



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

19920

Distr.
LIMITED

IPCT.169(SPEC.)
16 November 1992

UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ORIGINAL: ENGLISH

Workshop on Quality and Hygiene
Regulations in the
Fisheries Industry*

Shetland, United Kingdom
6-10 July 1992

1/1/92
1/1/92
1/1/92
1/1/92

REPORT**

* Organized by UNIDO in cooperation with the Shetland Islands Council and the North Atlantic Fisheries College.

** The views expressed in this document are those of the authors and do not necessarily reflect the views of the Secretariat of UNIDO. This document has not been edited.

V.92 58668

CONTENTS

	<u>Page</u>
PREFACE	1
 <u>Chapter</u>	
I. Health Inspection of Fishery Products in the Single European Market by H. Belvez	3
II. An Insight and General Overview of the Activities of the Shetland Seafood Quality Control (SSQC) by B. Smith	15
III. Quality and Hygiene Standards for the Fisheries Industry by B.R. Knudtsen	22
IV. Canadian Seafood Import Inspection Procedures by B.J. Emberley	30
V. Quality Assurance in Fish Processing by P. Howgate	43
VI. The Developing Countries	52
CONCLUSIONS	54
 <u>Annexes</u>	
I. Note on Japan Import Regulations for Fish Products by ITC	56
II. Council Directive 22 July 1991	60
III. List of Participants	80
IV. Information on the North Atlantic Fisheries College	83
V. Factories Visted During the Workshop on Quality Control and Hygiene Regulations in the Fisheries Industry	86
VI. Bibliography	87

Explanatory notes

References to tonnes (t) are to metric tonnes.

Besides the common abbreviations, symbols and terms, the following have been used in this document:

DFO	Department of Fisheries and Oceans, Canada
DSP	Diarrhetic shellfish poison
EEC	European Economic Community
EFTA	European Free Trade Association
FAO/WHO	Food and Agriculture Organization/ World Health Organization
FDA	Food and Drug Administration, USA
FIR	Fish Inspection Regulations
GMP	Good manufacturing practices
HACCP	Hazard Analysis Critical Control Point
HPLC	High pressure liquid chromatography
IQF	Individual quick frozen
ISO	International Organization for Standardization
ITC	International Trade Centre UNCTAD/GATT
MIL	Mandatory Inspection List
NAFC	North Atlantic Fisheries College
NKr	Norwegian Krone
NMFS	National Marine Fisheries Service
PPM	Part per million
PSP	Paralytic shellfish poison
QA	Quality assurance
QACCP	Quality Analysis Critical Control Point
QC	Quality control
QMP	Quality Management Program
SFPA	Shetland Fish Processing Association
SFPO	Shetland Fish Producers Organization
SSFA	Shetland Salmon Farmers Association
SSQC	Shetland Seafood Quality Control
SV Committee	Standing Veterinary Committee
TMA-N	Trimethylamine-nitrogen
TVB-N	Total volatile basic-nitrogen
UHHT	Unloading, handling, holding and transportation

Mention of the names of firms or commercial products does not imply endorsement by the United Nations Industrial Development Organization (UNIDO).

PREFACE

This Workshop is a follow-up activity to the recommendations of the Regional Consultation on the Fisheries Industry for Asia and the Pacific Island Countries where the participants particularly expressed concern about import standards in those industrialized countries which represent major import markets for fish products from developing countries. In particular, and in view of their application by 1993, there is a strong need on the side of exporting developing countries to become acquainted with the new EEC regulations.

The main aim of the EEC is to establish a common market and gradually harmonize the economic policies of its member countries. About half the world's trade takes place in the EEC. The combined gross domestic product (GDP) of its members make it the second largest trade block in the world, after North America.

Despite its size, however, the Community has continued to lose ground against its principal competitors, the U.S. and Japan. It is its deficit which has had a major influence on governments to agree to the formation of the single market.

In this respect the EEC Heads of State agreed in 1985 to a programme comprising 282 basic measures which would lead to a unified single market by 1992. Of those only 69 remained to be agreed at the end of 1991. The most obvious outcome of the single market is the change it will bring about in competition, suppliers and customers.

Competition is likely to increase in most industrial sectors. Because of the impact of the single market price-levelling, and the internal and external competition, few industries will remain untouched by the change. There is, therefore, some urgency for industrial companies to start doing something about the single market, yet there is little purpose in making hasty decisions at the expense of something which has been clearly thought through. Making radical changes to a company's business strategies and working practices is pointless unless they are aimed at achieving specific goals in response to identifiable changes in the business environment.

The Chinese symbol for "crisis" takes into account two aspects of that concept: danger and opportunity. If the EEC 1992 is viewed as posing a danger that forces industries to realize their opportunities, then industries will have benefited from the developments now taking shape in Europe.

The opportunities and threats are not just those associated with new opportunities and direct competition from Europe. They are to do with changing product standards and norms and changes in the financial environment, and transport and frontier controls.

Seen from the outside world, the expanded market can be regarded as an ideal platform for reducing sales and marketing costs by making it easier to sell essentially the same products across borders.

So far, in fact, the fragmentation of the European Market, which arises from the existence of national regulations and non-tariff barriers, has discouraged companies from operating in more than one country. Questions about the most appropriate set of products, pricing, promotion and distribution strategies across Europe and the desirability to implement a common market programme will no longer be limited to a few multinationals

but must be considered by small and medium-sized industrial companies as well.

While the creation of a large integrated market of 320 million consumers offers potential trade benefits to European and non-EEC producers, possible use of aggressive reciprocity to exclude outsiders, discrimination in the use of standards for health and safety provisions can represent threats to producers of non-EEC origin.

Like many other industrial sectors, the food industry, and within it, the fish-processing industry, has to examine how it can best prepare itself for the many challenges and opportunities which may arise in the 1990's as the Single European Market becomes a reality.

Industries from developing countries must ensure that they are ready to meet the Single European Market challenge and maintain/expand their sales in Europe. If they do not prepare to meet this challenge, they risk being forced out of the market.

These proceedings are divided into 6 chapters which examine separately import inspection procedures in the EEC as well as in countries within and outside the EEC. They are largely based on the presentations of five experts who have provided an analysis of the situation in particular with respect to their countries.

UNIDO would like to take this opportunity to express to the North Atlantic Fisheries College and the Shetland Islands Council its gratitude for the excellent work carried out in the organization and holding of the Workshop as well as for their support and hospitality.

I. HEALTH INSPECTION OF FISHER PRODUCTS IN THE SINGLE EUROPEAN MARKET

Prepared by
Henri Belveze¹

INTRODUCTION

Two directives have been adopted one year ago:

1. Council directive 91/492/EEC of 15 of July 1991 laying down the health conditions for the production and the placing on the market of live bivalve mollusca.
2. Council directive 91/493/EEC of 22 of July 1991 laying down the health conditions for the production and the placing on the market of fishery products.

These directives have to be transposed into national law by each member state before 1 January 1993, the date of entry into force of the single European Market.

It is necessary to explain why the european community was obliged to harmonize national legislations of member states.

- 25 March 1957: Treaty of Rome created a common market free of quantitative or tariff restrictions on the movement of goods. However, the article 36 of the treaty allows member states to limit or prohibit importations or exportations if public health or animal health is threatened. All states have maintained their sanitary legislation or built a new sanitary legislation based on the article 36. It means that products must be inspected on crossing any border within the community for compliance with the national sanitary legislation.

- 28 February 1986: The single European act creates a common economic area without internal borders before end 1992. The implementation of the single act imposes a single set of requirements and criteria in the EC, the removal of controls at the internal borders and setting up checks at external borders.

Commission published a white book with a programme and timetable for achieving internal market. This white book draws up a list of all national regulations to be harmonize before the end of 1992. Fishery products are on this list.

¹ Administrative Principal, Commission des Communautés Européennes, Brussels, Belgium.

Directive on Fishery Products

SCOPE

The directive covers production and placing on the market of

- all seawater and freshwater animals (fish - mollusca - crustaceans)
- fished or farmed
- live, fresh (chilled), frozen, prepared, or processed.

Are excluded:

- aquatic mammals, frogs, other aquatic animals covered elsewhere
- dehydrogenated fish oils or fish oils which have undergone industrial processing
- live bivalve mollusca which are covered by the 91/492/EEC directive
- retail sales and direct transfer on local market of small quantities by fishermen to retailers or consumers

Requirements

The placing on the market of fishery products shall be subject to conditions laid down by the directive. These conditions are compulsory.

The competent authorities have to verify that all requirements are fulfilled.

The component authority is the central and official authority in a member state or in a third country which has responsibility for applying the sanitary control legislation to fishery products.

This central authority may delegate the competence of the inspection and laboratory checks to any other local or technical agency.

In any case the competent authority is the contact point for communication with the EC Commission on matters relating to compliance with the requirements of the directive.

Five Types of conditions are imposed by the directive:

- structural requirements
- Hygiene requirements
- standards products requirements
- inspection requirements

A. STRUCTURAL REQUIREMENTS

Establishments, factory vessels, auctions and wholesale markets must meet the structural requirements specified in the annex of the directive in terms of construction and equipment.

Establishments and factory vessels have to be approved by the competent authority and this approval could be withdrawn if the requirements cease to be met.

The approval must be renewed if an establishment carry out other activities than those for which it has received approval.

For example if an establishment approved for smoking and salting fish decided to cook, peel and freeze shrimps or prawns, it must fulfil specific

requirements concerning these new activities and must get the renewal of its approval from the competent authority.

Auctions and wholesale markets have to be registered by the competent authority after verifying that such installations comply with the provisions of the directive.

The requirements concern the layout of the premises:

- reception area
- work area
- storage of raw material
- storage of end products
- storage of packaging material
- storage of waste material

Requirements concern also construction and equipment of the premises:

- flooring and the lining of walls and ceiling.
- waste water drainage.
- drinking water or clean seawater supply.
- sanitary installations, (lavatories...)
- cleaning and disinfection facilities.
- waste disposal.
- adequate ventilation
- adequate number of facilities.
- protection against pests
- quality of materials used for instruments and working equipments which must be easy to clean and disinfect
- power rating of freezer and cold storage units, etc....

All these requirements are taken from the existing codex codes of practice recommended for fish and fishery products but they are mandatory in European law.

B. HYGIENE REQUIREMENTS

The directive lays down general conditions of hygiene applicable to premises and equipment - on board of factory vessels and - on shore in auctions, wholesale markets and establishments.

Provision concern:

- Maintenance, cleaning and disinfection of premises, equipments and instruments used for working on fishery products
- extermination of rodents, insects and other pests
- use of working areas and equipments only for the handling of fishery products
- use of drinking water or clean seawater
- use of detergents, disinfectants and similar substances.

General conditions of hygiene are also applicable to staff concerning working clothes, hand washing, prohibition of smoking, spitting, etc...in working and storage areas, medical certificate at recruitment and medical supervision of persons handling fishery products.

Special conditions for handling fishery products on shore are also laid down by the directive for:

- Fresh products:

They must be chilled with ice made with drinking water or clean seawater and stored under hygienic conditions:
 They must be washed with drinking water or clean seawater before and after heading and gutting operations:
 Filleting and slicing must be carried out in a separate place other than place used for gutting:
 Containers for storage fresh fish must provide adequate drainage of melted ice:
 Guts and wastes must be removed from working areas as soon as possible.

- Frozen products:

Freezing equipment must be sufficiently powerful to achieve a temperature of -18°C in all parts of the products and to maintain this temperature in storage rooms;
 Fresh products to be frozen must comply with requirements for fresh products:
 Temperature must be recorded and records must be available for inspection by authorities.

- Thawing products:

During thawing, temperature must not increase excessively above the temperature of the melting ice:
 There must be adequate drainage for any melt water produced during thawing:
 The thawed state of the products must be clearly marked on the labelling if they are put directly into the market for consumption.

- Processed products:

If the process is carried out to inhibit the development of pathogenic micro-organisms or; if the process is a significant factor in preservation of the product:

- the treatment must be scientifically recognized
- the person responsible for the establishment must keep a register of the processing carried out
- heating time, salt content, pH water content, preservatives etc... must be recorded and records must be available to the competent authority

In addition, more precise and detailed provisions are laid down for canning, smoking, salting, cooking, and minced fish flesh.

- Parasites:

Fish or parts of fish which are to be consumed raw or almost raw, lightly salted, treated by smoking or marinating, where this process is insufficient to destroy the larvae of nematodes, must be subjected to freezing at temperature of no more than -20°C for not less than 24 hours

This provision applies to herrings, mackerels, sprats, and wild atlantic and pacific salmon, but this list may be amended in the light of scientific data.

Furthermore, hygiene rules on board of fishing vessels other than factory vessels have been laid down in a separate directive recently adopted by the council (1st of June).

This directive lays down provisions for general hygiene conditions applicable to fishery products handled on board of all fishing vessels and for additional hygiene conditions only applicable to fishing vessels which are designed and equipped to preserve fishery products on board for more than twenty-four hours.

All sections, containers and equipment directly in contact with fish of fishery products must be easily cleaned and not be contaminated by bilge water or fuel used for propulsion of the boat.

As soon as they are taken on board, fish and fishery products must be protected from contamination, from the effects of the sun or any other source of heat, and must be chilled or frozen.

In the case of fishing vessels where cooling is not possible from a practicable point of view, the fishery products must not be kept on board for more than 8 hours.

Ice used must be made from drinking water or clean seawater and stored under conditions which prevent its contamination.

After unloading, all parts of the vessel which are directly in contact with fishery products must be cleaned with drinking water or clean seawater.

In addition, more detailed and precise provisions are laid down by the directive for fishing vessels equipped with holds, tanks or containers for the storage on board of refrigerated or frozen fishery products.

C. STANDARDS PRODUCTS REQUIREMENTS

Fishery products placed on the market for human consumption must meet health and quality standards laid down by the directive or to be fixed with a procedure of committee.

Under this procedure, the member states become party to the decision by a qualified majority vote on a commission proposal to the standing veterinary committee. If the committee votes against the proposal of the commission, the proposal must be submitted to the council of minister.

- Poisonous fish or fishery products containing biotoxins such as ciguatera are prohibited. Detailed requirements concerning the species covered by this prohibition shall be laid down with the committee procedure.

- The content of histamine must not exceed 100 ppm (mean value of nine samples) - no sample may exceed 200 ppm and only two samples of nine may have a value between 100 and 200 ppm.

These limits apply only to fish species of the families of scombridae and clupeidae.

- Freshness:

Spoiled fish are considered unfit for human consumption and must be withdrawn from the market.

Specific organoleptic requirements are necessary for evaluation of freshness.

For economical purpose these requirements are already fixed as common marketing standards at the first sale for 44 species of fish for other species and where necessary, specific requirements may be laid down by the committee procedure.

Organoleptic checks must be repeated after the first sale at each stage of the production and sale.

If necessary, the freshness of fishery products may also be evaluated by chemical checks as TVB-N or TMA-N but the levels of these parameters must be specified for each category of fish with the committee procedure.

- Contaminants:

Fishery products must not contain in their edible parts contaminants such as heavy metals and pesticides at such a level that the calculated dietary intake exceeds the acceptable daily or weekly intake for humans. A monitoring system must be carried out to check the level of contamination of fishery products.

Sampling plans, methods of analysis and acceptable levels for contaminants must be adopted with the committee procedure.

- Microbiological criteria including sampling plans and methods of analysis may be laid down when there is a need to protect public health by the committee procedure.

No health certificate is required for fishery products placed on the market in accordance with these arrangements. A health stamp bearing the approval number of the establishment must be printed on the packing of on the commercial documents. This will allow free movement of the product and also enable the establishment of origin to be identified if necessary.

D. INSPECTION REQUIREMENTS

Three levels of inspection and monitoring system are laid down in the directive:

- For industry itself;
- For competent authorities;
- For the EEC Commission.

1) FOR INDUSTRY

A compulsory self-monitoring system must be carried out in the establishment by a qualified responsible person appointed by the manager of the establishment.

All necessary measures must be taken to ensure that, at all stages of the production of fishery products, the requirements of the directive are met.

The responsible persons must carry out their own checks based on the following principles:

- Identification of critical points in their establishment on the basis of the manufacturing processes used;
- Establishment and implementation of methods for monitoring and checking such critical points;
- Taking samples for analysis in a laboratory approved by the competent authority for the purpose of checking the effectiveness of cleaning and disinfection methods and for the purpose of checking compliance with the standards laid down by the directive;
- Keeping a written record of the above points with a view to submitting them to the competent authority.

The results of different test and checks will be kept for two years and available to the competent authority.

If the results of the own checks carried out by the industry reveal any risk for the public health, appropriate measures must be taken under official supervision, it means that competent authority must be informed of the problem and of the measures to be taken.

Guidelines and rules for the application of the hazard analysis and critical control points system shall be established by the committee procedure.

2) FOR COMPETENT AUTHORITY

A supervision and inspection system must be carried out by the competent authority in order to verify if the requirements laid down in the directive are complied with.

Controls will include, in particular:

- Checks of fishing vessels during the stay in port;
- Inspection and approval of factory vessels and establishments;
- Inspection and registration of auctions and wholesale markets;
- Regular inspection of premises in order to verify that conditions for approval are still fulfilled, that fishery products are correctly handled, that the cleanliness of the premises and facilities, and staff hygiene are complied with;
- Supervision of self-monitoring procedures and own checks implemented by the management of the establishment;
- Monitoring and checks of the products placed on the market to ensure that they comply with the rules on packaging, marking, transport and storage, and with the quality requirements relating to products.

