CANADA
Department of
Regional Economic
Expansion

RAMEA, NEWFOUNDLAND - FISH PROCESSING PLANT

REPORT
PRE-DESIGN STUDY

IMPROVEMENTS TO SALT WATER SUPPLY SYSTEM

FENCO Foundation of Canada Engineering Corporation Limited

Planning
Engineering
Project Management

FENCO

239 Water St.
P.O. Box 1406
St. John's, Nfld.
709 · 722–3145

January 19, 1973

Director
Technical Services Branch
Department of Regional Economic Expansion
161 Laurier Avenue West
Ottawa, Ontario
K1A OM4

Attention Mr. V.G. Ulrich, P. Eng.
Utilities Engineer

Gentlemen,

IMPROVEMENTS - SALT WATER SUPPLY
FISH PLANT, RAMEA, NEWFOUNDLAND

We are pleased to submit herewith two copies of our Report "Pre-Design Study - Improvements to Salt Water Supply, Ramea, Newfoundland, Fish Processing Plant".

A draft copy of this Report was previously circulated among the persons and authorities concerned and their valuable comments have been included in this final copy of the Report.

We estimate that the surveys necessary for the final design can be completed in four weeks. It would take another six weeks to prepare the contract documents. Approval of the documents, tendering, and awarding of the contract would take another nine weeks, for a total of nineteen weeks before start of construction. We estimate a construction time of six months.

We estimate the engineering costs for the remaining work as follows:

	Fees	Expenses
1. Detail design, contract documents and office supervision.	$ 11,000	$ 1,000
2. Site surveying, ownership and right-of-way drawings, and soils information (excav. by local machine).	3,500	1,500

	(cont'd.)	Fees	Expenses
3.	Equipment examination and cataloguing of deficiencies.	$ 1,000	$ 500
4.	Pipeline testing (rough estimate only) (local labour and materials in "expenses").	1,500	3,000
5.	Construction supervision by engineer during 6 months of construction.	18,000	2,500
		$ 35,000	$ 8,500
		TOTAL:-	$ 43,500

We recognize that time is critical if construction is to be carried out during the 1973 construction season. We would therefore, be prepared to start the site surveying within 10 days from notification to start.

As requested, copies of this Report have also been sent to:

Mr. D.J. Burden, D.P.W., St. John's - 2 copies
Mr. H. Doane, CAWSA, St. John's - 2 copies
Mr. D.R. L. White, Fisheries Service, St. John's - 1 copy
Mr. H. Reid, John Penny & Sons Ltd., Ramea - 1 copy

Yours very truly,
FOUNDATION OF CANADA ENGINEERING
CORPORATION LIMITED

D.J.W. Moncrieff, P. Eng.
MANAGER

DJWM/AB/km
I-6017-1

REPORT
PRE-DESIGN STUDY

IMPROVEMENTS TO SALT WATER SUPPLY SYSTEM

for

FISH PROCESSING PLANT
RAMEA, NEWFOUNDLAND

January, 1973

CANADA
Department of
Regional Economic
Expansion

FENCO Foundation of Canada Engineering Corporation Limited

SUMMARY

This report contains the results of an engineering study carried out by the Foundation of Canada Engineering Corporation Limited (FENCO) for the Department of Regional Economic Expansion (DREE), on the salt water supply system for the John Penny and Sons Limited fish processing plant in Ramea, Newfoundland.

The study was awarded on July 20, 1972, and field work commenced in Ramea on July 27, 1972.

Two progress meetings were held during the course of this Study, one on August 10, 1972 and one on January 10, 1973. The August meeting dealt mainly with the findings of the FENCO field survey. The January meeting was convened to review a draft copy of this Report. Various comments and suggestions brought forward at the meeting by the persons concerned have been incorporated in the Report. Written comments submitted to FENCO are enclosed in Appendix 6 - "COMMENTS ON DRAFT REPORT."

The water quantity requirements have been established on three different occasions by three different consultants as follows:

	R.J. Noah 1965*	Gorman-Butler 1967**	FENCO 1972***
Calculated demand, USGPM	960	-	820 present 1100 future
Design demand, USGPM	1200	1200	1200
Design head at pumps, psig	87	67	65

* using cement lined Cast Iron Pipe - pumphouse near Northeast Pond.

** using polyethylene pipe and 30 PSIG pressure at the plant - pumphouse at Island Cove.

*** using polyethylene pipe and the minimum 20 PSIG pressure at the plant - pumphouse at Muddy Hole Channel. The quantity is based on actual measurements in the plant.

There are presently two separate salt water supply systems for the plant - in this Report termed the "Penny System" and the "A.D.B. System". The "Penny System" is owned and operated by the plant. It takes water from the harbour directly beside the plant. The water in the harbour is contaminated and the source is unacceptable to Fisheries Service. A new system, the "A.D.B. System", was constructed in 1970 to provide an acceptable water supply. This system has not been operating satisfactorily, however, and the plant has reverted to using the original "Penny System".

The A.D.B. system was thoroughly examined by FENCO during the field trip conducted between July 27 and August 2, 1972. A number of defects were noted which have the aggregate effect of making the system unusable at this time.

Significant deficiencies include:

a) Holes in the pipeline.

b) Inoperative vacuum breaker, pumps, and other equipment.

c) Bog particles in the water supply.

d) Flooding of pumphouse during storms and erosion of beach.

e) Intake located closer to the shore and at shallower depth than specified.

f) Concrete casing of intake pipe disintegrating.

Four potential supply schemes have been considered in this study:

Scheme No. 1 - The existing A.D.B. system, with sufficient modifications and improvements to make it operational and permanent.

Scheme No. 2 - A new intake and pumphouse at Muddy Hole Channel, with a new 1000 ft. long, 10" polyethylene pipe connecting the pumps to the existing pipeline at Island Cove.

Scheme No. 3 - A new pumphouse at the fish plant, with a new 2,000 ft. long, 14" polyethylene intake

located between Middle and Harbour Island.

Scheme No. 4 - A new pumphouse at the fish plant, with a new 800 ft. long, 14" polyethylene intake pipe along the dock connecting to an intake located some 500 ft. south of the Government Wharf in the Main Ship Channel.

The Main Ship Channel is contaminated, with an M.P.N. coliform count exceeding 1000 per 100 Milliliters at times. The source is therefore unacceptable to Fisheries Service, and the potential Scheme No. 4 was rejected on that basis.

Scheme No. 3 would require the placing of an intake immediately adjacent to the Main Ship Channel. This source, although presently acceptable, may require additional works in the future which would close off the connection to the Main Ship Channel and so prevent contamination of the source. These works would close off the route taken by local inshore fishermen travelling to and from the fishing grounds, and their implementation would therefore be vigorously resisted. Scheme No. 3 is also estimated to cost more to construct than either Scheme No. 1 or No. 2.

Schemes No. 1 and No. 2 are quite similar in construction

costs, but Scheme No. 2 appears to be superior from the point of view of system quality, reliability, and ease of construction. We therefore recommend that Scheme No. 2 be implemented.

The capital costs of the three schemes are estimated at:

Scheme No. 1,	$174,000
Scheme No. 2,	$169,000
Scheme No. 3,	$185,500 + 30,000 at a later date.

We recommend that all gravel mining be prohibited in the Muddy Hole Cove shoreward of the runoff diversion dyke. We also recommend that prior to the design and contract document stage the following be carried out:

(i) - Surveys for property ownership and right of way.

(ii) - Surveys for design purposes of pipeline route and the pumphouse and intake areas, so that quantities can be estimated to within plus or minus 15%.

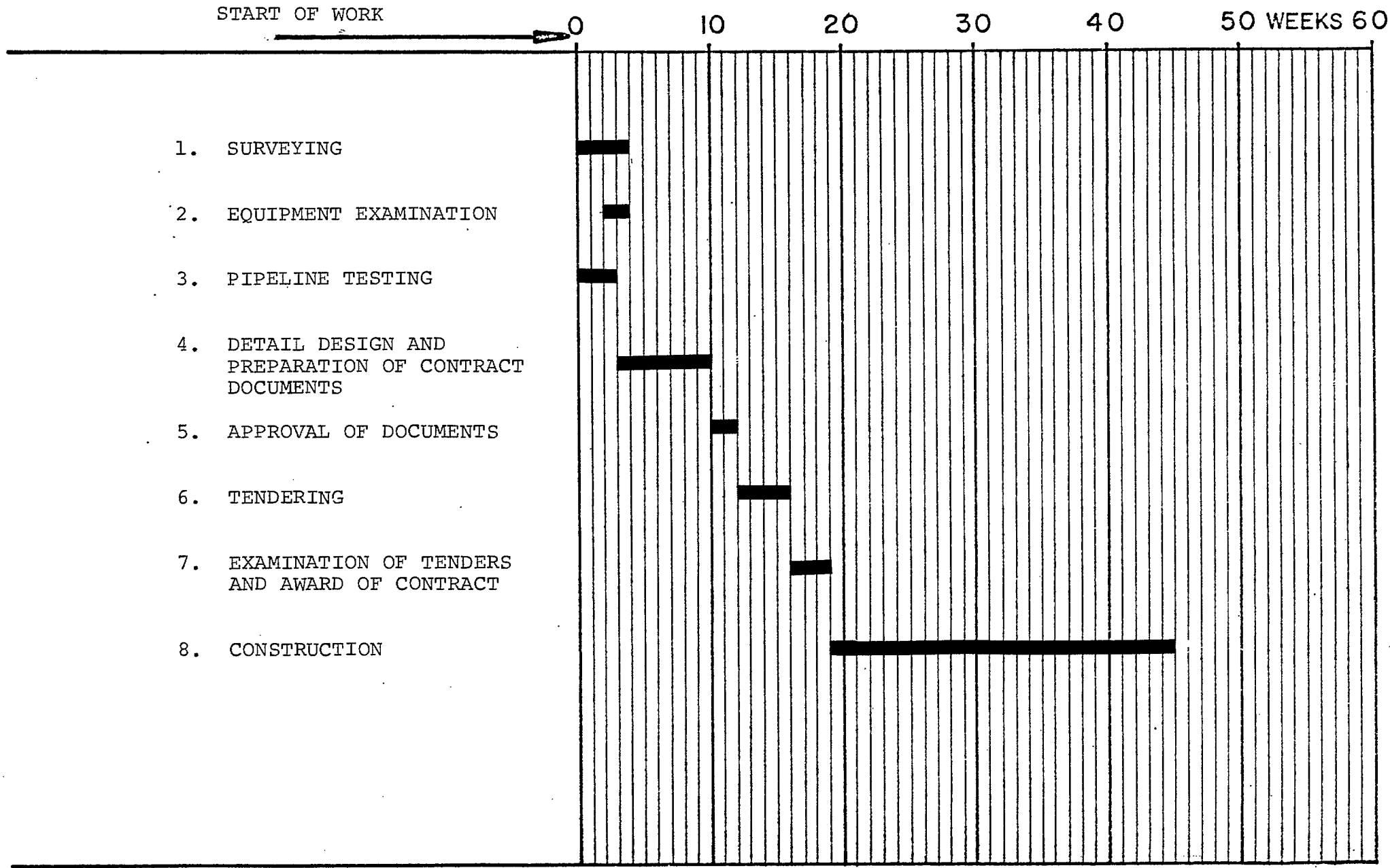
(iii) - Testing and inspection of the existing 8 inch pipeline to ascertain its quality.

(iv) - Examination, evaluation and report on the condition of all equipment in existing pumphouse

which would be incorporated in the new pump building, if Scheme No. 2 is adopted.

We strongly recommend that full-time supervision by an experienced engineer is carried out during the whole construction period, to assure strict compliance with the Contract Documents.

SURVEYING, ENGINEERING AND CONSTRUCTION SCHEDULE



DEPARTMENT OF REGIONAL ECONOMIC EXPANSION
Improvements to Salt Water Supply System, Ramea, Newfoundland.

TABLE OF CONTENTS

APPENDIX 1 - DRAWINGS

APPENDIX 2 - DETAIL CONSTRUCTION COST ESTIMATES

APPENDIX 3 - BACTERIOLOGICAL TEST RESULTS

APPENDIX 4 - RECORDS OF FISH LANDINGS

APPENDIX 5 - TERMS OF REFERENCE

APPENDIX 6 - COMMENTS ON DRAFT REPORT

INTRODUCTION

This report contains the results of an engineering study carried out by the Foundation of Canada Engineering Corporation Limited (FENCO) for the Department of Regional Economic Expansion (DREE), on the salt water supply system for the John Penny and Sons Limited fish processing plant in Ramea, Newfoundland.

The study was awarded on July 20, 1972, and field work commenced in Ramea on July 27, 1972.

The purpose of this study is to:

1. Evaluate the present and future needs of salt water for the plant.

2. Evaluate the existing salt water supply systems.

3. Conduct the necessary field investigations and prepare a report recommending work to be done to provide an adequate and acceptable salt water supply system.

Ramea is located on the Northwest Island which is one in the group of Ramea Islands, located some six miles offshore from the south coast of Newfoundland, in the district of Burgeo-La Poile. The community is incorporated and the municipal government consists of a Mayor and Council.

The only industry is the fish processing plant which, in addition to operating its own fishing fleet, also receives the catch from local inshore fishermen. The plant operates 12 months of the year, working extended shifts when required.

The 1961 census lists a population of 970; the 1971 census lists 1208; and the forecast for 1986 is 1900 persons. At the present time, there is essentially full employment on Ramea.

Ramea is accessible either by coastal steamer or by float equipped airplane. The boat trip takes a full day and air travel is often impeded by fog. As an example, fog was continuous during the full month of June, 1972, making air travel impossible.

During the field investigations in Ramea, FENCO received substantial information and assistance from John Penny and Sons Limited, in particular from Mr. Kevin Smart, Assistant Plant Manager.

Two progress meetings were held during the course of this Study, one on August 10, 1972 and one on January 10, 1973. The August meeting dealt mainly with the findings of the FENCO field survey. The January meeting was convened to review a draft copy of this Report. Various comments and suggestions brought forward at the meeting by the persons concerned have been incorporated in the Report. Written comments submitted to FENCO are enclosed in Appendix 6 - "COMMENTS ON DRAFT REPORT."

PROJECT BACKGROUND AND OBJECTIVES

The John Penny and Sons Limited fish processing plant on Ramea Island has been operating its own salt water supply systems. There are two separate systems, one using chlorinated water for fish fluming and processing, and one using untreated sea water for compressor cooling.

At the end of July 1972, the plant owners were constructing a new pumphouse for the condensor cooling water pumps, and an additional pump had been purchased. This study is concerned only with the system supplying water for the fish processing, and the condenser cooling water will not

be further considered.

The salt water supply system presently in use is owned and operated by the plant. It takes water from the harbour directly beside the plant.

The harbour receives all the effluent from the plant and the surrounding community, with the result that the bacterial contamination often exceeds a Most Probable Number (MPN) of 1000 per 100 milliliters. Particulate matter is also prevalent in the area. The source, therefore, does not comply with the requirements of the Fisheries Service of Environment Canada.

Work toward finding a new and acceptable source of supply was carried out in 1965 for the Atlantic Development Board. The findings and recommendations are listed in a report entitled Proposed Water Supply System, Ramea, Newfoundland, submitted by R. J. Noah & Associates Ltd. The recommended system would take water from the other side of the island, away from the harbour. A subsequent report entitled Proposed Water System for John Penny & Sons Fish Plant, Ramea, Newfoundland list the findings

and recommendations resulting from an engineering study carried out in late 1968 by Gorman-Butler Associates Ltd., also for the Atlantic Development Board. Contract documents were subsequently prepared based on the latter study, and were certified by the Department of Public Works, Canada on March 5, 1968. This new supply system (referred to herein as the A.D.B. System) was apparently put into operation early in 1970.

In this sytem, water is taken from Island Cove and pumped through a pipeline to the plant (see drawing No. 6017-2 "Plan - Potential Supply Schemes" in Appendix 1). The fish plant operators stated that this system was operated briefly, but soon became unsatisfactory on two counts. One, the pumps failed to operate properly, and two, particles of bog were constantly getting into the water, making it completely unsuitable for use in fish processing, as these bog particles would cling to the fish fillets. The plant, therefore, reverted to its original salt water supply system and has been using it up to the present.

The objective of this study is to catalogue the deficiencies in the A.D.B. salt water supply system as it now exists, and to recommend measures for either improvement

of the system or the construction of new works, whichever is more viable and less prone to risk factors, having proper regard for economics.

SCOPE OF WORK

The scope of work is essentially as outlined in our Proposal and in the Terms of Reference enclosed in Appendix 5 of this Report.

In order to minimize the field trips to this remote location, some of the work listed for Stage II - Pre-design, has been carried out and the results are included in this Report. As a result, the detail and cost estimates for the various schemes can be made more detailed than would be the case in a strictly feasibility study.

The scope of work for this study is summarized as follows:

1. Assemble and examine all existing reports and field data, "as built" drawings, construction supervision inspector's reports, etc., including bacteriological test results, pertaining to the salt water supply systems.
2. Augment the existing information with a field reconnaissance. The field work shall include both the examination of the existing system and a search for possible alternative systems.
3. Investigate all potential alternatives from the point of view of:
   a) source quality;
   b) system reliability and ease of operation;
   c) ease of construction in severe weather conditions, and the remote location of the site;
   d) cost of construction and yearly operating cost;
   e) possible risk factors and their degree.
4. Discuss the findings with DREE and other interested parties designated by DREE during appropriate stages of the work and submit a report containing all pertinent findings and recommendations.

DESIGN REQUIREMENTS

The Terms of Reference require that "all designs meet the requirements of:"

A. The Newfoundland and Labrador Clean Air, Water and Soil Authority.

B. The Canada Department of the Environment, Fisheries Service.

The fundamental requirements are:

i) An adequate supply of safe, sanitary water that:

a) Has a coliform bacterial count of not more than two per 100 milliliters, or

b) is derived from a source approved by the Minister.

ii) A minimum operating pressure of 20 psig at the fish plant.

The water quantity requirements have been established on three different occasions by three different consultants. It should also be noted that R.J. Noah recommends a pumphouse near Northeast Pond, Gorman-Butler at Island Cove, and FENCO at Muddy Hole Channel, each requiring a different initial pumping head.

	R.J.Noah 1965	Gorman-Butler 1967	FENCO 1972
Calculated demand, USGPM	960	-	820 present 1100 future
Design demand, USGPM	1200	1200	1200
Design head at pumps, psig	87*	67**	65***

* using cement lined Cast Iron Pipe.

** using polyethylene pipe and 30 PSIG pressure at the plant.

*** using polyethylene pipe and the minimum 20 PSIG pressure at the plant.

R. J. Noah & Associates based their estimates on projected fish landings of 20 million pounds round fish per year. The Gorman-Butler Associates report does not list fish landings. The copies of statements of annual fish landings enclosed in Appendix 4, show that for the four year period from 1968 to 1971, the maximum was 19.7 million pounds round fish per year.

During the progress meeting on August 10, 1972, it was established that the present plant capacity is 19 million pounds per year, and the expected plant expansion will allow the processing of 24 million pounds of round fish per year. Maximum daily capacity is 150,000 pounds of round fish, giving 50,000 pounds fillets and 100,000 pounds of offal for the fish meal plant.

The FENCO estimate of water consumption is based on actual measurements in the plant. The plant operators were asked to turn on the water at the various points of use, to provide what was, in their opinion, a sufficient-to-generous amount of flow for each specific use. The flow was carefully measured by FENCO personnel. The results are summarized on drawing no. 6017-1 "EXISTING AND FUTURE FLOW REQUIREMENTS." Condensor cooling water is supplied by

separate pumps and is, therefore, not included in this quantity.

The drawing no. 6017-1 also shows future demand with two new style cutting and candling tables added to the existing equipment. The water requirements for the future equipment were based on information supplied by Mr. Kevin Smart, Assistant Fish Plant Manager. The new style cutting tables are fed by conveyor belts instead of flumes and, therefore, require considerably less water than the present "old style" tables.

