN TRAY
- E - PACKING TABLE
- F - HAND DIP
- G - OFFICE

FIGURE II
PANGNIRTUNG PROPOSED FISH PLANT LAYOUT



PROCESS FLOW CHART

PANGNI

FIGURE

5.6.2 Cost Estimate (1988 Values)

Foundations, superstructure, waste holding tank	$340,000
Insulated walls (panel construction) c/w doors	$65,000
Steel framing	$50,000
Ice crusher	$7,000
Band saw	$8,000
Skinning Machine	$7,000
Refrigeration equipment	$140,000
Cutting table and misc. equipment	$18,000
Water storage, pumping, treatment and supply	$11,000
	$646,000
Engineering and Contingency @ 15%	$97,000
	$743,000

5.6.3 Economic Evaluation

Assuming the new plant processes an average of 4,000 lbs. per day the first year, 5,000 lbs. per day the second and 6,000 lbs. per day the third year; the fillet cost per pound would be $2.95, $2.38 and $1.93 at the plant gate. At $0.90/lb. paid for the fish, the operation becomes profitable in the second year. The break even points in terms of price paid to the fishermen per pound of H&G weight are $0.80, $0.98 and $1.14 for the first, second and third years respectively.

See Table VI for a list of assumptions and Table VII for the 3 year projections for the proposed new plant.

TABLE VI - LIST OF ASSUMPTIONS

Raw Data ● d Assumptions (Proposed New Plant)

Capital Costs

Capital Cost of Building	$525,000
Skinning machine, other processing equipment	$57,000
Refrigeration	$161,000
Life Expectancy of Plant(Years)	12
Life Expectancy of Equipment(Years)	5
Life Expectancy of Refigeration Equipment(Years)	20
Plant Use for Turbot (Month per year)	3
Depreciation Straight Line Method	
Monthly Plant Depreciation	$3,646
Annual Plant Depreciation(Monthly *3)	S10,938
Annual Equipment Depreciation(1/5 total cost)	$11,400
Monthly Refrigeration Depreciation	3671
Annual Refrigeration Depreciation(Monthly *3)	$2,013
Annual Capital Charge	$14,0s3
Training/Set Up Costs (Annual in years 1,2)	$25,000
Training/Set Up spread over period in years	10
Annual Start Up Charge	$2,500
Land Lease (annual for plant)	500
monthly	S42
Processing Season	$12s

Labour Costs

Assume 5 workers and one manager
Work Time: 8 hours per day
5 days per Week
1 0 - 1
Hours Worked 4a3

Fishing season =12-14 weeks
20% allowance for bad weather =2-4 weeks
Net fishing time =10 weeks

Rate of Pay

	Year 1	Year 2	Year 3
Manager	$10.00	$12.00	$15.00
Workers	Sam	$8.00	$8.00
Person Employed			
Manager	1	1	1
Workers	7	7	7
Labour Costs	$26,400	$27,200	$28,400

Raw Fish

Price Paid to Fishermen	Year 1	Year 2	Year 3	
Landed at Plant(per pound)	$0.90	$0.80	$0.70	
Pounds Landed at Plant(Average per Day)				
	Year 1	Year 2	Year 3	
	4000	5000	6000	
Total Plant Input (lbs)				
	200000	250000	300000	
Cost of Raw Fish (includes transportation to plant)				
	$180,000	$200,000	$210,000	

Water/Sewer Charges

Daily Charge	$100.00
Total (30 days operation)	$5,000

Garbage Collection

Daily Charge	$25.00
Total (SO days operation)	$1,250

Packaging Materials

For all product, per lb		$0.25	
Yield	0.45	0.50	0.55
	Year 1	Year 2	Year 3
Cost	$22,500	S312s0	$41,250

Repair and Maintenance

Assume 5 % of fixed capital and equipment
Pro rated to monthly average

Annual Charge	$37,150
Monthly Charge	S3,096
Yearly Charge to Fish Processing	S9,2-S8

Power/Heat

Average per month based on utility cost record
10 month average 1500
Yearly Charge to Fish Processing $4,500

Transportation Cost

subsidized cost to Montreal (per lb) $0.42

Market Price

Assume Montreal Price ($/lb) 33.15
Based on $3.30 for fresh fillets and $3.00 for frozen fillets

Gross Revenue	Year 1	Year 2	Year 3
	$283,500	$393,750	$51 9,750

Last Revision 24/

TABLE VII

THREE YEAR PROJECTION OF OPERATING COSTS

Pangnirtung Winter Turbot Fishery
Proposed New Plant

	Year 1	Year 2	Year 3
Startup costs	$2>500	$5,000	$5,000
Raw Fish	$180,000	$200,000	$210,000
Labour	$26,400	$27,200	$28,400
Packaging	$22,500	$31,250	$41,250
Heat/Power	$4,500	$4,500	$4,500
Land Lease	$125	$125	$125
Water/Sewer	$5,000	$5,000	$5,000
GarbageCollection	$1,250	$1,250	$1,250
Repairs and Maintenance	$9,288	$9,288	$9,288
Capital Consumption	$14,083	$14,083	$14,083
Total Costs	$265,646	$297,696	$318,896
Fish Processed (lbs)	200000	250000	300000
Fillet CostPerPound**	$2.95	$2.38	$1.93
Yield	0.45	0.5	0.55
Transportation Costs	$37,350	$51,875	$68,475
Gross Revenue	**$283,500**	**$393,750**	**$519,750**
Net Revenue	**($19,496)**	**$44,179**	**$132,379**
Break Even Price to fishermen	**$0.80**	**$0.98**	**$1.14**

** Assuming all fish is processed into fillets.

6.0 CONCLUSIONS and RECOMMENDATIONS

The 1988 trial fishery achieved its objectives despite the setbacks described earlier in this report. On the harvesting side, new fishing gear was tried and useful knowledge gained from the experience. A motorized hydraulic hauler was used for the first time, several different types and sizes of hooks were tried and several long line materials were used.

In addition, the existing HTA processing facility provided a useful location for the processing and marketing base for the fresh' and frozen products. A counterpart manager was trained in the correct methods of handling the fish and selling good quality products. Plant workers were trained in correct methods of filleting, skinning, freezing and packaging the products. Feed back from the product buyers was excellent, especially in terms of the quality of the product (see Appendix I, Letter from 'Les Aliments Auffrey Foods,' dated April 22, 1988).

The cost of raw material is the largest single operating cost. If the price paid to fishermen could be reduced from $0.90/lb to $0.60/lb., the cost of fillets is reduced by $0.64/lb. (at 47% yield fillet weight to H&G weight). There is scope for improvement in fishing productivity. If catch rates improve, income for the fishermen can increase and unit costs to the plant can decrease.

6.1 Proposed Improved Fishing Method

Using a three man fishing team and a two ice hole method, a longer line with more hooks can be used. DFO Newfoundland/ Labrador region have successfully tested a self propelled homing device under sea ice conditions. This simple device can simplify the initial setting up by pin pointing a location for the second hole. With the existing system, the length of the long line is limited by the glide angle of the 'kite' using the one ice hole method. With a two ice hole system, the length of line (and thus the number of hooks fishing) is limited only by the capability of the fishermen to work it (baiting, setting, hauling, bleeding and gutting fish).

Using a two hold system, two sets of long line (attached) would be used. While one is in the water fishing, the other is on the ice (where the fish are being removed, bled, gutted, headed and then redbaited).

The full potential of the hydraulic hauler could not be tried in 1988. The speed of the hauler was limited to about the same speed as was previously used in manual hauling. The fishermen could not haul faster for fear of losing some of their catch. A heavier line and larger hooks will reduce this problem and enable the hauling to proceed much faster.

Galvanized steel and plastic coated steel lines were tried.

Fishermen complained about the weight of the steel line causing it to sink in the muddy bottom (the best turbot fishing was apparently off mud bottoms). The preferred line is the plastic coated steel line and the preferred hooks are sizes # 2 and # 3 in the semi-circle type.

After fishing camp is set-up, the holes are cut and the lines are rigged. Table VIII is an approximation of the working cycle for the existing method and the proposed improved method.

Table" VIII indicates that a 2 man fishing team only works 4 to 5 man hours per fishing cycle (4.5 to 6.5 hrs). In other words the fishermen have only been working approximately one half the time. While the line is being fished, very little work is required. In addition, only one man is required for setting the line and hauling it.

Table VIII also illustrates the proposed two hole fishing method using a three man team. This method would require an attached double long line, two haulers instead of one and an extra snow-mobile. Using about 1600 feet of baited long line on each of two sections, a total of 520 hooks can be attached. The anchor lines at- each end would be shorter since the line does not have to be "flown" down with the metal 'kite'. The total length of line would not be much longer. up to 4,000 ft. of anchor line was used in the 1988 fishery.