3) FOR EEC COMMISSION

A supervision shall be implemented by the commission which may send experts on the spot in order to:

- Verify that the competent authorities of the member states are applying the directive in a correct and uniform way;

- Check if establishments comply with the structural and hygiene requirements laid down in the directive.

Member states must give all necessary assistance to the experts of the commission in carrying out their inspection. Member states are informed of the results of the investigations. If such inspection reveals that the requirements of this directive are not being met, the competent authority must take appropriate action.

An evaluation of the competent authorities of the member states is currently carried out by the commission. This evaluation is necessary within the more general framework of the directives adopted in 1989 and 1990 with a view to the harmonization of hygiene controls in the single market, removing checks at internal borders and setting up uniform checks at external borders.

DIRECTIVE ON LIVE BIVALVE MOLLUSCS

SCOPE

The directive covers production and placing on the market of live bivalve molluscs which are intended for immediate human consumption or for further processing before consumption.

It means that as long as the bivalve molluscs are alive, they must comply with the rules laid down by that directive. Where they are processed (frozen or cooked for example) raw material must comply first with that directive and after with requirements laid down in the fish and fishery products directive.

In addition, this directive applies to echinoderms (sea urchins), marine gastropods and tunicates intended for the human consumption.

Are excluded the direct sale by the coastal fisherman or the producer to the retailer or the consumer on local market and in small quantities.

REQUIREMENTS

The production areas must be classified in three classes according to the observed levels of contamination.

The molluscs placed on the market must be alive and must comply with health requirements concerning:

- Level of faecal contamination;
- Absence of salmonella;
- Levels of contaminants, toxic and radionuclide contents;
- Level of biotoxins such as PSP or DSP contents.

The 3 classes of production areas are:

1. The molluscs collected for direct human consumption must be harvested from production areas where these health requirements are met.
2. The molluscs collected from moderately contaminated areas can be placed on the market for human consumption only after treatment in a purification centre or relaying in a non-contaminated zone.

3. The molluscs collected from areas which are more contaminated can only be relayed over a long period (at least two months) so as to meet the health requirements.

Areas where molluscs are heavily contaminated must be closed by the competent authorities and the harvesting is prohibited. Harvesting in a non-classified area is prohibited.

These different zones must be clearly identified and listed by the competent authorities, with an indication of their location and boundaries, and their category from which live bivalve molluscs may be taken in accordance with the requirements of the directive.

Live bivalve placed on the market must have been handled hygienically after harvesting, and where necessary, they must have been purified in approved dispatch or purification centres.

Conditions for the approval of these centres are laid down in the annex of the directive including general conditions relating to premises and equipment, general hygiene requirements and specific requirements for purification centres and dispatch centres.

In addition to the own checks carried out by the producers, a public health control system must be established by the competent authority including:

- Periodic monitoring of production and relaying areas;
- Checking possible presence of toxin-producing plankton and the possible contamination of the molluscs in the production and relaying areas;
- Inspection of the centre at regular intervals after approval in order to verify if the approval conditions are still being complied with. These checks may include a sampling of molluscs for laboratory tests;
- Monitoring on the storage and transport conditions for consignments of live bivalve molluscs.

A supervision shall be implemented by the commission which may send experts on the spot in the same way as for fishery products.

APPLICATION TO EXPORTING COUNTRIES

The primary objective of these directives is harmonise national legislations within the community.

To allow free movement in a large market without internal borders for fishery products produced in the community as well as imported from third countries, it was necessary to harmonise also import conditions.

In all directives, the words "THIRD COUNTRY" means "NON-EEC-COUNTRY".

It is a principle of the directives that their provisions should apply to importations from third countries and that there should be common import conditions applied by all member states of the community at the external borders.

Each directive devote a specific chapter to imports from third countries, beginning by a quite clear statement:

"Provisions applied to imports from third countries shall be at least equivalent to those governing the production and the placing on the market of community products".

It means that the EC requires live bivalve molluscs and fishery products intended for export to the community:

- to be harvested and processed under conditions equivalent those laid down in the community;
- to have been subjected to inspection and control equivalent to that applied in the community;
- to meet quality standards fixed by the directives or established by the commission with the S V Committee.

This principle of equivalence is already applied to imports into other countries importing fishery products, particularly by authorities in USA and Canada.

The objective of this provisions is mainly to assure the safety of the imported products, and to avoid systematic detention, heavy sampling plans and many laboratory checks at the point of entrance in the community.

The directives do not fix in detail the import conditions for all products and all countries. These conditions will be fixed case by case, country by country, by the commission with the S V Committee.

Before fixing import conditions and in order to verify the real conditions of production, storage, and dispatch of fishery products for consignment to the community, inspections may be carried out on the spot by experts from the commission and the member states.

Some specific import conditions could be fixed according to specific sanitary situation existing in the third country concerned.

When fixing these import conditions the commission will take into account:

- The existing legislation of the third country concerning food controls and quality standards. A comparison will be made with the directives in order to estimate if they are equivalent or not;
- The organization of the competent authority and inspection services of the third country, legal powers of such services, as well as training of the staff of inspectors;
- The facilities available to the inspectorate including appropriate laboratory facilities, for effectively verifying the implementation of the legislation in force;
- The actual sanitary conditions prevailing during the production storage and dispatch of fishery products intended for the community;
- What assurances the competent authority can give on the compliance with the requirements and the standards laid down in the directives?

On the basis of the information communicated by competent authorities of third country to the commission and/or the inspection report of the experts mission of the commission on the spot, the import conditions could be fixed by the commission with the standing veterinary committee.

In any case, these import conditions shall include at least:

- The procedure for obtaining from competent authority the health certificate which must accompany consignments;
- The printing of a mark identifying the origin of the product by the number of approval of the producing establishment on the packaging;
- A list of approved establishments which must be adopted by the commission with the committee:

In addition, import conditions for bivalve molluscs shall include:

- A list of third countries fulfilling the conditions of equivalence;
- The precise demarcation of the production areas from which bivalve molluscs intended for the community may be harvested;
- The obligation to notify the commission of any possible change in the approval of production areas;
- Where necessary, any purification or relaying after arrival in the territory of the community.

With the competent authority of the third country could be considered as equivalent to the competent authorities of the member states of the community (and these competent authorities are still being evaluated by the commission), the approval of establishments exporting to the EC will be carried out by that competent authority.

Such approval is subjected to the observance of the following requirements:

- Compliance with requirements equivalent to those laid down in the directives;
- Monitoring by an official inspection service of the third country.

The list of officially approved establishments exporting to EC must be drawn up and communicated to the commission by the competent authority of the third country. This delegation of responsibility to the relevant third country authorities will be effected only after recognition of their equivalence to the competent authorities of the member states.

Consequently, it is useless to send to the commission lists of establishments exporting fish and fishery products before an agreement of the standing vet committee concerning the recognition of equivalence of the competent authority.

After this agreement, the commission reserves the right to carry out inspections in the exporting country in order to verify the conditions of inspection and to visit some establishments chosen at random with the inspectors of the competent authority. Following these investigations, the import conditions could be modified.

Statistics show that about 140 countries have exported fish and fishery products to the EC during the past year for more than two million seven hundred thousand tons.

It is completely impossible to expect that import conditions could be fixed for each country by first January 1993.

However, it is foreseen in the directives that pending the fixing of the import conditions, member states which import shall ensure themselves that conditions applied to imported fishery products are at least equivalent to those governing the production and the placing on the market of community products.

A member state which import regularly fishery products from a third country shall have a good knowledge of the sanitary conditions prevailing in this country and of the controls implemented by authorities, in order to carry out all appropriate checks at the border before the acceptance of the rejection of the products.

Nevertheless, 33% of imports of fishery products come from EFTA countries (European free trade association) with which EEC has already reached an agreement.

- 80% of imports of fishery products come from only 20 countries and for these twenty countries an agreement concerning the recognition of the competent authorities and the import conditions could be reached by the end of the year for at least ten countries.

To deal with the task laid down by the directives, the commission decided the creation of an office of veterinary inspectorate and the recruitment of fish inspectors specially trained for the monitoring and the control of the provisions of the directives.

It is expected that a first team of inspectors will be available for the middle of the next year.

II. AN INSIGHT AND GENERAL OVERVIEW OF THE ACTIVITIES OF THE
SHETLAND SEAFOOD QUALITY CONTROL (SSQC)

Prepared by
Brian Smith

Background

Shetland is surrounded by rich fishing grounds and has the ideal environment for the production of excellent quality seafood. Over the years the islands dependence on the seafood industry has been increasingly important and by 1991 accounted for 28.9% of the total Shetland workforce (table 1). In addition to fish processing and their ancillary activities, Shetland has experienced a dramatic growth in the fish farming industry over the last decade, accounting for no workforce in 1981 to 8% of the total workforce in 1991.

Table 1

THE SHETLAND SEAFOOD INDUSTRY	
Employment in Seafood in 1991	
Catching (direct)	485
Catching (ancillary)	330
Processing (direct)	578
Processing (ancillary)	780
Fish farming (direct)	386
Fish farming (ancillary)	52
Total	3011

28.9% of total Shetland workforce of 10,400.

The dominance of the seafood industry in the Shetland economy is startling (table 2). The total annual value of Shetland fish (caught, farmed and processed) is approaching £90 million - virtually all of which is exported from the islands. A dramatic figure from an island community of only 23,000. Fish and fish products now account for well over 89% of Shetland's total exports (excluding oil). A figure which is likely to increase even more in the future.

Table 2

THE SHETLAND SEAFOOD INDUSTRY - Annual production and value		
Pelagic catch	55,000 tonnes	
Demersal catch	15,000 tonnes	
Industrial catch	10,000 tonnes	worth £27 million
Shellfish catch	1,000 tonnes	
Farmed salmon	11,000 tonnes	worth £30 million
Processing		worth £25 million
Total	92,000 tonnes	£86 million

In the early 1980's the local government and the Shetland seafood industries, realising the future of Shetland's economy was becoming totally dependent on the seafood industries, took steps to maintain and strengthen the islands reputation for high quality products.

Developments by 1985 saw the evolution of an independent quality control organization named Shetland Seafood Quality Control Ltd. (S.S.Q.C.) Currently the breakdown of funding for S.S.Q.C. is 50% local government and 50% split evenly between the Shetland Fish Producers Organization (S.D.P.O.), the Shetland Salmon Farmers Association (S.S.F.S.), and the Shetland Fish Processors Association (S.F.P.A.).

Activities of S.S.Q.C.

The activities of the S.S.Q.C. can be put under 6 main headings. I wish to take each heading and expand a little to give you an insight and general overview of how S.S.Q.C. operates.

1. Q.C. STANDARDS AND GUIDELINES

In its inception three of the objectives which S.S.Q.C. set out to achieve were:

1. To develop, implement and administer the inspection and quality control system for fish and fish products caught, landed, grown, processed or manufactured in Shetland.
2. To develop, implement and administer the inspection and quality control systems for premises, facilities and vessels in which fish and fish products are caught, landed, grown, processed or manufactured in Shetland.
3. To introduce a quality control system with a brand mark, which will indicate that fish and fish products meet the requirements of the standards established.

Detailed standards, stringent guidelines and codes of practice were set out and implemented throughout the Shetland seafood industry after intensive research of existing standards of Codex Alimentarius, Icelandic and Norwegian seafood industries, the Seafish Industry Authority, the Scottish Office and the Ministry of Agriculture Fisheries and Food.

These standards and guidelines and codes of practice have been continually updated with the implementation of large and extensive programmes on improving factory structures, staff hygiene, product handling and product analysis. Emphasis over the last couple of years has been on factory improvement schemes to meet the forthcoming EC Directives and when completed, these improvement schemes will ensure Shetland's seafood industry will have the best structured, technical and quality standards available.

(Table 3) A brand mark was introduced after the standards were established and recently S.S.Q.C. have introduced a certificate of quality assurance to accompany consignments of seafood and seafood products which satisfy S.S.Q.C. requirements. Products carrying the brand mark and the Q.C. system which we have in place ensures traceability of products to source.

Table 3.



Presently a code of practice for the distribution of fish and fish products is being compiled. Once introduced S.S.Q.C. will carry out thermoscript temperature recordings of shipments to ensure strict temperature control of consignments from Shetland. This will also make the S.S.Q.C. scheme more comprehensive as we will be capable of monitoring the flow of fish products from the sea through processing and packing within Shetland and to the wholesale market place wherever in the world.

2. INSPECTION SERVICE

To see that the standards set by S.S.Q.C. are fulfilled a comprehensive inspection service for each sector of the seafood industry has been implemented. This is monitored by S.S.Q.C. inspectors who arrive at premises unannounced to carry out their inspections.

Fish Catching -

There are 3 main areas where S.S.Q.C. monitor the Q.C. scheme:

- 1) Hygiene aboard fishing vessels;
- 2) Hygiene practices within fish markets;
- 3) Inspection of fish landed.

Inspections are carried out on condition, freshness and temperature of fish. Landing receive the S.S.Q.C. Quality Mark if they satisfy 8 parameters - weight of fish in box, ice content, temperature, washing, flesh cuts, gutting, packing, crushed/soft. (Notes on this system are detailed in handouts contained in folder).

Fish Farming -

There are 6 main areas where S.S.Q.C. monitor the Q.C. scheme:

- 1) In Shetland any medication given to fish must be prescribed by a veterinary surgeon. The prescribing veterinarian must provide suitable

written information to S.S.Q.C. on the name and quantity of each veterinary medicine supplied and to which farm he supplied the medication to.

2) Usually salmon which have been treated with antibiotics can only be harvested after a legal withdrawal period has been adhered to. However within the S.S.Q.C. scheme there is an additional withdrawal period of 200 days beyond the legal withdrawal period. Shetland salmon can only be harvested during this extended withdrawal period if a sample has been tested through S.S.Q.C. for residues of the antibiotic in question and found to be either cleared or under the permissible residue levels.

3) S.S.Q.C. also operate Mandatory Antibiotic and Chemical Residue Testing of salmon from each farm within Shetland. Here S.S.Q.C. take salmon without prior warning and test it for the range of possible antibiotics and chemicals available to the fish farming industry within the S.S.Q.C. scheme.

4) When a salmon farmer harvests fish he must complete and return to S.S.Q.C. a comprehensive harvest form giving details of antibiotics previously used. S.S.Q.C. then compare this to the vets prescription to ensure the information corresponds.

5) Post-harvest, a major component of the S.S.Q.C. scheme is temperature control and sufficient monitoring of this. No salmon can be packed until core temperature of the fish is below 4° C.

6) S.S.Q.C. Inspectors monitor Approved Graders of Shetland salmon at work. I will discuss approved Graders in more detail under Training.

Fish Processing -

This can be summed up as the 3 P's:

Premises: Here we concern ourselves with the structure of premises, the layout, the facilities provided within the premises, the equipment used and general conditions of hygiene of premises and equipment. A large effort is made to ensure that structural finishes are of a type acceptable to meet or suppress the forthcoming EC Directives.

Product: Here we carry out comprehensive checks to ensure the condition and freshness of the product is to an acceptable standard. Also highly important is temperature from when the fish arrive at the premises until it is dispatched as product.

Premises: Personal hygiene of staff and good manufacturing practices (GMP) are monitored. S.S.Q.C. has its own Personal Hygiene Regulations and set of GMP which the seafood industry adheres to and this is monitored by S.S.Q.C. inspectors.

3. LABORATORY ANALYSIS

The laboratory analysis of fish, fish products and fish product preparation areas is becoming increasingly important in our industry for 3 main reasons:

1. Discerning customers are demanding analysis to be carried out to show the fish or fish products are in line with product specification.

2. Under the food Safety Act 1990 to show "due diligence" a regular programme of analysis must be implemented.

3. The proposals being put forward in October 1992 to the EC council indicate the implementation of future Directives stipulating regular analysis of fish and fish products.

At present under the S.S.Q.C. scheme the laboratory analysis falls into 3 categories:

1. Microbiological Analysis:
2. Antibiotic and Chemical Residue Testing:
3. Nutritional Data.

Most processors in Shetland are not big enough to sustain the cost of having their own laboratory facilities in-house. Also to improve S.S.Q.C.'s strength, experience and contribution to the seafood industry the development of an analytical laboratory service to back up S.S.Q.C. physical inspections of products was seen as an essential development.

The setting up of the laboratory will take time, investment and a great deal of professional training and experience enabling S.S.Q.C. to offer a more comprehensive service to the Shetland seafood industry.

At present a great deal of investment has ensured S.S.Q.C. of a suitable laboratory facility within the N.A.F.C. and suitable equipment to carry out Microbiological Analysis and Nutritional Data Studies. The facility is not yet operational, therefore, samples are currently sent to laboratory on mainland U.K.

Once the Microbiological Analysis and Nutritional Data Studies are routinely carried out S.S.Q.C. will begin to develop the section and invest in suitable equipment (HPLC and Extraction Systems) for the Antibiotic and Chemical Residue Testing which is also currently being carried out in a laboratory on mainland U.K.

4. TRAINING

The Shetland people believe training to be an essential role within the seafood industry which is highlighted with the development of the N.A.F.C.

S.S.Q.C. have 3 main areas where they concert their training efforts to the industry as well as offering, on request, other relevant courses to the seafood industry.