The new equipment is presently being manufactured by the Atlantic Bridge Company in Lunenburg, Nova Scotia. A check with Mr. G. Tanner of that company on January 16, 1973 confirmed that the estimated flow quantities for the new tables are adequate.

It is noted that this method of in-plant conveying of the fish is in line with expected objectives of the Water Pollution Control Directorate, Environment Canada, which will advocate the minimizing of water consumption.

It is, therefore, anticipated that a total plant salt water

supply of 1,100 USGPM for the foreseeable future is realistic. Adding approximately 10% for errors and possible leakage brings the required design quantity to 1,200 USGPM.

In an effort to further certify our prognostications as to salt water consumption in fish processing plants, we conferred with a reputable engineer employed by a company who own and manage some 6 fish plants in Newfoundland.

We were advised that empirical approaches or transferring usage rates (per pound of fish or any other parameter) does not yield reliable design parameters and can, in fact, be misleading, as the requirements in water quantity vary from plant to plant, and from day to day for such reasons as follow:

(a) Fish size - a ton of small fish require more water than a ton of large fish.

(b) Catch size - catches vary significantly in size due to ship capacity or fish availability.

(c) Method of washing.

(d) Plant efficiency.

(e) Operator preference.

(f) Miscellaneous factors.

A totalizing type water flow meter will be installed in the pumphouse, to show the actual water consumption.

A maximum tidal range of 5.6 feet is listed on the Hydrographic chart for the area. D.P.W. reports, however, that this range increases to 7 feet when wind effects are included. The design will therefore be based on the full 7 foot range.

EXISTING SALT WATER SUPPLY SYSTEMS

Two salt water supply systems exist presently for the fish plant, namely:

1. The John Penny System, owned and operated by the fish plant, and presently in operation, and

2. The Atlantic Development Board (A.D.B.) System, completed in early 1970, but presently not operational.

The John Penny System

The present Penny salt water supply systems draws water from under the dock at the fish plant. Two centrifugal pumps,

one rated at 300 USGPM and one at 500 USGPM (nameplate ratings at unspecified pressure) are located in the fish plant on the harbour side of the Building Complex. An intake pipe passes through the pumproom floor into the water below and proceeds horizontally a short distance to place the inlet at approximately the outside edge of the wharf.

The inlet is some 250 feet from the nearest municipal sewage outlet pipe and some 150 feet from the fish meal plant effluent discharge point. As shown in Appendix 3, "Bacteriological Test Results", the source is contaminated, and often has an MPN coliform count of 1,000 per 100 milliliters or more, with fecal coliform and particulate matter also present. Vigorous and careful application of chlorine by the fish plant operators reduces the contamination to a level where the water is presently usable. There are two basic factors, however, which make the system unacceptable in the long run, namely:

a) The source quality is unacceptable to the Fisheries Service, and

b) The chlorine contact time is only in the 1 to 2 minute range or even less in places, since the pumps discharge directly into the plant piping system.

The existing plant distribution system is composed of rather small diameter pipes, resulting in flow velocities of 20 to 30 FPS in places. (Flow velocities in 1 inch to 3 inch pipes would normally range between 8 FPS and 12 FPS.)

The aggregate (nameplate) delivery rating of the two pumps is 800 USGPM at an unspecified pressure. The plant operators report that the water flow which can be supplied by these pumps is not quite sufficient at the present time when all the processing equipment is required to operate. It should be noted that the water demands shown on Dwg. No. 6017-1 were measured using the Penny system, with all valves closed except for the ones where the flow was actually being measured. In this manner, there was ample water for the operators to adjust each stream to the desired flow quantity. It can be deduced from the above that the plant is at present operating with less than 800 USGPM of salt water.

The existing pumps have been in operation for a considerable length of time and presently require frequent maintenance.

The A.D.B. System as Installed

The A.D.B. system consists of an intake in Island Cove, leading to a pumphouse on shore. Two vertical turbine

pumps of 600 USGPM capacity each, plus one 600 GPM spare pump, pump the water through a 2,200 ft. long 8" diameter polyethylene pipeline to the fish plant. The system is outlined on Dwg. No. 6017-2, "PLAN-POTENTIAL SUPPLY SCHEMES."

Construction started in April, 1969, and was essentially finished in March 1970. The system is reported to have been used for approximately one month for washing round fish only. No visible leaks in the pipeline were observed during this time. The stand-by pump was reportedly turned on and operated for approximately two hours when it broke down and could not be restarted.

As a cross-check on the above reports an examination of electric power charges for the pumphouse was carried out. It revealed that the pumps could not have been in operation much more than reported. In particular since the electric building heaters would have consumed most of the power, the pumps could not have been in operation for more than a few days per month for the first few months after construction.

Records of the construction activities kept by the (Federal) Department of Public Works in St. John's were examined in the course of this work. It appears from these records that numerous difficulties were encountered during construction,

PHOTO NO. 1 General view of pipeline route through bog area and school yard.

PHOTO NO. 2 Exposed pipe in school yard area. A man standing on a rock which rests directly on the pipe.

and, as a result, some of the work was not quite up to the requirements as set forth in the Contract Documents.

The field Inspector's report for the period from the 9th to 14th of March, 1970 records that the saltwater pipeline was tested at 1-1/2 times its working pressure and was found to be satisfactory. It also records that the pipe floated in the trench during backfilling operations and, as a consequence, the pipe has numerous humps and dips, and the depth of bury is no more than 2 feet in some places.

The A.D.B. System in July, 1972

The A.D.B. system was thoroughly examined by FENCO during the field trip conducted between July 27 and August 2, 1972. A number of defects were noted which have the aggregate effect of making the system unusable at this time.

Photo No. 1 shows a general view of the pipeline route - from the air outlet chamber at the highest pipeline elevation down to a few hundred feet from the fish plant. It was noted that the bog in the school yard area was being excavated and replaced with rock and till to provide an expanded school yard. As shown on Photo No. 2 no particular attention appears to have been taken to protect the pipe in this area. The equipment used in the excavating operation was a tractor-mounted

backhoe. The same tractor equipped with a blade was used to level the fill which was trucked in from the beach. It is entirely possible that the pipe has been weakened, and possibly holed in places in the area of this school yard expansion.

An attempt was made to (1) test the pipe in order to find its condition and (2) find the flow versus pumping head curve for the system. An excavation was made to locate the shut-off and drain valves on the terminal end of the pipeline at the fish plant, and open these to allow maximum throughflow. The drain line is 4 inches nominal size, and the line heading into the plant is 3 inches, reduced from the 8 inches of the main pipe. The digging was done in the location designated by fish plant personnel who had recorded the location of the valves at the time of installation. The drain valve was eventually located, but the shut-off valve was not found in the designated location. Both valves are located under the main thoroughfare leading from the Government Dock, where the traffic is practically continuous. Any protracted attempts to locate the shut-off valve would have required a complete blockage of through traffic. Since the shut-off valve was supposed to be normally open, it was decided to try the testing with only the drain valve opera-

tional. The excavation had exposed the drain pipe downstream of the drain valve, and the valve box for the drain valve.

One pump, in the Island Cove pumphouse was turned on for the test. As soon as the pressure was built up in the pipeline, a serious leak developed in the vicinity of the drain valve, rapidly filling the excavation with water. A messenger was sent to the pumphouse to turn off the pump. At the same time, the 4-inch drain valve was opened fully to relieve the pressure on the 8-inch pipeline. While the pressure was still on, water was observed bubbling up through the ground at various locations above the drain pipe, indicating that the 4-inch drain pipe is also in disrepair. The leakages were so severe that the attempt at testing the pipeline had to be abandoned.

Since the pipeline had been tested at the time of installation, and did not have serious leaks at that time, it must be concluded that the damage was caused more recently.

There are two possible reasons for this damage. One is the heavy and consistent traffic over the pipe and valves. In particular, the contractor-fabricated steel valve boxes which, for the drain valve, at least, extend almost to the

PHOTO NO. 3 Scheme No. 1 - Bog and beach area at low tide, showing effects of gravel excavation. Shape of original beach profile evident from beach in background.

road surface and which appear to have sharp bottom edges, could have been pressed onto the plastic pipe with sufficient force to cause puncture. The second reason is that the finished wall of the recent plant extension is within some 8 feet of the drain valve, and this excavation could have been extensive enough for the excavating equipment to have breached the pipeline.

We are of the opinion that the present valving system has to be repaired and modified, particularly since excavation with a power excavator must be carried out in the main thoroughfare every time a valve is to be operated. The whole system is, of course, unusable at this time because of the severe leaks in the pipe.

The operation of the air-outlet-vacuum-breaker chamber at the high point of the pipeline was found to be inadequate. The cast-in-place concrete chamber is located in bog, where the water table is at ground level and the chamber fills with water to the same level. The vacuum breaker was observed to be completely submerged (water one foot above breaker inlet) making it inoperative as a vacuum preventing device for the pipeline.

A general view of Island Cove at low tide, and the pumphouse, is shown on Photo No. 3. The effects of the beach gravel

PHOTO NO. 4 Close-up of bog erosion at Island Cove. The edge of bog is only 15 feet from the pipeline at this point.

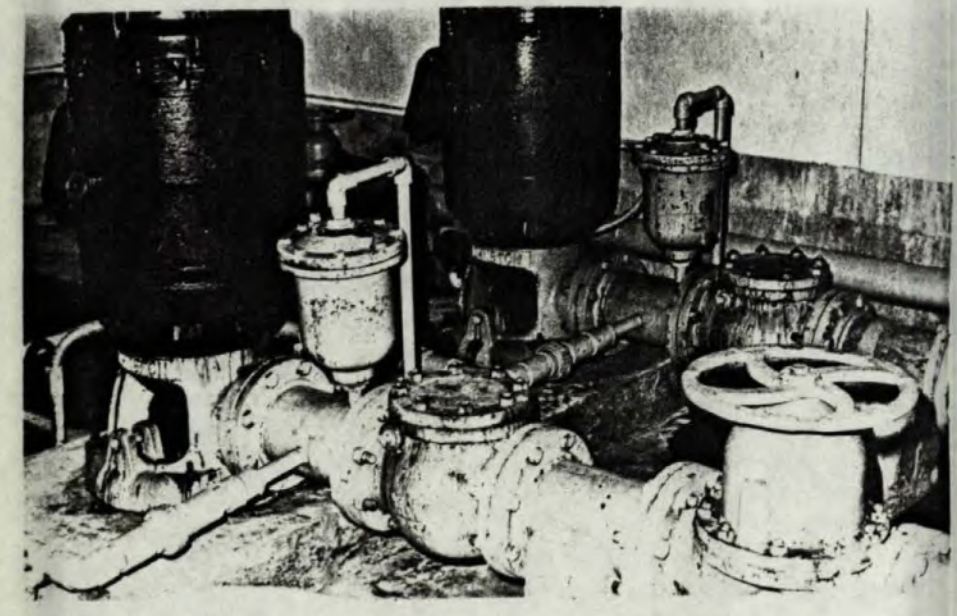


PHOTO NO. 5 Close-up of two pumps and equipment in the pumphouse.

excavation are obvious. The sea water, under the normal weather and sea conditions, reaches the exposed bog at high tide, and any wave action whatsoever will dislodge substantial quantities of bog. Some of the bog particles will find their way into the intake and thus contaminate the water supply. Photo No. 4 clearly illustrates this bog erosion problem. Photo No. 5 shows a close-up of two of the pumps and some valving. The equipment appears in good condition.

Tests on a representative bog sample carried out by FENCO showed that the particles could be removed by a 10 micron screen. Of course, partciles less than 10 microns in size are not visible to the naked eye and would, therefore, not be noticeable, even if they did pass through the screen. The nature of the particles is such, however, that the 10 micron screen becomes plugged immediately.

A general view of the beach at high tide is shown on Photo No. 11 (opposite text page 37). It was reported by the plant operators that during westerly storms the wave uprush can completely surround the pumphouse with water, and at times flood the pumphouse floor through the door grilles, which can be seen on Photo No. 11.

The water intake pipe was found to be about 35 feet shorter than shown on the contract drawings, and the top of the intake was only two feet below LWOST, instead of the specified 4-1/2 feet. As a consequence, the intake would be sucking in some air when a wave trough would be passing it at low tide. This could significantly reduce the capacity of the intake pipe at times.

Underwater examination of the intake and also the sea floor of Island Cove was carried out by FENCO personnel as part of the field work. The weather was calm at the time of the underwater examination. The examination revealed that some 15 feet of the corrugated metal intake pipe and of the 3 inch chlorine pipe were exposed to sea action. The concrete encasement over the top third of the pipe had been completely washed away, and some of the remaining concrete was crumbling and much of it appeared to be in a very weak condition. It was concluded that this section of the pipe could be severely damaged during any of the strong storms which occur frequently in this area, which could result in making the intake system completely inoperative.

The underwater examination also revealed considerable amount of settled bog particles throughout the Cove. The

natural bottom material consists of sand and gravel, densely covered with boulders. It was noted that, in order to extend the intake, boulders up to 2 tons in size would have to be cleared all along the route.

The wave action in Island Cove can be severe, with up to approximately 6 foot high waves breaking over the intake at high tide. Based on wave hindcast theory, and considering the water depth near the shore, it is estimated that the highest waves outside the mouth of the Island Cove are of the order of 20 feet. The maximum uprush on the rocky shore of the exposed headland is about 40 feet, which also indicates a 20 foot maximum wave height. The rock at the headland has a slope of approximately 2 horizontal to 1 vertical, and it slopes down into the water to a depth of approximately 30 feet. Refraction around the headland of Island Cove would reduce the 20 foot wave height to approximately 10 feet inside the Cove.

It was also evident during the underwater inspection that wave action in the Cove at approximately the 10 foot depth was severe enough to move individual stones weighing up to 1 ton. Any intake pipe and structure would, therefore, have to be of substantial mass in order to ensure their permanence.

POTENTIAL SUPPLY SCHEMES

Four potential supply schemes have been considered. They are, in summary:

Scheme No. 1 - The existing A.D.B. system, with sufficient modifications and improvements to make it operational and permanent.

Scheme No. 2 - A new intake and pumphouse at Muddy Hole Channel, with a new 1000 ft. long, 10 inch polyethylene pipe connecting the pumps to the existing pipeline at Island Cove. Some 200 feet of the existing pipe would have to be relocated away from the beach to allow for beach erosion.

Scheme No. 3 - A new pumphouse at the fish plant, with a new 2000 ft. long, 14 inch polyethylene intake

located between Middle and Harbour Islands.

Scheme No. 4 - A new pumphouse at the fish plant, with a new 800 ft. long, 14" polyethylene intake pipe along the dock connecting to an intake located some 500 ft. south of the Government Wharf in the Main Ship Channel.

Schemes No. 1,2 and 3 are shown in general on Dwg. No. 6017-2 PLAN-POTENTIAL SUPPLY SCHEMES. Preliminary engineering studies have been carried out for these three schemes. Drawings showing the principal preliminary details are included in Appendix 1, "Drawings".

Scheme No. 4 would take water from the Main Ship Channel which is contaminated. Bacteriological test results revealed that the source was not acceptable to the Fisheries Service (Refer to letter in Appendix 3, "Bacteriological Test Results", dated September 8, 1972). Scheme No. 4 was, therefore, abandoned and no detail work was carried out on this scheme.

A brief presentation of the general features of these potential schemes, including preliminary rough cost estimates, was made by FENCO on September 21, 1972, in St. John's. Present at this meeting were:

Mr. V. Ulrich (DREE)

Mr. D. White (Dept. of Environment, Fisheries Service)

Mr. H. Doane (CAWSA)

Mr. M. Cameron (D.P.W. - Federal)

Mr. J. Cruden (D.P.W. - Federal)

Mr. D. Moncrieff (FENCO)

Mr. A. Bergs (FENCO)

Mr. W. Hayes (FENCO)

The discussion following the presentation established more closely the course for the remaining work, and our subsequent work was formulated on the specific directions received, in addition to the more general ones contained in the Terms of Reference.

Scheme No. 1 - Improvements to the Existing A.D.B. System

The existing A.D.B. salt water supply system and the preliminary details of the proposed improvements to the system are shown on Dwgs. No. 6017-3 "PIPELINE DETAILS - SCHEMES NO. 1 and 2". and No. 6017-4 "SCHEME NO. 1 -DETAILS".

As described under the heading "The A.D.B. System, in July,

1972" above, the terminal end of the 8" pipeline at the fish plant is presently inoperative. It is proposed that a concrete valve chamber be constructed as shown on Dwg. No. 6017-4, and the pipe be repaired and connected as shown. A heavy duty manhole cover at grade level would allow unobstructed traffic passage while the valves would be accessible at all times.

Because of the possible damage to the pipeline at various locations, and the need to carefully test the whole line, it is proposed that two additional shut-off valves be installed in the pipeline, as suggested by CAWSA. The valves will facilitate the testing of the pipe in sections, making it more easy to find any leaks in the first instance and permit more ready maintenance in the future.

The extent of necessary repairs to the pipeline cannot be assessed and estimated at this time. This can only be established after the required tests have been made. Therefore, the present cost estimate contains only an arbitrary allowance for the repair of mains.

The air vent-vacuum breaker at the high point of the line

would be modified to serve its intended purpose by mounting it above the groundwater line. The chamber would require to be insulated against freezing. This can simply be done by placing soil around the sides of the chamber and a sheet of styrofoam or other suitable material under the cover.

The existing beach has been severely mined and disturbed. It should be rebuilt to approximately its original location and shape. It is evident from Photo No. 3 that a considerable amount of stone, presently spread around the beach, is available for dyke construction. The beach reconstruction would proceed in the following sequence:

1. The existing stone on the beach would be bulldozed at low tide to form the start of the wave protection layer. Additional stone, either collected from elsewhere or quarried nearby, would be used to complete the layer as shown on Drawing No. 6017-4, "SCHEME NO. 1 - DETAILS".

2. The bog would be removed from the beach up to the proposed ditch line and transported away from the beach to a suitable location. It should be spread out, sprinkled with lime and seeded to promote grass

growth and reduce the erosion of the material. The exposed bog, near the ditch and the pumphouse, would be treated similarly to reduce erosion from rainfall and run-off.

3. Gravel or a sand and gravel mixture would be trucked in and spread between the wave protection layer and the ditch as necessary to build the area up to the 10 ft. elevation. A small dyke on the sea side of the ditch, running the length of the ditch, would be built to prevent any run-off which could contain bog particles from entering directly into the Island Cove waters.

4. A small wave breaker dyke would also be built, closing the gap between the rock island and the shore at the east end of Island Cove, to prevent the diverted run-off from flowing directly back into the Cove.

To prevent sea water from flooding into the pumphouse the following modifications would be required:

The area around the pumphouse would be raised approximately to elevation 11 ft. The valve chamber on the sea side

would be raised to elevation 11.5 ft. The door sills of the pumphouse would be raised to elevation 11.5 ft., which would necessitate a shortening of the doors and moving of the door grilles, but would still provide adequate access into the pumphouse (see Photo No. 11 on opposite text page 37).

In addition to the work outlined to modify the existing facilities, we also investigated an alternative possibility of providing adequate water treatment to remove the visible particles. The cheapest and most direct method would be to use a micro-strainer with a 10 or 15 micron size screen. Such a unit would require additional low head pumps, a larger pumphouse, and various controls. The cost would be well over $100,000. We believe that the solution outlined above for the shoreline improvement and the provision of the run-off diversion dyke would prove adequate in preventing bog particles from entering the intake, at a much lesser cost.

Scheme No. 2 - New Pumphouse At Muddy Hole Channel

Scheme No. 2 consists of a new pumphouse at Muddy Hole Channel, with a short inlet channel connecting the pump

PHOTO NO. 6 General view of Muddy Hole Cove showing effects of gravel mining (foreground) and original stable beach (background).