TABLE VIII - FISHING ROUTINE AND PRODUCTIVITY

	1988 TRIAL METHOD			PROPOSED METHOD				
ACTIVITY	1988 TRIAL METHOD			LINE		LINE B		TOTAL
	~~TIME REQUIRED~~	~~NO. OF MEN~~	~~MAN HOURS~~	TIME REQUIRED	NO. OF MEN	ACTIVITY	NO. OF MEN	NO.MEN
BAIT HOOKS	0.25 HR.	2	0.5	0.5 HR.	3	FISH	NIL	3
SET LINE	1.0-1.5 HR.	1	1.0 - 1.5	0.5 HR.	1	HAUL UP	2	3
FISH	1.5-2.0 HR.	NIL	NIL	1.5-2.0 HR.	NIL	BAIT HOOKS) BLEED HEAD) GUT & BOX)	3	3
HAUL UP (Anchor Line)	1.0-1.5 HR.	1	1.0-1.5	0.25 HR.	1	SET LINE	1	2
HAUL UP (Hooked Line)	0.25 HR.	2	0.5	0.25 HR.	2	SET LINE	1	3
BLEED, HEAD, GUT & BOX	0.5 HR.	2	1.0	HR	3	FISH	NIL	3
TOTALS	4.5-6.5 HRS.	2	4.0-5.0	3.0-5.0 HRS.	1-3		1-3	3

	CURRENT METHOD	PROPOSED METHOD
Number of Hooks per Line	130	520
Number of Lines Fished per da	2	4
Catch per Day	300-500 lbs.	2400 - 4000 lbs
Number of Men per Team	2	3
Catch per Man per Day	150-250 lbs.	800 - 1300 lbs

Using the same productivity rates (lbs. per man hour) for baiting, bleeding, gutting, heading and boxing; and assuming the haul-up velocity can be doubled by using larger hooks and heavier lines; overall productivity could be increased to 1300 lbs./man/days. At this catch rate and a price of $0.70/lbs (H&G weight) sold to the new plant, the fisherman would earn over $600 per day.

6.2 Other Recommendations

Increasing the productivity of the fishermen will have the most significant impact on overall viability of the turbot fishery. The improved fishing method recommended in Section 6.1 should be tried in the 1989 winter season.

Other recommendations/observations are:

Investigations should continue in seeking markets for the by-catch (primarily sharks),

During periods of low landings of turbot (periods of bad weather or initial low catch rates) production should be supplemented with filleting of arctic char; as was done successfully during the 1988 trial fishery. With the established char market, plant viability would be enhanced.

More insulated fish boxes will be required for the 1989 fishing season in 1989.

Prices paid to the fishermen should reflect the market

conditions. Before the fishery begins an agreement should be reached with the fishermen to allow the landed price to fluctuate with the market price.

An experienced outside plant manager should operate the plant for the first two years (either the HTA facility or a new plant). Allowance has been made for the cost of this manager in the economic analysis.

Further study should be made to reduce shark damage (gear loss and catch loss). Potential repellents and/or shark detractants should be investigated (practices in other fisheries have achieved some success in this regard).

A prefabricated portable shelter should be purchased for trial (to erect over the fishing holes). The shelter should be large enough to allow fishing, gutting, etc. to be done inside. Some of the fishing activities could then be carried out in bad weather. Insulated sandwich panels are recommended. They are easy to erect and transport.

APPENDIX B

LIST OF PEOPLE CONTACTED IN IQALUIT AND PANGNIRTUNG

LIST OF PEOPLE CONTACTED IN IQALUIT AND PANGNIRTUNG

IQALUIT

Larry Simpson, Economic Development and Tourism
Mark Norsworthy, Municipal and Community Affairs
John Spencer, Municipal and Community Affairs
R.M. (Ron) Allen, Fisheries and Oceans
Lothar W. Dahlke, Fisheries and Oceans
Rick Moulton, Burdette - Moulton
Georges D'Aousr, Jomanic-Can Inc.
Jacques Belleau, Frobuild Construction Ltd.
Sandy Mongeau, Iqaluit Enterprises Ltd.
Brent Fyfe, Canadrill Ltd.

PANGNIRTUNG

Gary Magee, Economic Development and Tourism
Keith Colewell, Global Marine Ltd.
Kevin Smart, Plant Manager
Moe Keenainak, Pangnirtung Tourism Committee
Carlos DaSilva, Hamlet of Pangnirtung
Bill Killabuk, Hamlet of Pangnirtung
Jaypatee Akpalialuk, President, Pangnirtung HTA
Peter Kanayuk, Member - Pangnirtung HTA
Peterosie Qappik, Member - Pangnirtung HTA
Joanasie Maniapik, Member - Pangnirtung HTA
Tommy Evic, Member - Pangnirtung HTA
Penena Mossessee, Secretary - Pangnirtung HTA
Paul Sutherland, Director, Fisheries and Oceans
Loasle Anilniliak, Fisherman
Judas Akpalialuk, Fisherman
Thamosie Etuangat, Fisherman
Levi Evic, Fisherman

APPENDIX C

FIRST DFO PLANT INSPECTION REPORT

FISH PLANT REPORT FISHERIES AND OCEANS - SOUTHERN OPERATIONS DIRECTORATE/WESTERN REGION

Plant name PANG-AKULIK FREEZER. Location PANGNIRTUNG, N.W.T. Plant No. [ ] Reg.# [ ]

Operation type H, F, D, D, FI, FR Season J F M A M J J A S O N D Photos (Yes) No Time required 2.0 hours

Inspector No. 45 [ ] Inspection [ ] Followup Inspection [X] Survey [ ] Followup Team Survey

F.I.R. Section	Requirement	Comply	Not Comply	N/A	Description and Remarks
101	Floors - Wet work area		X		Salvaged panels, Not shaped T.D.
242	Floors - Clean				N.O
102	Floors - Dry work area			X	
103	Drains - Adequate, Covered		X		NO DRAINS
104	Walls - Wet area				
135	Ceilings - Processing area		X		
115	Lighting - Adequate, Covered		X		
105	Ventilation - Adequate		X		
106	Toilets - Types/numbers	X			
107	Toilet room doors - self closing	X			
206	Toilet facilities maintained				N. O.
108	Handwash facilities - approved		X		
202	Handwashing - each abscence				N-O.
137	Hand covering dips - provided		X		
240	Handcoverings clean and disinfected				N-O
109	Process water - approved/pressure	X			sampled yes/no PPM Cl2 [ ]
136	Hot water - at least 43°c	X			
235	Fish washed - prior to processing				N. O
236	Ice - approved		X		sampled yes/no Required
112	Offal containers - approved		X		
208	Offal/refuse - removed daily				N. O
209	Offal containers - approved		X		
207	Sewage disposal - approved				N. O.
113	Conveyors - approved			X	
142	Conveyor belts - spray/scraper			X	
114	Fish flumes - approved/cleanable			X	
110	Equipment frames - approved				Required to comply.
111	Tables - approved/cleanable		X		
138	Processing boards - approved				Required
139	Other fish contact surfaces				Refused to comply.
140	Containers/utensils - approved				Refused to comply.
141	Fish tubs/containers - approved				Refused to comply.
243	Utensils - clean, disinfect, stored				N. O
244	Fish contact equipment - clean				N-O.
201	Employee health - satisfactory				N. O
205	No smoking/spitting - work area				N-O.
204	Garments - clean				N-O-
241	Garments/headgear - worn/proper type				N-O.
210	Animals - not allowed				N.O.
211	Pest control - adequate/materials				N.O
212	No unecessary equipment - work area				N. O.
213	Plant surroundings - clean				N-O.
214	Cleaning equipment - available				Required.
245	General maintenance - satisfactory				N. O.
145	Contact freezer - adequate			X	
146	Blast freezer - adequate				N. O
401	Cold storage - adequate temp.				N-O.
149	Ingredient storage - adequate			X	

OVERALL PLANT CLASSIFICATION RATING A B C D ACTION LEVEL

- Corrective action (please print)

F.I.R. Section		Correction date YY/MM/DD
101		

ABOVE DEFICIENCIES ACKNOWLEDGED BY _____, POSITION _____

Form PS-100 (83/4/1) , Inspection date 870114 YY/MM/DD

No " " 985

APPENDIX D

APPLICATION FOR DFO PLANT REGISTRATION AND RELATED CORRESPONDENCE

Government of Canada / Gouvernement du Canada

MEMORANDUM NOTE DE SERVICE

TO / A: r Mr. W.E. Beggs 1-′
Manager, Inspection and Field Services
Dept. Fisheries & Oceans
Freshwater Institute
Winnipeg, Manitoba -J

FROM / DE: 1
P. Bobinski
Manager,
Inspection and Field Services .
N.W.T. District -1

SECURITY -CLASSIFICATION - DESÉCURITÉ
OUR FILE– N/REFERENCE
YOUR FILE – V/REFERENCE
DATE: January 15, 1987

SUBJECT / OBJET: PANGNIRTUNG PROCESSING FACILITY

The Pangnirtung Hunters and Trappers Association, with the advisory/support agencies, has requested registration of the freezer/processing facility, with exemptions, in conjunction with **a** test fishery to develop a processing operation and look at export markets.