(1) In-Factory Q.C. Procedures

Under the S.S.Q.C. scheme it is our intention to train up a suitable employee within each factory who will be responsible for in-factory Q.C. procedures. These people are training to deal with Critical Control Points. Hygiene within the factory, how to carry out basic physical inspections of products and educated in taking temperature checks. This will enable the factory to build up its own data base of in-house Q.C. results as well as S.S.Q.C.'s more extensive inspections results.

(2) Approved Salmon Graders Training Scheme

It is mandatory that all salmon being graded and packed in Shetland under the S.S.Q.C. scheme are graded by an Approved Salmon. It is also part of the scheme that each salmon packing station has 2 Approved salmon graders available at any given time. This ensures that salmon from Shetland are graded in a consistent manner.

Approved salmon graders must:

1. Be fully familiar with the application of the grading standards;
2. Understand the relevant quality factors and handling techniques for fresh farmed Shetland salmon;
3. Carry out temperature and colour checks on the salmon;
4. Competent in the use of the grading board to ensure correct grading of salmon.

(Note: Full description on approved graders is given in handout.)

Once approved, an approved salmon grader is given his/her own number and graders labels with this number are issued to them. Every box of salmon graded within shetland under S.S.Q.C. will have a graders label inside it. This can then tell us who graded the salmon.

(3) Nationally recognized food hygiene course

As well as setting out hygiene regulations S.S.Q.C. saw the need to formally train employees within the seafood industry in a nationally recognized food hygiene course. This has also been emphasized in the Food Safety Act 1990 and forthcoming EC Directives.

Before training the employees within the industry it was necessary for me (on behalf of S.S.Q.C.) to attain the relevant qualifications set out and be accredited to the Royal Environmental Health Institute for Scotland. Courses are now up and running and cover 7 main areas:

1. Bacteriology;
2. Food poisoning;
3. Preventing food poisoning and food contamination;
4. Personal hygiene;
5. Premises, equipment and pest control;
6. Cleaning of premises and equipment;
7. Legislation.

(Note: Details of the syllabus and the certificate issued are given in handouts.)

5. ADVICE

S.S.Q.C. give advice to the seafood industry in Shetland with respect to premises, procedures, equipment and any other relevant issues to the industry. S.S.Q.C. are heavily involved at present in advising the industry on design, construction and materials to use for upgrading and building of new factories to meet the forthcoming EC Directives.

6. GENERAL ENQUIRIES AND COMPLAINTS

S.S.Q.C. deal with a lot of enquiries regarding the seafood industry in Shetland. S.S.Q.C. are dealing more and more regularly with customers of Shetland seafood who require particular records to ensure the products they buy comply with their product specification.

The Food Safety Act 1990 and forthcoming EC Directives have resulted in customers demanding more information and assurance of quality and this is a service S.S.Q.C. provides. If we get a complaint then we examine all the facts of the case closely and report them. S.S.Q.C. works as much for the customer as it does to serve the local seafood industry.

In conclusion, it only remains for me to say:

- Get to know our trademark;
- This is your guarantee of quality.

III. QUALITY AND HYGIENE STANDARDS FOR THE FISHERIES INDUSTRY

Prepared by
B.R. Knudtsen²

INTRODUCTION

In this session I will give a brief summary of the main elements of the Norwegian fisheries and the Norwegian Quality Control Service. I will briefly discuss some of our experiences with various elements of the Norwegian control system. Finally, I will give a presentation of defined quality standards in Norwegian regulations.

With regard to the wide geographical representation of this workshop, I will first of all give a short presentation of Norway and its fishing industry.

Norway has 4.2 million inhabitants. With a land area of 387.000 km² we have a low population density - the only European country with a lower population density is Iceland. Norway is a small country with a very long coast line. If one were to turn Norway around its geographical axis, the northern part would reach South Italy. Nature has blessed Norway with rich fishing grounds off the coast, and throughout history the export of fish products and timber has been Norway's main economic resource.

Eleven per cent of the inhabitants live in the northern part of the country, which to maintain a sufficient basis of employment depends greatly on the fisheries and the fishing industry.

THE NORWEGIAN FISHERIES

Norwegian fisheries are characterized by landings from a great number of fishing vessels supplying a geographically widespread fishing industry.

In addition to our traditional fishing activity the fish farming industry is very important. During the last two decades there has been an enormous growth in fish farming. Off the coast there are 838 fish farms which produced 150.000 tons of salmon and trout last year.

Ninety per cent of our production of fishery products is exported, the fisheries and the fisheries industry contribute to an export value of about 12 billion Nkr. (1.1 billion £) and is the third greatest branch of Norwegian exports, only surpassed by our oil and shipping industries.

THE QUALITY AND INSPECTION CONTROL SERVICE

The Norwegian Government has long traditions in regulating the fishing trade. As early as the 14th century the Norwegian Queen Margareth instituted the death penalty to those who put bad quality herring in barrels. Today the reactions from official authorities are somewhat modified, however, government involvement in the quality control of fish and fish products remains.

² Chief of District, Quality and Inspections Control Service,
Norwegian Directorate of Fisheries, Bergen Norway.

The main reason for this involvement in fish quality control has been, and still is, the economic importance of the fisheries to our country. The aims of the authorities have been to secure the quality of fishery products through regulations and control. Loss of reputation caused by exports of bad quality fish products is considered a threat to national economics and employment.

The Directorate of Fisheries

The Directorate of Fisheries was established in Bergen in 1900. The administrative branch of the Directorate covers legal matters, fishing activities, fishery economics and statistics, quality control and administration in general. All in all, some 550 persons are employed by the Directorate of Fisheries. More than 300 of our employees work outside Bergen.

TABLE 4

DEPARTMENT OF QUALITY CONTROL	
5 REGIONAL OFFICES	CENTRAL LABORATORY
80 INSPECTORS	3 REGIONAL LABORATORIES
TOTAL: 140 PERSONS	
TOTALLY BUDGETED EXPENDITURE: 50 MILLION NKR	

The Department of Quality Control

The Department of Quality Control is responsible for all control of fish and fish products in Norway. The Department, with more than 80 inspectors, sees to it that fish processing plants as well as fishing vessels are constructed and maintained in accordance with the Norwegian quality and hygiene regulations. The quality of the products are controlled at random on landing, during production and as final products.

Another main task for this department is to control that no farmed fish being sold or exported from Norway contains residues of medicine.

Finally, the Quality Department has in recent years been cooperating with the Norwegian Coastguard in controlling that the fisheries are conducted in accordance with the Norwegian law of Salt Water Fisheries.

The Department of Quality Control has four laboratories that cover analysis needs. The central laboratory in Bergen is in addition responsible for developing and standardizing analysis methods.

The national budgeted expenditure of our official quality control is about 50 million NKR/year (5 million £).

REGULATIONS

The Norwegian quality regulations relating to fish and fishery products are based on international principles and are in accordance with the standards given by the Codex Alimentarius for fish and fishery products.

In addition to these quality regulations we have general hygiene regulations for the production and sale/distribution, etc. of food stuffs. By royal decree the Directorate of Fisheries is granted authority to make individual decisions and to carry out supervision in pursuance of these hygiene regulations.

The Norwegian quality regulations previously comprised more than 50 single regulations. This patchwork of regulations was inconvenient to both the fisheries industry and to the authorities. At the middle of the eighties the Directorate of Fisheries revised all these regulations leading to a single "Quality regulation relating to fish and fishery products". There were two important effects of this revision: first, the revision, of course, led to a simplification. The former regulations were overlapping, sometimes contradictory, with many dispensations that made an overwhelming jungle of paragraphs difficult to use even understand.

Another important effect of this revision was that the work of our inspectors became less specialized, not concentrated on a few specific regulations. Previous specialization made the control system too rigid with resulting reduced efficiency.

I want to point out some parts of our national legislation which, in my point of view, have made today's regulations a valuable tool to reach the quality aims of the Directorate:

The contents of the regulations

First of all, it is natural to point out the level or the general contents of the regulations. Both the quality regulations and the general hygiene regulations have been influenced by relevant international legislation and standards. Last year our Directorate compared the national legislation to relevant legislation within the European Community. The said requirements in our national legislation are, in most fields, stricter than today's ECC legislation. To achieve harmonization with the directives of the Common Market only a few minor improvements have to be done in our national quality regulations.

A single, competent authority

The Norwegian legislation on quality and hygiene regulations for fish and fishery products gives authority to one single, competent national body. The responsibility for control measures by carrying out checks and inspections and the issuing of inspection certificates, therefore, rests entirely on the national Quality Control Service. In this way both producers and manufacturers (as well as foreign customers and authorities) experience a single surveyable public authority in this field.

Approval of establishments

The requirements for approval of establishments and factory vessels cover both conditions concerning design and equipment as well as conditions of hygiene relating to handling and storage of fishery products.

The requirements for approval of establishments are the same for all food production plants in Norway. The conditions concerning design and equipment were previously part of regulations specific to the fisheries industry. Common hygiene regulations for all food production have improved the overall status of the fisheries industry and removed previous attitudes that standards for fishery premises could be lower than for other food production activities.

Increased hygiene requirements have led to the closing of many old, poorly equipped premises. Still, the production potential of today's premises far exceeds the amount of raw material delivered by the fishing fleet. The approval of an establishment decides which activities the establishment may carry out. The Directorate of Fisheries has drawn up a list of approved establishments in Norway. Approved establishments are given an official registration number. This registration number must be used on all consignments. This combination of approval and registration number is necessary for our inspectors to make it possible to trace the dispatch establishment of consignments. This registration system is also an important measure to ensure that no fishery products are placed on the market from non-approved establishments.

TABLE 5
THE DIRECTOR-GENERAL OF FISHERIES' REGISTER OF APPROVED PLANTS

OFFICIAL REGISTRATION NUMBER	NAME/ADDRESS	APPROVED OPERATIONS
M 54 (22629)	LESUND KOOP. HANDELSLAG 6698 LESUND	1 3 6 7 9
M 55 (22528)	A/S AUREFISK & CO. 6698 LESUND	1 3 6 7 10 11
M 56 (40984)	M/S LONGVA III M-62-A V/A/S LONGVATRAL POSTBOKS 5090 6021 ALESUND	2 3
M 57 (42356)	M/S RISTON V/K/S RISTON 6428 MYKLEBOST	3

Approval which has been granted may be withdrawn if the plant, premises, equipment, hygienic conditions or handling of raw materials and products no longer meet the requirements laid down, and the owner/tenant has been given a reasonable deadline to correct the shortcomings, and this deadline has not been met.

Norwegian regulations for premises used for the production of other food stuffs than fish do not contain the same possibilities to withdraw an approval when the requirements in the regulations are no longer met. In this case the authorities have to prove that continued production may be a risk to human health. There is no doubt that the system of improvements and eventual withdrawals of approvals has raised the general level of hygiene in fish processing plants.

QUALITY STANDARDS IN NORWEGIAN REGULATIONS

General

It is not permitted to sell for human consumption fish and fishery products which:

1. Are not regarded as sound and wholesome (i.e. are spoilt or hazardous to health) or will not be sound and wholesome on arrival at their destination:
2. Are damaged and/or not regarded as fit to be used as merchandise:
3. Suffer from any of the quality defects mentioned below:
 - a. Be strongly rancid or damaged by freezing:
 - b. Have flesh which is so soft that it can be loosened from the bones by finger pressure, or which is in a state of decomposition:
 - c. Smell of spoilage, products which are sour, stinging or rotten, have strongly discoloured meat along the backbone or yellow slime on the mucous membranes (bacterial slime):
 - d. Are extensively affected by parasites or show major damage caused by them:
 - e. Are contaminated by foreign substances (paraffin, creosote, etc.):
 - f. Contain substances which are regarded as hazardous to health in the concentration found:
 - g. Contain traces of medicine which are detectable according to the methods specified by the Director-General of Fisheries:
 - h. Contain bacteria of species or in numbers which cannot be accepted in food stuffs:
 - i. Contain higher values of trimethylamine-nitrogen or total volatile nitrogen than specified in other paragraphs of this regulation.

Bleeding

All fish shall be bled as they are harvested. Exemptions are herring, sprat, capelin, mackerel, dogfish, skate, angler fish, red-fish, blue whiting, greater argentine, roundnose grenadier, eel and fish for production of fish meal and animal fodder.

Gutting

Fish for which bleeding is required shall be gutted as soon as possible after they are drained of blood.

If the gut contains food: may be kept ungutted for up to 4 hours:
starved fish: may be kept ungutted for up to 12 hours.

Chilling on ice or in chilled water

Fish shall be chilled on ice or in chilled water within an hour of harvesting.

Chilling in tanks/containers: not more than 3 days on board.

Between 1 October and 31 March fish may be landed without chilling within 12 hours of being caught as the temperature in the fish is +5° or lower.

QUALITY REQUIREMENTS FOR VARIOUS PURPOSES

1. **Raw materials which are used for chilled fish. Fishery products to be marketed as fresh.**

Specified requirements are set for the following characters:

- a. Rigor mortis, consistency:
 - b. Odour and taste:
 - c. Signs of unsatisfactory bleeding/delayed gutting:
 - d. surface of the fish/the flesh/the mucous membranes.
- * Shall be packed not more than one day after harvesting:
 - * Lean fish: sold to the consumer less than 8 days after they are caught:
 - * Fat fish: sold less than 3 days after they are caught:
 - * TMA-N: less than 3mg/100g (no sample more than 5 mg).

2. **Raw materials which are used for freezing, light salting, smoking, salting (herring, mackerel and sprat)**

- * The requirements to rigor mortis, consistency, odour, etc. are not so strict as for raw materials used for chilled fish:
- * Lean fish: not more than 7 days on ice before processing:
- * Fat fish: less than 3 days:
- * The threshold values for TMA-N are the same as for fresh, chilled products.

3. **Processed, frozen products**

Processed, frozen products shall satisfy the quality requirements for raw materials for freezing concerning odour, flavour, consistency and the appearance of the fish meat.

Samples of meat from lean fish, flatfish and herring, and mackerel species shall not on average contain more than 5 mg TMA-N/100g. (No sample more than 7 mg.)

4. **Raw material which is to be used for stockfish and for salting fish (with the exception of herring, mackerel and sprat)**

- * The requirements to consistency, odour, etc. are not so strict as for raw materials for freezing:
- * Not more than 12 days on ice before salting/drying:
- * The threshold values for TMA-N less than 10mg/100g
TVB-N less than 30mg/100g.

QUALITY GRADING

The Norwegian quality regulations define standards for sorting and quality grading for the following products:

Slated fish is sorted into trade categories and size categories (extra, superior, universal):

Salted fillet is also sorted into trade and size categories (extra, superior):

Klippfish is sorted into trade and size categories as well as degrees of dryness (extra, imperial/superior, universal, popular):

Farmed salmonids are sorted and graded in 3 quality classes: superior, ordinary and production fish.

LABORATORIES

Originally the control of fish and fishery products was entirely based on sensoric examinations. The inspectors made their judgements from organoleptic observations combined with good knowledge of the actual product and its markets. The organoleptic check carried out by sampling is still the most efficient method to determine whether fish and fishery products comply with said freshness criteria.

However, international standards and buyers' specifications are increasingly focusing on objective criteria to achieve a mutual understanding and acceptance of common standards. Both the fisheries industry and national authorities therefore need independent, officially approved laboratories to perform the requested examinations.

To most establishments the costs of running their own laboratory will be too high. Besides, such arrangements must always face the suspicions of not being objective. Elementary laboratory examinations as a part of a self-supervision system may of course be a valuable exception to this rule.

The Quality Control Service has three regional and one central laboratory as an integrated part of our control system. The laboratories are specialized in analysis relevant to fish and fishery products. Our laboratories have a good reputation, both in Norway and in foreign markets. Their work brings additional quality to the work of our inspectors and is a cost-effective organization of laboratory capacity to the Norwegian fisheries industry.

THE NORWEGIAN CONTROL OF VETERINARY DRUG RESIDUES IN FISH

I have previously underlined that one of the basic aims of our national control system is to avoid economic losses due to exports of low quality fish products. Drug residues in fish products are a potential hazard to human health. Besides, the use of veterinary drugs in fish farming is an extremely sensitive area with regard to consumers' opinion upon the quality of farmed fish.

Consequently, the Norwegian Quality Control Service has established a control system to make sure that no fish product containing traceable drug residues is placed on the market. The combination of strict regulations and thorough control regimes gives the national authorities (and the fish farming industry) very good, documented references for the guarantees given about drug-free fishery products. I will give a short description of the main elements of this control system.