PHOTO NO. 7 View of existing inlet channel for Scheme 2, as seen from proposed pumphouse location. Excavated rock to be dumped into the low section at left.

well to the Muddy Hole Channel. A 10 inch diameter polyethylene pipe, 1000 ft. long, would connect the pump discharges to the existing 8 inch pipeline, east of the existing Island Cove pumphouse. In addition, some 200 feet of the existing 8 inch polyethylene pipeline would be relaid further away from the eroding beach to ensure a more reliable system permanence. The scheme is shown on Dwg. No. 6017-5, "SCHEME NO. 2 - DETAILS". The general location and the main features of the system are shown on Dwg. No. 6017-2, "PLAN-POTENTIAL SUPPLY SCHEMES".

The existing 8 inch pipeline, in the vicinity of the schoolyard and at the fish plant, would be modified and repaired as described in Scheme No. 1.

The water at the Muddy Hole Cove is clear and the bacterial contamination is minimal (see Appendix 3, "Bacteriological Test Results"). The Muddy Hole Channel is located at the east end of the Muddy Hole Cove. Photo No. 6 shows that gravel mining is presently being carried out in this area. The beach proper had not yet been disturbed at the time of our July survey. However,

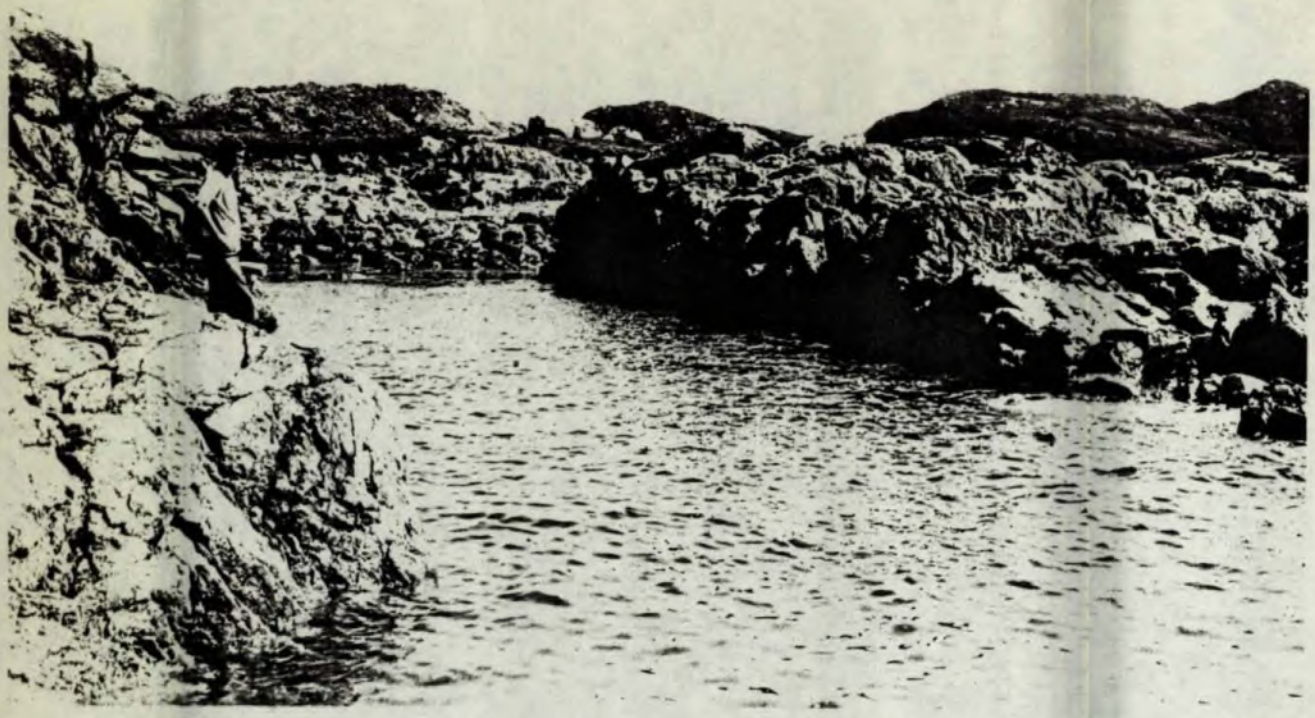


PHOTO NO. 8 View of shoreline at existing inlet channel for Scheme 2. The proposed pumphouse location is on high ground at end of channel.

PHOTO NO. 9 Close-up of shoreline and pumphouse location for Scheme 2. The inlet channel would be extended to the pumphouse wall at the edge of the grassed area.

during a follow-up survey of the site, the bog and shoreline gravel had been disturbed at a place near the proposed pumphouse location. As shown on Dwg. No. 6017-4, bog would be removed from near the shore, and a dyke for diverting rainfall run-off would be bulldozed from local sand and gravel material. The run-off containing any bog particles would thus be diverted to North-West Pond, preventing any bog from flowing directly into Muddy Hole Cove. It should be noted that this would add the runoff from an additional 2 acres to the freshwater supply source. The additional bog particles, if any, would not in any significant way influence the freshwater source, since the present supply is from run-off coming almost entirely from bog areas.

Photos No. 7 and 8 show the existing Muddy Hole Channel (the captions under the photographs refer to it as 'inlet channel'). The pumphouse would be located at the end of this Channel on the grassed area shown on Photo No. 9. It is evident that wave up-rush does not reach this plateau, and the pumphouse would not, therefore, be subjected to direct wave attack. An inlet channel would be blasted in the rock, connecting the Muddy Hole Channel to the pump well under the pumphouse. It is anticipated that the blasting can be carried out with sufficient care to shape the pump well in the bedrock, thus minimizing overbreak and

avoiding the added expense of a poured concrete well. The excavated rock would be used to build the small rockfill wave-breaker dyke on the west side of the Channel, as shown on Dwg. No. 6017-5, "SCHEME NO. 2 - DETAILS." The proposed pumphouse is shown on Dwg. No. 6017-6, "SCHEME NO. 2 - PUMPHOUSE AND INTAKE DETAILS." The perforated concrete wall across the intake channel is designed to:

1. Reduce surges in the pump well from wave action.
2. Act as a coarse screen while allowing unimpeded flow of sufficient water into the pump well.

All the equipment from the existing pumphouse would be reused except for the screens which are in disrepair. The pumps will require 5 ft. column extensions, which are available from the manufacturer as standard items, at approximately $200 each.

Although the capacity of the pumps is sufficient for the foreseeable future needs, a space would be provided in the new pumphouse for an additional pump should the requirements of the fish plant change significantly from those presently anticipated.

The fine screening at the present Island Cove pumphouse is through 50 mesh "Monel" screens. When the pumps were in operation the screens, according to the operators, were plugging very rapidly with bog particles and required

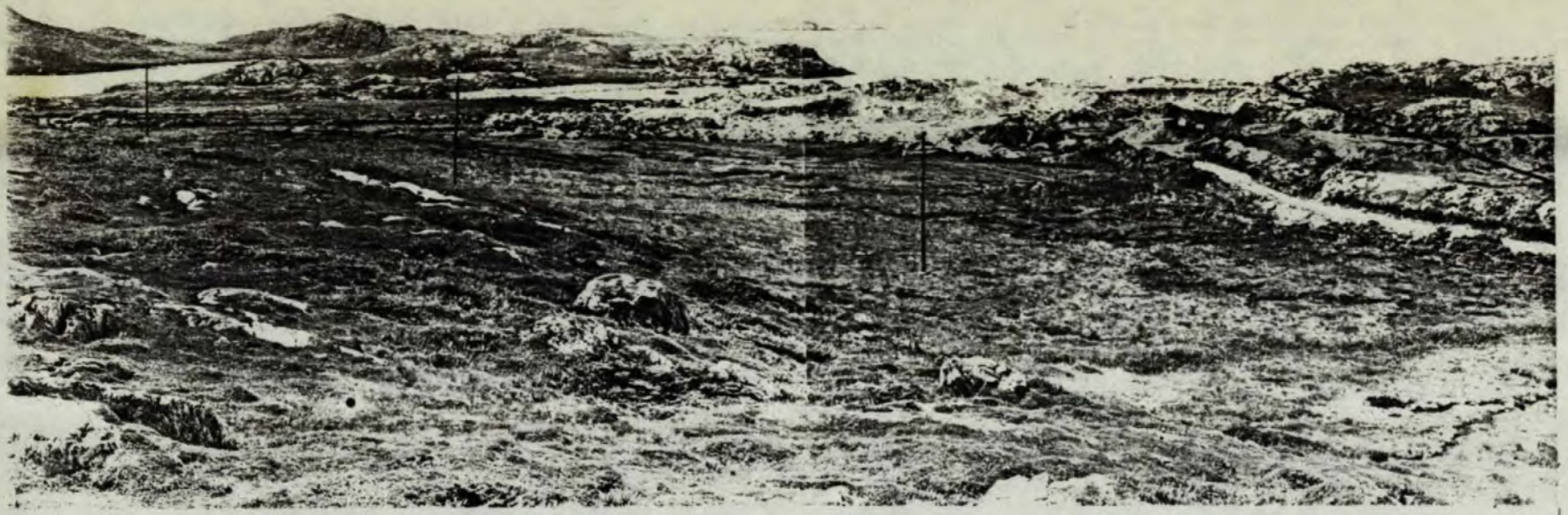
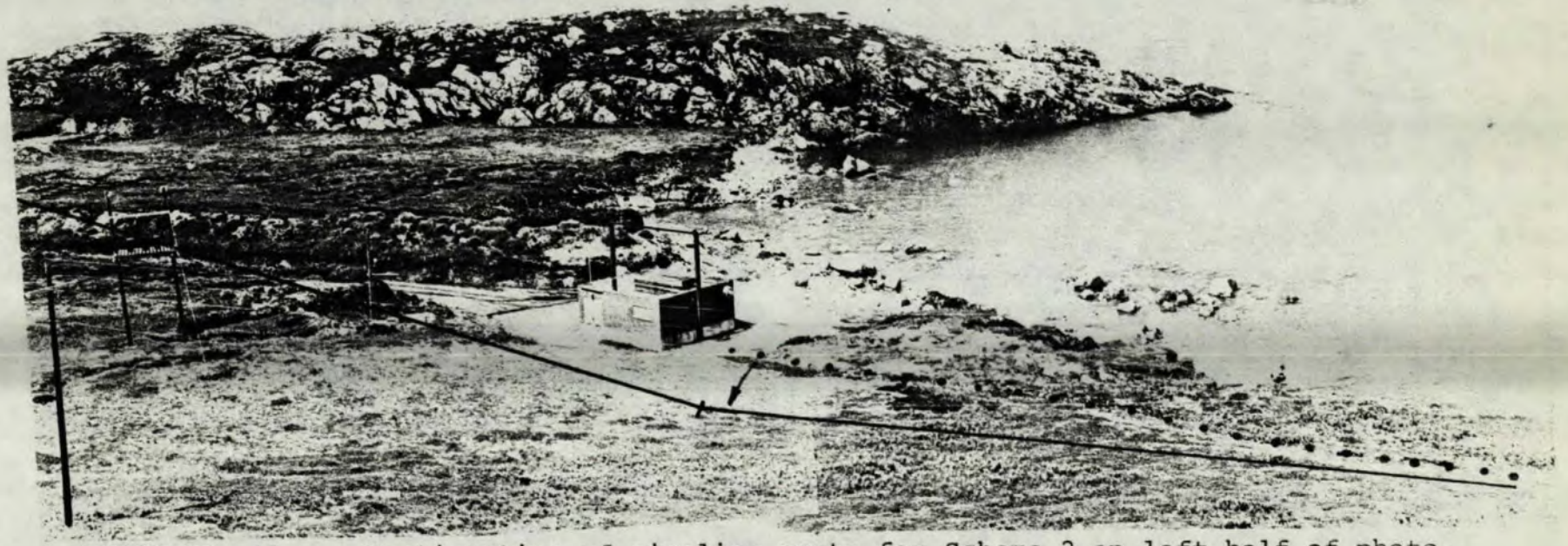


PHOTO NO. 10 View of bog area requiring containment - Scheme 2. The pipeline would pass between the roadways at upper right.

Match Line



Match Line

PHOTO NO. 11 Continuation of pipeline route for Scheme 2 on left half of photo. Right half of photo shows the existing pumphouse and Island Cove at high tide.

considerable attention. It is proposed that the fine screening at the new pumphouse be 10 mesh and that a duplex-type automatic strainer with baskets of fine mesh screen be installed if required. Space has been provided in the pumphouse for such a unit, but we do not feel, at this time, that the water would require very fine screening, since no bog particles should be reaching the intake.

We have also investigated the use of submersible type pumps located in the well, rather than reusing the existing pumps, which would then permit a reduction in the size of the pumphouse. The manufacturers of submersible pumps report that they have attempted to use their regular units in saltwater service, but have found that pump life can be as short as six months. They will not guarantee their products for saltwater use and we, therefore, do not recommend such a system, particularly since the cost of such pumps would also be high - of the order of $25,000., which is more than the trade-off saving in pumphouse construction that could conceivably be effected.

The route for the 10 inch polyethylene pipeline is shown on Photographs No. 10 and 11. The first 400 feet of the line pass over a rock outcfop and rock excavation will, therefore, be necessary. The remaining 600 feet pass through the bog in the Island Cove area. The pipe trench would be excavated

to a minimum depth of 5 feet in areas of rock and till, and where the bog is less than 5 feet thick. The excavation would be carried down to a sound rock or till layer in areas where the bog is more than 5 feet thick. A pipe bedding of sand, or a sand and gravel mixture, would be provided and the pipe trench would be backfilled with similar material to 18 inches above the top of the pipe. The remaining backfill would be bog or till, with adequate check dams or obstructions along the route to prevent the trench from becoming a drainage ditch. The exact location of the pipeline route would be determined during the field survey.

A section of the existing 8 inch polyethylene pipe, east of the existing pumphouse, is only about 15 feet from the eroding shoreline (see Photo No. 4). To ensure permanence of the system, a 200 foot long section would be relocated away from the shoreline, as shown on Dwg. No. 6017-4,"SCHEME No. 1 - DETAILS."

A 10 inch pipe is proposed as opposed to the 8 inch size of the existing pipe, in order to reduce the friction loss which will be occasioned by adding 1000 feet of pipe to the system. The added friction at 1200 USGPM flow is only

PHOTO NO. 12 General view of exposed rock west of Island Cove.

PHOTO NO. 13 Close-up view of the exposed rock showing thin layers and fractures. This type of rock would not easily yield large blocks suitable for armour stone by blasting.

about 5-1/2 PSI. with a 10 inch pipe and, therefore, the existing pumps can be used without increase in motor size or addition of impellers. The calculated pressure at the fish plant, for the existing system (unmodified) flowing at 1200 USGPM., is 30 PSIG. The Scheme No. 2 system would, therefore, reduce this by 5-1/2 PSIG. to approximately 24-1/2 PSIG. Since the minimum pressure acceptable, to the Fisheries Service is 20 PSIG., we conclude that the pumps would be quite capable of fulfilling the volume and pressure requirements particularly since, at the present, water required is only about 800 USGPM., and modification to the impellers, as previously discussed, could simply be implemented at any time in the future to improve the delivery head.

We also investigated the possibility of building a pump well in the rock on the east side of Muddy Hole Channel and blasting an intake from there out to deeper water. As is evident from Photographs No. 12 and 13, the rock is layered and fractured. In order to do underwater blasting in this type of rock it would be necessary to either carry out extensive grouting or work under compressed air, but which may also require some grouting. In any event, the cost would be very high and we, therefore, do not recommend this approach.

Further to our Site Visits, Mr. K, McCarthy (CAWSA) has had the existing pumps and motors for the Island Cove installation dismantled for inspection. In his opinion, they are in good condition. However, this will not preclude our recommendation, as discussed more fully later, that in the detailed design stage and as part of the field survey program, a mechanical/electrical inspection be carried out to determine the extent of refurbishing required to make sure the equipment is sound.

We recommend that the location of the door in the pumphouse and general disposition of the access road should be redefined in the design-survey stage. We believe this to be necessary to ensure that the operator will be able to enter the building at the most protected (from wind) side of the facility. This requirement was brought to our attention by the plant operators, who have experienced, on occasion, extreme difficulties in working outdoors at the proposed building site area, during storms.

The new pumphouse would be provided with a separate chlorine room in line with current design practice and the requirements of local regulatory agencies.

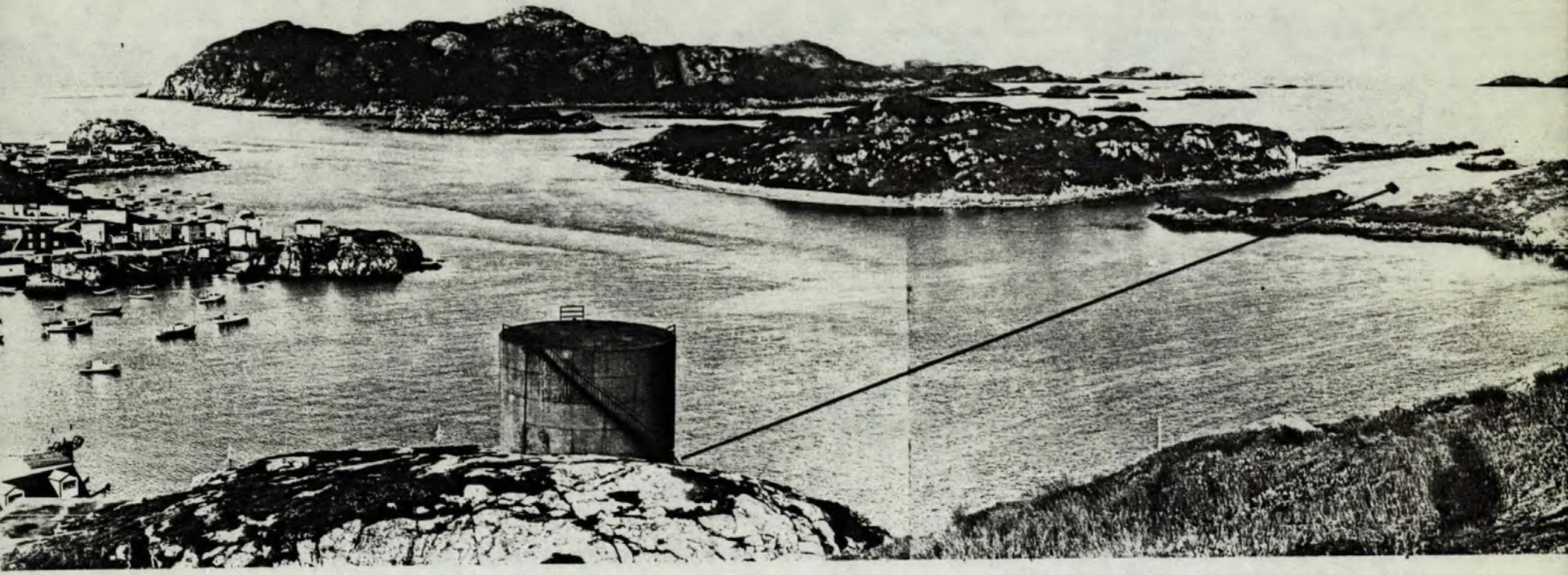


PHOTO NO. 14 General view of pipeline route for Scheme 3. The pumphouse would be located at the fish plant partly visible in the lower left.

Scheme No. 3 - Intake At Harbour Island

Scheme No. 3 requires the abandonment of the existing A.D.B. system, except for the pumps and pumphouse equipment. The system is outlined on Dwg. No. 6017-2, "PLAN-POTENTIAL SUPPLY SCHEMES".