This 'test' operation would be a minimum two year duration. The anticipated operating periods would be March to April and July to September. -The species considered are turbot, 6 - 15,000 Kgs, and scallops, approximately 10,000 Kgs of meat.

Production capacity of the plant would be approximately 1 - 2,000 pounds per day. The limiting factor will be the capacity of the freezing units. Operation type is everything from selling fresh and frozen **in** the dressed form to filleting, freezing, and steaking.

The plan is to test the harvest stocks available, the processing capabilities of the parties involved and the market capabilities of the product. Should all aspects prove favorable then the plans are to proceed with the construction of a 'registered' processing facility.

A brief physical description of the present facility:

A Bally type freezer unit.
Outside dimensions - 30′ x 38′.
Freezer Room - 20′ x 30′ .
Freezer Unit - Blast freezer/holding.
Cold Temperature capability - Minus 25°F - 30°F
(Distributor claim)

. . ./2

Processing room - 17′ 10″ x 23′ 6″

Compression room - 6′ 3″ x 12′

Washroom - 6′ 3″ x 5′ 6″

Floor construction - 4′ x varying length insulated galvanized panels with rubber gaskets between panels.

No drain provisions' not sloped to drain, no floor/ wall coving. Walls and ceilings - enamel panels, painted, with rubber gaskets.

Open metal truses and beams along ceiling.

Ceiling height - 94″. Height to bottom of beams - 82″.

Electrical power for the building is from the community power source.

Water supply - 2 holding tanks, approximately 150 gallons per tank.

Self contained pressure system.

Self contained hot water system.

Two refrigerator units. Cold temperature.

Capacity - according to supplier - "Hussman" from Brantford, Ontario is -25°F to -30°F.

The attached correspondence to Peteroosie Qarpik, Chairman, Pangnirtung Hunters and Trappers Association, details the corrections/improvements required for an approved facility.

I am recommending, contingent upon compliance of conditions, registration of the planned facility with the following exemptions:

1. Ceiling height.
2. Enclosing of open beams and truses. Enclosing of these would have a direct bearing on the lighting in the plant.
3. Floor - galvanized aluminum panels - not sloped to drain. Exemption on the slope, if jacking of the facility is not feasible. Panelled sections and grooves may not provide for proper drainage and easy cleaning.

Polaroid photographs, #1 - 13 depict the condition of the facility, survey, January 14, 1987.

P. Bobinski

c.c.: See attached.

"C. C. : G. McGee, GNWT, Pangnirtung
L. Simpson, GNWT, Iqaluit
M. Hoppe, GNWT, Pangnirtung
S. Green, Health Officer, Iqaluit
L. Gambrel, DFO, Winnipeg
R. Allen, DFO, Iqaluit

Government of Canada / Gouvernement du Canada

Fisheries and Oceans / Pêches et Océans

Inspection and Field Services
N.W. T. District
P.O. Box 1008
HAY RIVER, N. W.T.
XOE ORO
January 15, 1987

Your file / Votre référence

Our file / Notre référence

Mr. Peteroosie Qarpik
Chairman, Pangnirtung Hunters & Trappers Assoc.
Pangnirtung, N.W.T.
XOA ORO

Dear Mr. Qarpik:

On Wednesday, January 14, 1987, at a Hunters and Trappers Association meeting in Pangnirtung, attended by H.T.A. members , and Department of Fisheries & Oceans and Government of the N.W.T. personnel, use of the new freezer facility in Pangnirtung for the purpose of processing fish for export was discussed.

The purpose of this letter is to identify briefly, the conditions of usage regarding a registered facility and outline the corrections/improvements required in order that the facility might meet registration standards pursuant to the requirements of the Fish Inspection Regulations.

In order that fish be allowed for export, all processing of such fish must be carried out in a facility registered pursuant to the authority of the Fish Inspection Regulations.

The use of the facility in question, for a dual purpose, ie; processing of, and storage of fish and meat was discussed. Fish and other products are not to be processed in the plant at the "same time. This department has no objection to the processing of products in the plant after a season of fish processing has been 'completed. Prior to re-commencement of processing of fish, following processing of a product other than fish, a satisfactory clean-up, followed by an inspection by this department will be required.

Regarding the storage of fish and meat products in the freezer, a physical barrier would be required in the freezer to keep the fish separate from any other product, and the non-fish products would have to be adequately packaged.

Please be advised also of the Freshwater Fish Marketing Corporation's authority with regards to the trade of freshwater fish, should you decide to process such species.

Further terms of usage, including exemptions recommended, is outlined in the attached correspondence to W.E. Beggs of this department.

The results of the plant inspection" and corrections/improvements identified are as follows:

PROCESSING AREA

1. Floors - construction is of a heavy gauge galvanized panelling, with rubber gaskets between the panels; with no adequate slope or drainage provided. A proper drainage system is required. The rubber gaskets between the panels are to be trimmed as low as possible and the grooves to be filled with a suitable compound.

   An attempt at improving the slope of the flow might be considered by jacking at" the outside perimeters of the processing room. Caution is to be exercised here so as not to structurally damage the building by jacking.

2. Drains - adequate drains with proper covers are required.

3. Walls - of painted enamel panels, with rubber gaskets. The gaskets are to be trimmed as much as possible.

4. Floor/wall joints adequate coving is required.

5. 'Ceiling - enamel panels -' satisfactory. Height, open beams, and truses; recommendations as per attached.

6. Lighting - flourescent bulbs to be covered.

7. Ventilation - satisfactory ventilation to be provided.

8. The oil space heater to be removed, oradequately safeguarded against oil spilling on the floor.

9. Hand wash facilities, including a sink with hot and cold water, single service disposable towels and soap in a dispenser, are required in the processing area.

10. A facility for a hand covering disinfectant is required in the processing area.

11. Adequate fish washing facilities are required.

12. A sufficient supply of approved ice is required for the fresh fish operation.

13. Approved offal containers with tight fitting lids are required.

all done

14. Equipment frames are to be constructed of an approved material and maintained in a satisfactory condition.

15. All fish contact surfaces are to be constructed of an approved material such as stainless steel, no corrodible material, or wood, is to be used.

16. Processing boards to be constructed of an approved material, a rubber composition, or similar material is recommended. ,

17. All equipment and equipment frames to be constructed of an approved material and to be constructed so as to be readily cleanable.

18. All containers and utensils to be of an approved material.

19. Fish tubs/containers to be of an approved material, with adequate drainage where required.

20. Sufficient cleaning equipment is required.

21. Recommend that an in-line chlorination system be installed to provide for adequate equipment disinfecting.

22. An adequate freezing capacity and holding temperature is required.

23. Recommend the installation of a ledge in the doorway between the processing area and the freezer to prevent the flow of water into the freezer.

24. The attached Fish Plan Report form of which many points have been identified and expanded on, further details requirements surrounding the operation of a fish processing facility.

Contingent upon the satisfactory completion of the items identified, and recommended exemptions granted, a final facility inspection by a representative of this department to determine regulatory compliance will be necessary prior to commencement of processing for export.