TABLE 6

THE NORWEGIAN CONTROL OF VETERINARY DRUG RESIDUES IN FISH

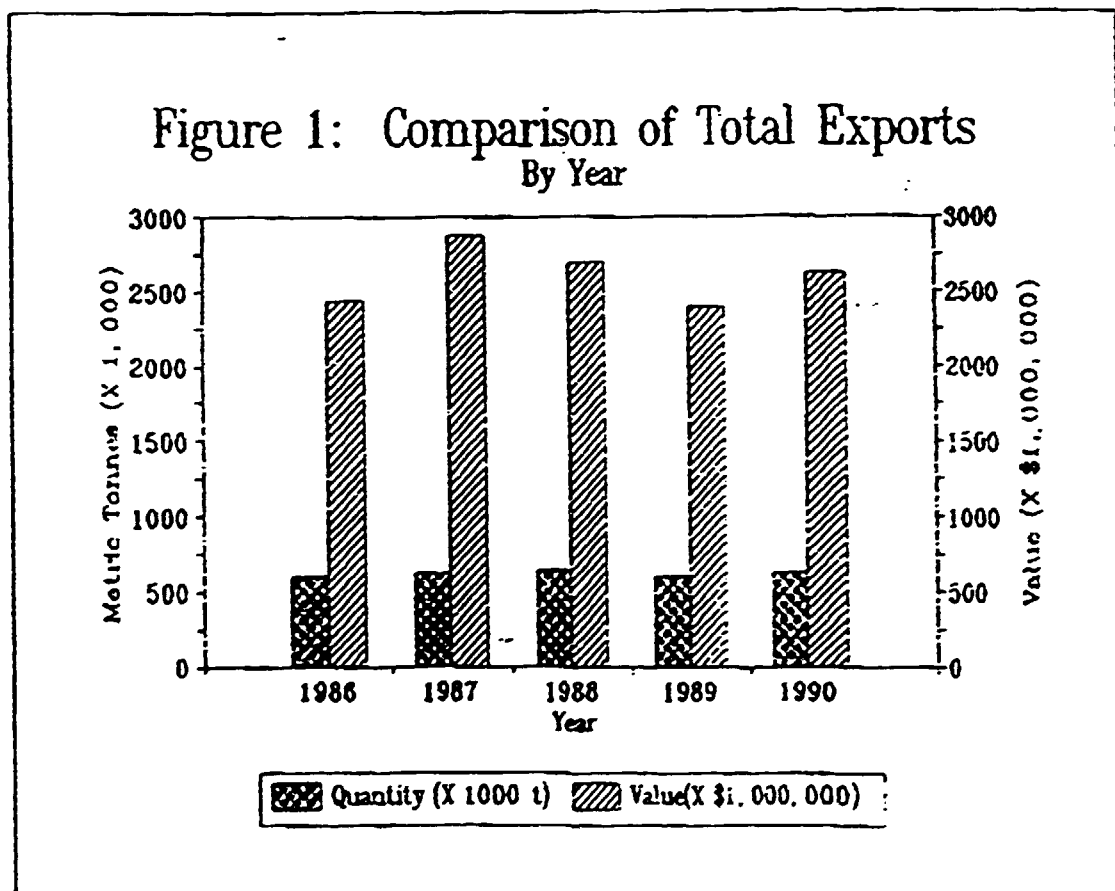
Fish farming in Norway has to be licensed by the Directorate of Fisheries	Drugs for treatment of fish are only obtainable on veterinary prescription	Withdrawal periods decided for all types of drugs used to treat slaughter fish
In advance of removal of fish for slaughter: Standard notification form to the Directorate of Fisheries	Standardized veterinary prescription forms The Directorate of Fisheries receives weekly copies of all prescriptions	Fish treated with antibiotics or chemotherapeutic agents during the last 12 months are subjected to control in advance of slaughter
Permission to slaughter when standard notification form is approved	Electronic data registration	Slaughtered fish are subject to post-mortem examinations for the presence of relevant drugs Slaughtered fish that contain drug residues are condemned as unfit for human consumption

IV. CANADIAN SEAFOOD IMPORT INSPECTION PROCEDURES

Prepared by
B.J. Emberly¹

Fish inspection - overview

Inspection Services is responsible for the development and implementation of national policies, regulations and procedures to ensure that Canadian produced fish and fish products meet appropriate grade, handling, identity, process, quality and safety standards, and that imported fish and fish products meet minimum standards of identity, quality and safety. Inspection Services sets standards for fish products and facilities, and inspects fish and fish products against these standards to determine acceptability of products for sale in Canada and in foreign markets. Because over 80% of domestic product is exported, it is important to ensure that foreign country health, safety and quality standards are met to maintain the reputation of Canadian fish and fish products in the international marketplace. And that reputation is a good one. Figure 1 shows the value and quantity of Canadian fish exports from 1986 to 1990.



¹ Director-General, Inspection, Regulations and Enforcement,
Department of Fisheries and Oceans, Canada.

Because of the increasing globalization of markets for all types of food commodities, arrangements between Canada and her trading partners can have significant implications for inspection systems and standards. That's why we in the fish inspection programme are heavily involved in international discussions under Canada-US Trade Agreement, and the General Agreement on Tariffs and Trade, and are closely monitoring discussions by the European Economic Community regarding economic integration in 1992. We want to be sure that the fish products that we import meet Canadian standards, and that our exports continue to have fair and ready access to international markets.

Personnel

Canada's national seafood inspection programme is a multifaceted and comprehensive one involved with fish and fish production at all stages. As illustrated in Table 7 there are currently about 550 people employed by Inspection Services across Canada: of which 320 are field inspectors, and 143 are laboratory staff. These people are all engaged in one way or another in ensuring that the fish and fish products available in Canada and exported abroad meet federal standards for health, safety and quality.

Table 7

PERSONNEL EMPLOYED BY INSPECTION SERVICES	
POSITION	NUMBER OF STAFF
FIELD INSPECTORS	320
LABORATORY STAFF	143
ADMIN/SUPPORT STAFF	87
TOTAL	550

Domestic fish inspection programme

On the domestic side, that is for fish and fish products produced in Canada, we inspect fishing vessels, processing plants, handling storage and transportation practices. A few basic statistics provided in Table 8 might give you an idea of the scale of our inspection efforts.

There are approximately 40,000 registered fishing vessels in Canada and on average we inspect about one third of them each year. There are approximately 1400 processing plants housing different processing operations (freezing, filleting, marinating, pickling, etc.) each type of operation having different requirements. This results in approximately 18,000 plant inspections every year. We also conduct about 65,000 inspections annually of finished fish products and about 13,000 inspections of raw materials. Approximately 3,000 inspections each are conducted at unloading sites and transport vehicles.

Table 8

DOMESTIC INSPECTION ACTIVITIES	
TYPE OF INSPECTIONS	NO. OF INSPECTIONS
FISHING VESSELS	13.000
PROCESSING PLANTS	18.000
RAW MATERIAL	13.000
FINISHED PRODUCTS	65.000
UHHT	3.000

DFO has recently developed, with the fish processing industry, a new approach to plant and product inspection: an In-Plant Quality Management Programme by which industry will assume an increased responsibility for quality management. The QMP approach focuses on monitoring Critical Control Points during processing, and incorporates elements of the Hazards Analysis Critical Control Points approach which is being adopted by many inspection agencies in other countries.

Plants that apply and maintain QMP consistently over a period of time may be able to use a "Canada Inspected" logo on their labelled product. This would be a direct benefit to both industry and the consumer. We expect that the QMP initiative will enhance both the efficiency and cost effectiveness of our inspection system.

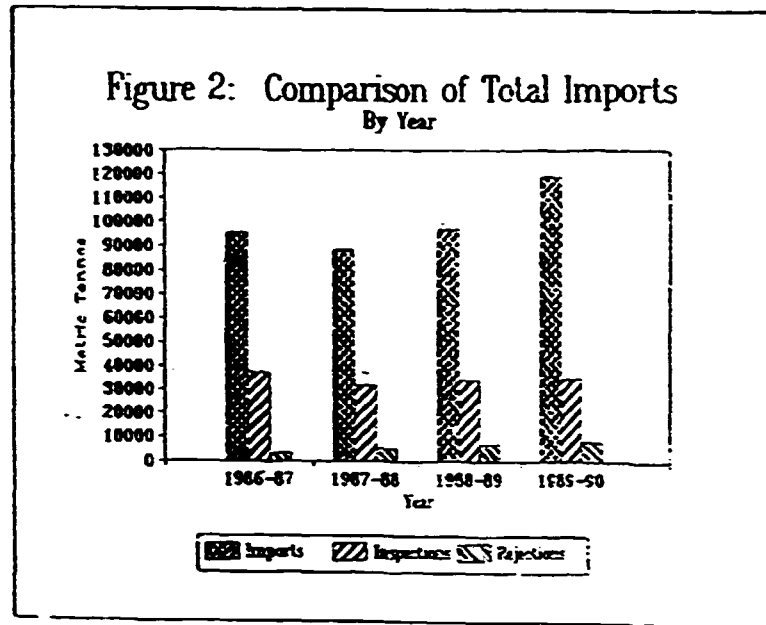
Import fish inspection programme

About half the fish consumed by Canadians comes from the domestic industry; the other half is imported from over 80 different countries around the world. We know far more about the conditions under which Canadian fish is processed than we do about imported products, therefore imported products are a priority for the fish inspection programme.

For imported fish products, our inspection programme involves systematic sampling and inspection of incoming products by DFO inspectors and laboratory analysts. Approximately 7,500 inspections of imported shipments of fish products are carried out each year. Inspections of products involve either sensory testing of colour, odour, texture, flavour or appearance and chemical, microbiological or physical inspection, as appropriate. Canned products are also examined for container integrity, *Clostridium botulinum* being the main concern.

Fish imports 1989/90

Canada may export 80% of its production but Canada also imports a large quantity of fish products. In 1989/90 over 119 thousand tonnes of product was imported based on information supplied to Inspection Service by licensed importers. This was an increase over previous years. Figure 2 shows a comparison of imports from 1986 to 1990.



Main imports

Over 400 different products were imported into Canada in 1989/90. Canned tuna accounted for approximately 70% of all canned product imported; and frozen shrimp was our main frozen product import. Table 9 lists the main products which are imported into Canada.

In 1989/90, fish imports to Canada originated from over 80 different countries. The United States was Canada's major supplier, accounting for 45% of all fish imports. Table 10 lists the top 5 countries supplying imported products for the Canadian market.

Table 9

Main imports by product type for 1989/90		
Product	Quantity (t)	Imp. of type
CANNED Tuna	22,422	70%
Clams	2,198	7%
Shrimp	1,672	5%
TOTAL CANNED	31,893	
FROZEN Shrimp/prawns	15,957	25%
Tuna	8,081	13%
Salmon	5,359	9%
TOTAL FROZEN	62,306	
FRESH Herring	5,279	22%
Salmon	3,592	14%
Sea Urchins	2,321	9%
TOTAL FRESH	25,195	

From 1 April 1989 to 31 March 1990.

Table 10

Imports from main countries for 1989/90 ^a		
Country	Quantity (t)	% Total imp. by wt.
United States	53.130	45
Thailand	14.081	12
Philippines	6.685	6
Japan	6.573	5
China	4.618	4
All other countries	34.284	28
Total	119.371	100

Fish Inspection Act & Regulations

The Fish Inspection Act. (Chapter F12. Revised Statutes of Canada 1985) authorizes the Governor-In-Council to make regulations governing fishery products entering into interprovincial or international trade, including imports. The Fish Inspection Act grants effective enforcement powers to inspectors; provides for seizure, detention and forfeiture of product; prohibits the import, export or possession for export of tainted, decomposed or unwholesome fish; and provides minimum and maximum fines and imprisonment terms for violations.

The Minister of Fisheries and Oceans is responsible for administration of the Fish Inspection Act and has an obligation to provide reasonable assurance that fish and fish products for domestic and export trade consistently meet Canadian and/or foreign Country standards for grade, handling, identity, process, quality and safety. These responsibilities, under the act, are met through the operation of a National Fish Inspection Programme with inspection staff located in all ten provinces and the Northwest Territories.

There are 130 field inspection centres throughout Canada supported by 23 strategically located laboratories. All fish inspection activities under the authority of the Fish Inspection Act from harvesting through processing and up to the retail level are carried out solely by officers of the Inspection Branch, Fisheries and Oceans Canada. In addition, enforcement of provincial fish inspection legislation is also carried out in all provinces except Manitoba and Quebec. By agreement with both the Department of National Health & Welfare, and Consumer & Corporate Affairs, DFO ensures that fish products sold in Canada are in compliance with the Food and Drug Act and the Consumer Packaging and Labelling Act.

The Fish Inspection Regulations made under the Fish Inspection Act, apply to fish and containers intended for export or import for human consumption. All fish are subject to inspection and inspectors may take samples free of charge. As stated "all fish are subject" to inspection, not that all fish must be inspected. The regulations define import as follows:

From 1 April 1989 to 31 March 1990.

"means ship into Canada from any other country, or into any province from any other province."

Importation of fish

There are several requirements which must be met for importing fish into Canada. Section 6(1) of the regulations states:

"No person shall import, export or process for export or attempt to import, export or process for export

(a) Any fish that is tainted, decomposed or unwholesome or otherwise fails to meet the requirements of these regulations:"

The terms tainted, decomposed and unwholesome are defined in the regulations as follows:

Tainted - with respect to fish, means that it is rancid or has an abnormal odour or flavour:

Decomposed - with respect to fish, means fish that has an offensive or objectionable odour, flavour, colour, texture or substance associated with spoilage:

Unwholesome - with respect to fish, means fish that has in or upon it bacteria of public health significance or substances toxic or aesthetically offensive to man.

The remaining part of section 6(1) of the regulations is applied to molluscs:

6(1)(b) "Live oysters, clams, mussels or other molluscs (except scallops) or raw products derived therefrom, whether frozen or unfrozen, unless the Minister is satisfied on the basis of information submitted to him that the waters from which such shellfish are taken and the premises in which they are handled and processed are of such a nature as will ensure that the shellfish are wholesome."

In following this regulation, fresh or frozen bivalve molluscs are permitted entry only from countries which have a formal shellfish agreement with Canada and who have control programs identical or similar to Canada to ensure shellfish safety. Bivalve molluscs from all other countries are automatically refused entry without inspection. Canada currently has agreements with the United States and New Zealand covering all shellfish. Japan and Korea for shucked frozen oysters only and fresh oysters from two certified shippers in France.

The mitten crab harbours a parasite which causes lung fluke disease in humans. The parasite is transferred to humans by touch. Therefore, all handlers of the live crab, including the importer, the inspector and the retailer may become infected by the parasite. In order to prevent this, live mitten crab is not allowed to be imported into Canada.

Import license requirements

On 1 April 1986, the Department implemented a programme to recover part of the cost of inspecting imported products. The regulations were modified at this time to require that all importers of fish products be holders of a valid import license.

6(2) "No person shall import into Canada or attempt to import into Canada any fish unless:

(d) That person is a holder of an import license."

This license, as described in Section 6.1 of the regulations entitles the holder to import fish products anywhere in Canada, and further states that:

- 6.1 (1) "The fee for an import license is \$150.00;
 (2) An application for an import license shall be made to the minister on a form supplied by the minister and accompanied by a fee set out in subsection (1);
 (3) An import license expires on 31 December of the year for which it is issued;
 (4) An import license is non-transferable".

Notification requirements

To comply with the following regulation, the importer is required to give notification to the nearest DFO inspection office within 48 hours of the shipment's arrival in Canada.

6(2) "No person shall import into Canada or attempt to import into Canada any fish unless:

(e) Written notification of each shipment of fish to be imported is provided to an inspector either prior to the importation or within 48 hours following the importation."

This written notification must state the identity of the importer and details concerning the size and nature of the shipment, as outlined in Section 6(2.1) of the regulations:

6(2.1) "The notification referred to in paragraph 2(e) shall set out, in respect of each shipment of fish imported or to be imported into Canada,
 (a) the quantity;
 (b) the producer; and
 (c) the country of origin
 for each type of fish contained in the shipment."

Section 6.2 of the regulations requires that a \$25.00 inspection services fee is charged as part of the Cost Recovery Programme for each shipment of fish imported, other than fresh fish, or a shipment of any fish less than 25 kg. All shipments of fish intended for human consumption must be notified whether or not an inspection service fee is charged.

6.2 "An inspection service fee of \$25.00 for each shipment of fish, other than a shipment of fresh fish or a shipment of less than 25 kg of any fish, that is imported into Canada under the authority of an import

license shall be payable by the license holder upon receipt of an invoice from the minister."

Inspection Service's National Import Database

In order to enable Inspection Services to quickly access accurate and up to date information concerning fish products imported into Canada, DFO has developed a National Import Computer System. This system keeps track of all fish products imported into Canada in one computer, located in Ottawa, which is accessible by all inspection personnel Canada wide.

This system is available and used at all levels in Inspection Services. Inspectors have a history of all inspections done anywhere in Canada and use this information to aid in making their decision to inspect or release the imported product. Requests concerning imported products are responded to quickly with accurate information and management information concerning the inspection of imports is available on a national basis.

When the inspector is notified by an importer of a product being imported into Canada, the inspector enters information into a computer which is linked to the main computer in Ottawa. This background information describes the shipment as is required by the written notification, and includes the importer's name, a description of the product, the name of the plant which processed the product and the quantity of product being imported.

Decision to sample

By matching the information the inspector has entered against the import database, the computer is able to provide information which the inspector uses to make a decision as to whether to inspect the product. As stated previously, approximately 120,000 tonnes of fish products are imported annually and with present inspection resources, it is possible to examine only 15 to 20 per cent of shipments. To ensure best use of resources we direct our efforts at those products and countries which have had unacceptable products in the past. If an imported product fails to comply with the Fish Inspection Regulations it is listed on the Mandatory Inspection List (MIL).

Section 6.3(1) of the Fish Inspection Regulations states:

"Where a shipment from a producer of a type of fish imported into Canada fails to pass a type of inspection set out in the table to this section, the type of fish, the name of the producer and the type of inspection shall be recorded on the mandatory inspection list and subsequent shipments of that type of fish from that producer shall be subject to the same type of inspection on a mandatory basis, until four consecutive shipments have passed the mandatory inspection."