A new pumphouse similar to the existing A.D.B. pumphouse would be constructed beside the fish plant on the dock. A buried 14-inch diameter polyethylene pipeline, weighted down with concrete weights, would connect the pump well, via a route across the main ship channel and the tip of Harbour Island to an intake located some 500 feet east of the Island. Photo No. 14 shows the proposed pipeline route and intake area.

The existing pumps, valves, building heaters and ventilators, chlorinators, electrical equipment, etc. would be reused in the new pumphouse. The pump columns would be extended by 5 feet each as in Scheme No. 2, to allow mounting of the pumps at the dock elevation. Three of the five stages of each pump would be removed and kept as spares since the required pump discharge pressure would be less with this scheme.

The drawdown in the pump well at a flow of 1200 USGPM. would be approximately 4 feet. The well would be sufficiently large to prevent excessive water fluctuations during pump start-up or shut-down.

A dredge would be required to provide the excavation for the pipe across the main ship channel, to place the pipe in a trench. A small back-hoe would be sufficient for the land excavation across the tip of Harbour Island.

The depth of cover in the channel would be approximately 5 feet, and the high point at the top of the intake pipe at Harbour Island, would be at elevation -6.0 feet. A simple 4 inch diameter gooseneck vent pipe would be installed at this high point to allow the escape of any entrapped air.

The installation of the intake pipe would proceed as follows:

The pipe trench would be prepared first. The concrete pipe weights would be poured while the dredging of the trench was in progress. The intake pipe would be assembled, floated into the water and weighted with the

concrete weights. The complete assembly of the intake pipe should take approximately 3 days. This assembly should be ready for floating in place, and sunk into the trench, as soon as the trenching is complete, in order to avoid premature silting-in of the trench. Backfilling over the pipe with local granular material would be carried out in areas where the top of the pipe would be above elevation -10 feet. This requirement stems from the fact that active wave or ice action could occur down to this elevation. The remainder would be allowed to silt in gradually in time.

From local discussions we have determined that ships will occasionally anchor in the main ship channel, and drag the anchors at times during storms. We believe that with appropriate warning signs and notices the possiblity of dragging the anchors across the pipeline route could be discounted. The 5 foot cover would be adequate to protect the pipe against damage from small boat anchors.

It is assumed that the bottom material in the channel is sand and silt and not rock. This assumption is substantiated by the fact that ships can be anchored there during a

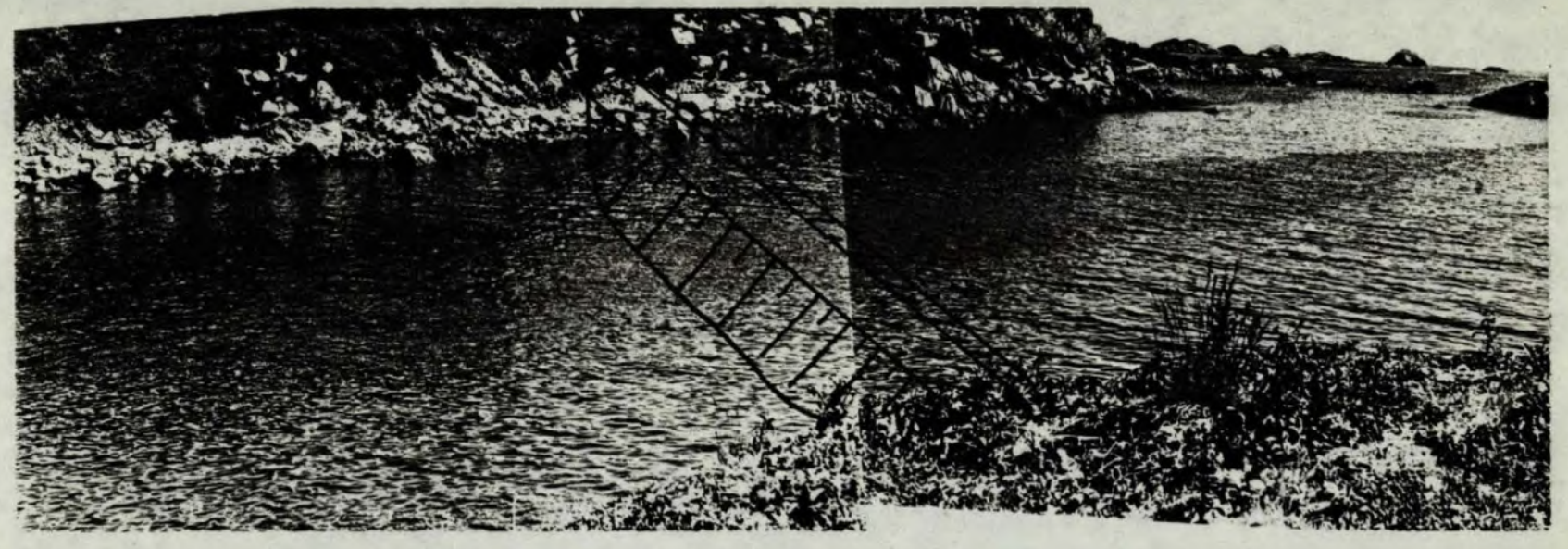


PHOTO NO. 15 View of narrow channel between Middle (or Puffin) and Harbour Islands. A dam might be required to close this gap for Scheme 3.

storm. Silt was noticed during two short interval dives near the fish plant. However, if rock is encountered, the cost of excavation of the pipe trench would, of course, be significantly increased. Underwater examination of the area east of Harbour Island revealed a gradually sloping sand and gravel bottom out to the proposed intake structure location.

The Fisheries Service has expressed concern about the future water quality at the proposed intake location. Although the bacteriological test results to date show acceptable source quality, the water is directly connected to the main ship channel and, with increased population and waste discharge, could become unacceptable in the future. It was further stated by Fisheries Service that the present sampling frequency is inadequate to prove that the source is acceptable at all times. We have, therefore, allowed, in our cost estimates, for the construction of a small rockfill dyke to close the gap between Harbour and Middle Islands. The area for this dyke or dam is shown on Photo No. 15 and Dwg. No. 6017-2. Interviews with local fishermen have determined that this gap is used by many of the local fishermen taking their catches to the plant, and that a proposal to close

this gap would be vigorously resisted.

Considerable marine equipment would be required to carry out this scheme. The dredge for the pipeline excavation would have to be able to remove the material in a depth up to 50 feet. The cost estimates contain allowances for mobilization and de-mobilization of the equipment. The bid prices would depend on the location, availability, and contractor preference for the equipment.

Mr. K. Smart was of the opinion that access (across the main channel) to the intake would not present any problems in inclement conditions. The intake location is in a sheltered location and would permit year round maintenance.

COST ESTIMATES

Estimates of construction costs have been made based on bid prices for contracts recently carried out on Ramea and elsewhere in Newfoundland, together with the Preliminary Design data and quantity estimates. The site is difficult (and time-consuming) to reach and some allowance has been made for this fact.

It is particularly difficult to predict any mobilization and de-mobilization costs for the construction equipment, as these are dependent on a particular contractor's own equipment, his preference, availability of rental

equipment, equipment location, etc., and also the work load carried by the contractor who would be interested in bidding for this work.

The construction cost estimates for the three schemes considered are detailed in Appendix 2 - Detail Construction Cost Estimates. We have used estimated unit costs wherever feasible. Allowances have been made only for items which could not be estimated on a unit basis.

Construction Costs (for details see Appendix 2)

Scheme 1	-	$174,000
Scheme 2	-	$169,000
Scheme 3	-	$185,500 plus $30,000 at a later date.

Operating Costs

Scheme 1 and Scheme 2:

Electric Power @ 6¢/kw	-	$10,000/year
Chlorine @ 20¢/lb	-	$ 1,500/year
Pumphouse Operator, part-time	-	$ 5,000/year
Operator's helpers, part-time	-	$ 3,000/year
Snow removal and miscellaneous	-	$ 2,000/year
Total	-	$21,500/year

For Scheme 3, the pumps would not draw the full 30 HP, and the operator and snow removal costs would also be slightly less.

The estimated operating cost for Scheme 3 is $18,000/year.

Maintenance Costs

Building, Ground and Access Road	$ 300
Pipeline and Valve Chambers	$ 400
Electric Supply	$ 300
Pumps and Pumphouse Equipment	
Allow 10% of approximate	
Capital Cost	$6,000
Total	$7,000/year

RECOMMENDATIONS

The "SCOPE OF WORK" on page 9 of this Report lists the following points to be evaluated in arriving at a recommendation of the most suitable salt water supply system:

a) source quality;

b) system reliability and ease of operation;

c) ease of construction in severe weather conditions, and the remote location of the site;

d) cost of construction and yearly operating cost;

e) possible risk factors and their degree.

The Scheme No. 2 is recommended for implementation as it best meets these criteria in all respects but operating cost where Scheme No. 3 would be more economical. However, Scheme No. 3 is inferior in all other respects, and therefore not competitive with Scheme No. 2. Scheme No. 2 is safer than No. 1 from bog contamination as all the runoff is diverted away from the shore, whereas in No. 1 the runoff enters the sea adjacent to Island Cove. From the point of view of bacterial contamination schemes No. 1 and No. 2 are both rated equally highly, whereas Scheme No. 3 is considered by Fisheries Service to be potentially subject to contamination.

Scheme No. 2 is the easiest to construct since no marine or heavy equipment is required. It is the most likely of the three schemes to attract a larger number of bidders, as the construction is simple and all on land.

It is also recommended that all quarrying or gravel mining be prohibited in the Muddy Hole Cove shoreward of the runoff diversion dyke.

We also recommend that prior to the design and contract document stage the following be carried out:

(i) - Surveys for property ownership and right of way.

(ii) - Surveys for design purposes of pipeline route and the pumphouse and intake areas, so that quantities can be estimated to within plus or minus 15%.

(iii) - Testing and inspection of the existing 8 inch pipeline to ascertain its quality.

(iv) - Examination, evaluation and report on the condition of all equipment in existing pumphouse which would be incorporated in the new pump building, if Scheme No. 2 is adopted.

We strongly recommend that full-time supervision by an experienced engineer is carried out during the whole construction period, to assure strict compliance with the Contract Documents.

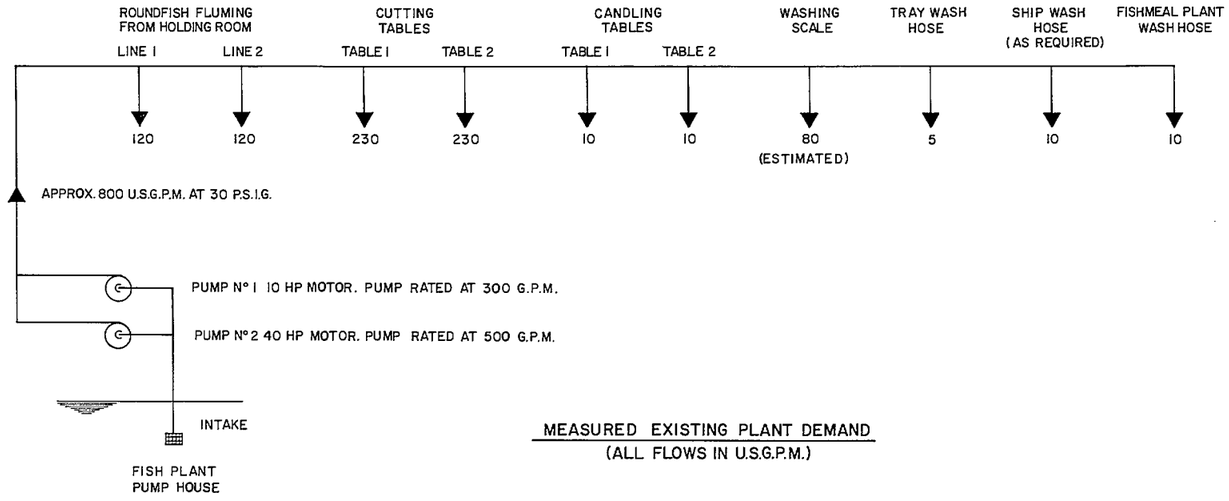
ACKNOWLEDGEMENTS

During the course of this work we have received courteous and valuable assistance from many persons interested in this project. We wish to express our appreciation for this help to all concerned, in particular to the following persons:

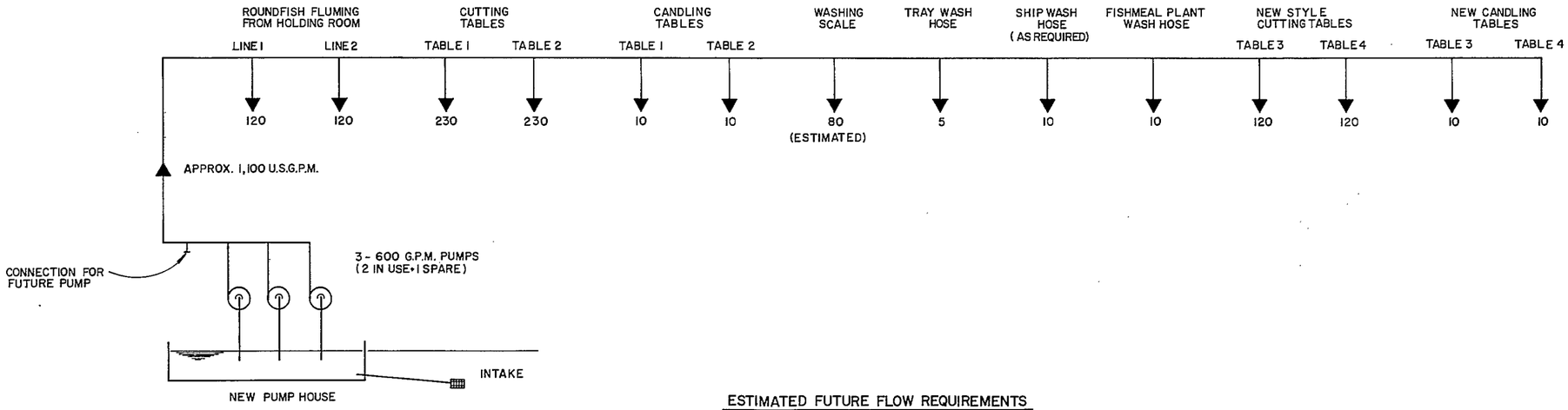
Messrs. V. Ulrich (DREE)
M. Cameron (DPW)
F. Cruden (DPW)
H. Doane (CAWSA)
K. Smart (J. Penny & Sons Ltd.)
D. White (Environment Canada)

APPENDIX 1

DRAWINGS



MEASURED EXISTING PLANT DEMAND
(ALL FLOWS IN U.S.G.P.M.)



ESTIMATED FUTURE FLOW REQUIREMENTS
(ALL FLOWS IN U.S.G.P.M.)

REFERENCES

BY	DATE	REVISION	LOC.	NO.

Detail numbers are indicated thus (3 / L-E7)
Top figure is the detail number
Bottom figure indicates the drawing on which the detail or its location may be found

	COMP.	DWG.	REG.
MADE	AB	M.C.Z	
CHKD.		AB	
DATE	NOV. 22' 72		

BRIDGE		MECH. DESIGN	
ELECTRICAL		MECH. PROCESS	
HEAVY ENG.		MECH. SERVICES	
HIGHWAYS		STRUCTURAL	
IND. DESIGN			
DEPT. HEAD		PROJECT ENG.	

ISSUE DATE
ISSUED FOR

DEPARTMENT OF REGIONAL ECONOMIC EXPANSION

PROJECT TITLE
IMPROVEMENTS TO SALT WATER SYSTEM
RAMEA, NEWFOUNDLAND

DRAWING TITLE
EXISTING AND FUTURE FLOW REQUIREMENTS

Foundation Of Canada Engineering Corporation Limited
FENCO

SCALE
0 1 2 3 INCH.

DRAWING NUMBER 6017 - 1

GULF OF ST. LAWRENCE

NORTH-EAST POND

SCHEME Nº1

WAVE PROTECTION

INTAKE EL.-20'

EXISTING INTAKE

ISLAND COVE

DRAINAGE DITCH

BOG RETAINING DYKE

EXISTING PUMP HOUSE

MUDDY HOLE CHANNEL

INTAKE CHANNEL

ROCKFILL DYKE

10"ϕ PIPELINE (SCHEME Nº2)

(NEW) SHUT-OFF VALVE REQ'D

EXISTING AIR VENT

AIR VENT

ACCESS ROAD

PUMP HOUSE

DRAINAGE DITCH

EXISTING 8"ϕ POLYETHYLENE PIPELINE

THIS SECTION OF PIPELINE MAY BE UNSOUND

(NEW) SHUT-OFF VALVE REQ'D

SCHEME Nº2

MUDDY HOLE COVE

EXISTING ACCESS ROAD

BOG RETAINING DYKE

MUDDY HOLE ROAD

VALVE BOX

SHIP COVE

PUBLIC WHARF

EXIST. VALVES SHOWN NEW MANHOLE REQ'D

PLANT'S FISH

PUMP HOUSE

GOV'T WHARF

14"ϕ PIPE LINE (BURIED)

SCHEME Nº3

TEAL POND

BEACH SIDE

HATCHER'S POINT

MIDDLE ISLAND (PUFFIN IS.)

1 TO 2 TON ROCKFILL DYKE TO PREVENT POLLUTION FROM HARBOUR (FUTURE)

LOCAL FISHING ROUTE

AIR VENT

INTAKE EL.-35'

NORTH-WEST POND

MAIN SHIP CHANNEL

HARBOUR ISLAND

MUDDY HARBOUR

0 200 400 600

SCALE IN FEET

NEWFOUNDLAND-LABRADOR

QUEBEC

STRAIT OF BELLE ISLE

GULF OF ST. LAWRENCE

BONAVISTA BAY

NEWFOUNDLAND

CONCEPTION BAY

ST. JOHN'S

RAMEA (ISLAND)

PLACENTIA BAY

ST. MARY'S BAY

0 25 50 75 100

SCALE IN MILES

SITE PLAN

REFERENCES

LEGEND

- SHORELINE
- 25 LAND CONTOURS ABOVE GEODETIC DATUM.
- BOG AREA
- EXISTING PIPELINE
- 10"ϕ PIPELINE SCH.2
- 14"ϕ PIPELINE SCH.3

BY	DATE	REVISION	LOC.	NO.

Detail numbers are indicated thus (3 / 1-E7)
Top figure is the detail number
Bottom figure indicates the drawing on which the detail or its location may be found

	COMP	DWG	REG.
MADE	WH	MCZ	
CHKD	AB	AB	
DATE	NOV. 22' 72		

NOMINAL

BRIDGE		MECH. DESIGN	
ELECTRICAL		MECH. PROCESS	
HEAVY ENG.		MECH. SERVICES	
HIGHWAYS		STRUCTURAL	
IND. DESIGN			
DEPT. HEAD		PROJECT ENG.	