Should you have any questions or require an explanation on any of the above as mentioned, please contact my office at:

P.O.Box 1008,
HAY RIVER, N.W.T.
XOE ORO
Phone (403) 874-2334

OR:

Ron Allen, Area Manager,
Dept. Fisheries & Oceans,
P.O.Box 358,
IQALUIT, N.W.T.
XOA OHO
Phone (819) 979-5966

Yours truly,

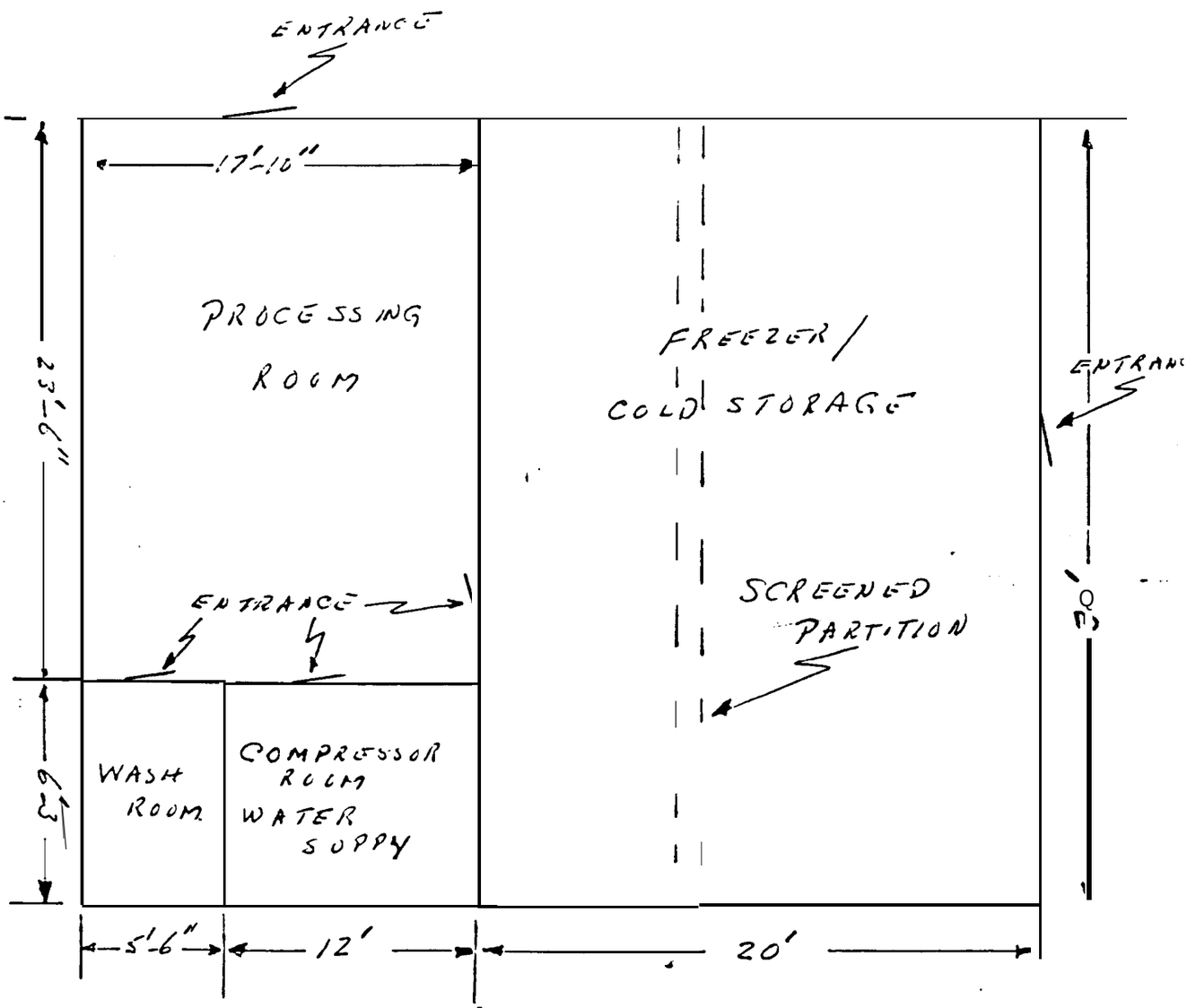
Pat Bobinski,
Manager.

Cc: G. McGee, GNWT, Pangnirtung
L. Simpson, GNWT, Iqaluit
M. Hoppe, GNWT, Pangnirtung
S. Green, Health Officer, Iqaluit
W.E. Beggs, DFO, Winnipeg
R. Allen, DFO, Iqaluit
L. Gambrel, DFO, Winnipeg

PANGNIRTUNG AKULIK FREEZER

FLOOR PLAN JAN 14, 1987

NOT TO SCALE



APPENDIX E

—

1988 **DFO PLANT INSPECTION REPORT**

FISH PLANT REPORT FISHERIES AND OCEANS - SOUTHERN OPERATIONS DIRECTORATE/WESTERN REGION

Plant nome AKUSIK Freezer LOC~tiOll&:<N'T [illegible] NWT Plant No. [ ] Reg.# [ ]

*ration type N/O Season J F M A M J J A S O N D Photos Yes/No Time required 4.0 hours

Inspector No. 44 ☑ Inspection ☐ Followup Inspection ☐ Survey ☐ Followup Teem Survey

F.I.R. Section	Requirement	Comply	Not Comply	N/A	Description and Remarks
101	Floors - Wet work area	✓			
242	Floors - Clean	✓			
102	Floors - Dry work area			✓	
103	Drains - Adequate, Covered	✓			
104	Walls - Wet area	✓			
135	Ceilings - Processing area	✓			
115	Lighting - Adequate, Covered	✓			
105	Ventilation - Adequate	✓			
106	Toilets - Types/numbers	✓			1 - Flush
107	Toilet room doors - self closing	✓			
206	Toilet facilities maintained	✓			
108	Handwash facilities - approved	✓			
202	Handwashing - each abscence			✓	
137	Hand covering dips - provided			✓	
240	Handcoverings clean and disinfected	✓			
109	Process water - approved/pressure	✓			sampled yes (no) PPM Cl2 0.8
136	Hot water - at least 43°c	✓			
235	Fish washed - prior to processing			✓	
236	Ice - approved			✓	sampled yes (no)
112	Offal containers - approved	✓			
208	Offal/refuse - removed daily			✓	
209	Offal containers - approved	✓			
207	Sewage disposal - approved	✓			municipal
113	Conveyors - approved			✓	
142	Conveyor belts - spray/scraper			✓	
114	Fish flumes - approved/cleanable			✓	
110	Equipment frames - approved	✓			
111	Tables - approved/cleanable		✓		Approved cutting Tables required
138	Processing boards - approved	✓			
139	Other fish contact surfaces	✓			
140	Containers/utensils - approved	✓			
141	Fish tubs/containers - approved	✓			
243	Utensils - clean, disinfect, stored	✓			
244	Fish contact equipment - clean	✓			
201	Employee health - satisfactory	✓			
205	No smoking/spitting - work area	✓			
204	Garments - clean	✓			
241	Garments/headgear - worn/proper type	✓			
210	Animals - not allowed	✓			
211	Pest control - adequate/materials	✓			
212	No unecessary equipment - work area	✓			
213	Plant surroundings - clean	✓			
214	Cleaning equipment - available	✓			
245	General maintenance - satisfactory	✓			
145	Contact freezer - adequate			✓	
146	Blast freezer - adequate	✓			
401	Cold storage - adequate temp.	✓			
149	Ingredient storage - adequate			✓	

OVERALL PLANT CLASSIFICATION RATING (A) B C D ACTION LEVEL II

Corrective action (please print)

F.I.R. Section		Correction dote YY/MM/DD
111	Approved cutting Tables required	88 10-29

ABOVE DEFICIENCIES ACKNOWLEDGED BY KEVIN Smart POSITION Project Manager

Form PS - 100 (83/4/1) Inspection date 88 02 25 YY/MM/DD № 1132

APPENDIX F

INVENTORY OF EXISTING PLANT

1NVENT0R% OF EXISTING EQUIPMENT AT THE PLANT

1 - Two section stainless steel sink
2 - Chlorinator, Liquid metronics, Model A151-190S, 110V 50/60 cycle
3 - Two - 125 gal storage water tanks, plastic, Equinox Model E-125W
4 - Electric hotwater heater / tank
5 - One domestic water pump Jacuzzi Model 3C-H25-S1/4, 1/3 HP
6 - Two 3 H.P. Hussman, Model H545 RLK, refrigeration compressor, complete with evaporators, Copelmatic Model MRB1-0500-TFC
7 - Two hardwood laminated tables with s.s. legs, size 21" wide x 6' long
8 - One s.s. table 24" x 6' long
9 - One kold draft ice crusher, Model T-10 Cap. 50 lbs/man hr.
10 - One s.s. table 3" deep with drain size 3' x 5'
11 - One Hobart meat grinder model 4812
12 - One Hobart band saw model 5212
13 - Eight filleting knives 6"
14 - Ten tote boxes, capacity 100 lbs
15 - Eight Xactic 9 cu.ft. insulated fish boxes with covers
16 - One hand sealer for plastic bags
17 - One shrink wrapping machine with heat sealing pad
18 - One TEC scale model SL37 capacity 6 x .005 kg.
19 - 400 master cartons 36" x 15" x 11" cap. 75 lbs
20 - One roll poly bags for master cartons approx 350 bags

APPENDIX G

PLANT UTILITIES AND COSTS

MUNICIPALITY AND COMMUNITY AFFAIRS
24-124-804

December 22, 1987

Larry Simpson
Economic Development
Officer Resources

PANGNIRTUNG FISHERIES DEVELOPMENT
WATER AND SANITATION FACILITIES

The recently completed reservoir which was designed to meet the communities twenty year demand has a capacity of at least 72 million litres which should indicate that your maximum demand of 2 million litres annually could easily be met by the reservoir facility itself in the long term.