The MIL lists by primary process, (i.e. canned, frozen), country of product, origin and processor, the product and the reason the product was found unacceptable. All products appearing on the MIL are automatically detained, sampled and examined. A product remains on the MIL until four consecutive shipments have been found acceptable and released. Also, products new to the Canadian market are sampled on entry, and products not on the MIL are subjected to random sampling and examination, usually on a basis of one in five shipments.

Inspection fees

As part of the Cost Recovery Programme, section 6.3(2) of the regulations, requires that importers pay a fee for the inspection of all products on the Mandatory Inspection List.

"Where a type of inspection is mandatory pursuant to subsection (1), the fee set out in the table to this section for that type of inspection shall be payable by the person that imports the fish into Canada, upon receipt of an invoice from the Minister."

Sampling and examination

Where sampling and examination is required, the Inspector will decide whether to inspect the shipment (or the product) on an individual "per code" basis or on a "lot" basis depending on the code list reliability and the analysis to be performed. A "lot" in this case means a group of codes of the same packer, product, brand and size. The importer may request sampling on a code basis or lot basis but the final decision is made by the inspector. All shipments sampled are detained pursuant to Section 8 of the FIR until the results of examination are available.

The number of samples taken by the Inspector depends on the type of examination to be carried out:

- (a) For bacteriological examination of fresh or frozen fish products, the sample size is 5 individual prepackaged units or 5 one lb sample units from large bulk containers;
- (b) for organoleptic evaluation of fresh and frozen and canned goods, the department has adopted the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (1969) where the number of sample units is dependent on the total number of units in the lot. The smallest number of sample units called for is 6;
- (c) For container integrity evaluation of canned products, the inspector will carry out a visual examination in the warehouse, of at least 200 cans per code chosen at random. He will look for blown or leaking cans and visible seam defects. If problems are encountered, he will obtain samples for detailed examination by the laboratory.

All results and actions taken as a result of an inspection on the product are entered into the computer system. After examination, if the product fails to meet the requirements of the FIR, a Fish Inspection Report is issued to the importer, stating the reasons for non-acceptability and the product is listed on the Mandatory Inspection List.

Reinspection

If a lot is rejected on initial inspection, the importer or his representative has the right, under Section 10(1) of the Fish Inspection Regulations, to request in writing a re-inspection, provided the importer or his representative can satisfy the following conditions as stipulated in Section 11 of the regulations:

"A reinspection shall not be ordered pursuant to subsection 10(1) where:

- (a) The identity of the fish or containers of fish in dispute has not been preserved:
- (b) The request for reinspection was not made within 30 days after the disputed inspection:
- (c) The fish or containers of fish have in or upon them any poisonous or harmful substance: or
- (d) The fish or containers of fish have been previously reinspected."

As regards subsection (c) above, it should be noted that no reinspection may be granted where:

- (a) In the examination of canned foods, the product is rejected for blown containers or commercially non-sterile products:
- (b) The product contains bacteria of public health significance in excess of the bacteriological guidelines: or
- (c) The product contains a chemical contaminant or hazardous substances exceeding established guidelines, or contains non-permitted food additives.

Providing the above conditions can be satisfactorily met by the importer or his representative, a reinspection can be carried out. A reinspection fee is charged for all reinspections. The amount is dependent upon the tests performed and a schedule of these fees is found in the FIR. The importer, or his representative, may also request permission to cull or rework the lot in question before reinspection. Such requests will be considered on an individual basis with consideration given to the particular circumstances surrounding each request.

There are three main points to be considered before the Inspector gives the importer or his representative permission to cull:

- (a) The criteria for culling must be reasonable. A detailed proposal must be submitted in writing to the Inspector for consideration. It must include all pertinent details such as time, date, methods, etc.
- (b) The culling must be done before the reinspection:
- (c) All material culled from the lot is to be automatically segregated from the original lot and is to be placed under detention, as it is to be dealt with separately.

Provided the conditions for reinspection have been met, a reinspection may be carried out on the lot rejected on original inspection. As stated previously, the Inspector has the option to sample on a "per code" or on a "lot" basis. IN many situations "per code" sampling using increased inspection levels will be the route chosen for reinspection purposes.

The appropriate analysis or evaluation will be conducted on all the reinspection samples, with a team of inspectors carrying out the reinspection. The inspector who carried out the original inspection is normally not involved (if practical) in the reinspection. Each inspector on the team independently evaluates the reinspection samples and the lot, following which the team will bring their results together and render a decision.

In certain situations, at the request of the importer or his representative, the department may permit the reinspection of products to be conducted in a region other than the region which carried out the initial inspection. The region carrying out the reinspection is selected by National Headquarters; samples are collected and transported by the Department, with the transportation costs being the responsibility of the importer.

Also, the department may permit the importer or his representative to be present during the reinspection, as observers only. The inspector in charge of the reinspection has the final say on how many industry representatives may observe the reinspection. No discussion is allowed during the reinspection between inspection staff and the industry representatives with regard to the inspection/examination procedures employed. The inspector in charge of the reinspection can request the industry representative to leave if he/she interferes with the conduct of the reinspection. Once the product has been reinspected, the results are final and no subsequent request or appeals may be considered.

Disposition of imported products following inspection/reinspection

- If: - Reinspection is not requested within the 30 day appeal period,
or
- The product is not granted a reinspection; or
- The importation fails to pass reinspection.

appropriate disposal action has to be taken by the importer within 45 days of the date of notification of inspection/reinspection results.

Disposal of rejected imported products can be by:

- (a) Destruction of the goods; in which case an inspector must be present to witness the destruction; or
(b) Removal of the goods from the country; in this case the requirements to verify removal are:
- Provision of information regarding the shipping means, dates, destination, etc. and
 - Appropriate custom's documentation.

Where the product has been found unacceptable due to improper labelling, including shortweight conditions, the importer may be allowed a period of 45 days from the final notification in which to effect the necessary label corrections or to remove the shipment from Canada.

Should the importer fail to take appropriate disposal action within 45 days of the date of notification (or by the date of extension, where an extension has been granted), legal action will be initiated.

Imports and rejections

Earlier, it was stated that in 1989/90, fish imports to Canada originated from over 80 different countries. Rejections occurred in products from over 60 different countries. In several cases the quantity involved was small and may have represented only one shipment or part thereof. For the fiscal year 1989/90 the rejection rate was 7% of total imports. Table 11 gives a summary for the quantities of fish products which were rejected.

Table 11

Fish product imports and rejections for 1989/90*		
Product	Quantity imported (t)	Quantity rejected (t)
Frozen	63.336	6.225
Canned	31.892	1.965
Fresh	24.327	53
Other	816	114
Total	119.371	8.357

Rejections by main reasons

Table 12 shows the quantity of product rejection and the main reasons for rejection. You will note that decomposed and tainted products lead the way.

Table 12

Major reasons for rejection of all fish products 1989/90*	
Reason	Quantity
Decomposed/Tainted	5.158
Bacteria	618
Container Integrity	503
Foreign Matter	272
Mercury, Heavy Metals ⁷	719
Non-permitted additive	28

Offshore Inspection Programme

As with the domestic side of the programme, we have established a new approach to the inspection of imports, the Offshore Inspection Programme. To date the programme has covered canned tuna from Japan, Thailand and the Philippines along with frozen shrimp from the Philippines. Under this programme, DFO inspectors inspect offshore processing plants and based on the plants' compliance with Canadian Good Manufacturing Practices, an international agreement is negotiated with foreign governments for

* From 1 April 1989 to 31 March 1990.

⁷ One rejected shipment for mercury was 636 t.

"preferred inspection status". Products from processors on preferred status are subjected to a reduced inspection frequency. We plan to extend this programme to other countries and products depending on the cooperation and compliance of the exporting countries involved. Negotiations have been initiated in the establishment of MOUs with Morocco and France. To date our monitoring of existing agreements suggests that by and large, the approach is working. The Offshore Inspection Programme is allowing us to better target our existing inspection effort to high risk areas as we expect the Quality Management Programme will do for our domestic inspection operations.

V. QUALITY ASSURANCE IN FISH PROCESSING

Prepared by
Peter Howgate¹

1. The importance of quality and quality assurance

There is a strong and increasing demand for fishery products throughout the world, particularly from consumers in the economically developed countries. At the same time production of fish is increasing only very slowly. All important natural fish stocks are fully, if not over, exploited and though fish farming is making an increasing contribution to supplies, demand is exceeding supply for most species. The consequence of this strong demand with almost constant supply is that prices of fish products are increasing, and in most countries increasing faster than for other food products. This is good news for the fish producer, but the high prices make the customers more selective in their purchases and more demanding in their requirements for high quality. High prices will only be paid for products of high quality.

The demand by consumers for high quality is reinforced by the marketing and retailing systems in those countries with advanced economies. Here foods, including fish products, are increasingly being sold by large retailing chains and supermarket companies. These companies are very concerned about their reputations for the quality of the foods they sell and in their turn insist on high quality products from the merchants and processors who supply them. In order to ensure consistently high quality of fish products in their stores supermarket companies are insisting that their suppliers establish quality assurance systems in their factories. In the case of imported material, the companies are requiring directly or through their agents that exporters establish quality assurance systems in their factories.

An additional factor is that many countries are strengthening their food control legislation and public health authorities are becoming more stringent in the application of these regulations. The authorities in importing countries realise that inspection of products at the point of entry into the country and rejection of those batches that do not meet specifications gives very poor protection against importation of unwholesome material. Regulatory authorities are more and more pushing responsibility for safe and wholesome imported food products back to where it belongs - the exporting country. They are insisting that imported fish products be processed under same hygienic and sanitary conditions that are imposed on processors in the importing country and that products are assured of being safe and wholesome when they leave the processing plants. This principle is incorporated in recent EEC legislation on hygiene requirements for fish processing and in moves in the USA and Canada toward memoranda of agreement with companies in exporting countries.

This increased pressure both from consumers and from officials requires that fish processors must establish effective quality assurance systems in their plants and must devote both management and technical resources to this end. Quality assurance must be an integral part of company policy and management and there must be a systematic approach to

¹ Consultant, Aberdeen, United Kingdom.

There are international standards for quality assurance systems - ISO 9000 to 9004 - and though they were developed in the engineering industry they are being increasingly applied in the food, including fish, processing industry.

2. Some definitions and principles

Before dealing with specific aspects of a quality assurance programme for fish processing some terms should be defined and explained. The definitions have been taken from British Standard BS 4788: "Glossary of Terms Used in Quality Assurance", with some slight modifications.

2.1 Quality: The totality of the features and characteristics of a product that bear on its ability to satisfy a given need.

Two important aspects of this definition should be noted. The first is that quality is dependent on more than one feature and characteristic of the product. In fish products these would be factors like freshness, cold storage deterioration, size of fish or fillet, freedom from blemishes, wholesomeness, packaging, to give just a few examples. Variations in the presence or absence of quality factors, or in their amounts or intensities, differentiate samples of a product and establish grades of quality.

For a particular product in a particular market some factors will be more important than others, and the overall quality is the balance of the factors that meets the requirements of the market. The second aspect of this definition recognises there are different needs to be satisfied and that separate quality standards might have to be set to satisfy them.

2.2 Quality assurance: All the activities and functions concerned with the attainment of quality.

Quality assurance does not include only the technical aspects of quality management. It covers policy, administration, management as well as the technology of quality control. It means that many individuals in a company, and not just those in the QC department, make a contribution to the quality assurance programme.

2.3 Quality control: The operational techniques and activities that sustain the product quality to specified requirements, and the use of such techniques and activities.

Quality control is what quality controllers do. It is an active process which monitors and if necessary modifies the production system so as to consistently achieve the required quality of the end product. Quality control includes control over hygiene and sanitation of the plant and process in order to achieve a wholesome product.

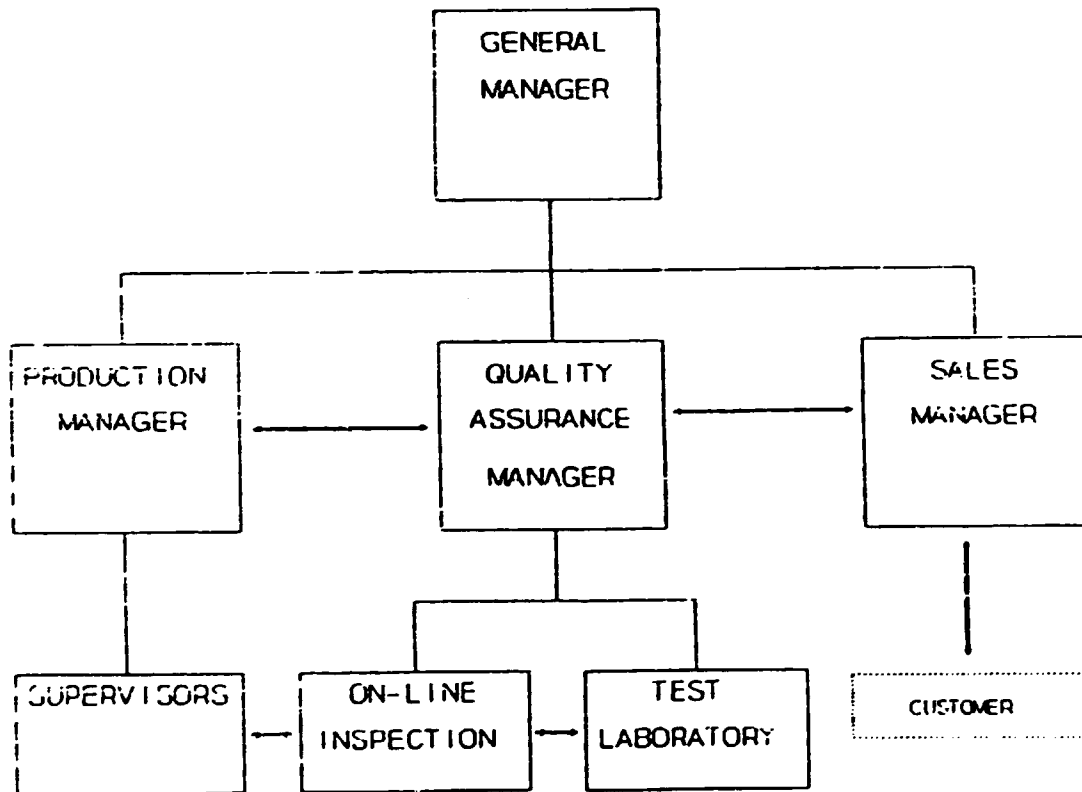
3. Administration of a quality assurance programme

A company should have a clearly defined and stated policy towards achieving and maintaining the quality of the products supplied by it and towards the execution of this policy. The owners of the company must ensure that the proper administrative structures are in place to implement the policy, and that sufficient resources are provided. Attaining and maintaining high standards of quality requires investment in buildings, equipment and personnel, but this investment is not large compared with the total capital and running costs of a factory. The costs should be recouped

in a more efficient process, by reduction of waste, and by realisation of higher market prices for the products. If the company does not make the investment of its own choice it might find the public health authorities and the consumers both in its own country and in importing countries insisting on the investment.

The overall responsibility for running a factory lies with the General Manager who will have immediately below him, or her, other managers. The section of the organizational chart relevant to the quality assurance programme might look like this:

Table 13



The Quality Assurance Manager should report directly to the General Manager and not to the Production Manager. The QA Manager will be in charge of the QC staff and of any laboratory facilities. The function of the QC staff will be to carry out all the activities of quality control as defined in 2.3 above.

The QA Manager and Sales Manager will consult about the quality of products as required by the customer, and whether they can be met. The QA Manager will be responsible, in consultation with the Sales and Production Managers, for drawing up specifications for quality of products, and if necessary any process specifications. Rejections of products by customers and customer complaints will be reported to the QA Manager by the Sales Manager.

Liaison between the QA and the Production Manager is very important. The latter is responsible for achieving production targets within the constraints posed by supplies, facilities and availability of staff and within budgetary targets. At times these objectives clash with those of the QA Manager's and disputes between them might have to be resolved by the General Manager, but detailed product and process specifications, and an agreed policy towards quality of products will help to resolve difficulties. Immediate supervision of production workers to ensure they do their jobs properly is the responsibility of the Production Manager and his supervisory staff, but it is the responsibility of the QA Manager and his staff to check the performance of the production workers so far as quality of the product is concerned and to report back to supervisory staff so that any faults can be corrected.

Responsibility for the sanitary condition of premises and equipment will also probably lie with the Production Manager, but again the QA Manager will be responsible for checking that the job has been done properly and that personnel, premises and equipment comply with the company code of practice for hygiene and sanitation.

4. Personnel

Every process worker is responsible for the quality assurance of his or her own particular part in the process; the QC staff can only monitor on a sampling basis that the job is being carried out according to specifications. It is very important then for the success of a QA programme that the staff are motivated to meet the standards required of them and are disciplined if they do not. When staff are recruited they should be made aware of the special responsibilities for hygiene demanded of workers in food factories and the seriousness of any breaches of hygienic and sanitary codes of practice. Newly recruited staff should receive specific instruction on the tasks they are to carry out and particularly on any operations that affect quality. They must of course be instructed on the importance of hygiene and sanitation. The company should also consider holding refresher courses in hygiene, sanitation and quality control. It is advisable to prepare brief written instructions for staff to reinforce verbal instructions and also so that there is no excuse of ignorance in the event that a worker has to be disciplined. These instructions can also be posted in wash rooms and rest areas.