ISSUE DATE

ISSUED FOR

DEPARTMENT OF REGIONAL ECONOMIC EXPANSION

PROJECT TITLE

IMPROVEMENTS TO SALT WATER SYSTEM

RAMEA, NEWFOUNDLAND

DRAWING TITLE

PLAN

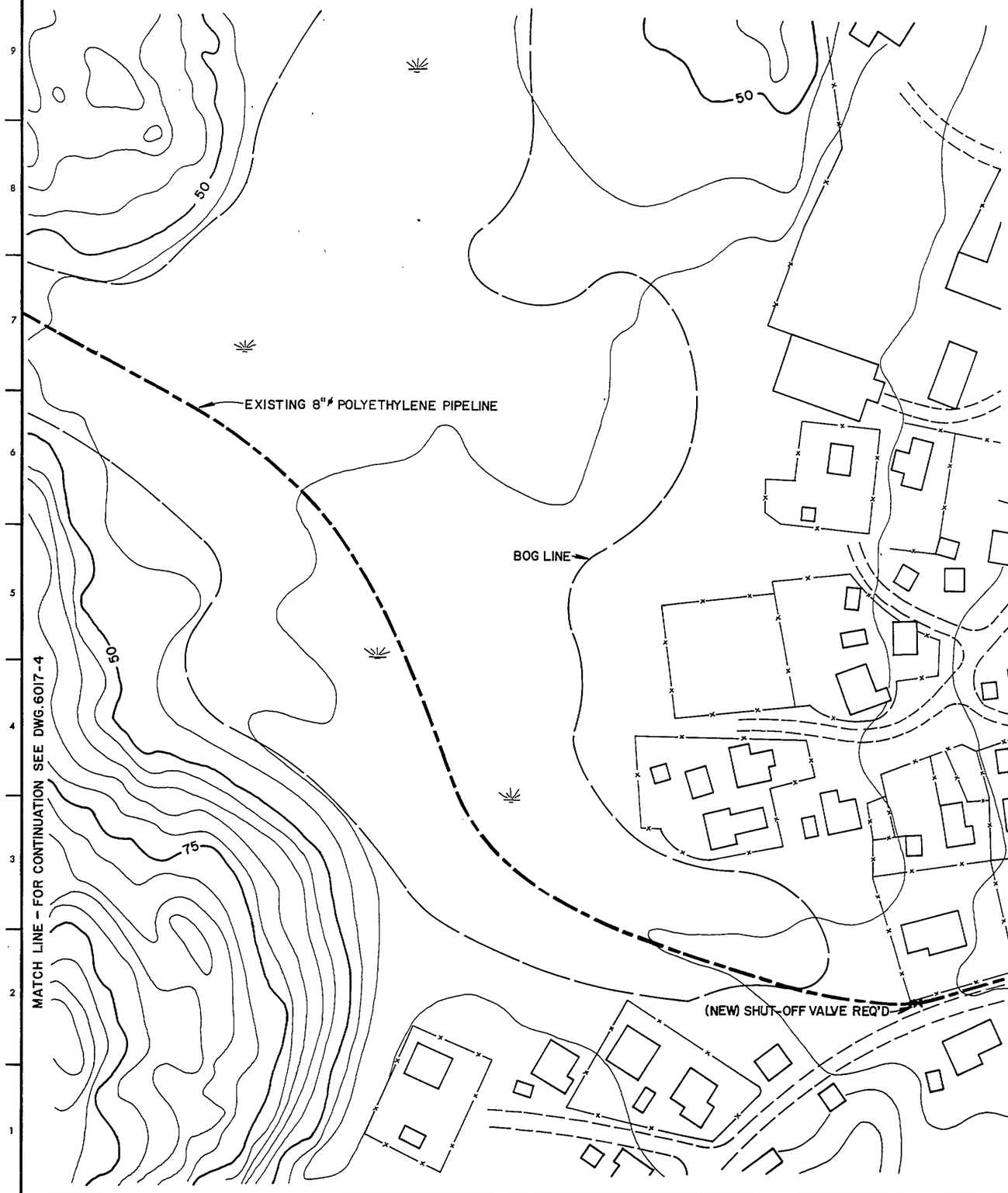
POTENTIAL SUPPLY SCHEMES

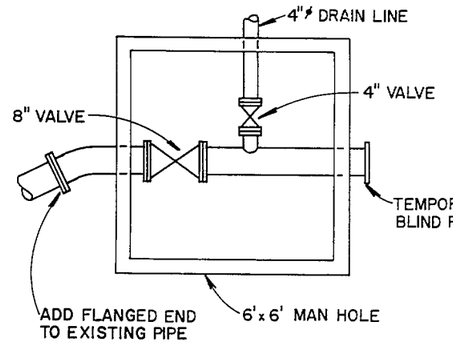
Foundation Of Canada Engineering Corporation Limited

FENCO

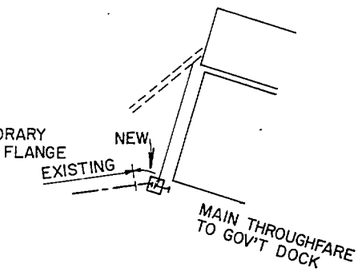
SCALE 0 1 2 3 INCH.

DRAWING NUMBER 6017 - 2





PLAN



PLAN

SCHEMES N° 1 & 2 - MODIFICATIONS AT FISH PLANT

REFERENCES

LEGEND

- SHORELINE
- LAND CONTOURS ABOVE GEODETIC DATUM
- BOG AREA
- EXISTING PIPELINE

BY	DATE	REVISION	LOC.	NO.

Detail numbers are indicated thus (3 / 1-E7)
Top figure is the detail number.
Bottom figure indicates the drawing on which the detail, or its location may be found

	COMP.	DWG.
MADE	WH	MCZ
CHKD	AB	AB
DATE	NOV. 28'72	

NOMINAL

BRIDGE		MECH DESIGN	
ELECTRICAL		MECH PROCESS	
HEAVY ENG.		MECH SERVICES	
HIGHWAYS		STRUCTURAL	
IND DESIGN			
DEPT HEAD		PROJECT ENG.	

ISSUE DATE

ISSUED FOR

DEPARTMENT OF REGIONAL ECONOMIC EXPANSION

PROJECT TITLE

IMPROVEMENTS TO SALT WATER SYSTEM

RAMEA, NEWFOUNDLAND

DRAWING TITLE

PIPELINE DETAILS

SCHEMES N° 1 & 2

Foundation Of Canada Engineering Corporation Limited

FENCO

SCALE 0 1 2 3 INCH

DRAWING NUMBER 6017-3

ISLAND COVE

ROCK FILL DYKE
1 TO 2 TON STONE
3:1 SIDE SLOPES

RIP-RAP LINING

DITCH EL. 8'

REMOVE ALL BOG SHORE-
WARD OF THIS LINE

BEACH EL. 10'
H.W.L. EL. 3.5'
L.W.L. EL. -3.5'
EL. 12'
DITCH
EXIST. GRADE
(TOP OF BOG)
BOG
EXIST. SAND & GRAVEL
BED
SAND & GRAVEL DYKE
(LOCAL MATERIAL)
ARMOUR STONE OF LOCAL
BEACH MATERIAL WITH
1 TON TO 2 TON ROCK IN
OUTER LAYER

SECTION (1)
N.T.S.

PROP. INTAKE
EXIST. INTAKE
EXIST. INTAKE PIPE
DRAINAGE
DITCH
DITCH EL. 9.5'
EXIST. SHORE LINE
RELOCATE
EXIST. 8"ø PIPE
EXIST. PUMP HOUSE
EL. 11'
RECONSTRUCTED
BEACH EL. 10'
DITCH EL. 11'
EXISTING
ACCESS ROAD
EXISTING AIR VENT
(NEW) SHUT-OFF VALVE REQ'D
EXIST.
8"ø POLYETHYLENE
PIPE LINE
SCHEME N°2 ONLY
10"ø PIPE LINE
DEPTH OF BURY 4'-0" MIN.
BOG LINE

MATCH LINE-FOR CONTINUATION SEE DWG. 6017-5

MATCH LINE FOR CONTINUATION SEE DWG. 6017-3

0 50 100 150
SCALE IN FEET

REFERENCES

LEGEND
- SHORELINE
- 25 — LAND CONTOURS ABOVE GEODETIC DATUM
- BOG AREA
- EXISTING PIPELINE
- 10"ø PIPELINE SCH. 2
- NATURAL DRAINAGE DITCH

BY	DATE	REVISION	LOC.	NO.

Detail numbers are indicated thus (3 / 1-E)
Top figure is the detail number
Bottom figure indicates the drawing on which the detail, or its location may be found

	COMP	DWG.	REG.
MADE	WH	MCZ	
CHKD	AB	AB	
DATE	NOV. 28 ' 72		
BRIDGE		MECH. DESIGN	
ELECTRICAL		MECH. PROCESS	
HEAVY ENG.		MECH. SERVICES	
HIGHWAYS		STRUCTURAL	
IND. DESIGN			
DEPT. HEAD		PROJECT ENG.	

NOMINAL

ISSUE DATE
ISSUED FOR

DEPARTMENT OF
REGIONAL ECONOMIC
EXPANSION

PROJECT TITLE
IMPROVEMENTS TO
SALT WATER SYSTEM
RAMEA, NEWFOUNDLAND

DRAWING TITLE
SCHEME N°1 - DETAILS

Foundation
Of
Canada
Engineering
Corporation Limited
FENCO

SCALE
0 1 2 3 INCH

DRAWING NUMBER 6017 - 4

REMOVE ALL BOG SHOREWARD OF THIS LINE

TOP OF DYKE 2'-0" ABOVE ORIGINAL BOG LINE.

6'-0"

EXIST. GRADE (TOP OF BOG)

EXIST. SAND & GRAVEL BED

BOG

3

2

1

VARIES (1/2' TO 2')

SAND & GRAVEL DYKE (LOCAL MATERIAL)

TYPICAL SECTION (1)

MUDDY HOLE COVE

MUDDY HOLE CHANNEL

ROCK FILL DYKE

INTAKE CHANNEL 4' TO 5' BOTTOM WIDTH

PUMP HOUSE

EL. 13.5'

MATCH LINE - FOR CONTINUATION SEE DWG. 6017-4

SHORE LINE

BOG LINE

DRAINAGE DITCH

BOG RETAINING DYKE

BOG RETAINING DYKE

CULVERT

10" ϕ PIPE LINE DEPTH OF BURY 4'-0" MIN.

ACCESS ROAD

EXISTING ACCESS ROAD

19

5

25

0 50 100 150

SCALE IN FEET

REFERENCES

LEGEND

- SHORELINE
- 25 — LAND CONTOURS ABOVE GEODETIC DATUM
- BOG AREA
- 10" ϕ PIPELINE SCH. 2

NOTES

GEODETIC DATUM APPROX. 2·7 FT. ABOVE HYDROGRAPHIC DATUM.

BY	DATE	REVISION	LOC.	NO.

Detail numbers are indicated thus (3 / 1-E7)
Top figure is the detail number.
Bottom figure indicates the drawing on which the detail or its location may be found

	COMP.	DWG.
MADE	WH	MCZ
CHKD.	AB	AB
DATE	JAN. 16/73	

NOMINAL — REG.

BRIDGE		MECH. DESIGN	
ELECTRICAL		MECH. PROCESS	
HEAVY ENG.		MECH. SERVICES	
HIGHWAYS		STRUCTURAL	
IND. DESIGN			
DEPT. HEAD		PROJECT ENG.	

ISSUE DATE

ISSUED FOR

DEPARTMENT OF REGIONAL ECONOMIC EXPANSION

PROJECT TITLE

IMPROVEMENTS TO SALT WATER SYSTEM

RAMEA, NEWFOUNDLAND

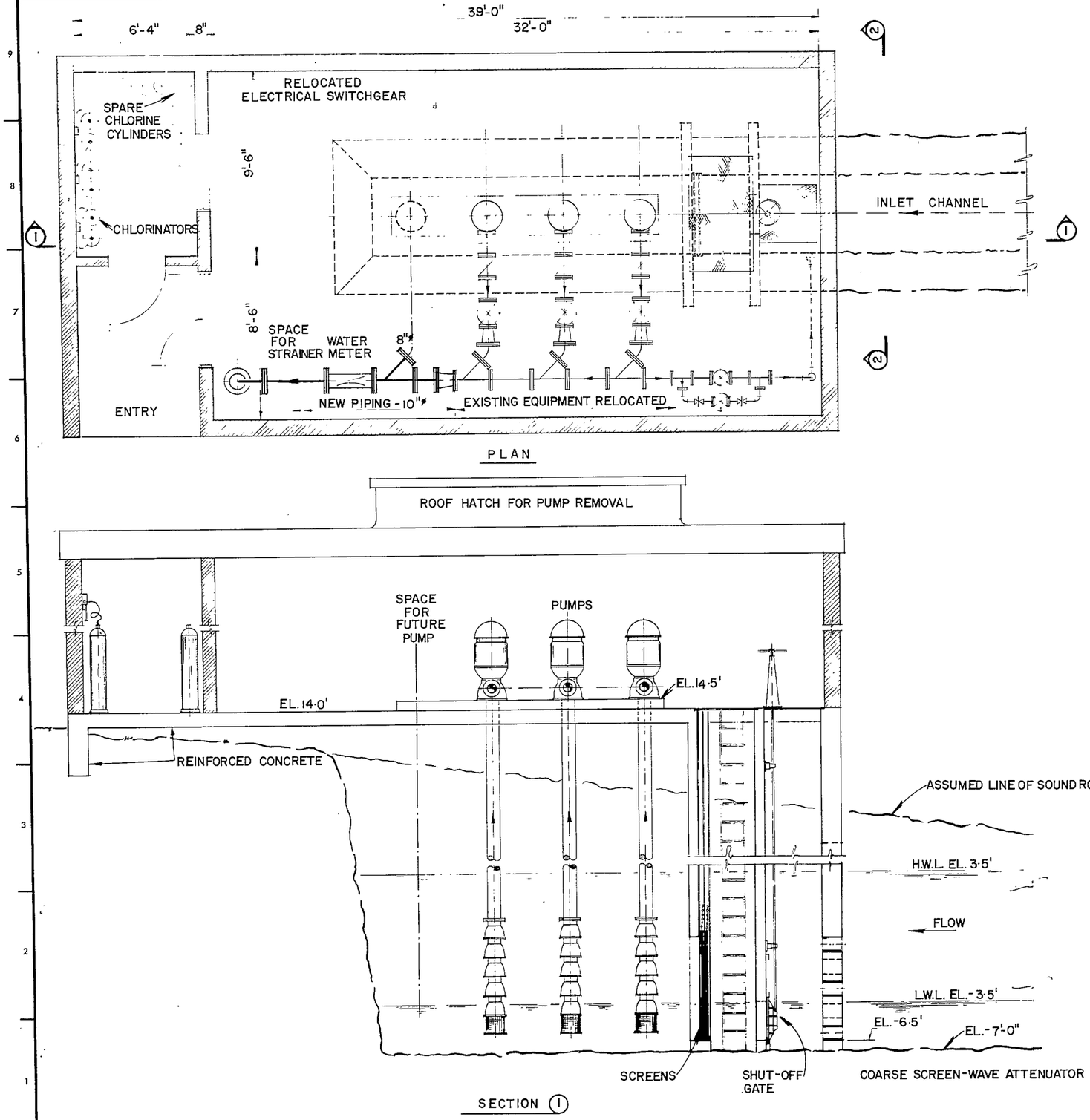
DRAWING TITLE

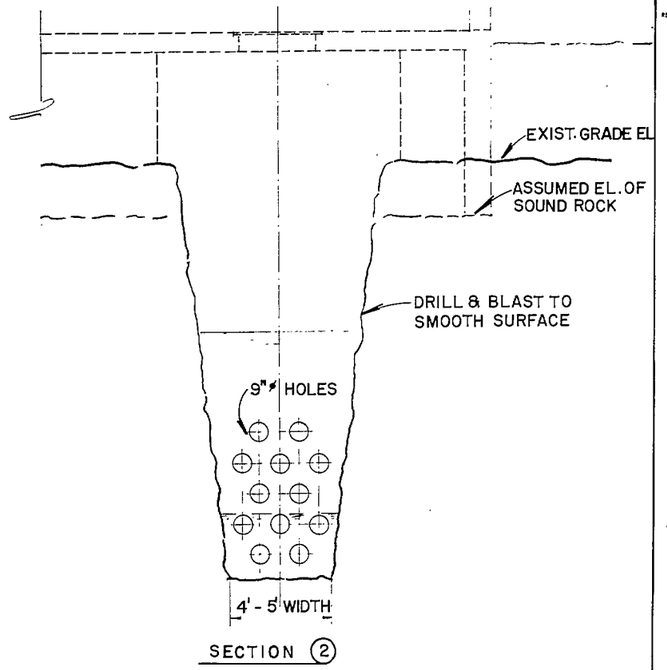
SCHEME N° 2-DETAILS

Foundation Of Canada Engineering Corporation Limited — FENCO

SCALE 0 1 2 3 INCH.

DRAWING NUMBER 6017-5





REFERENCES

NOTES

1. GEODETIC DATUM - APPROX. 2·7 FT. ABOVE HYDROGRAPHIC DATUM.
2. FOR LOCATION SEE DWG. 6017-2.
3. ELEVATIONS ABOVE GEODETIC DATUM.

BY	DATE	REVISION	LOC.	NO.

Detail numbers are indicated thus (3 / 1-E7)
Top figure is the detail number
Bottom figure indicates the drawing on which the detail or its location may be found

	COMP.	DWG.		REG.
MADE	WH	BW	NOMINAL Z	
CHKD.	AB	AB		
DATE	JAN. 16/73			
BRIDGE			MECH DESIGN	
ELECTRICAL			MECH PROCESS	
HEAVY ENG.			MECH SERVICES	
HIGHWAYS			STRUCTURAL	
IND DESIGN			-	
DEPT HEAD			PROJECT ENG.	