The community plan shows the proposed fish plant to be located in the old gravel pit area which will soon be cleaned out as a gravel pit due to heavy demand. The method of water distribution is via 1000 gallon water trucks that fill up at the reservoir truckfill station. There, pumps deliver 1000 litres per minute and will fill the truck in 4.5 minutes. These vehicles are purchased by the G.N.W-T. as needed and turned over to the Hamlet as they manage the water distribution system. A private company could operate their own trucking system. Road conditions, layout and grades dictate the maximum truck size to be used, as well as both the truckfill station and bridge crossing design.

Consideration should be given and provisions made in your proposal to facilitate the construction of a long term water pipeline from the reservoir to the fish plant; depending on the scale and timing of such an operation. An interrupted water supply may be an operational requirement. This infrastructure is clearly the responsibility of the Department of Economic Development & Tourism and as such needs to be programmed into your Capital Plan.

Should the short term decision be made to utilize the water truck delivery system, the Hamlet and our Department will have to assess the implications - particularly with respect to the need for an additional water truck. The Department of Economic Development & Tourism will have to provide details of the operation as soon as they are available. Currently our Departmental Capital Plan does not include funding for an additional water truck prior to **1990/91. The factor that went into shaping our Capital Plan obviously did not include a fish processing operation.**

Under the water & sanitation program the following water rate is expected which includes sewage pickup;

Economic 'Rate $ 0.04 per litre

(subject to change on short notice)

The water use in N.W.T. is monitored or overseen by the N.W.T. Water Board which governs through the Northern Inland Waters Act. The board has the authority to waive the licensing process in order to issue a permit if they consider this demand minor in nature. Nevertheless, the board will require an application to be submitted so the decision can be made. The board is advised by their Technical Advisory Committee in the licensing process and they review all impacts on the public, environment, existing and future facilities, etc. Obtaining a license is an easy, but sometimes a time consuming process. As an aside, the Hamlet now requires a proper development permit to be obtained prior to commencing construction.

Besides water demand, one must analyze the demand on the sewage, solid waste and power systems and other components of the community infrastructure.

Combustible wastes are burned at the incinerator station which is operated by the Hamlet and supervised routinely by the Department of Public Works. Residue from the incinerator and other non-combustible wastes are disposed of at the dumpsites by burial at the solid waste site with heavy metals (vehicle chassis) being the exception. The heavy metals dumpsite is the second disposal site mentioned. The sewage wastes which consist of honeybags, which are from the older homes, is one sewage component with the direct discharge from the sewage trucks being the second sewage component. The honeybags are buried and the sewage discharged is allowed to percolate to the sea. As one can see the existing disposal area has limited capacity and treatment. The effluent and fish parts from a fish packing plant could be; discharged via an outfall pipe into deeper waters beyond the tidal flats (at great expense); disposed of by processing the plant waste; disposed of by expanding the present disposal sites and upgrading them; or a combination of the above.

The above mentioned items and tasks are common place for any major project, the challenge they represent is easily overcome given good planning and communication. As for power requirements, estimate your demand and notify NCPC of your potential needs, they will take it from there. Good luck with your plan and I hope it materializes soon. Should you have any further questions please call me at 979-5364. Thank you.

John Spencer
Municipal Engineer

Cc. Tim Smyth
Senior Projects Engineer,
Regional D.P.W.

Andy Swiderski
Assistant Superintendent,
M.A.C.A.
Ken MacRury
Regional Director
Baffin Region, N.W.T.