Staff should have the facilities to enable them to comply with good hygienic practices. Clean, well maintained toilet areas are required, provided with adequate washing facilities. Staff should have facilities for changing into protective clothing and for safely storing their outdoor

clothing and personal property. Personnel are not permitted to consume food or drink in processing areas or to smoke there, so suitable rest areas must be provided.

5. Documents required for quality assurance programme

5.1 Product specifications

A company should prepare a specification of quality for each product or product type it makes. The specification might be prepared by the company used "in-house" as part of its quality assurance programme or it might be developed during discussions with a customer. A specification prepared for use within the company could still be used as a demonstration to a customer of what the company is capable of producing. The company might also have in-house specifications for intermediate products taken from the processing line.

Specifications should also be prepared for materials entering into the process. Apart from the fish supplies, specifications should be set for ingredients like additives and batter, and crumb mixes, and for non-food items like packaging materials, cleaning materials and sanitisers. These specifications will form the basis of tenders for supply, and suppliers should realise that incoming materials are liable for inspection and testing against the specification and could be rejected or the price renegotiated on the basis of the results.

A specification consists of a definition of the product and any permitted sub-classes like size or species, followed by a list of those factors which govern the quality or quality grades if more than one is specified. Some factors are defined as being present or absent, others will have the property defined as a value on a scale. The specification might describe how batches of the product should be sampled and how some factors should be measured.

5.2 Process specifications

Process specifications lay down the essential requirements for stages in the manufacture of a product which are critical for its quality, particularly its safety. They might specify the nature and quality of the materials going into the process but they usually concentrate on how various processing steps should be carried out. Any special hygiene and sanitary requirements for the product will be specified. Process specifications should follow what are considered to be "Good Manufacturing Practices" for the manufacture of the particular product.

Process specifications should be drawn up by the company as part of its quality assurance programme, but sometimes they will be laid down by the customer, particularly when a process includes steps like time and temperature of cooking, pasteurising or retorting that cannot be easily verified by end product inspection.

5.3 Codes of practice

Codes of practice, or to give them their full title, Codes of Good Manufacturing Practice, describe the procedures to be followed, and the precautions to be taken in handling, processing and storage of material in order to ensure a safe and high quality product. They are usually written for a type of product like chilled fish, frozen fish, shrimps, but a company

might write a code for the factory as a whole, particularly where only a few types of products are made. Process specifications are more detailed subsets of codes of practice. There should be a separate code of practice for hygiene and sanitation covering all aspects of operations in the factory.

Codes of practice are meant to be widely read throughout the factory and not just by the QC staff. They should form the basis of training courses for personnel, and individual workers should be aware of, and be particularly instructed in, those sections that involve him or her.

5.4 Manual of sampling and testing

This is intended for the QC staff and describes general procedures for the taking and storage of samples, and the detailed procedures for testing them in the QC laboratory or on the processing line.

5.5 Protocols for quality control

These describe in detail procedures for the quality control of a product, from reception of raw materials to despatch from the factory. The protocol should be based on an appraisal of the critical points in the process where quality can be lost or the product rendered unsafe for consumption - this procedure is described in a following section. The protocol will state the necessary quality of the materials entering the process, how these materials are to be sampled and tested, and the criteria for approving them, or not, for the process. It will specify the stages where the process will be examined, the measurements to be made, if any, and the action to be taken if the process or the products at that stage are not within the specified limits. There will also be descriptions of sampling and testing of the end product, including its packaging, and of any final checks just prior to despatch. Limits of temperature and time of storage or any other storage conditions will be specified, along with procedures checking that they are not exceeded.

6. Analysis of a process for critical control points

Effective quality control of a process requires a detailed survey of all the factors in the process that might affect the quality and the safety of the product, and the action required to achieve and maintain quality and safety. Detailed analysis of a process for these purposes always has been a feature of effective quality control under various headings such as quality audit, but a more formalized system has been developed over the last 20 years or so for ensuring microbiological safety and quality as the Hazard Analysis Critical Control Point (HACCP) system. The basis of the HACCP approach is the identification of the hazards associated with the production of a food under their severity, identification of critical points in the process where hazards can be controlled, specification of the procedures for exercising control over the hazard, and establishment of procedures for monitoring the effectiveness of the control.

HACCP has been widely adopted in the food industry as an important component of quality assurance programmes and has also been taken up by regulatory authorities as basis for control of safety of processed foods. The main thrust HACCP is to reduce the risk of food poisoning, but it has as an aim prevention of spillage by reduction of overall bacterial contamination and growth. For a very perishable commodity like fish this is an important consideration. HACCP is not directly concerned with consumer

satisfaction in the sense of ensuring that the product is pleasant to eat. (other than ensuring it is not grossly spoiled). but the principle practices of HACCP can be used in total quality assurance. In this case the approach could be termed QACCP. Quality Analysis Critical Control Point.

The first step in QACCP is to prepare a detailed flow diagram of the process. This might be further broken down into unit operations where these operations, for example the freezing stage, are shared by more than one process. The flow diagram must include all materials entering the process, the storage of raw materials and final products, and means of distribution so far as these are under the influence of the producer. The flow diagram will be prepared by the production staff, but the quality control staff should have some input to ensure critical points are identified as separate steps.

The diagram is next examined to determine the hazards associated with the individual steps. A hazard is the potential for loss of quality, or for compromise of the safety of the product by contamination or growth or survival of microorganisms of public health significance. The severity of the risk should also be evaluated. For example, contamination with food spoilage organisms is a less severe hazard than contamination with food poisoning organisms. presence of bone is a more severe quality hazard in fish portion blocks than it is in IQF fillets.

The processing step or the product at that step is associated with a risk that the hazard will occur. It will be found that a hazard exists at almost every step because people are around and people transmit food poisoning organisms, but the probability, the risk, or an operation resulting in an incidence of food poisoning varies with the step and product. For example, contamination with *Staphylococcus aureus* is almost impossible to prevent where people touch fish. In the case of chilled or frozen fish, the risk of food poisoning is very low because the organism does not grow and produce toxin at chill and freezer temperatures, and the product is very likely to be cooked immediately before consumption. In the case of cooked and peeled shrimps the risk of food poisoning is high because there can be temperature abuse in the way this type of product is prepared and served at a meal, and it is not cooked prior to consumption. Almost every step has quality hazard associated with it, usually related to temperature rises and delays in processing, and GMP is designed to minimize the risk. As an example, in frozen fish products there is a hazard of loss of eating quality by the development of tough textures and off-flavours during storage, and the risk is high because temperatures during storage and distribution are often not low enough to prevent this deterioration.

Having identified the hazards of risks of the process it is necessary to locate on the flow diagram the critical control points where the product is most vulnerable and where control ought to be and can be exercised. Some systems differentiate between elimination of a hazard, for example by heat processing, and minimization of the risk by good manufacturing practices, but in fish processing, other than canning, there is usually scope only for minimization. The necessary procedures for control of the hazard and for minimizing the risks need to be specified for these critical control points. If any parameters of the operation, for example temperature, time, concentration of additive, can be quantified, limits to the values should be specified. Procedures for monitoring and controlling the process at this step should be specified - things like inspection, sampling, testing, action to be taken.

All the conclusions and procedures resulting from the QACCP exercise should be compiled into the codes of practice and the protocols for quality control. They will constitute the bulk of the company's manual for quality assurance.

7. Failures, rejections and complaints

At times raw material, processed products, or processes might not meet the quality control criteria imposed. A quality assurance scheme must have well defined procedures for dealing with this situation. In the first instant the inspected product or the product subjected to the failed process since the last inspection will be marked by the inspector and isolated. The process also might be stopped until the fault had been rectified. The isolated product should be clearly marked and stored for more extensive examination by the quality controller and laboratory. There must be defined procedures for testing isolated batches and for coming to a decision as to their fate. This might be return to the process unreservedly, move to another process, re-work, or disposal. Disposal might be for non-human food purposes, for example as animal feed or fish meal, or destruction if the material is contaminated. Raw materials failing inspection on receipt might be rejected completely or accepted with reservations pending further tests.

The goal of effective quality assurance is not to have consumer complaints at all, but the company must have a policy for dealing with any complaints that do occur. At least there should be testing of the material which is the subject of complaint if possible and examination of records to determine the cause of the failure of quality control. Action might require recall of the material in which case there is the possibility of extensive testing and perhaps recovery of acceptable material from the batch.

8. Record keeping

Effective quality assurance requires the keeping of comprehensive and accurate records. All inspections should be recorded and the results and decisions entered on pre-printed forms. Batches of material should as far as possible be identified and their progress through the manufacturing process recorded. This is very important in the case of material, chilled, frozen or canned, going into store. Automatic recording, for example of temperatures of cold stores, cookers, canning retorts, should be used as much as possible.

The records should be kept at least as long as the product is in the distribution chain, but preferably for longer so that quality, and particularly changes in quality can be reviewed as raw materials or conditions in the factory change. Nowadays with the availability of relatively cheap computing power and suitable software, a company should consider putting its records in an electronic database. Some types of measurements, for example temperatures and weights, can be continuously logged by the system and data from inspections can be keyed in directly by the quality controllers. Such a system not only permits of extensive reviews of past data, but also allows immediate statistical data processing, to support decision-making and to detect processes going out of control.

Adequate records are a requirement for proper investigation of complaints and failures in quality control. They are essential requirements for quality audits and accreditation.

9. Reviews, audits and accreditation

The quality assurance programme should be reviewed from time to time in the light of experience. Critical appraisal of data might suggest where inspection could be relaxed and where it should be tightened. Any change in the process or the introduction of new equipment or working practices will need a QACCP exercise for the new situation.

It is a useful exercise for a company to have an audit of the programme carried out by an outside expert. An outsider can sometimes see aspects of the process or quality control procedures which are missed by the company's own staff because of their familiarization with the systems. An expert can introduce ideas gained from experience in other companies and other fields. Often large customers, particularly if they buy from more than one producer, might carry out a quality audit, using their own staff or an outside consultant, before they award a contract and at intervals during the lifetime of it.

In some countries there are government or semi-government agencies who will accredit a company's programme as meeting specifications for quality assurance systems, for example the ISO 9000 series. Accreditation focuses on the management of the quality assurance system and is not a guarantee of the quality of the product. Documentation is very important in any audit. The inspector will want to see detailed written statements of the company policy towards quality and of the procedures for implementing that policy. They will also want to see how results of inspections are recorded and acted upon.

VI: THE DEVELOPING COUNTRIES

According to EEC Regulations, the EEC counterpart in (non-EEC) developing countries responsible for fish products inspection is the designated "competent national authority". This authority has the responsibility of ensuring that fish processing plants, exporting to Community countries, meet EEC quality and hygiene requirements.

Usually the "competent national authority" will be a government inspection agency but there might be exceptions to the rule in the case of a country in which the exporting fish processing plants meet the EEC requirements while the national authority has not been recognized.

For such cases, a provision has been included in the EEC Directives under Article 11.6 foreseeing direct import from approved plants when the national authority is unable to provide guarantees. Periodical EEC inspection of the plants is also foreseen.

One of the characteristics of the EEC Regulations for EEC member countries is that they apply by "equivalence" also to all non-EEC countries. In some cases a Memorandum of Understanding between an EEC and a non-EEC government might replace the registration of the national competent authority with the EEC.

In order to attain stringent quality standards for consumer protection, it is important to identify the critical control points in the flow chart of fish processing operations. The identification of critical control points is the responsibility of plant managers who are expected to discuss and agree upon them with the national competent inspection authority.

In the industrialized countries as well as the developing countries, the concept of in-plant quality control rather than end-product control, becomes more important. Therefore emphasis on process control indicates the need for an evolution of the inspection system into an advisory service during the whole process flow.

Developing countries are concerned about the level of quality assurance/inspection services in their countries compared with European services. Inspection services on the other hand, provided they ensure that inspected products meet the set criteria, do not have to be organized following a pre-established model and can even be delegated to private companies. Examples of non-EEC countries' inspection services such as Thailand, Chile, Norway can be followed. In this respect an INFOFISH report on quality control and inspection systems for fish products in INFOFISH member countries* provides useful guidelines for developing countries.

A trend towards private inspection services is already noticeable in some developing countries and reflects the limited role played by national standard institutions. Private inspection services can be on a fee-for-service basis thus self-financing and providing for their running costs. In some cases the government of a given developing country can authorize a

*INFOFISH Report No. 13 "Report on Quality Control and Inspection Systems for Fish Products in INFOFISH Member countries" prepared by Peter Howgate, INFOFISH, Kuala Lumpur, Malaysia, August 1984.

national fish processing industry. Such cases can be discussed with the EEC counterpart responsible and flexible solutions applied. Under paragraph 11.6 of the ECC Directive, a mission might be sent to a factory to assess its suitability. The national authority also bears responsibility for products caught/frozen/processed by third country ships fishing in national waters.

As EEC inspection mission teams will not be available before mid-93, the present procedure of establishing agreements with individual importing countries within the EEC will be followed.

There are not specific regulations about laboratory facilities which mainly depend on the product being exported. Factory vessels are precisely defined as manufacturing fishery products and include packaging on board.

In the eventuality of a product being stopped at the border for failure to meet EEC requirements, two consequences will arise:

(a) The importer can reject, destroy or treat the product (Directive 9675 of 10-12-90):

(b) The exporting company will have to discuss the problem with the EEC responsible counterpart. Besides, its next delivery will undergo mandatory inspection and EEC inspectors could be sent to the plant in the exporting country for control.

Consideration of the differences between national and EEC regulations for fish products export and adaptation of the national regulations to the EEC requirements involve less costs than the risk of having the exported products rejected at the EEC border. Some non-EEC countries such as Norway, have gone through the adaptation process with the contribution and support of the industry and thus has proven worthwhile.

Problems relating to rejected products can be dealt with at the individual plant basis whereby EEC import permission for products from that specific plant is withdrawn or at level of national competent authority when products from several plants of the same country fail to meet import requirements.

Examples of the cost of a national inspection agency have been shown to range from 0.3% to 0.5% of the value of the exported products, mainly to cover labour as laboratory costs are limited.

Some procedures for control of import fish products differ between the EEC and Canada. The Memorandum of Understanding is, for example, more used by Canada than by the EEC, so as the agreements for off-shore inspection programme whereby control at the border is reduced, and the Preferred Inspection Status granted to companies listed for entering Canada without many inspections.

In principle, the US apply similar regulations to Canada and the EEC. Monitoring systems for safety of imported products are being worked out. The system of registration/certification for exporting countries foresees reduced inspection for approved plants. Equivalency in consumer protection between domestic and imported products is required through a Memorandum of Understanding between US and exporting government. Two US agencies, namely the Food and Drug Administration (FDA) and the National Marine Fisheries

Service (NMFS), are responsible for inspecting the end product and assessing its compliance with the US grading system.

CONCLUSIONS

It would appear a matter of urgency that in addition to the Workshop on Quality and Hygiene Regulations in the Fisheries Industry, held in Shetland from 6 to 10 July 1992, a series of meetings of the same nature should be convened in other regions to enable participants from a larger number of developing countries to be briefed and have discussions with experts from major importing markets regarding their import regulations for fish products.

The knowledge of specific technical information would enable the authorities of each fish-exporting country to make relevant changes in some of their fish inspection and quality control procedures with a view to reaching the desired markets. The authorities would thereby be able to place the export of fish and fish products within the proper perspective.

The attendance at future workshops should include fish processors and exporters as well as relevant inspection authorities of developing countries. Any such workshop should also include, first and foremost, fish importers and inspection authorities of importing countries.

In considering the target audience to be reached, three distinct groups of developing countries, each having a different degree of complementarity vis-a-vis the EEC can be identified as follows:

Group I: South-East Asian countries

which constitute for Europe, together with Japan, the most important trade partners. The economies of these countries, being based on export-oriented policies, are particularly vulnerable to changes in Europe.

Group II: ACP countries

signatories to the Lomé Convention which have preferential EEC access for some of their exports. Both the export composition, based mainly on primary products, and the continuing use of a system of preferences favouring former colonies, could deter any diversification away from the EEC by the African countries which remain heavily dependent on its markets which represent more than 50% of their total exports.

Group III: Other countries not belonging to Group I or II

for some of which, such as the Central and Latin American countries, the EEC is a much less important market than the United States. However, to diversify their markets, these countries are trying to reduce their dependence on the US market and to increase the share of manufactured products exports to the EEC.

Parallel to the convening of the above workshops and in view of the participants concern as to their ability to adhere to importing countries' regulations, it is apparent that there is a need for further, more detailed guidelines on the upgrading of fish products inspection facilities in developing countries.

In this connection, and as immediate follow-up to the Workshop on Quality and Hygiene Regulations in the Fisheries Industry, the preparation

of a manual of recommendations aimed at providing guidelines to developing countries in this specific area will be commissioned within 1992 and be available to all developing countries, government agencies, and fisheries enterprises at the same time as the Single European Market comes into effect.

The above guidelines will, however, be applicable to import requirements not only of the EEC, but also of other major importing markets.