ISSUE DATE

ISSUED FOR

DEPARTMENT OF REGIONAL ECONOMIC EXPANSION

PROJECT TITLE

IMPROVEMENTS TO SALT WATER SYSTEM
RAMEA, NEWFOUNDLAND

DRAWING TITLE

SCHEME N° 2 - PUMPHOUSE AND INTAKE DETAILS

Foundation Of Canada Engineering Corporation Limited — FENCO

0 5 10
SCALE IN FEET

SCALE 0 1 2 3 INCH

DRAWING NUMBER 6017 - 6

APPENDIX 2

DETAIL CONSTRUCTION

COST ESTIMATES

CAPITAL COST ESTIMATES

Scheme #1 - Improvements to Existing System

Item	Description	Quantity	Unit	Unit Cost	Capital Costs	
(a)	Overhaul of pumps and pumphouse equipment incl. dismantling, cleaning, and re-assembling					
	300 hrs. @$10/hr mechanic				$3,000	
	100 hrs. @$ 5/hr local labourer				500	
	Travel cost for 3 men & living allowance				2,500	
	Miscellaneous Materials				1,000	
		1	ea.	L.S.		$ 7,000
(b)	Waterproofing of lower section of existing bldg., raising of outside gate well, and of door sill	1	ea.	L.S.		3,000
(c)	Removal of bog from shore and transp.to offsite	15,000	C.Y.	@$2.50		12,500
(d)	Beach fill and bulldozing of small sand & gravel dyke from local material	10,000	C.Y.	@$2.00		20,000

FENCO

Scheme # 1 - Continued

Item	Description	Quantity	Unit	Unit Cost	Capital Costs	
(e)	Grading & seeding of bog	1	ea.	L.S.		1,500
(f)	Armour stone for wave protection, 1 ton to 2 ton size	1,000	C.Y.@	30.00	30,000	
	Local material	8,000	C.Y.@	3.00	24,000	
			ea.	L.S.		54,000
(g)	Repair and extension of intake pipe & new intake crib					
	Piping	120	L.F.@	150.00	18,000	
	Mob. & Demob of pipe installation equipment.	1	ea.	L.S.	5,000	
	New intake structure				10,000	
			ea.	L.S.		33,000
(h)	Pipe repairs at fish plant	1	ea.	L.S.		3,000
(i)	Water meter and modifications to house it	1	ea.	L.S.		7,000
		Total for Scheme #1			=	$141,000
		10% Contingency				14,000
					TOTAL	$155,000
Relaying of 1000' of pipe & installation of shut-off valves in pipeline						19,000
					TOTAL	$174,000

Scheme #2 - New Pumphouse at Muddy Hole Channel

Item	Description	Quantity	Unit	Unit Cost	Capital Costs	
(a)	Overhaul of pumps and pumphouse equipment incl. dismantling, cleaning, repairing and reassembling in new building.	1	ea.	L.S.		10,000
(b)	Bog removal (dig and push)	5,000	C.Y.	@2.25		11,500
(c)	Bulldozing of 2' high dyke from local material	8,500	C.Y.	@2.00		17,000
(d)	Excavate inlet channel and build small stone dyke adjacent to the channel from the excavated material	50	C.Y.	@ 40.00 (above L.W.)		2,000
		50	C.Y.	@150.00 (below L.W.)		7,500
(e)	Electrical service to pumphouse (allowance)	1	ea.	L.S.		2,000
(f)	Pumphouse, incl. well					
	Concrete	100	C.Y.	@200.00	20,000	
	Excav. (place mat'l as ind.)	80	C.Y.	@ 40.00	3,000	
		20	C.Y.	@150.00	3,000	
	Backfill around structure, driveway and misc.	1	ea.	L.S.	3,000	
	Block walls, door, roof, etc.	1	ea.	L.S.	8,000	
	Electrical work in pumphouse	1	ea.	L.S.	4,000	
	Inlet gate, screens, etc.	1	ea.	L.S.	4,000	
	Water meter	1	ea.	L.S.	3,500	
			ea.	L.S.		48,500

FENCO

Scheme #2 - Continued

Item	Description	Quantity	Unit	Unit Cost	Capital Costs	
(g)	Pipe repairs at fish plant	1	ea.	L.S.		3,000
(h)	Pipe trench & back-fill 200ft. of 8" pipe relay	200	L.F.	@20.00	4,000	
	600 ft. O.M.	400	C.Y.	@17.50	7,000	
	400 ft. rock	300	C.Y.	@30.00	9,000	
	Makeup of backfill	150	C.Y.	@ 6.00	1,000	
			ea.	L.S.		21,000
(i)	10" - 100 psi polyethylene pipe	1,000	L.F.	@10.00	10,000	
	Jointing & installation	1,000	L.F.	@ 4.00	4,000	
			ea.	L.S.		14,000
	Total for Scheme #2				=	$136,500
	10% Contingency					13,500
					Total	$150,000
	Relaying of 1000' of pipe and installation of shut-off valve in pipeline					19,000
					Total	$169,000

FENCO

Scheme #3 - Intake at Harbour Island

Item	Description	Quantity	Unit	Unit Cost	Capital Costs	
(a)	Overhaul of pumps and pumphouse equipment incl. dismantling, cleaning, repairing and reassembling in new building (as in Scheme #1)	1	ea.	L.S.		10,000
(b)	Dredging at & under wharf with small clam					
	work	1	ea.	L.S.	1,000	
	mob & de-mob.	1	ea.	L.S.	4,000	
			ea.	L.S.		5,000
(c)	Dredging near island with small clam from small barge	1	ea.	L.S.		5,000
(d)	Pipeline - 14" sched. 60 polyethylene					
	Pipe material	2,000	L.F.	@12.00	24,000	
	Installation in trench	2,000	L.F.	@ 8.00	16,000	
	Concrete weights	200	PCS	@30.00	6,000	
	Dredging for pipe-line burials (no rock)	1,200	L.F.	@20.00	34,000	
	Mob & demob.dredge (5C.Y./L.F. @$4.00/ C.Y. = 20.00/L.F.)	1	ea.	@10,000		
						80,000
(e)	Intake structure	1	ea.	L.S.		10,000

Scheme #3 - Continued

Item	Description	Quantity	Unit	Unit Cost	Capital Costs
(f)	Pumphouse structure (deep well, dock repair, close quarters)	1	ea.	L.S.	40,000
(g)	Excav. & backfill across island	1	ea.	L.S.	3,000
(h)	Electrical connection pumphouse to fish plant	1	ea.	L.S.	1,000
(i)	Electrical work in pumphouse	1	ea.	L.S.	4,000
(j)	Water meter	1	ea.	L.S.	3,500
		Total for Scheme #3		=	$161,500
		15% Contingency			24,000
		Immediate Total			$185,500
		Future Embankment, allow			30,000
		Grand Total			$215,500

APPENDIX 3

BACTERIOLOGICAL TEST RESULTS

Environment Canada
Fisheries

Environnement Canada
Pêches

Foundation of Canada Engineering Corporation Ltd.,
239 Water St.,
St. John's, Nfld.

Attn: Mr. William Hayes

Your file Votre référence

Our file Notre référence 737-2-11

September 8, 1972

Dear Sirs:

Attached please find results of water analyses performed on samples of water from Ramea Harbour and areas outside Ramea Island. These analyses were made at your request as per your plan #6017-1.

Stations numbers 1, 2, 3 and 5 are acceptable to this Department as a sea water system for fish processing, provided the supply is chlorinated to reduce the "coliform" count to a Most Probable Number of 2 or less per 100 ml.

Station number 4, in the channel between Ramea and Harbour Islands, is not acceptable unless treated prior to chlorination. This decision is based on results of analyses conducted in January and February, 1972, as well as on the fact that raw sewage continues to be dumped into Ramea Harbour. During a water survey in January, 1972, particulate matter was retrieved in water samples taken in the area of the present station number 4.

Yours very truly,

David R.L. White,
Senior Bacteriologist,
Fish Inspection Laboratory,
Inspection Branch,
Fisheries Service,
Newfoundland Region

DRLW/tm
Attach.

c.c. Mr. J. Burden,
Canada Dept. of
Public Works.

P.O. Box 5667
St. John's, Newfoundland

Boîte postale 5667
Saint-Jean (Terre-Neuve)

JOHN PENNY & SONS LTD; RAMEA, NFLD.

SEA WATER SURVEY

Station No.	Date Sampled	Tide	M.P.N. per 100 ml. Coliforms	Faecal Coliforms
#1	28-8-72	3/4 Down	4	0
Island Cove			0	0
Depth @ 20'			0	0
			0	0
			0	0
#2	28-8-72	3/4 Down	0	0
Muddy Hole			4	0
Cove Channel			4	0
Depth @ 8'			4	0
			0	0
#3	28-8-72	3/4 Down	0	0
Muddy Hole Cove			0	0
Depth @ 25'			0	0
			3	0
			0	0
#4	28-8-72	3/4 Down	23	0
Channel - Ramea			39	9
Harbour			23	0
Depth @ 45'			7	3
			9	4
#5	28-8-72	3/4 Down	23	4
Reach, Harbour			4	0
Island - Niddle Island			4	0
Depth @ 30'			4	0
			23	0

Requested By
FENCO/Wm. Hayes

FOR APPROX. LOCATION OF SAMPLE STATIONS SEE DWG. 6017-C-1.

Fisheries Service
P. O. Box 5667
St. John's, Nfld.

Environment Canada Environnement Canada

FISH INSPECTION LABORATORY
ST. JOHN'S, NEWFOUNDLAND

Your file Votre dossier

Our file Notre dossier

A

John Penny & Sons Ltd. - Ramea, Nfld.

Harbour Water M.P.N. Results

Sample #	Date	Description	M.P.N.
1.	Mar. 20/60	Oil Tanks	0
2.		" "	15
3.	✳	100' from Oil Tanks	11
4.			43
5.		200' from Oil Tanks	43
6.			43
7.		Near end of Public Wharf	43
8.			240
9.		Far end of Public Wharf	43
10.			23
1.	Oct. 31/61	Salt water intake to plant	210
2.		(under wharf)	240
3.			93
4.			150
5.			43
6.			150
7.			43
8.			43
9.			43
10.			43
1.	Nov. 3/61	Salt water intake to plant	7/100
2.		(under wharf)	240
3.		Taken with Batch (C) of grid samples	460
4.			1100
5.			7/100
1.	Nov. 4/61	Salt water intake to plant	210
2.		(under wharf)	240
3.		Taken with Batch (d) of grid samples	460
4.			240
5.			93
1.	May 16/62	Salt water from pump in	93
2.		pumphouse	150
3.			240
4.			93
5.			75
6.			150
7.			460
8.			75
9.			240
10.			150

.../2

✳ FOR APPROX. LOCATION OF SAMPLE STATIONS SEE DWG 6017-C-1

Sample #	Date	Description	M.P.N.
1.	April 1/63	Salt water from pump in pumphouse	> 1100
2.			460
3.			460
4.			460
5.			240
6.			460
7.			1100
8.			240
9.			460
10.			1100
1.	April 29/65	Salt water - pumphouse	240
2.		1/2 tide (rising)	460
3.		time 1700	240
4.		Sunny & calm	240
5.			240
6.			210
7.			240
8.			460
9.			460
10.			93
1.	April 30/65	Salt water - pumphouse	43
2.		High tide (full);	93
3.		time 0845	43
4.		Calm	43
5.			43
6.			75
7.			43
8.			93
9.			43
10.			93
1.	April 30/65	Salt water - pumphouse	240
2.		1/2 tide (falling);	240
3.		time 1145;	240
4.		calm	150
5.			240
6.			93
7.			93
8.			240
9.			75
10.			43
1.	Sept. 14/65	Salt water	9.1
2.			0
3.			23
4.			3.6
5.			7.3

SEE LAST PAGE

.../3

Sample #	Date	Description	M.P.N.
1.	Feb. 3/66	Salt water - pumphouse	1100
2.			460
3.			1100
4.			460
5.			460
1.	Feb. 28/66	Salt water - pumphouse	75
2.			150
3.			93
4.			43
5.			93
1.	Mar. 30/66	Salt water - pumphouse	460
2.			1100
3.			460
4.			460
5.			460
1.	Mar. 6/67	Salt water - pumphouse	460
2.			460
3.			240
4.			93
5.			210
1.	Mar. 16/64	Salt water - taken from pumphouse	1100
2.			1100
3.			1100
4.			1100
5.			1100
6.			1100
7.			1100
8.			1100
9.			1100
10.			1100
1.	Sept. 13/64	Salt water - 300' from shoreline opposite oil tahks	240
2.			460
3.			43
4.			150
5.			240
6.			75
7.			43
8.			75
9.			93
10.			43
1.	Apr. 29/65	Salt water - pumphouse	43
2.		Low tide (falling);	43

.../4

Sample #	Date	Description	M.P.N.
3.	Apr. 29/65 (cont'd)	time 1300;	1100
4.		Sunny & calm	240
5.			240
6.			150
7.			210
8.			93
9.			150
10.			93
1.	Apr. 10/67	Salt water - hose in	93
2.		plant on skinning machine	240
3.			240
4.			43
5.			240
1.	May 1/67	Salt water - hose in	1100
2.		cutting room	1100
3.			460
4.			240
5.			240
1.	Jan. 26/68	Salt water - pumphouse	93
2.			460
3.			460
4.			240
5.			240
1.	Mar. 11/69	Salt water - pumphouse	75
2.			460
3.			1100
4.			460
5.			1100
1.	Feb. 7/70	Salt water - pumphouse	75
2.			75
3.			93
4.			43
5.			93
1.	Mar. 3/70	Salt water - pumphouse	1100
2.			460
3.			460
4.			1100
5.			460
1.	Apr. 10/70	Salt water - hose off	1100
2.		skinning machine	43

GULF OF ST. LAWRENCE

NORTH-EAST POND

ISLAND COVE

"MUDDY HOLE CHANNEL"

MUDDY HOLE COVE

TEAL POND

BEACH SIDE

SHIP COVE

PUBLIC WHARF

FISH PLANTS

HATCHER'S POINT

MUDDY HOLE ROAD

GOVT. WHARF

OIL TANKS

MAIN SHIP CHANNEL

MIDDLE ISLAND
(PUFFIN IS.)

NORTH-WEST POND

HARBOUR ISLAND

MUDDY HARBOUR

SCALE IN FEET

NEWFOUNDLAND-LABRADOR

QUEBEC

STRAIT OF BELLE ISLE

GULF OF ST LAWRENCE

BONAVISTA BAY

CONCEPTION BAY

NEWFOUNDLAND

ST JOHN'S

RAMEA ISLAND

PLACENTIA BAY

ST MARY'S BAY

SCALE IN MILES

SITE PLAN

REFERENCES

LEGEND

(1) SAMPLE ST'N (№1) FOR 28-6-72 SURVEY

⚠ SAMPLE ST'N (№1) FOR 20-3-60 SURVEY

—— SHORE LINE

–25– LAND CONTOURS IN FEET ABOVE GEODETIC DATUM

NOTES

1. TEST RESULTS PRECEEDING SIX PAGES

BY	DATE	REVISION	LOC	NO

Detail numbers are indicated thus (3 / 1-E7). Top fraction is the detail number. Bottom figure indicates the drawing on which the detail or its location may be found.

	COMP	DWG
MADE	AB	MCZ
CHKD		AB
DATE	NOV. 22'72	

NOMINAL

BRIDGE	MECH DESIGN
ELECTRICAL	MECH PROCESS
HEAVY ENG.	MECH SERVICES
HIGHWAYS	STRUCTURAL
HYD DESIGN	
DEPT HEAD	PROJECT ENG.

ISSUE DATE

ISSUED FOR

DEPARTMENT OF REGIONAL ECONOMIC EXPANSION

PROJECT TITLE

IMPROVEMENTS TO SALT WATER SYSTEM

RAMEA, NEWFOUNDLAND

DRAWING TITLE

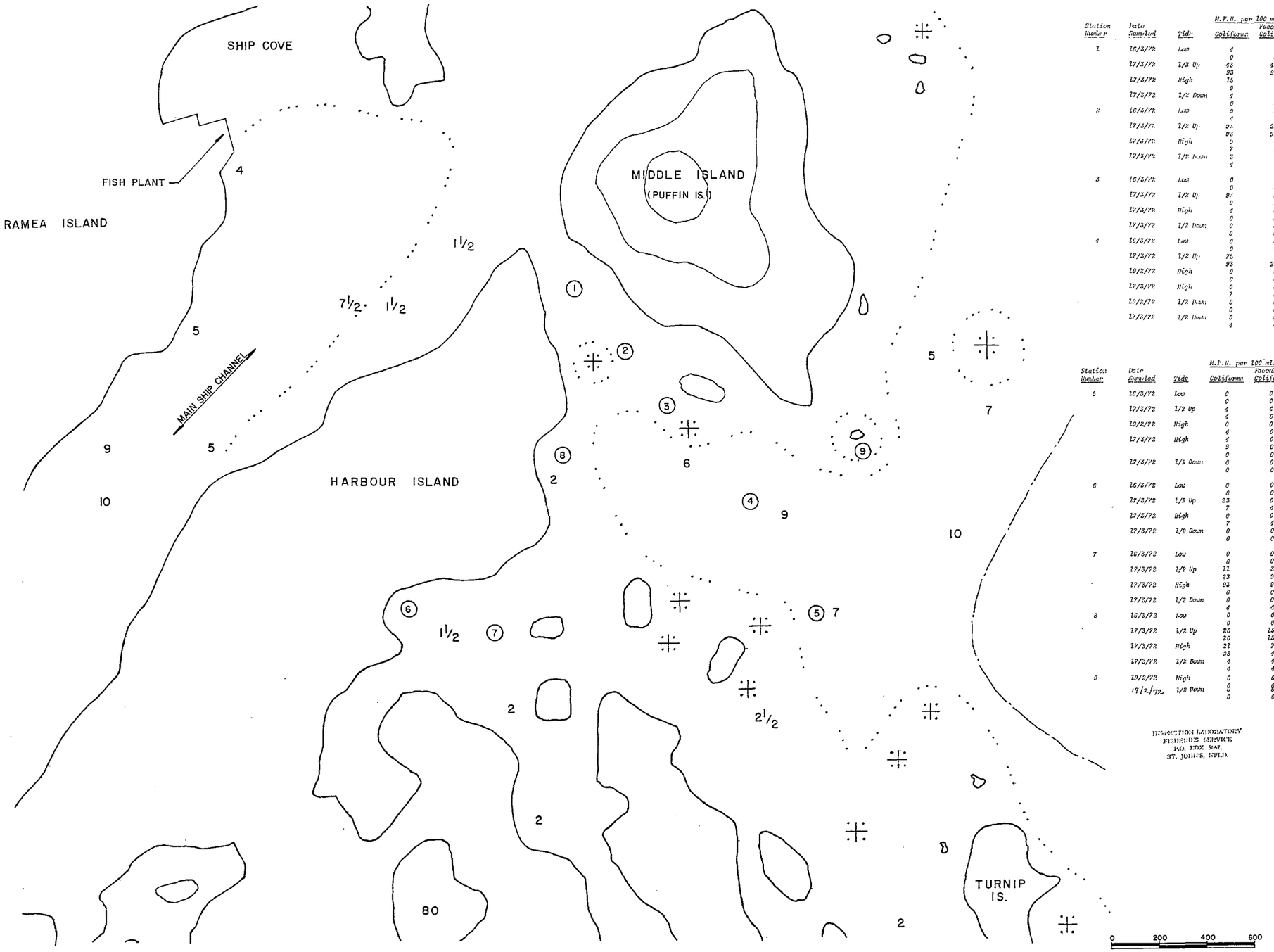
BACTERIOLOGICAL TEST REPORTS SHEET 1 OF 5

Foundation Of Canada Engineering Corporation Limited

FENCO

SCALE 0 1 2 3 INCH

DRAWING NUMBER 6017-C-1



JOHN PENNY & SONS LTD., RAMEA, NFLD.
CLA WATER SAMPLE - M.P.N. RESULTS

Station Number	Date Sampled	Tide	M.P.N. per 100 ml. Coliforms	Fecal Coliforms
1	16/3/72	Low	4	0
			0	0
	17/3/72	1/2 Up	43	43
	17/3/72	High	15	4
			9	9
	17/3/72	1/2 Down	4	4
2	16/3/72	Low	0	0
			1	0
	17/3/72	1/2 Up	94	43
			93	93
	17/3/72	High	4	4
			7	4
	17/3/72	1/2 Down	2	0
			4	0
3	16/3/72	Low	0	0
			0	0
	17/3/72	1/2 Up	94	9
			9	9
	17/3/72	High	4	0
			0	0
	17/3/72	1/2 Down	0	0
			0	0
4	16/3/72	Low	0	0
			0	0
	17/3/72	1/2 Up	24	4
			93	23
	19/2/72	High	0	0
			0	0
	17/3/72	High	0	0
			7	0
	19/3/72	1/2 Down	0	0
	17/3/72	1/2 Down	0	0
			4	4

Station Number	Date Sampled	Tide	M.P.N. per 100 ml. Coliforms	Fecal Coliforms
5	16/3/72	Low	0	0
			0	0
	17/3/72	1/2 Up	4	4
	19/2/72	High	0	0
			4	0
	17/3/72	High	4	0
			0	0
	17/3/72	1/2 Down	0	0
			0	0
6	16/3/72	Low	0	0
			2	0
	17/3/72	1/2 Up	23	0
			7	4
	17/3/72	High	0	0
			7	4
	17/3/72	1/2 Down	0	0
			0	0
7	16/3/72	Low	0	0
			0	0
	17/3/72	1/2 Up	11	3
			23	9
	17/3/72	High	93	9
			0	0
	17/3/72	1/2 Down	0	0
			4	4
8	16/3/72	Low	0	0
			0	0
	17/3/72	1/2 Up	20	15
			20	15
	17/3/72	High	21	7
			23	4
	17/3/72	1/2 Down	4	4
			4	4
9	19/2/72	High	0	0
	19/2/72	1/2 Down	0	0
			0	0

INFECTION LABORATORY
FISHERIES SERVICE
P.O. BOX 5667,
ST. JOHN'S, NFLD.

REFERENCES

LEGEND

(1) SAMPLE STATION Nº
SHORE LINE
ROCK SHOAL
1 FATHOM CONTOUR
3 FATHOM CONTOUR
10 FATHOM CONTOUR

BY	DATE	REVISION	LOC.	NO.

Detail numbers are indicated thus (3 / 1-E7)
Top figure is the detail number
Bottom figure indicates the drawing on which the detail or its location may be found

	COMP	DWG	REG.
MADE	AB	RBM NCZ	
CHKD		AB	
DATE	NOV. 22' 72		

BRIDGE		MECH DESIGN	
ELECTRICAL		MECH PROCESS	
HEAVY ENG.		MECH SERVICES	
HIGHWAYS		STRUCTURAL	
IND. DESIGN			
DEPT HEAD		PROJECT ENG.	