Attachment
JS/dr

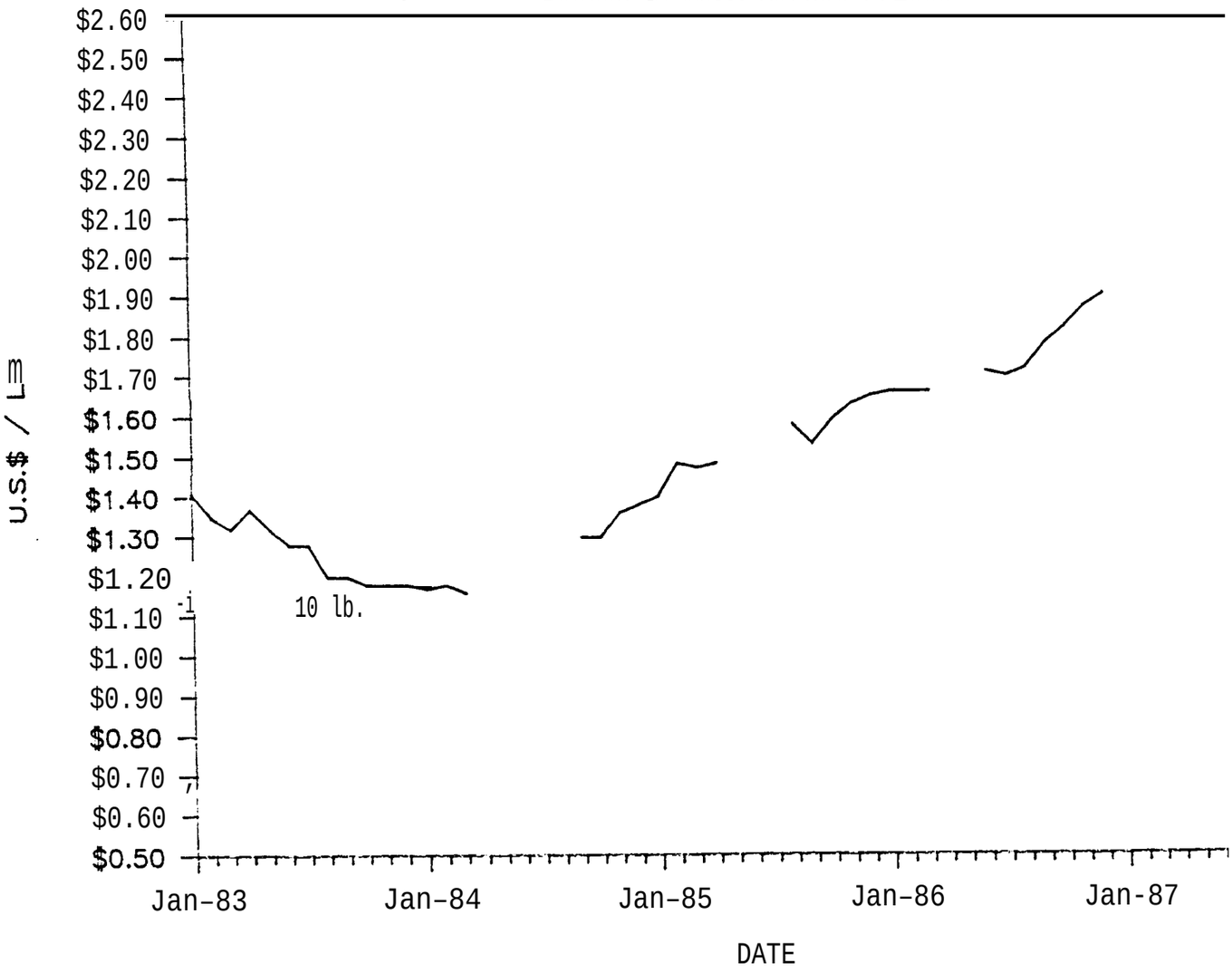
APPENDIX H

MARKET PRICES FOR FROZEN TURBOT

1983 - 1988

GREENLANDTURBOT

Boston Bluesheet Market Prices



Date :88-05-05

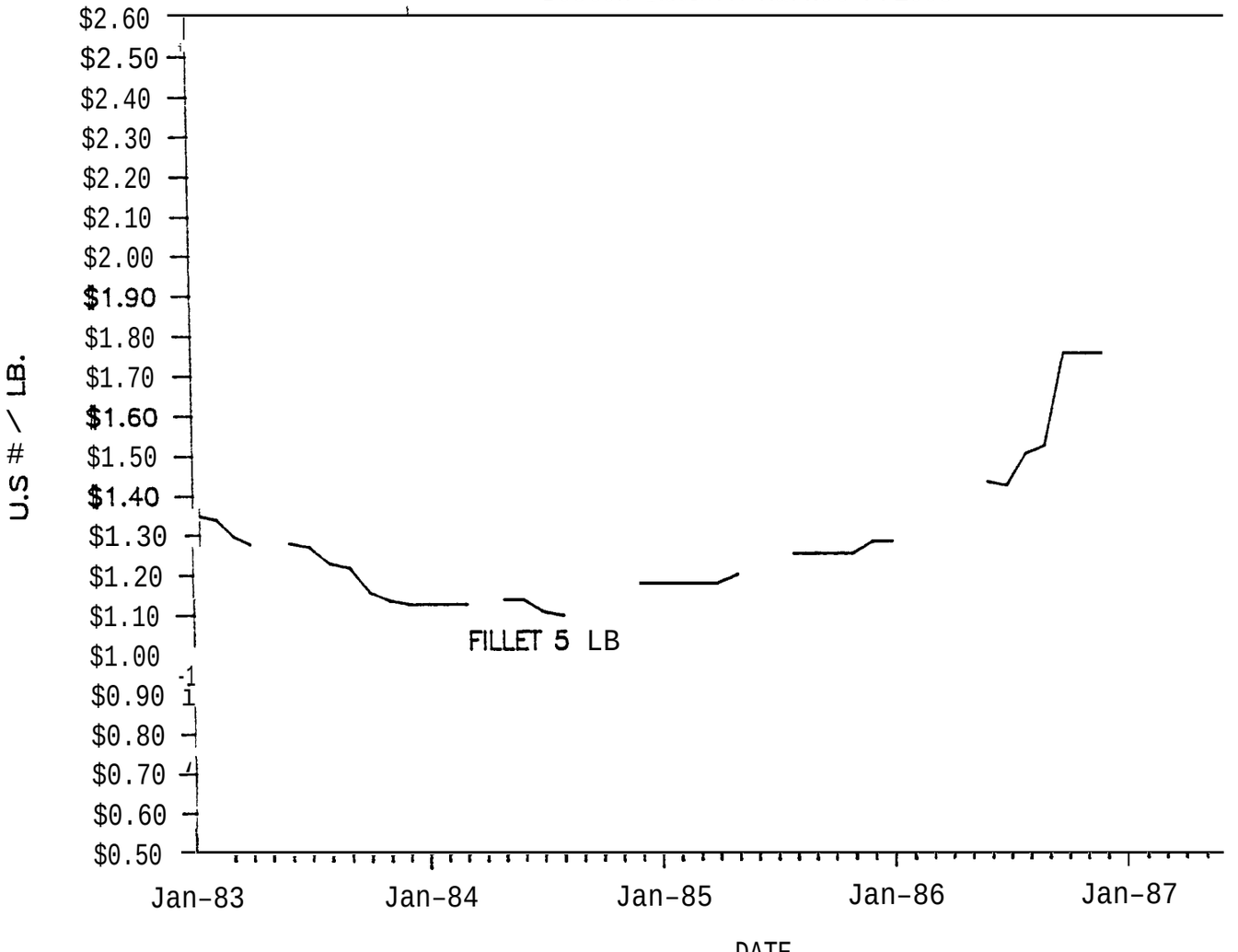
GREENLAND TURBOT 10 LB. L.P.

MONTHLY AVGS.

1988	1987	1986	1985	1984	1983
2.50	**NA**	**1.66**	**1.40**	**1.17**	**1.41**
NA	**NA**	**1.66**	**1.48**	**1.18**	**1.35**
2.28	**NA**	**1.66**	**1.47**	**1.16**	**1.32**
NA	**NA**	**NA**	**1.48**	**NA**	**1.37**
0.00	**NA**	**NA**	**NA**	**NA**	**1.32**
0.00	**NA**	**1.71**	**NA**	NA	1.28
0.00	NA	1.70	NA	NA	1.28
0.00	NA	1.72	1.58	NA	1.20
0.00	NA	1.78	1.53	1.30	1.20
0.00	NA	1.82	1.59	1.30	1.18
0.00	NA	1.87	1.63	1.36	1.18
0.00	2.50	1.90	1.65	1.38	1.18

GREENLANDTURBOT

Boston Bluesheet Market Prices



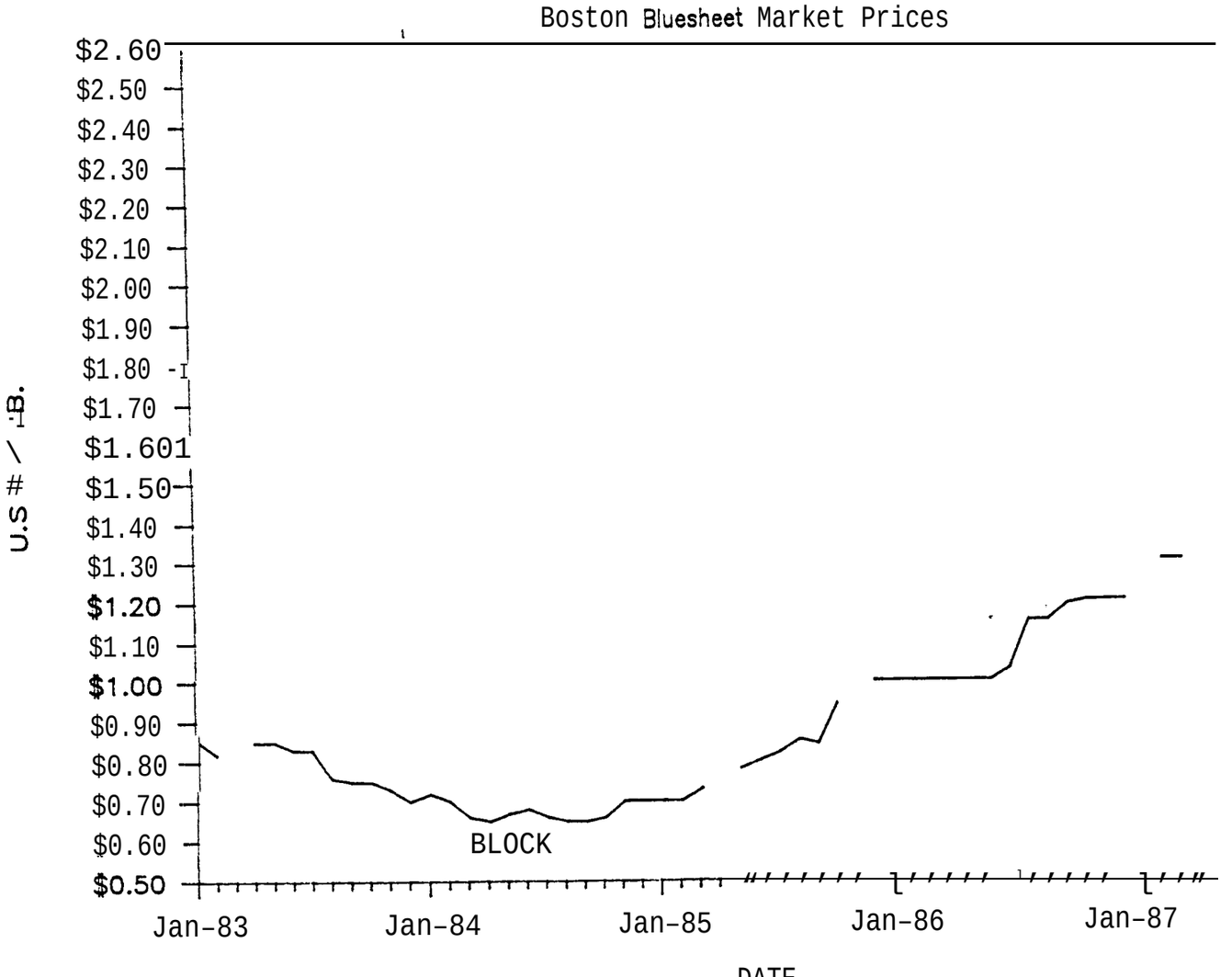
Date :88-05-05

GREENLAND TURBOT 5 LB.

MONTHLY AVGS.

1988	1987	1986	1985	1984	1983
2.25	NA	1.28	1.18	1.13	1.35
1.95	NA	NA	1.18	1.13	1.34
1.93	NA	NA	1.18	1.13	1.30
1.88	NA	NA	1.18	NA	1.28
0.00	NA	NA	1.20	1.14	NA
0.00	NA	1.43	NA	1.14	1.28
0.00	NA	1.42	NA	1.11	1.27
0.00	2.30	1.50	1.25	1.10	1.23
0.00	2.30	1.52	1.25	NA	1.22
0.00	NA	1.75	1.25	1.09	1.16
0.00	NA	1.75	1.25	NA	1.14
0.00	2.25	1.75	1.28	NA	1.13

GREENLANDTURBOT



Date :88-05-05

GREENLAND TURBOT BLOCK

MONTHLY AVGS.