EXPORT QUALITY CONTROL



INTERNATIONAL TRADE CENTRE UNCTAD/GATT

No. 30

ITC

September 1991

Technical regulations for the import of marine products into Japan *

In view of the rapid increase in Japanese fish imports in recent years and the increasingly important role of imported fish in the Japanese diet, the health authorities are becoming acutely aware of the question of sanitary regulations. As a result of this, Japan has formulated specific requirements as to quality, form, shape, temperature, foreign substance, additives, antiseptic, smell, flesh conditions, bacteria count, packaging etc., which have to be met before the product will be permitted on the Japanese market. Such requirements are set forth in the Japanese Food Sanitation Laws. The following are important factors to be considered prior to exporting marine products to Japan:

1. Inspection

The consignments are usually checked for the following factors:

- (a) Whether consignments are rotten and give off a bad smell.

- (b) Whether consignments are free from foreign matter or not.

2. Grading

Sum of score points in accordance with the specified scoring standard shall average above 3 and shall not be 1.

3. Temperature

The temperature shall be below -18°C at the core of the product.

4. Net weight

The net weight of the product shall not be less than the declared (labelled) weight.

5. Packaging materials

Packaging material shall be hygienic and strong enough to protect the product from any damage by external force.

6. Labelling

Name and nature of the product should be labelled.

7. Extraneous substance

There shall be no extraneous substance either on the surface or inside the product.

8. Freshness

The product shall not be decomposed. The VN-N (volatile basic nitrogen) content shall be below 25mg/100mg.

9. Size

The size of the shrimps shall conform to the size labelled or contracted.

10. Net weight

(a) Thawing

A block of the sample is put in a bag made of water proof material such as polythene film. The bag is soaked in flowing or still potable water until each of the individual shrimp can be easily separated from the blocks.

(b) Weighing

The bag is emptied into a sieve. After draining for about 2 minutes the sieve is weighed. The temperature of the internal

This note on Export Quality Control has been prepared, without formal editing, as a service to exporters and industries in developing countries by Mr. E. Sierra, Senior Adviser on Export Quality Control, International Trade Centre UNCTAD/GATT, 54-56 rue de Montbrillant, CH-1202 Geneva, Switzerland. Tel. (4122) 7300111; cables: INTRADEN; telex: 414119 ITC-CH; fax: (4122) 733 4439. (Postal address: International Trade Centre UNCTAD/GATT, Palais des Nations, CH-1211 Geneva 10, Switzerland.)

<p>centre of the product shall be measured just before and after thawing. Shrimps are also checked for conformity to the weight.</p> <p>Examination of size assortment</p> <p>Weigh a unit of 1 lb (454 g) of shrimp taken at random from the sample and examined for:</p> <p>(a) The conformity of the number of shrimps (prawns) per lb to the contracted number.</p> <p>(b) The conformity of the weight of each of the individual shrimps (prawns) to the specifications as shown in table 1.</p> <p>Sampling and Inspection</p> <p>The inspection is conducted under the provisions of marking specification, based on samples drawn at random under specified sampling rates in proportion to the sizes of lots undergoing inspection. Any single unit of the sample shall be regarded as defective if the unit count does not exceed the count specified in the column A (passed) and there is no major defect (e.g. temperature,</p>	<p>labelling, extraneous substance and freshness) in the sample, as shown in tables 2 and 3.</p> <p>Microbiological standards and tolerance limits for marine products</p> <p>Marine products should not be contaminated with pathogenic micro organism injurious to human health.</p> <p>Microbiological standards for fresh and live products are as follows:</p> <p><i>V. cholerae</i> - should be nil</p> <p>Faecal coliform - should be nil</p> <p><i>Staphylococcus</i> - should be nil</p> <p>TPC (frozen/fresh/live marine products for raw consumption) - 100 000</p> <p>Inspection is very stringent for the above standards.</p> <p>Chemical standards and tolerance</p> <p>The presence of chemicals are not regularly checked. Whenever serious incidents in food occur, special checks start with severe standards.</p>	<p>S02 Residue: maximum limits 100 ppm</p> <p>Antibiotic residue: should be nil (especially in cultured eel)</p> <p>Boric acid: should not be used</p> <p>PCB: 0.5 ppm</p> <p>Mercury (Hg): 0.4 ppm</p> <p>Packing standards</p> <p>Packages used for fish shall comply with the standards for container packages used for general foods under the Japanese Food Sanitation Law.</p> <p>Labelling and marking standards</p> <p>Labelling regulations are more specific and detailed for certain products than others. The label must contain the date of manufacture or the date of importation as well as the location of the manufacturing plant or the name and location of the importer. Nutrients such as vitamins and amino acids contained in food, are regarded as additives when they are applied to food to enrich it. Goods should be labelled and marked according to normal commercial practice. Fishery products must have a sticker</p>
--	---	--

Table 1: size assortment of shrimps

No. of shrimps per pound	Weight of each shrimp (g)
10 or less	43 or more
11 - 15	29 - 43
16 - 20	22 - 29
21 - 25	18 - 22
26 - 30	15 - 18
31 - 35	13 - 15
36 - 40	11 - 13
41 - 50	9 - 11
51 or more	9 or less

Table 2: score table for judgement
(when weight of a unit is more than 1 kg)

Size of lot	Count of samples	Count of defective unit for judgement	
		A (passed)	B (defective)
1 - 10	All	0	1
11 - 100	10	1	2
101 - 500	15	1	2
501 - 1,000	25	2	3
1,001 - 5,000	50	4	5

Table 3: score table for judgement
(when weight of a unit is below than 1 kg)

Size of lot	Count of samples	Count of defective unit for judgement	
		A (passed)	B (defective)
35 - 1,000	35	3	4
1,000 - 5,000	50	4	5
5,000 - 10,000	75	6	7
10,000 - 20,000	110	10	11
20,000 - 50,000	150	10	11
more than 50,000	225	14	15

attached to each package after importation showing in Japanese a detailed description of contents, including artificial colourings or preservatives, name and address of importer and date of importation. Containers of canned frozen fish must be marked and labelled in metric units, even though responsibility for metric measure rests with the Japanese distributor.

Import inspection procedures

Health and Welfare (MHW) is responsible for inspecting all incoming seafood products as well as other foodstuff. This

inspection is mandatory under the Japanese Food Sanitation law.

The Japanese Food Sanitation Law stipulates that no imported food stuff is allowed to pass through customs without a written permit issued by the Food Sanitation Inspector of the MHW. Once permitted entry, the goods are treated no differently from domestic products.

Immediately upon arrival of a consignment, the importer submits the notification along with necessary documents to the Ministry of Health and Welfare through the Food

Sanitation Inspection Office at the port of entry. One of these documents is a declaration of the name of synthetic chemical compounds contained as preservatives or colouring agent in the food. The Inspector then decides whether or not to conduct sampling inspection. Less than about 10 percent of the incoming food products are inspected for freshness, various types of bacteria including intestinal types and Salmonella, whole-someness, food additives etc. If the inspection is passed, the permission for importation is granted and the consignment is allowed to proceed to customs.

Although the MHW inspection is mandatory, voluntary inspection by the Japan Frozen Foods Inspection Corporation or the Japan Canned Food Inspection Corporation are also performed upon request by the importer.

Certification requirements

All consignments accompanied by health certificates from Government Agencies certifying that the products are free from *Vibrio cholera*, deleterious chemicals, fish poison etc. are easily allowed through quarantine. Such health certificates also lead to easy customs clearances.

* The author of this article, Mr. V.D. Ramamurthy, is Joint Director of Marine Products Export Development Authority (MPEDA), Government of India. This article, which was published in INFOFISH International (FAO) No. 2/90, is also partly based on the ITC publication "Shrimps: a survey of the world market" (ITC, Geneva, 1983).

Note: Additional information on fish and fishery products' standards and quality control regulations in selected markets may be obtained from:

INFOFISH

P.O. Box 10899
50728 Kuala Lumpur, Malaysia
Tel: 291 4466
Tlx: INFISH MA 31560
Fax: (603) 291 6804

Regional Offices

Latin America, Caribbean
INFOPECA,
Apartado 6-4894, Estafeta
El Dorado, Panama R P
Tel: 693477
Tlx: 2582 INFPECA PG

Africa

INFOPECHE
Fax: (507)64-6589
BP 1747
Abidjan 01, Cote d'Ivoire
Tel: (225)323198
Tlx: 22989 INFOPE CI
Fax: (225)328054

Arab countries

INFOSAMAK
P.O. Box 26629
Manama, Bahrain
Tel: 727693
Tlx: INFSAK7716BN
Fax: (973)7727587

The Marine Products Export
Development Authority of
India (MPEDA)
MPEDA House,
Panampilli Avenue
P.B. No. 1663
Cochin - 682 015, India
Tel: 351979
Tlx: (0885)6648/6288
Fax: 91-484-353361

COUNCIL DIRECTIVE

of 22 July 1991

laying down the health conditions for the production and the placing on the market of fishery products

(91/493/EEC)

THE COUNCIL OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Economic Community, and in particular Article 43 thereof,

Having regard to the proposals from the Commission ⁽¹⁾,

Having regard to the opinions of the European Parliament ⁽²⁾,

Having regard to the opinions of the Economic and Social Committee ⁽³⁾,

Whereas, with a view to achieving the internal market and more especially to ensuring the smooth operation of the common organization of the market in fishery products established by Regulation (EEC) No 3796/81 ⁽⁴⁾, as last amended by Regulation (EEC) No 2886/89 ⁽⁵⁾, it is essential that the marketing of fish and fish products should no longer be hindered by disparities existing in the Member States in respect of health requirements; whereas this will enable production and placing on the market to be better harmonized and bring about competition on equal terms, whilst ensuring quality products for the consumer;

Whereas the European Parliament in its legislative resolution of 17 March 1989 ⁽⁶⁾ requested the Commission to come forward with comprehensive proposals on the hygienic production and placing on the market of fishery products, including solutions for the problem of nematodes;

Whereas fishery products freshly caught are in principle free of contamination with micro-organisms; whereas however contamination and subsequent decomposition may occur when handled and treated unhygienically;

Whereas therefore the essential requirements should be laid down for the correct hygienic handling of fresh and processed fishery products at all stages of production and during storage and transport;

- ⁽¹⁾ OJ No C 66, 11. 3. 1988, p. 2;
OJ No C 282, 8. 11. 1989, p. 7 and OJ No C 84, 2. 4. 1990, p. 56.
- ⁽²⁾ OJ No C 96, 17. 4. 1989, p. 29 and OJ No C 183, 15. 7. 1991.
- ⁽³⁾ OJ No C 134, 24. 5. 1988, p. 31 and OJ No C 332, 31. 12. 1990, p. 59.
- ⁽⁴⁾ OJ No L 379, 31. 12. 1981, p. 1.
- ⁽⁵⁾ OJ No L 282, 2. 10. 1989, p. 1.
- ⁽⁶⁾ OJ No C 96, 17. 4. 1989, p. 199.

Whereas it is appropriate to apply by analogy certain marketing standards which are laid down pursuant to Article 2 of Regulation (EEC) No 3796/81, in order to fix the health quality of these products;

Whereas it is the responsibility primarily of the fisheries industry to ensure that fishery products meet the health requirements laid down in this Directive;

Whereas the competent authorities of the Member States must, by carrying out checks and inspections, ensure that producers and manufacturers comply with the said requirements;

Whereas Community control measures should be introduced to guarantee the uniform application in all Member States of the standards laid down in this Directive;

Whereas, in order to ensure the smooth operation of the internal market, the measures should apply in an identical manner to trade within the Member States and to trade between the Member States;

Whereas in the context of intra-Community trade, the rules laid down in Council Directive 89/662/EEC of 11 December 1989 concerning veterinary checks in intra-Community trade with a view to the completion of the internal market ⁽⁷⁾ as amended by Directive 90/675/EEC ⁽⁸⁾ apply to fishery products;

Whereas fishery products from third countries intended to be placed on the market of the Community must not qualify for more favourable arrangements than those applied in the Community; whereas provision should therefore be made for a Community procedure for the inspection in third countries of the conditions of production and placing on the market in order to permit the application of a common import system based on conditions of equivalence;

Whereas the products in question are subject to the rules concerning checks and to safeguard measures covered by Council Directive 90/675/EEC of 10 December 1990 laying down the principles governing the organization of veterinary checks on products entering the Community from third countries;

Whereas, so that account may be taken of particular circumstances, derogations should be granted to some establishments already operating before 1 January 1993 so as to allow them to adapt to all the requirements laid down in this Directive;

- ⁽⁷⁾ OJ No L 395, 30. 12. 1989, p. 13.
- ⁽⁸⁾ OJ No L 373, 31. 12. 1990, p. 1.

Whereas the Commission should be entrusted with the task of adopting certain measures for implementing this Directive; whereas, to that end, procedures should be laid down introducing close and effective cooperation between the Commission and the Member States within the Standing Veterinary Committee;

Whereas the essential requirements laid down in this Directive may need further specification,

HAS ADOPTED THIS DIRECTIVE

CHAPTER I

General provisions

Article 1

This Directive lays down the health conditions for the production and the placing on the market of fishery products for human consumption.

Article 2

For the purposes of this Directive, the following definitions shall apply:

1. *'fishery products'* means all seawater or freshwater animals or parts thereof, including their roes, excluding aquatic mammals, frogs and aquatic animals covered by other Community acts;
2. *'aquaculture products'* means all fishery products born and raised in controlled conditions until placed on the market as a foodstuff. However seawater or freshwater fish or crustaceans caught in their natural environment when juvenile and kept until they reach the desired commercial size for human consumption are also considered to be aquaculture products. Fish and crustaceans of commercial size caught in their natural environment and kept alive to be sold at a later date are not considered to be aquaculture products if they are merely kept alive without any attempt being made to increase their size or weight;
3. *'chilling'* means the process of cooling fishery products to a temperature approaching that of melting ice;
4. *'fresh products'* means any fishery product whether whole or prepared, including products packaged under vacuum or in a modified atmosphere, which have not undergone any treatment to ensure preservation other than chilling;
5. *'prepared products'* means any fishery product which has undergone an operation affecting its anatomical wholeness, such as gutting, heading, slicing, filleting, chopping, etc.;
6. *'processed products'* means any fishery product which has undergone a chemical or physical process such as the heating, smoking, salting, dehydration or marinating, etc., of chilled or frozen products, whether or not associated with other foodstuffs, or a combination of these various processes;
7. *'preserve'* means the process whereby products are packaged in hermetically sealed containers and subjected to heat treatment to the extent that any micro-organisms that might proliferate are destroyed or inactivated, irrespective of the temperature at which the product is to be stored;
8. *'frozen products'* means any fishery product which has undergone a freezing process to reach a core temperature of -18°C or lower after temperature stabilization;
9. *'packaging'* means the procedure of protecting fishery products by a wrapper, a container or any other suitable device;
10. *'batch'* means the quantity of fishery products obtained under practically identical circumstances;
11. *'consignment'* means the quantity of fishery products bound for one or more customers in the country of destination and conveyed by one means of transport only;
12. *'means of transport'* means those parts set aside for goods in automobile vehicles, rail vehicles and aircraft, the holds of vessels, and containers for transport by land, sea or air;
13. *'competent authority'* means the central authority of a Member State competent to carry out veterinary checks or any authority to which it has delegated that competence;
14. *'establishment'* means any premises where fishery products are prepared, processed, chilled, frozen, packaged or stored. Auction and wholesale markets in which only display and sale by wholesale takes place are not deemed to be establishments;
15. *'placing on the market'* means the holding or displaying for sale, offering for sale, selling, delivering or any other form of placing on the market in the Community, excluding retail sales and direct transfers on local markets of small quantities by fishermen to retailers or consumers, which must be subject to the health checks laid down by national rules for checking the retail trade;
16. *'importation'* means the introduction into the territory of the Community of fishery products from third countries;

17. 'clean seawater' means seawater or briny water which is free from microbiological contamination, harmful substances and/or toxic marine plankton in such quantities as may affect the health quality of fishery products and which is used under the conditions laid down in this Directive;
18. 'factory vessel' means any vessel on which fishery products undergo one or more of the following operations followed by packaging: filleting, slicing, skinning, mincing, freezing or processing.

The following are not deemed to be 'factory vessels':

- fishing vessels in which only shrimps and molluscs are cooked on board;
- fishing vessels on board which only freezing is carried out.

Article 3

1. The placing on the market of fishery products caught in their natural environment shall be subject to the following conditions:

(a) they must have:

- (i) been caught and where appropriate handled for bleeding, heading, gutting and the removal of fins, chilled or frozen, on board vessels in accordance with hygiene rules to be established by the Council acting by a qualified majority on a proposal from the Commission. The Commission shall submit proposals to that effect before 1 October 1992;
- (ii) where appropriate, been handled in factory vessels approved in accordance with Article 7, and in accordance with the requirements of Chapter I of the Annex.

The cooking of shrimps and molluscs on board must comply with the provisions of Chapter III, section I(5), or Chapter IV, section IV(7), of the Annex. Such vessels shall be specifically registered by the competent authorities;

- (b) during and after landing they must have been handled in accordance with Chapter II of the Annex;
- (c) they must have been handled and, where appropriate, packaged, prepared, processed, frozen, defrosted or stored hygienically in establishments approved in accordance with Article 7, in compliance with the requirements of Chapters III and IV of the Annex.

The competent authority may, notwithstanding Chapter II, section 2 of the Annex, authorize the transfer of fishery products *ex quay* into containers for immediate delivery to an approved establishment or registered auction or wholesale market to be checked there;

- (d) they must have undergone a health check in accordance with Chapter V of the Annex;
- (e) they must have been appropriately packaged in accordance with Chapter VI of the Annex;
- (f) they must have been given an identification mark in accordance with Chapter VII of the Annex;
- (g) they must have been stored and transported under satisfactory conditions of hygiene, in accordance with Chapter VIII of the Annex.