ISSUE DATE
ISSUED FOR

DEPARTMENT OF
REGIONAL ECONOMIC
EXPANSION

PROJECT TITLE
IMPROVEMENTS TO
SALT WATER SYSTEM
RAMEA, NEWFOUNDLAND

DRAWING TITLE
BACTERIOLOGICAL
TEST RESULTS
SHEET 2 OF 5

Foundation Of Canada Engineering Corporation Limited
FENCO

SCALE 0 1 2 3 INCH.

DRAWING NUMBER 6017-C-2

Environment Canada / Environnement Canada

Your file / Votre dossier

Our file / Notre dossier

John Penny & Sons Ltd. - Ramea, Nfld.

Harbour Water Survey

M.P.N. Results

Stn.#1	Stn.#5	Stn.#9	Stn.#12	Stn.#15	Stn.#18	Stn.#21	Stn.#27
(A) 23	240	39	150	43	240	93	93
(B) 93	93	43	23	23	23	43	93
(C) 43	75	21	28	4	21	15	21

Stn.#2	Stn.#6	Stn.#10	Stn.#13	Stn.#16	Stn.#19	Stn.#22
93	93	240	240	43	93	1100
75	93	240	43	43	9	93
43	23	21	15	15	21	9

Stn.#3	Stn.#7	Stn.#11	Stn.#14	Stn.#17	Stn.#20
93	43	43	9	240	240
93	460	93	43	21	43
93	240	43	43	20	9

Stn.#4	Stn.#8	Stn.#25	Stn.#26
43	15	93	43
93	43	43	150
43	93	43	15

Stn.#23
43
460
23

Stn.#24
75
43
20

Legend:

(A) Survey Jan. 24, 1972: Tide, high; time 1630.
(B) Survey Jan. 25, 1972: Tide, half low; time 0830.
(C) Survey Jan. 25, 1972: Tide, low; time 1100.

Note:

All samples sub-surface and plant in production during sampling.

John Penny & Sons Ltd. - Ramea, Nfld.

Harbour Water Survey

M.P.N. Results

Stn.#1	Stn.#2	Stn.#3	Stn.#4	Stn.#5
23	9	15	15	23
9	23	9	15	9
23	15	0	9	7
4	7	7	4	7
23	93	15	15	4

Sub-surface Samples Collected February 18, 1971 (1100-1120)

GULF OF ST. LAWRENCE

HORTH-EAST POND

ISLAND COVE

TEAL POND

BEACH SIDE

MUDDY HOLE COVE

SHIP COVE

PUBLIC WHARF

FISH PLANTS

HATCHER'S POINT

MUDDY HOLE ROAD

GOV'T. WHARF

MIDDLE ISLAND
(PUFFIN IS.)

1971 (FEB.)
SURVEY
5 STA. - 25 SAMPLES

1972 (FEB.)
SURVEY
27 STA. - 81 SAMPLES

NORTH-WEST POND

MAIN SHIP CHANNEL

42 100' FROM SHORE WITH THREE POLES (ANTENNA) IN LINE

MUDDY HARBOUR

HARBOUR ISLAND

SCALE IN FEET 0 200 400 600

NEWFOUNDLAND-LABRADOR

QUEBEC

STRAIT OF BELLE ISLE

GULF OF ST. LAWRENCE

BONAVISTA BAY

NEWFOUNDLAND

CONCEPTION BAY

ST JOHN'S

RAMEA ISLAND

PLACENTIA BAY

ST MARY'S BAY

SCALE IN MILES 0 25 50 75 100

SITE PLAN

REFERENCES

LEGEND

—— SHORE LINE

—25— LAND CONTOURS IN FEET ABOVE GEODETIC DATUM

NOTES

1. TEST RESULTS PRECEEDING TWO PAGES

BY	DATE	REVISION	LOC	NO

Detail numbers are indicated thus (3 / 1-E7)
Top figure is the detail number
Bottom figure indicates the drawing on which the detail or its location may be found

	COMP	DWG	REG
MADE	AB	MCZ	
CHKD		AB	
DATE	NOV. 22' 72	NOMINAL	

BRIDGE		MECH DESIGN	
ELECTRICAL		MECH PROCESS	
HEAVY ENG		MECH SERVICES	
HIGHWAYS		STRUCTURAL	
IND DESIGN			
DEPT HEAD		PROJECT ENG	

ISSUE DATE

ISSUED FOR

DEPARTMENT OF
REGIONAL ECONOMIC
EXPANSION

PROJECT TITLE
IMPROVEMENTS TO
SALT WATER SYSTEM
RAMEA, NEWFOUNDLAND

DRAWING TITLE
BACTERIOLOGICAL
TEST REPORTS
SHEET 3 OF 5

Foundation Of Canada Engineering Corporation Limited
FENCO

SCALE 0 1 2 3 INCH

DRAWING NUMBER 6017-C-3

Harbour Water Survey - M.P.N. Results

	Stn.#1	Stn.#10	Stn.#19	Stn.#28	Stn.#36	Stn.#45	Stn.#53	Stn.#61	Stn.#68
(A)	9.1	0	23	0	9.1	43	43	9.1	43
(B)	3.6	3.6	0	0	0	3.6	3.6	3.6	9.1
(C)	14	9.1	7.3	43	43	36	23	150	93
(D)	23	15	15	3	240	15	43	93	9.1

	Stn.#2	Stn.#11	Stn.#20	Stn.#29	Stn.#37	Stn.#46	Stn.#54	Stn.#62	Stn.#69
	75	3.6	15	4.1	23	43	3.6	3	21
	3.6	7.3	0	0	3.6	23	23	3.6	14
	210	23	23	23	23	23	23	3.6	9.1
	23	15	0	3.6	14	43	39	3.6	3.6

	Stn.#3	Stn.#12	Stn.#21	Stn.#30	Stn.#38	Stn.#47	Stn.#55	Stn.#63	Stn.#70
	43	38	15	3.6	3	3.6	43	9.1	9.1
	0	43	0	3.6	3.6	15	43	9.1	15
	20	3.6	9.1	23	23	15	23	75	39
	3.6	15	460	9.1	93	3.6	21	9.1	3.6

	Stn.#4	Stn.#13	Stn.#22	Stn.#31	Stn.#39	Stn.#48	Stn.#56	Stn.#64	Stn.#71
	3.6	210	7.3	23	23	3.6	240	23	15
	0	11	0	43	7.3	15	23	3.6	9.1
	7.3	7.3	15	43	23	9.1	23	75	9.1
	3.6	23	3.6	93	9.1	7.3	23	9.1	0

	Stn.#5	Stn.#14	Stn.#23	Stn.#32	Stn.#40	Stn.#49	Stn.#57	Stn.#65	Stn.#72
	39	150	23	15	9.1	9.1	93	75	9.1
	3.6	23	9.1	23	23	43	9.1	9.1	23
	3.6	23	21	23	43	23	9.1	93	23
	1100	9.1	43	15	43	0	3	0	9.1

	Stn.#6	Stn.#15	Stn.#24	Stn.#33	Stn.#41	Stn.#50	Stn.#58	Stn.#66	Stn.#73
	120	23	150	23	0	23	150	23	15
	7.3	3.6	9.1	75	9.1	23	15	15	14
	39	43	11	23	14	23	43	0	23
	9.1	9.1	9.1	9.1	9.1	3.6	3.6	9.1	9.1

	Stn.#7	Stn.#16	Stn.#25	Stn.#34	Stn.#42	Stn.#51	Stn.#59	Stn.#67
	7.3	43	9.1	210	43	9.1	11	23
	9.1	23	15	9.1	23	150	23	9.1
	15	9.1	15	23	75	43	43	93
	93	9.1	15	7.3	15	7.3	7.3	23

	Stn.#8	Stn.#17	Stn.#26	Stn.#35	Stn.#43	Stn.#52	Stn.#60
	3.6	3.6	14	240	9.1	23	9.1
	15	9.1	43	3.6	93	43	43
	32	15	23	75	93	150	23
	7.3	23	23	23	0	3.6	15

	Stn.#9	Stn.#18	Stn.#27	Stn.#44
	23	93	75	9.1
	15	23	23	9.1
	7.3	15	23	240
	3.6	9.1	43	9.1

(C)	Stn.#	Result
	74	43
	75	11
	76	23
	77	9.1
	78	23
	79	3.6
	80	23
	81	43
	82	9.1
	83	23
	84	15
	85	120
	86	75
	87	9.1
	88	11
	89	23
	90	75
	91	23
	92	3.6
	93	11
	94	11
	95	43
	96	23
	97	7.3
	98	9.1
	99	75
	100	11
	101	23
	102	75
	103	23
	104	23
	105	15
	106	11
	107	3.6
	108	43
	109	120
	110	23
	111	75
	112	43
	113	75
	114	23
	115	43
	116	75
	117	23
	118	11
	119	15
	120	23
	121	75
	122	23

Legend:

(A) Survey May 7, 1962: Tide; low rising: wind; southeast light to calm: overcast: water temperature 38°F; air temperature 45°F; time 6:45-7:45 p.m. This grid taken with Norwegian type sampler.

(B) Survey May 10, 1962: Tide; high rising: wind; west 15 to 20 m.p.h.; cloudy; water temperature 38°F; air temperature 38°F; time 1:30-2:30 p.m. This grid taken with Norwegian type sampler.

(C) Survey May 14, 1962: Tide; low falling: wind; south light to calm; Sunny with fog patches; water temperature 38°F; air temperature 40°F; time 9:45-11:00 a.m. This grid taken with Forrest type sampler.

(D) Survey May 16, 1962: Tide; high falling; wind, variable light; sunny; water temperature 38°F; air temperature 45°F; time 8:30 to 9:30 a.m. This grid taken with Forrest type sampler.

NOTE: Triangle and shoreline samples were taken with grid sampler on May 14, 1962. (C). All samples were sub-surface; depth 7 to 11 fathoms; plant in operation at all times.

M.P.N. results indicated grids read from top to bottom in grid areas for findings of (A), (B), (C) and (D) surveys.

GULF OF ST. LAWRENCE

NORTH-EAST POND

ISLAND COVE

TEAL POND

BEACH SIDE

MUDDY HOLE COVE

MUDDY HOLE ROAD

SHIP COVE

PUBLIC WHARF

FISH PLANTS

GOV'T. WHARF

HATCHERS POINT

MIDDLE ISLAND
(PUFFIN IS.)

NORTH-WEST POND

STN. 113 TO STN. 122
50' FROM SHORELINE
AND 100' APART.

1962(MAY)
SURVEY
STA.1-122

MAIN SHIP CHANNEL

HARBOUR ISLAND

MUDDY HARBOUR

SCALE IN FEET
0 200 400 600

NEWFOUNDLAND-LABRADOR
QUEBEC
STRAIT OF BELLE ISLE
GULF OF ST. LAWRENCE
BONAVISTA BAY
NEWFOUNDLAND
CONCEPTION BAY
ST. JOHN'S
RAMEA ISLAND
PLACENTIA BAY
STRAIT OF BELLE BAY
0 25 50 75 100
SCALE IN MILES

SITE PLAN

REFERENCES

LEGEND

—— SHORE LINE
–25– LAND CONTOURS IN FEET ABOVE GEODETIC DATUM.

NOTES

1. TEST RESULTS PRECEEDING PAGE

BY	DATE	REVISION	LOC	NO

Detail numbers are indicated thus (3 / 1-E7)
Top figure is the detail number
Bottom figure indicates the drawing on which the detail or its location may be found

	COMP	DWG
MADE	AB	MCZ
CHKD		AB
DATE	NOV. 22' 72	

NOMINAL

BRIDGE		MECH DESIGN	
ELECTRICAL		MECH PROCESS	
HEAVY ENG		MECH SERVICES	
HIGHWAYS		STRUCTURAL	
IND DESIGN			
DEPT HEAD		PROJECT ENG	

REG

ISSUE DATE

ISSUED FOR

DEPARTMENT OF
REGIONAL ECONOMIC
EXPANSION

PROJECT TITLE
IMPROVEMENTS TO
SALT WATER SYSTEM
RAMEA, NEWFOUNDLAND

DRAWING TITLE
BACTERIOLOGICAL
TEST REPORTS
SHEET 4 OF 5

Foundation
Of
Canada
Engineering
Corporation Limited
FENCO

SCALE
0 1 2 3 INCH

DRAWING NUMBER
6017-C-4

John Penny & Sons Ltd. - Ramea, Nfld.

Harbour Water Survey

Stn. #1	Stn. #6	Stn. #11
(a) 460	43	93
(b) >1100	460	>1100
(c) >1100	>1100	460
Stn. #2	**Stn. #7**	**Stn. #12**
(a) 240	23	240
(b) 150	460	75
(c) >1100	210	>1100
Stn. #3	**Stn. #8**	**Stn. #13**
(a) 150	23	43
(b) 460	93	460
(c) >1100	9	75
Stn. #4	**Stn. #9**	**Stn. #14**
(a) 23	23	20
(b) 240	93	>1100
(c) 39	23	240
Stn. #5	**Stn. #10**	**Stn. #15**
(a) 21	23	3.6
(b) >1100	>1100	43
(c) 23	43	43

Legend: (a) Survey Sept. 28, 1959 - tide ½ ebb, wind southeast 8 m.p.h., water temperature 51.4°F, air temperature 50°F, overcast and light rain.

(b) Survey Sept. 28, 1959 - tide high, (on flood), wind southeast 2 m.p.h., water temperature 50.5°F, air temperature 57°F, overcast and fog.

(c) Survey Sept. 29, 1959 - tide low, (on flood), wind calm, water temperature 51.0°F, air temperature 66°F, low lying fog.

Note: All samples taken from surface only, and the plant was not in operation during the sampling periods.

John Penny & Sons Ltd. - Ramea, Nfld.

Harbour Water Survey

Stn. #1	Stn. #7	Stn. #13	Stn. #19	Stn. #25	Stn. #31
(a) 150	240	240	93	240	1100
(b) >1100	1100	460	1100	1100	460
(c) 1100	150	460	460	1100	460
(d) 43	15	150	240	75	93
Stn. #2	**Stn. #8**	**Stn. #14**	**Stn. #20**	**Stn. #26**	**Stn. #32**
(a) 460	240	210	150	93	460
(b) >1100	240	>1100	1100	460	1100
(c) >1100	1100	1100	150	150	460
(d) 75	43	23	93	43	93
Stn. #3	**Stn. #9**	**Stn. #15**	**Stn. #21**	**Stn. #27**	**Stn. #33**
(a) 240	1100	460	1100	>1100	1100
(b) 460	1100	>1100	1100	460	>1100
(c) 240	460	460	93	240	1100
(d) 93	23	23	240	240	93
Stn. #4	**Stn. #10**	**Stn. #16**	**Stn. #22**	**Stn. #28**	**Stn. #34**
(a) 460	1100	460	240	240	93
(b) 1100	460	460	>1100	210	210
(c) 460	240	240	1100	460	>1100
(d) 9.1	93	93	93	43	15
Stn. #5	**Stn. #11**	**Stn. #17**	**Stn. #23**	**Stn. #29**	**Stn. #35**
(a) 240	460	460	1100	460	>1100
(b) 1100	>1100	1100	1100	460	290
(c) 240	1100	240	1100	1100	460
(d) 93	75	75	240	240	39
Stn. #6	**Stn. #12**	**Stn. #18**	**Stn. #24**	**Stn. #30**	**Stn. #36**
(a) 240	>1100	240	460	240	460
(b) 1100	1100	>1100	460	460	1100
(c) 1100	>1100	1100	1100	93	240
(d) 240	460	75	460	460	43

Legend: (a) Survey Oct. 30, 1961 - low tide,
wind west 15 m.p.h.,
water temperature 48°F,
air temperature 46°F.

(b) Survey Oct. 30, 1961 - high tide full,
wind west 15 m.p.h.,
water temperature 48°F,
air temperature 44°F.

(c) Survey Nov. 3, 1961 - tide half rising,
wind north 5-15 m.p.h.,
water temperature 47°F,
air temperature 42°F.

(d) Survey Nov. 4, 1961 - tide half falling,
wind southwest 15 m.p.h.,
water temperature 47°F,
air temperature 48°F.

All samples subsurface - depth 7 to 11 fathoms,
and taken while plant in operation.

GULF OF ST. LAWRENCE

NORTH-EAST POND

ISLAND COVE

TEAL POND

BEACH SIDE

SHIP COVE

PUBLIC WHARF

HATCHER'S POINT

MUDDY HOLE COVE

MUDDY HOLE ROAD

SYDNEY RD.

PLANTS

FISH

GOV'T. WHARF

1959(SEPT.) SURVEY STA.1-15

SUGGESTED LOCATION OF INTAKE

1961 OCT/NOV. SURVEY STA.1-36

MIDDLE ISLAND

(PUFFIN IS.)

NORTH-WEST POND

MAIN SHIP CHANNEL

HARBOUR ISLAND

MUDDY HARBOUR

SCALE IN FEET 0 200 400 600

NEWFOUNDLAND-LABRADOR

QUEBEC

STRAIT OF BELLE ISLE

GULF OF ST. LAWRENCE

BONAVISTA BAY

NEWFOUNDLAND

CONCEPTION BAY

ST. JOHN'S

RAMEA ISLAND

PLACENTIA BAY

STRAIT OF BELLE BAY

SCALE IN MILES 0 25 50 75 100

SITE PLAN

REFERENCES

LEGEND

——— SHORE LINE

—25— LAND CONTOURS IN FEET ABOVE GEODETIC DATUM

NOTES

1. TEST RESULTS PRECEEDING TWO PAGES

BY	DATE	REVISION	LOC	NO

Detail numbers are indicated thus (3 / 1-E7)
Top figure is the detail number
Bottom figure indicates the drawing on which the detail or its location may be found

	COMP	DWG
MADE	A B	MCZ
CHKD		A B
DATE	NOV.22 '72	

NOMINAL

BRIDGE		MECH DESIGN	
ELECTRICAL		MECH PROCESS	
HEAVY ENG.		MECH SERVICES	
HIGHWAYS		STRUCTURAL	
IND. DESIGN			
DEPT HEAD		PROJECT ENG.	

ISSUE DATE

ISSUED FOR

DEPARTMENT OF REGIONAL ECONOMIC EXPANSION

PROJECT TITLE

IMPROVEMENTS TO SALT WATER SYSTEM

RAMEA, NEWFOUNDLAND

DRAWING TITLE

BACTERIOLOGICAL TEST REPORTS SHEET 5 OF 5

Foundation Of Canada Engineering Corporation Limited

FENCO

SCALE 0 1 2 3 INCH

DRAWING NUMBER 6017-C-5

Your file / Votre dossier

Our file / Notre dossier

Environment Canada / Environnement Canada

John Penny & Sons Ltd. - Ramea, Nfld.

Sea Water and Beach Water M.P.N. Results.