1988	1987	1986	1985	1984	1983
NA	1.20	1.00	0.70	0.72	0.85
NA	NA	1.00	0.70	0.70	0.82
0.00	1.30	1.00	0.73	0.66	NA
0.00	1.30	1.00	NA	0.65	0.85
0.00	NA	1.00	0.78	0.67	0.85
0.00	NA	1.00	0.80	0.68	0.83
0.00	1.58	1.03	0.82	0.66	0.83
0.00	1.58	1.15	0.85	0.65	0.76
0.00	1.58	1.15	0.84	0.65	0.75
0.00	1.53	1.19	0.94	0.66	0.75
0.00	NA	1.20	NA	0.70	0.73
0.00	NA	1.20	1.00	0.70	0.70

TURBOT - FILLET

Market Condition - At present, the market is weak in light trading with hardly anything moving; no sales of any consequence being made. Reported that all packs of turbot may be in trouble due to current substantial cold storage holdings. However, smaller sizes **have** more of a chance of moving than larger sizes. Most traders and wholesalers report that turbot even at current low prices is not a good buy. Some large companies are reported to have high inventories. Market outlook is for lower prices, as markets are currently unsettled.

Price - U.S. - Layer pack - Truckload sales reported to be in the $1.55-1.60 (U.S.) price range, with small lots moving at $1.65 (U.S.). Some reported to be getting $1.80 (U.S.).

- I.Q.F. - Most $1.60-1.80 (Us.).

Inventories - April 22, 1988 - 2.67 million lbs.; month before . million bs.; year ago .37 million lbs.

TURBOT - FILLET

Market Condition The turbot fillet market is not good at the present time. What had been a hot item has come down considerably. Supplies are currently plentiful, as the market moves lower. In addition to having the Japanese product back on the market, U.S. buyers see turbot coming from Newfound Resources & U.S.S.R. However, while prices have weakened, it is still difficult to move production. I-t is hoped that once existing flounder inventories are depleted market demand for turbot will improve.

Price Us. - 5 lb. pack - Most $1.80-1.90 (U.S.)/lb.

Layer pack - Some sales $1.80-1.95 (U.S.); some receiving as high as $2.00 (U.S.) and even a low of $1.70 (U.S.) reported.

I.O.F. Most $1.90-2.00 (U.S.).

Inventories - Jan. 29, 1988 3.6 million lbs.; month before 3.8

TURBOT - FILLET

Market Condition - Although current inventories are tight, the market for turbot fillets, at present, is reported to be unsettled, especially for layer packs. One reason is the reported earlier selling of a large volume of layer pack fillets for $1.95 (U.S.), which was then well below most market asking prices. However, some companies are reported to be holding firm until the New Year, when most of current flounder inventories should be sold. There still is concern in the marketplace regarding the amount of offshore turbot that may be caught. There is also a rumour that there may be a vast amount of Korean caught turbot due to hit the U.S. market early in the New Year. Both are making some people nervous and these people may look at freeing up some of their inventories sooner than anticipated.

Price - Us. - Layer Pack - Most sales vary between $1.95-2.15; some able to get higher. Year ago $1.75-1.95 (Us.).

Competition - Iceland - Reported to be getting $2.20-2.30 (U.S.) if sales are made.

- I.Q.F. - $2.25-2.35 (U.S.), depending upon size.

Inventories - November 27, 1987 - 3.6 million lbs.: month before lbs.

TURBOT - FILLET

Market Condition - The current market for turbot fillets is. about steady. Inventories continue to be light. However, market prices may move higher in the near term, as inventories become tighter. Demand continues to be good for the supplies that are available.

Price -Us. - 5 lb. - Some buying at $2.30 (U.S.) price range. year ago $1.50-1.55 (U.S.)/lb.

Layer Pack - Most sales $2.30-2 .40 (U.S.), depending upon size. Year ago $ 1.75-1.80 (Us.).

Competition - Iceland - $2.25-2.30 (U.S.).

I.Q.F. - 10 lb. - $2.25-2.50 (U.S.),' depending upon size.

Inventories - Sept. 11, 1987 - 3.03 million lbs.; month before 1.3 million bs.; year ago 1.46 million lbs.

TURBOT - FILLET

Market Condition - Market price continues to be strong for the limited supply that is available. However, the market at present is mixed as supplies are now starting to improve, but not enough to satisfy existing demand. Current high market prices are primarily a result of shortages.

-.Price - u.s.- 5 lb. - not enough sales taking place to determine a market price.
year ago **$1.40-1.45** (U.S.)/lb.

Layer Pack - Most sales $2.50-2.60 (U.S.) price range.
Year ago $1.70-1.71 (U.S.).

Inventories - May 15, 1987 - 348,000 lbs.; month before 393,000 lbs.; year ago 628,000 bs.

TURBOT - FILLET

Market Condition - Market is said to be currently very 'hot' for the limited supply that is available, as inventories are almost exhausted. Current market prices are strong.

Price - Us. - 5 lb. - year ago $1.30-1.45 (U.S.)/per lb.

- Layer Pack - Most sales $2.50-2.60 (U.S.); Few as high as $2.70 (U.S.). Year ago $1.60-1.70 (U.S.).

Inventories - March 27, 1987 - 441,000 lbs.; month before **637,000** lbs.; year ago 1.2 million lbs.

TURBOT - FILLET

Market Condition - Market prices remain high as supplies are about'" nil; should remain so for the near term.

Price - U.S. - Sib.. Some $1.75 (U.S.), **Up** from $1.50-1.55 (U.S.). Year ago $1.25 (U.S.).

- Layer pack - Some $1.85 (U.S.), up from $1.75-1.85 (U.S.); year ago $1.60-1.68 (U.S.)*

- Competition - Japan 25 lb., boneless and skinless - $1.75-1.85 (U.S.).

Japan - In September, Atlantic turbot was selling in the price range of $1.17-1.47 (U.S.) per lb.

Inventories - November 28, 1986 - 1.3 million lbs.; Year ago 3.5 million bs.

TURBOT - FILLET

Market Condition - Although this year's fishing has been poor and supplies remain light, the market should continue the same for the near term, firmer somewhat by late fall or early winter as the demand becomes greater.

Price - 5 lb. - Most $1.50-1.55 (U.S.), up from $1.35-1.50 (U.S.) price range at the beginning of summer. Year ago $1.25 (U.S.).

Layer pack - $1.60-1.75-1.80 (U.S.), depending upon size and quality. Year ago $1.50-1.55 (U.S.).

- Competition - 25 lb. boneless and skinless - $1.75-1.85 (U.S.), up from $1.55-1.60 (U.S.) in June.

Inventories - Sept. 5, 1986 - 1.4 million lbs.; year ago 2.6 million lbs.

Comments - Japan - The Canadian government has provided Japan with an additional 1,000 m.t. allocation of Greenland turbot, bringing the total allocation to 39,000 m.t. The additional tonnage was the result of the Japanese-Canadian fisheries talks held in Ottawa recently, when the Japanese made the request in view of very poor redfish catches this year.

TURBOT - FILLET

Market Condition - Market prices should remain firm throughout the summer: inventories, which are light, should improve during upcoming months but not enough to have any major impact to cause price reductions.

Price - 5 lb. - Most $1.35-1.50 (U.S.), with $1.40-1.43 (U.S.) price range being the average. Year ago - $1.20 (Us.).

- Layer pack - $1.50-1.65-1.70 quality and size. 'u-s") ' "pending '"'.

- Competition - Japan - 25 lb., boneless and skinless - $1.55-1.60 (U.S.).

Inventories - June 6, 1986 - 336,000 lbs.; year ago 741,000 lbs.

TURBOT - FILLET

Market Condition	Market prices holding steady; short supplies should continue until new fishery begins-in the North Atlantic.
Price	5 lb. - Most $1.30-1.35 (U.S.). year ago $1.15-1.20 (U.S.). Layer pack - $1.55-1.60-1.70 (U.S.), depending upon quality and size. Competition - Japan - 25 lb., I.Q.F., boneless and skinless - $1.25-1 .40 (U.S.).
Inventories	April 11, 1986 - 1.2 million lbs.; year ago 1.1 million lbs.
Outlook	Outlook is for improved supplies during coming months; market prices should then ease a little.

TURBOT - FILLET

Market Condition	Market prices are firm; short supplies should exist until late spring.
Price	5 lb. Some $1.30 (U. S.) ; some as high as $1.35 (U.S.). Year ago $1.15-1.20 (U.S.). Layer pack $1.55-1.70 (U.S.) , depending upon quality and size. Competition Iceland - 5 lb. - $1.25-1.30 (Us.). Layer pack - "$1.35-1.40 (U.S.)* Japan - 25 lb. , I.Q.F., boneless and skinless - $1.25-1.40 (Us.).
Inventories	Feb. 21, 1986 - 2.1 million lbs.; year ago 1.9 million bs.

TURBOT - FILLET

Market Condition	Market about steady; market prices should remain firm, as no improvement in supply is expected until Spring.
Price	Us. - 5 lb. $1.50-1.70 (U. S.) (one source); year ago $1.30 (U.S.) Layer pack - $1.90-2.10 (U.S.); year ago $1.60-1.70 (U.S.). Competition - Japanese 25 lb. boneless & skinless - $1.75-1.85 (U.S.).
Inventories	Jan. 30, 1986 -'1.06 million lbs.; year ago 2.3 million lbs.