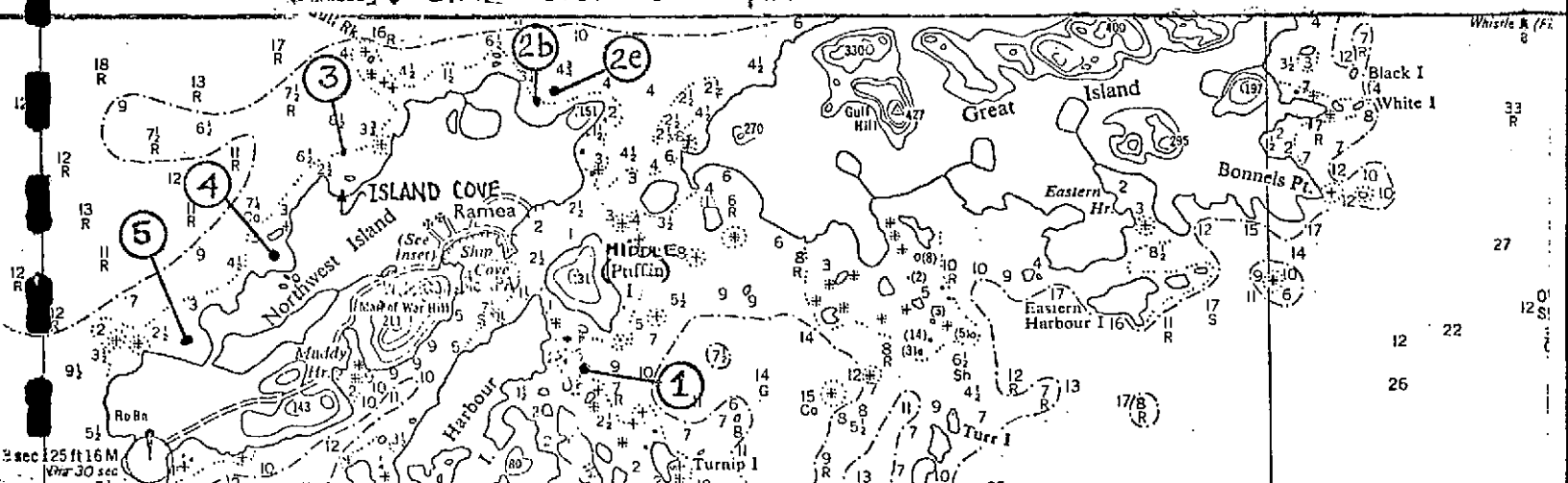
	Stn. #1	Stn. #2(a)	Stn. #2(b)	Stn. #3	Stn. #4	Stn. #5
(A)	7.3	0	9.1	0	20	3.6
"	3.6	0	0	3.6	0	3.6
"	0	3	0	3.6	3.6	3
"	3.6	0	0	0	0	0
"	7.3	0	3.6	0	11	7.3
"	0			3.6	15	9.1
"	9.1			9.1	23	3.6
"	0			0	9.1	3.6
"	9.1			3.6	9.1	9.6
"	3.6			9.1	3.6	3.6
(B)	0	0	0	3.6	9.1	3.6
"	0	0	0	0	3.6	0
"	0	0	0	0	3.6	3.6
"	0	3.6	0	3.6	9.1	3.6
"	3.6	0	0	0	0	0
"	0			0	3.6	0
"	0			0	3.6	0
"	0			3	9.1	3.6
"	3.6			9.1	0	3.6
"	0			0	3.6	3.6

Legend:

(A) Survey Sept. 29, 1964 - tide 1/2 (rising), wind nil, water temperature 43°F, air temperature 52°F, weather sunny, time 11:45 a.m. (Stn. #1).

Survey Sept. 29, 1964 - tide 3/4 (rising), wind nil, water temperature 43°F, air temperature 52°F, weather sunny, time 1:30-2:45 p.m. (Stn. #2, 3, 4 & 5).

(B) Survey Sept. 29, 1964 - tide 3/4 (falling), wind nil, water temperature 43°F, air temperature 43°F, weather sunny, time 5:30 - 6:30 p.m.



APPENDIX 4

RECORDS OF ROUND FISH LANDINGS

JOHN PENNY AND SONS, LIMITED

Statement of Vessel Operations
for the year ended 31st May 1969

(With comparative figures as at 31st May 1968)

	Ramea and Coastal Fishermen	Trawler Landing Plant	Vessel Collections	Total Plant Landings	Sold to Outside Plants	Total 1969	Total 1968
Summary of Fish Landings							
Fishing - Draggers and Others		16,058,852		16,058,852		16,058,852	14,707,982
Collections - M/V David Pauline			195,740	195,740		195,740	66,802
- M/V Geraldine Emily			1,825,397¾	1,825,397¾		1,825,397¾	1,805,663¾
- M/V Golden Nugget							141,104¾
- M/V Pennywise							4,824
- M/V Pennyworth							45,431
Ramea Fishermen and Coastal Fishermen	1,626,394¼			1,626,394¼		1,626,394¼	1,364,171¾
Total Round Fish Landings	1,626,394¼	16,058,852	2,021,137¾	19,706,384		19,706,384	18,135,979

Sydney, Nova Scotia
July 30, 1969.

JOHN PENNY AND SONS, LIMITED

Statement of Vessel Operations for the year ended 31st May, 1971

(With comparative figures for the year ended 31st May, 1970)

	Ramea and Coastal Fishermen	Trawler Landing Plant	Vessel Collections	Total Plant Landings 1971	Total Plant Landings 1970
Summary of Fish Landings					
Fishing - Draggers and Others		12,840,861		12,840,861	15,192,735
Collections - M/V David Pauline			282,999	282,999	16,654
- M/V Geraldine Emily			1,631,955	1,631,955	1,971,048
- M/V Golden Nugget			129,438	129,438	151,403
- M/V Pennyworth			185,965	185,965	
- M/V Shirley & Linda			185,009	185,009	
Ramea Fishermen and Coastal Fishermen	2,913,047			2,913,047	1,902,426
Total Round Fish Landings	2,913,047	12,840,861	2,415,366	18,169,274	19,234,266

Vessel Trips - Draggers	1971	1970
M/V Pennyfair	28	29
M/V Pennypride	29	26
M/V Senator Penny	15	24
M/V Pennyworth	32	24
	104	103

Sydney, Nova Scotia
July 29, 1971

APPENDIX 5

TERMS OF REFERENCE

CANADA
DEPARTMENT OF REGIONAL
ECONOMIC EXPANSION

MINISTÈRE DE L'EXPANSION
ÉCONOMIQUE RÉGIONALE

MAY 15 1972

OTTAWA K1A OM4,
May 11, 1972.

Foundation of Canada Engineering
Corporation Ltd.,
239 Water Street,
P. O. Box 1406,
St. John's, Newfoundland.

Re: Improvements - Salt Water Supply System
Fish Plant, Ramea, Newfoundland.

Gentlemen:

This is to advise you that your firm and several other firms have been invited to submit proposals to undertake the work as outlined in the attached "Consultants Terms of Reference".

Six copies of your proposal must be received by June 2, 1972 addressed as follows:

Director,
Technical Services Branch,
Department of Regional Economic Expansion,
161 Laurier Avenue, West,
Ottawa, K1A OM4,
Ontario.
Attention: Mr. V.G. Ulrich.

Additional information, if required, to prepare your proposal can be obtained from:

Mr. H. Doane, Provincial Clean Air, Water & Soil Authority,
St. John's, Newfoundland.

Mr. J. Major,
Federal Department of Public Works,
St. John's, Newfoundland.

... 2

Mr. D. Newbury,
Federal Department of Environment,
Fisheries Service,
St. John's, Newfoundland.

In order for your proposal to receive a proper evaluation it must include the following:

1. A list of projects with similar problems that have been completed by your firm or your associate, together with the clients names and addresses.

2. Biographical information on the personnel to be involved in the design, with particular reference to related work experience and/or special training.

3. Your views and suggested methods of approach to the solution of the problems.

4. A time span (activity chart and/or bar chart) indicating the time span for the various elements of the pre-design and design stages.

5. An estimate of the man days and costs together with categories and rates of pay for each individual that will be retained for the work. Note: this will not be used as a deciding factor in selecting a consultant.

Yours sincerely,

R. P. Harrison,
Director,
Technical Services Branch.

April 10, 1972.

CONSULTANTS TERMS OF REFERENCE

FOR

PRE-DESIGN AND DESIGN

SALT WATER SUPPLY SYSTEM

FOR

FISH PLANT LOCATED AT RAMEA DISTRICT OF BURGEO AND LAPOILE NEWFOUNDLAND

1. OBJECTIVE:

To prepare pre-design and final designs and specifications for a salt water supply for the John Penny and Sons Ltd. fish plant at Ramea, Newfoundland.

2. REQUIREMENTS:

All designs must meet the requirements of:

1) The Provincial Clean Air, Water & Soil Authority.

2) The Federal Department of Environment Fish Inspection Act dated May 18, 1971, in regards to the water supply and states as follows:

i) An adequate supply of safe, sanitary water that:

a) Has a coliform bacteria count, determined by a method acceptable to the Minister, of not more than two per one hundred millititres or

b) Is derived from a source approved by the Minister.

shall be provided under a minimum operating pressure of twenty pounds per square inch.

... 2

3. SCOPE:

This work is to be undertaken in three stages as follows:

Stage I - Feasibility

a) To conduct a thorough field examination of the existing system.

b) To assemble, review, and evaluate all existing data and plans, in regards to water quality for the alternative water sources, that have been obtained by the Federal Department of Environment - Fisheries Service, St. John's, Newfoundland.

c) To assemble, review and evaluate all information reports and designs that have been carried out by and for the Federal Department of Public Works, St. John's, Newfoundland on behalf of the Federal Department of Regional Economic Expansion. This information shall include general topographic maps and aerial photographs of the area as well as construction plans for the existing salt water supply system.

d) To do a field reconnaissance, in conjunction with the field examination of the existing system, of alternative possible sources systems for the salt water supply requirements.

e) To prepare a feasibility report on the existing system and all possible alternative systems. This report shall include comments and cost estimates.

... 3

Stage II - Pre-design

Work for this stage shall be undertaken after the feasibility report has been completed and evaluated by the responsible officials of the Department of Regional Economic Expansion or their delegated representative and shall include the following:

a) Investigation, exploration, surveys, soil investiations and testing, observation of tidal action, water depths possible contamination sources, climatic conditions, sea traffic, collection of supplementary (if necessary) water samples and analysis of conditions.

b) To prepare a report including: comparison of alternative systems, if more than one system is to be considered; design concepts; capital and operating costs; a general description of major process equipment; and intake structures to be used.

Stage III

Work for this stage shall be undertaken after the pre-design report has been completed and evaluated by the responsible officials of the Department of Regional Economic Expansion or their delegated representative and shall include the following:

a) Development of the pre-design information and recommendations into detailed engineering designs, drawings and specifications for the system or systems approved by the officials of the Department of Regional Economic Expansion.

b) Detailed engineering designs, drawings and specifications are to be prepared in such a manner, if necessary, to allow for separate tender calls for the purchase of equipment.

4. PRESENTATION OF INFORMATION, FINAL DESIGNS AND SPECIFICATIONS

1. The consultant shall be prepared to meet with the responsible officers from the Department of Regional Economic Expansion or their delegated representative on a regular basis during the progress of the Feasibility, Pre-design and Design stages to:

   a) Assess the completeness of the work.

   b) Obtain guidance and direction as required for clarification on controversial issues and additional information that may be required to complete the final designs, plans and specifications.

   c) Evaluate progress and progressive costs of the Feasibility, Pre-design and Design stages.

2. The Consultant, when submitting interim reports, must attach an updated statement of actual consultants costs.

3. The Consultant shall forward six copies of all interim and final reports. The final report is to contain the calculations, cost estimates, technical detail, if required and copies of the final plans and specifications.

4. The Consultant shall submit all original drawings and specifications - no additional copies required.

5. To each drawing and report the Consultant shall apply his professional stamp or seal to identify his professional responsibility.

APPENDIX 6

COMMENTS ON DRAFT REPORT

SALT WATER SUPPLY SYSTEM RAMEA NEWFOUNDLAND

Notes of Sub-Committee Meeting

Date: January 10, 1973

Place: Conference Room, CAWSA, St. John's

Present:
* V. Ulrich, DREE (Chairman)
* M. Cameron, D.P.W. (Federal)
* J. Cruden, D.P.W. (Federal)
* H. Doane, CAWSA
* D. White, Dept. of Environment (Fisheries Service)
D. Moncrieff, FENCO
A. Bergs, FENCO
W. Hayes, FENCO

* Sub-Committee Member

Purpose: To review FENCO's report entitled Pre-Design Study, Improvements to Salt Water Supply System, Ramea, dated Nov. 1972.

The Sub-Committee adopted in principle FENCO's recommended scheme, i.e. Scheme #2, "Muddy Hole Cove Natural Channel". The Sub-Committee then raised several points which required clarification by FENCO. The comments of the Sub-Committee members, arising from the review of the draft report, were then recorded as follows:-

(1) The pump house site was recognized as being exposed, but it was further appreciated by the Sub-Committee, that this condition would also apply to the other alternative schemes.

(2) Due to the exposed condition of the pump house, a roofed over windbreak will be incorporated in the design to protect the door from wind damage and facilitate access during adverse weather conditions. Door(s) should also open outwards, for safety reasons, from premises of this type.

(3) The pump house should be designed to have a separate room for the chlorinating equipment. This room should have a separate exterior entrance. This door might be located near the pump house door to take advantage of the windbreak. This would require the chlorinating equipment to be located in the south-east corner (FENCO to advise as to best arrangement). There should also be a window for viewing the chlorination room from the main pump room.

(4) FENCO stated that the final location and orientation of the pump house at Muddy Hole Cove would be determined during final survey and design, taking into account local opinion.

. . . 2

(5) The Sub-Committee queried the nature and extent of the rainfall run-off which would be diverted to Northwest Pond, referred to on page 36 of FENCO's draft final report. The diverted drainage area was calculated by FENCO to be approximately 1 to 2 acres. This would, in their opinion, not cause any significant change in the water quality conditions at Northwest Pond. In addition a good part of the diverted area has been stripped of bog.

(6) D.P.W. requested that all final design work be referenced to hydrographic datum. A hydrographic bench mark would be supplied to FENCO by D.P.W. for final survey purposes.

(7) Since John Penny & Sons were not represented at the meeting, they would be contacted by FENCO, and asked for their views on the draft report. In particular, they would be asked to confirm that the proposed delivery rate and pressures would be satisfactory, for both present and future needs.

(8) D.P.W. expressed reservations concerning the quantities of bog removal and bulldozing required for Scheme 2. FENCO stated that these quantities would be re-appraised and reduced if deemed appropriate after detailed design survey work was carried out.

(9) CAWSA agreed to send a letter to the Town Council asking that there be no further disturbance or removal of bog in the vicinity of the proposed works, by Council or other forces.

(10) D.P.W. produced information showing that the unit cost of item D (excavation of rock in inlet channel) quoted in the report as $30.00/c.y. was in all probability low. Examples of costs from recent contracts, would indicate that this unit cost could be in the order of $150.00/c.y. It was agreed that FENCO would re-examine this unit cost and if necessary it will be adjusted.

To arrive at a probable best estimate it might be assessed that a crane fitted with a clam bucket would be required for (say) only 1 month's work but would be confined to the island for the duration of the Contract.

(11) The views of Department of Environment, Federal Fisheries Service, were recorded as contained in their letter, to FENCO, dated December 11, 1972.

cc - to those present
-John Penny & Sons

+
ELECTRONIC SNF

PENNY RMA
P EHT NAHT GNIKROW FO ECNAV
ELECTRONIC SNF

PENNY RMA
RMA

JANUARY 11, 1973

MR W HAYES, FENCO

HAVE STUDIED YOUR REPORT AND LOOKED OVER PROPOSED PUMPING STATION SITE IN CONNECTION WITH SCHEME TWO. STOP SITE AT PRESENT LOOKS FAR FROM IDEAL WITH HEAVY SEAS AND STRONG N.W. WINDS - HOWEVER WE DO NOTE THAT AT LOW TIDE AND WITH ALL WHITE WATER THERE STILL APPEARS TO BE PLENTY OF WATER AT THE INTAKE LOCATION STOP IT IS IMPOSSIBLE TO DETERMINE WHETHER OR NOT SEAWEED AND OTHER DEBRIS WILL ACCUMULATE AT THE INTAKE IN STORMY WEATHER BUT THE WATER IS QUITE CLEAR AND CLEAN STOP IN VIEW OF THE SEVERAL UNFAVOURABLE FACTORS WHICH PROHIBIT THE CONSIDERATION OF SCHEME THREE AND DOUBT SURROUNDING SCHEME ONE WE APPROVE THE ADDOPTION OF SCHEME TWO AS THE BEST OF THE THREE STOP WE ALSO AGREE THAT A SUPPLY OF 100XXXXXXX 1200 GALLONS PER MINUTE AT MINIMUM PRESSURE OF 25 PSI IS IN OUR OPINION ADEQUATE FOR OUR PRESENT AND FUTURE NEEDS STOP WE REQUEST THIS FIGURE BE CONFIRMED WITH MR DAVE TANNER OF ATLANTIC BRIDGE AT LUNENBURG WHO ARE SUPPLYING THE NEW EQUIPMENT FOR THE PLANT STOP WE STRONGLY RECOMMEND THAT WHEN THE CONTRACT FOR CONSTRUCTION IS AWARDED IT SHOULD BE MADE QUITE CLEAR THAT PLANS AND SPECIFICATIONS MUST BE CARRIED OUT TO THE LETTER AND THAT NO SHORT CUTS OR SUBSTITUTIONS WILL BE TOLERATED STOP THIS COULD VERY WELL ENSURE THAT THE SYSTEM WHEN COMPLETED PROPERLY WILL HAVE A MUCH BETTER CHANCE OF WORKING THAN THE PREVIOUS ONE DID

H REID

PENNNNNNNNNNN+
ELECTRONIC SNF

LINE 8 SHOULD READ QUITE CLEAR AND CLEAN AND XXX AT PRESENT TIME STOP

DO YOU READ ALL RIGHT

YES
OK THANK YOU
+
ELECTRONIC SNF

PENNY RMA

Environment Canada
Fisheries

Environnement Canada
Pêches

December 11, 1972

Your file Votre référence

Our file Notre référence 737-2-11

Foundation of Canada
Engineering Corporation Ltd.,
P.O. Box 1406,
St. John's, Newfoundland.

DEC 12 1972

Attention: Mr. D. J. W. Moncrieff

Dear Sirs:

I have reviewed your report entitled "Pre-design Study, Improvements to Salt Water Supply System, Fish Processing Plant, Ramea, Newfoundland". Insofar as water delivered to the processing plant as per Scheme No. 2 will meet the requirements of Schedule A of the Fish Inspection Regulations P.C. 1971-935, 18th May, 1971, - "9.(1) an adequate supply of safe, sanitary water that (a) has a coliform bacteria count, determined by a method acceptable to the Minister, of not more than two per hundred millilitres, or (b) is derived from a source approved by the Minister, shall be provided under a minimum operating pressure of twenty pounds per square inch", this Department concurs with your recommendation for implementation of Scheme No. 2.

You should note that acceptance of Scheme No. 2 by this Department is conditional upon its acceptance with respect to engineering feasibility, cost, protection from damage and future microbial contamination, absence of contamination with bog particles, adequate volume etc., by the Department of Regional Economic Expansion, Canada Department of Public Works and the Newfoundland and Labrador Clean Air, Water and Soil Authority.

In reviewing your report, we noted that "The run-off containing any bog particles would thus be diverted to North-West Pond, preventing any bog from flowing directly into Muddy Hole Cove" (page 36). We presume that you have determined that such an occurrence would have no detrimental effects on the existing industrial/municipal fresh water supply which is taken from North-West Pond.

You might wish to make the following corrections -
(a) page 5, paragraph 2: ".... with the result that the "coliform" and "faecal coliform" contamination often exceeds a Most Probable Number of 1000 per 100 millilitres. Particulate matter is also prevalent in the area."
and (b), page 17, paragraph 2: "a) The source quality is unacceptable to

../2.

P.O. Box 5667
St. John's, Newfoundland

Boîte postale 5667
Saint-Jean (Terre-Neuve)

the Fisheries Service," (this would avoid confusion with the Provincial Department).

We would appreciate receiving two copies of your final report - one for retention by this Laboratory and the other for our District Office at Grand Bank.

Yours truly,

David R. L. White,
Chief, Inspection Laboratory,
Fisheries Service,
Newfoundland Region.

/mb