TURBOT - FILLET

Market Condition - Market prices should stay firm; supplies are tight; no near term improvement expected.

Price
- 5 lb. - $1.25-1.30 (U.S.); year ago" $1.10-1.15 (Us.).
- Layer pack - $1.60-1.70 (U.S.), depending upon quality and size.
- Competition - Iceland - 5 lb. - $1.25 (U.S.)
  - Layer pack - $1.25-1.30 (U.S.)
  - Japan - 25 lb., I.Q.F., boneless and skinless - $1.25-1.40 (U.S.)*

Inventories - Jan. 3, 1986 - 3.2 million lbs.; Year ago 3.1 million lbs.

Outlook - Present frozen inventories are expected to decrease during the coming months as catches are not expected to keep up with demand unless stronger buyer resistance sets in.

TURBOT - FILLET

Market Condition - Market is becoming stronger; market prices are expected to move higher by early winter. Supply should remain light.

Price
- 5 lb. - $1.25 (U.S.); year ago $1.08-1.10 (U.S.).
- Layer pack - $1.55-1.65 (U.S.), depending upon quality and size.
- Competition - Iceland - 5 lb. - $1.25 (U.S.)
  - Layer pack - $1.25-1.30 (Us.)
  - Japan - 25 lb., IQF, boneless and skinless - $1.25-1.40 (Us.).

Inventories - Oct. 25, 1985 - 3.7 million lbs.; year ago 4.4 million lbs.

Outlook - Although Japanese fishing vessels are currently having good catches of Greenland turbot, it is not enough to make much of an improvement in U.S. inventory holdings.

APPENDIX I

LETTER FROM 'LES ALIMENTS AUFFREY FOODS' DATED

APRIL 22, 1988

Les Aliments AUFFREY Foods
COURTIER EN ALIMENTATION / FOOD BROKERS

271 RUE QUEEN, SUITE 201, MONTRÉAL, QC H3C 2N7
TÉL.: (514) 861 -4085
FAX : [514)284-2282
TLX:055-62171 MTL

April 22, 1988

Economic Development and Tourism
Iqaluit, N.W.T. XOA OHO

Attention: Mr. Larry Simpson

Dear Mr. Simpson:-

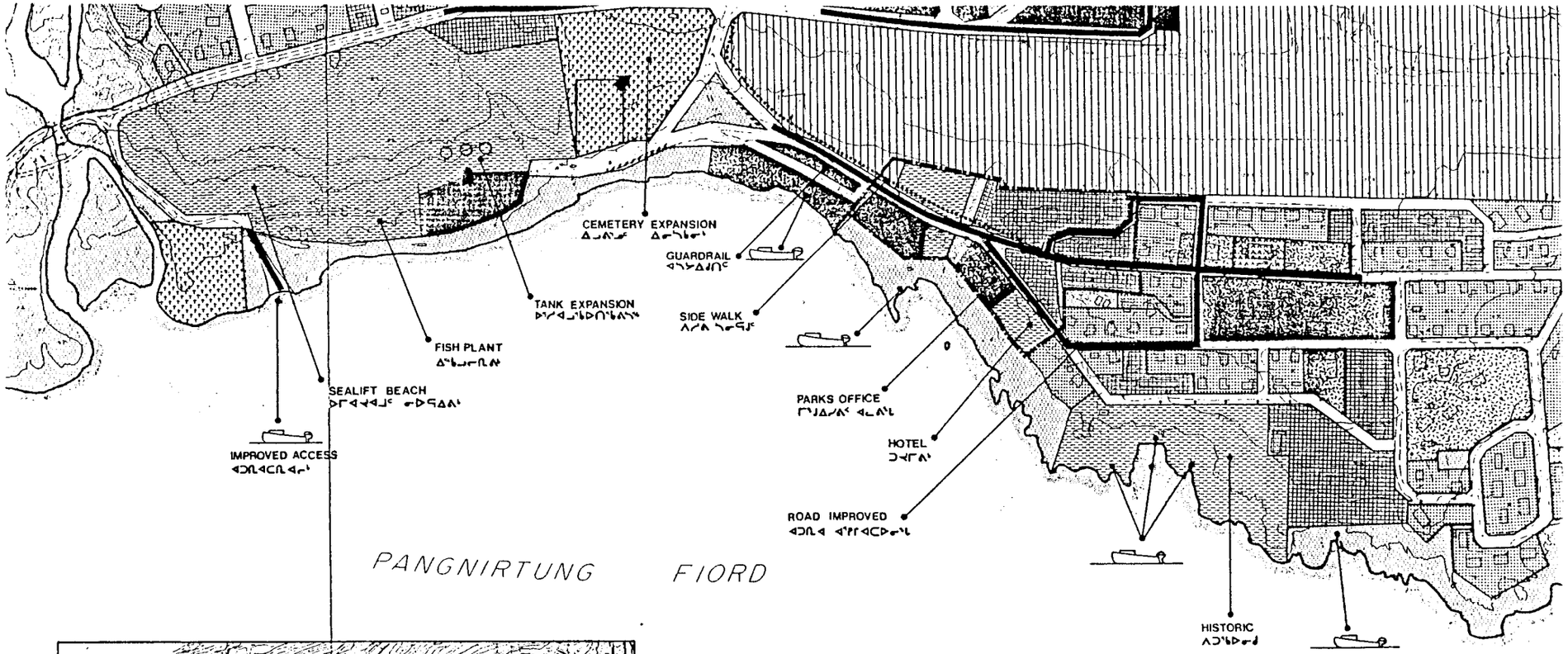
This letter is to furnish you with some information with regard to the fresh arctic turbot fillets and fresh arctic whole dressed turbot that we have been receiving for the past month or so from Mr. Kevin Smart and Mr. Gary Magee in Baffin Island. We are very pleased to tell you that we are most satisfied with the quality of the fillets and the whole fish. The product always arrives in Montreal in tip shape and they are very fresh indeed. This is extremely important as anything less than fresh would be rejected by our important customers. The fillets are nice and big and firm as well as attractive in looks. The whole dressed fish is nicely prepared and the packaging of both types of fish has been to our complete satisfaction. With regard to our requirements next year, we would estimate that the market potential would be for at least 12,000 lbs. of fillets and 6000 lbs. of whole dressed each week for the entire year. I would like to say that we would be interested in purchasing more, however it is difficult to say at this time because the entire market potential has not been fully developed and of course quantities would depend on prices at the time. It appears that we would be able to buy on a regular basis for our markets in Montreal, Quebec City, Toronto, Ottawa and possibly Western Canada. Before the Turbot season opens in the Gaspé, the prices could be strong, however, when the Gaspé season commences, prices would have to be in line with competition or within reason. We are very satisfied with the kind co-operation of Mr. Kevin Smart, Mr. Gary Magee and all those people involved with the catching and processing of the turbot in Baffin Island. We look forward to a close working relationship with these good people in the future. If you have any quiries we would be pleased to hear from you.

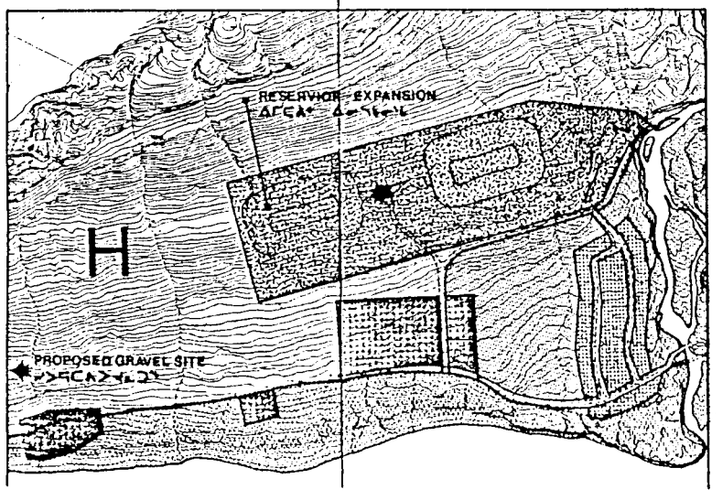
Yours very truly,

Raymond Thibault and Don Wilson

APPENDIX J

SITE LOCATION PLANT - PROPOSED NEW FISH PLANT


CEMETERY EXPANSION
GUARDRAIL
TANK EXPANSION
SIDE WALK
FISH PLANT
SEALIFT BEACH
IMPROVED ACCESS
PARKS OFFICE
HOTEL
ROAD IMPROVED
HISTORIC
PANGNIRTUNG FIORD


RESERVOIR EXPANSION
H
PROPOSED GRAVEL SITE