2. Where gutting is possible from a technical and commercial viewpoint, it must be carried out as quickly as possible after the products have been caught or landed.

3. The placing on the market of aquaculture products shall be subject to the following conditions:

- (a) they must have been slaughtered under appropriate conditions of hygiene. They must not be soiled with earth, slime or faeces. If not processed immediately after having been slaughtered, they must be kept chilled;
- (b) they must, in addition, comply with the requirements laid down under 1 (c) to (g).

4. (a) The placing on the market of live bivalve molluscs shall be subject to the requirements laid down in Council Directive 91/492/EEC of 15 July 1991 laying down the health conditions for the production and the placing on the market of live bivalve molluscs⁽¹⁾.

- (b) When processed, bivalve molluscs must, in addition to the requirements in point (a), satisfy those of paragraph 1 (c) to (g).

Article 4

Fishery products to be placed on the market alive shall at all times be kept under the most suitable survival conditions.

Article 5

The placing on the market of the following products shall be forbidden:

- poisonous fish of the following families: *Tetraodontidae*, *Moridae*, *Diodontidae*, *Canthigasteridae*,
- fishery products containing biotoxins such as ciguatera toxins or muscle-paralysing toxins.

Detailed requirements concerning the species covered by this Article and concerning methods of analysis shall be laid down in accordance with the procedure prescribed in Article 15.

⁽¹⁾ See page 1 of this Official Journal.

Article 6

1. Member States shall ensure that persons responsible for establishment take all necessary measures, so that, at all stages of the production of fishery products, the specifications of this Directive are complied with.

To that end, the said persons responsible must carry out their own checks based on the following principles;

- identification of critical points in their establishment on the basis of the manufacturing processes used;
- establishment and implementation of methods for monitoring and checking such critical points;
- taking samples for analysis in an approved laboratory by the competent authority for the purpose of checking cleaning and disinfection methods and for the purpose of checking compliance with the standards established by this Directive;
- keeping a written record or a record registered in an indelible fashion of the preceding points with a view to submitting them to the competent authority. The results of the different checks and tests will in particular be kept for a period of at least two years.

2. If the results of own checks or any information at the disposal of the persons responsible referred to in paragraph 1 reveal the risk of a health risk or suggest one might exist and without prejudice to the measures laid down in the fourth subparagraph of Article 3 (1) of Directive 89/662/EEC, the appropriate measures shall be taken, under official supervision.

3. Rules for the application of the second subparagraph of paragraph 1 shall be established in accordance with the procedure laid down in Article 15.

Article 7

1. The competent authorities shall approve establishments once they have verified that these establishments meet the requirements of this Directive, with regard to the nature of the activities they carry out. The approval must be renewed if an establishment decides to carry out activities other than those for which it has received approval.

The competent authorities shall take the necessary measures if the requirements cease to be met. To this end, they shall take particular account of the conclusions of any check carried out in accordance with Article 8.

The competent authority shall register those auction and wholesale markets which are not subject to approval after verifying that such installations comply with the provisions of this Directive.

2. However, subject to the express condition that products coming from factory-vessels and establishments,

and auction and wholesale markets meet the hygiene standards set by this Directive, Member States may, for the requirements relating to equipment and structures laid down in Chapters I to IV to the Annex, grant to factory-vessels and establishments, auction and wholesale markets a further period expiring on 31 December 1995 within which to comply with the conditions of approval set out in Chapter IX. Such derogations may be granted only to factory-vessels and establishments, auction and wholesale markets, already operating on 31 December 1991, which have, before 1 July 1992, submitted a duly justified application for derogation to the competent national authority. This application must be accompanied by a work plan and programme indicating the period within which it would be possible for them to comply with the requirements in question. Where financial assistance is requested from the Community, only requests in respect of projects complying with the requirements of this Directive can be accepted.

3. The competent authorities shall draw up a list of their approved establishments, each of which shall have an official number.

Each Member State shall notify the Commission of its list of approved establishments and of any subsequent amendment thereof. The Commission shall forward this information to the other Member States.

4. The inspection and monitoring of establishments shall be carried out regularly under the responsibility of the competent authority, which shall at all times have free access to all parts of establishments, in order to ensure compliance with the requirements of this Directive.

If such inspections and monitoring reveal that the requirements of this Directive are not being met, the competent authority shall take appropriate action.

5. Paragraphs 1, 3 and 4 shall also apply in respect of factory vessels.

6. Paragraphs 3 and 4 shall also apply to wholesale and auction markets.

Article 8

1. Experts from the Commission may, in cooperation with the competent authorities of the Member States, make on-the-spot checks insofar as this is necessary to ensure the uniform application of this Directive. They may in particular verify whether establishments are in effect complying with the requirements of this Directive. A Member State in whose territory a check is being carried out shall give all necessary assistance to the experts in carrying out their duties. The Commission shall inform the Member States of the results of the investigations.

2. The arrangements for implementing paragraph 1 shall be adopted in accordance with the procedure laid down in Article 15.

Article 9

1. The rules laid down in Directive 89/662/EEC, as regards fishery products intended for human consumption, shall apply, in particular as regards the organization of and the action to be taken following the inspections to be carried out by the Member States of destination, and the protective measures to be implemented.

2. Directive 89/662/EEC shall be amended as follows:

(a) in Annex A the following indent shall be added:

— Council Directive 91/493/EEC of 22 July 1991 laying down the health conditions for the production and placing on the market of fishery products (OJ No L 268, 24. 9. 1991, p. 15);

(b) In Annex B the following indent shall be deleted:

— fishery products intended for human consumption.

CHAPTER II

Imports from third countries

Article 10

Provisions applied to imports of fishery products from third countries shall be at least equivalent to those governing the production and placing on the market of Community products.

Fishery products caught in their natural environment by a fishing vessel flying the flag of a third country must undergo the checks laid down in Article 18 (3) of Directive 90/675/EEC.

Article 11

1. For each third country or group of third countries, fishery products must fulfil the specific import conditions fixed in accordance with the procedure laid down in Article 15, depending on the health situation in the third country concerned.

2. In order to allow the import conditions to be fixed, and in order to verify the conditions of production, storage and dispatch of fishery products for consignment to the Community, inspections may be carried out on the spot by experts from the Commission and the Member States.

The experts of the Member States who are to be entrusted with these inspections shall be appointed by the Commission acting on a proposal from the Member States.

These inspections shall be made on behalf of the Community, which shall bear any expenditure incurred.

The frequency of and procedure for these inspections shall be determined in accordance with the procedure laid down in Article 15.

3. When fixing the import conditions of fishery products referred to in paragraph 1, particular account shall be taken of:

- (a) the legislation of the third country;
- (b) the organization of the competent authority of the third country and of its inspection services, the powers of such services and the supervision to which they are subject, as well as their facilities for effectively verifying the implementation of their legislation in force;
- (c) the actual health conditions during the production, storage and dispatch of fishery products intended for the Community;
- (d) the assurances which a third country can give on the compliance with the standards laid down in Chapter V of the Annex.

4. The import conditions referred to in paragraph 1 shall include:

- (a) the procedure for obtaining a health certificate which must accompany consignments when forwarded to the Community;
- (b) the placing of a mark identifying the fishery products, in particular with the approval number of the establishment of origin, except in the case of frozen fishery products, landed immediately for canning and bearing the certificate provided for under (a);
- (c) drawing up a list of approved establishments and auction or wholesale markets registered and approved by the Commission in accordance with the procedure laid down in Article 15;

For that purpose, one or more lists of such establishments shall draw up on the basis of a communication from the competent authorities of the third country to the Commission. An establishment may not appear on a list unless it is officially approved by the competent authority of the third country exporting to the Community. Such approval shall be subject to observance of the following requirements:

- compliance with requirements equivalent to those laid down in this Directive,
- monitoring by an official inspection service of the third country.

5. The conditions referred to in paragraph 4 (a) and (b) may be modified in accordance with the procedure laid down in Article 15.

The list referred to in paragraph 4 (c) may be amended by the Commission, in accordance with the rules established by Commission Decision 90/13/EEC⁽¹⁾.

6. To deal with specific situations and in accordance with the procedure laid down in Article 15, imports may be authorized direct from an establishment or factory vessel of a third country where the latter is unable to provide the guarantees laid down in paragraph 3, provided that the establishment or factory vessel in question has received special approval following an inspection carried out in accordance with paragraph (2). The authorization decision shall fix the specific import conditions to be followed for products coming from that establishment or factory vessel.

7. Pending the fixing of the import conditions referred to in paragraph 1, the Member States shall ensure that the conditions applied to imports of fishery products from third countries shall be at least equivalent to those governing the production and placing on the market of Community products.

Article 12

1. The rules and principles laid down by Directive 90/675/EEC shall apply, notably as regards the organization of and follow up to the inspections to be carried out by the Member States.

2. Without prejudice to compliance with the rules and principles referred to in paragraph 1 of this Article and pending implementation of the decisions provided for in Article 8 (3) and Article 30 of Directive 90/675/EEC, and in Article 11 of this Directive the relevant national rules for applying Article 8 (1) and (2) of the said Directive shall continue to apply.

CHAPTER III

Final provisions

Article 13

The Annexes shall be amended by the Council, acting by a qualified majority on a proposal from the Commission.

Article 14

The Commission, after consulting the Member States, shall by 1 July 1992 submit a report to the Council concerning the minimum structural and equipment requirements to be met by small establishments which distribute on the local market and are situated in regions subject to particular supply constraints, together with any proposals, on which the

⁽¹⁾ OJ No L 8, 11. 1. 1990, p. 70.

Council, acting under the voting procedure laid down in Article 43 of the Treaty, shall act before 31 December 1992.

Article 15

1. Where the procedure laid down in this Article is to be followed, the Chairman shall refer the matter to the Standing Veterinary Committee set up by Decision 68/361/EEC⁽²⁾ hereafter referred to as the Committee, either on his own initiative or at the request of a Member State.

2. The representative of the Commission shall submit to the committee a draft of the measures to be taken. The committee shall deliver its opinion on the draft within a time limit which the chairman may lay down according to the urgency of the matter. The opinion shall be delivered by the majority laid down in Article 148 (2) of the Treaty in the case of decisions which the Council is required to adopt on a proposal from the Commission. The votes of the representatives of the Member States within the committee shall be weighted in the manner set out in that Article. The chairman shall not vote.

3. (a) The Commission shall adopt the measures envisaged if they are in accordance with the opinion of the committee.

(b) If the measures envisaged are not in accordance with the opinion of the committee, or if no opinion is delivered, the Commission shall, without delay, submit to the Council a proposal relating to the measures to be taken. The Council shall act by a qualified majority.

If, on the expiry of a period of three months from the date of referral to the Council, the Council has not acted, the proposed measures shall be adopted by the Commission, save where the Council has decided against the said measures by a simple majority.

Article 16

In order to take into account the possible failure to take a decision on the detailed rules for applying this Directive by 1 January 1993, necessary transitional measures may be adopted in accordance with the procedure laid down in Article 15 for a period of two years.

Article 17

The provisions of this Directive shall be re-examined before 1 January 1998 by the Council, acting on proposals from the Commission, on the basis of experience gained.

⁽²⁾ OJ No L 255, 18. 10. 1968, p. 23.

Article 18

The Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive before 1 January 1993. They shall notify the Commission thereof.

When Member States adopt these measures, they shall contain a reference to this Directive or shall be accompanied by such reference on the occasion of their official publication. The methods of making such a reference shall be laid down by the Member States.

Article 19

This Directive is addressed to the Member States.

Done at Brussels, 22 July 1991.

For the Council
The President
P. DANKERT

ANNEX

CHAPTER I

CONDITIONS APPLICABLE TO FACTORY VESSELS

1. Conditions concerning design and equipment

1. The minimum requirements for factory vessels are as follows:

- (a) a reception area set aside for taking fishery products on board, designed and arranged into pounds or pens that are large enough to allow each successive catch to be separated. The reception area and its movable parts must be easy to clean. It must be designed in such a way as to protect the products from the sun or the elements and from any source of dirt or contamination;
- (b) a system for conveying fishery products from the reception area to the work area that conforms with rules of hygiene;
- (c) work areas that are large enough for the preparation and processing of fishery products in proper conditions of hygiene. They must be designed and arranged in such a way as to prevent any contamination of the products;
- (d) storage areas for the finished products that are large enough and designed so that they are easy to clean. If a waste processing unit operates on board, a separate hold must be designated for the storage of these by-products;
- (e) a place for storing packaging materials that is separate from the product preparation and processing areas;
- (f) special equipment for pumping waste or fishery products that are unfit for human consumption either directly into the sea or, where circumstances so require, into a watertight tank reserved for that purpose. If waste is stored and processed on board with a view to cleaning, separate areas must be allocated for that purpose;
- (g) equipment providing a supply of potable water within the meaning of Council Directive 80/778/EEC of 15 July 1980 relating to the quality of water intended for human consumption ⁽¹⁾ or pressurized clean seawater. The seawater intake must be situated in a position where it is not possible for the water being taken in to be affected by discharges into the sea of waste water, waste and engine coolant outlets;
- (h) a suitable number of changing rooms, wash basins and toilets, the latter not opening directly onto areas where fishery products are prepared, processed or stored. The wash basins must be equipped with appliances for washing and drying the hands that comply with hygiene requirements; the wash-basin taps must not be hand-operable.

2. Areas used for the preparation and processing or freezing/quick-freezing of fishery products must have:

- (a) a non-slip floor that is also easy to clean and disinfect and equipped for easy drainage of water. Structures and fixtures must have lumber holds that are large enough not to be obstructed by fish waste and to allow water to drain freely;
- (b) walls and ceilings that are easy to clean, particularly where there are pipes, chains or electricity conduits;
- (c) the hydraulic circuits must be arranged or protected in such a way as to ensure that it is not possible for any leakage of oil to contaminate fishery products;
- (d) adequate ventilation and, where necessary, proper vapour extraction;
- (e) adequate lighting;
- (f) appliances for cleaning and disinfecting tools, equipment and fittings;
- (g) appliances for cleaning and disinfecting the hands with taps that are not hand-operable and with single use towels.

⁽¹⁾ OJ No L 229, 30. 9.1980, p. 11. Directive last amended by the 1985 Act of Accession (OJ No L 302, 15. 11. 1985, p. 218).

3. Equipment and tools such as cutting benches, containers, conveyors, gutting or filleting machines, etc., must be resistant to seawater corrosion, easy to clean and disinfect and well-maintained.
4. Factory vessels which freeze fishery products must have:
 - (a) a refrigeration plant sufficiently powerful to lower the temperature rapidly so as to achieve a core temperature that complies with the specifications of this Directive;
 - (b) refrigeration plants sufficiently powerful to keep fishery products in the storage holds at a temperature that complies with the specifications of this Directive. The storage holds must be equipped with a temperature recording system placed so that it can easily be consulted.

II. Conditions of hygiene relating to on-board handling and storage of fishery products

1. A qualified person on board the factory vessel must be responsible for applying good fishery products manufacturing practices. That person shall have the authority to ensure that the provisions of this Directive are applied and shall make available to inspectors the programme for inspecting and checking critical points as applied on board, a register containing that person's comments and the temperature recordings that may be required.
2. The general conditions of hygiene applicable to areas and equipment shall be those laid down in Chapter III, section II (A), of this Annex.
3. The general conditions of hygiene applicable to staff shall be those laid down in Chapter III, section II (B), of this Annex.
4. Heading, gutting and filleting must be carried out under the conditions of hygiene laid down in Chapter IV, section I (2), (3) and (4) of this Annex.
5. On-board processing of fishery products must be carried out under the conditions of hygiene laid down in Chapter IV, sections III, IV and V of this Annex.
6. Fishery products must be wrapped and packaged under the conditions of hygiene laid down in Chapter VI of this Annex.
7. On-board storage of fishery products must be carried out under the conditions of hygiene laid down in Chapter VIII, points 1 and 2, of this Annex.

CHAPTER II

REQUIREMENTS DURING AND AFTER LANDING

1. Unloading and landing equipment must be constructed of material which is easy to clean and disinfect and must be kept in a good state of repair and cleanliness.
2. During unloading and landing, contamination of fishery products must be avoided. It must in particular be ensured that:
 - unloading and landing operations proceed rapidly;
 - fishery products are placed without unnecessary delay in a protected environment at the temperature required on the basis of the nature of the product and, where necessary, in ice in transport, storage or market facilities, or in an establishment;
 - equipment and handling practices that cause unnecessary damage to the edible parts of the fishery products are not authorized.
3. Parts of auction or wholesale markets where fishery products are displayed for sale must:
 - (a) be covered and have walls which are easy to clean;
 - (b) have waterproof flooring which is easy to wash and disinfect and laid in such a way as to facilitate the drainage of water and have a hygienic waste water disposal system;

- (c) be equipped with sanitary facilities with an appropriate number of wash basins and flush lavatories. Wash basins shall be supplied with materials for cleaning the hands and single use hand towels;
 - (d) be well lit to facilitate the inspection of fishery products provided for in Chapter V of this Annex;
 - (e) when they are used for display or storage of fishery products, not be used for other purposes; vehicles emitting exhaust fumes which may impair the quality of the fishery products not be admitted to markets; undesirable animals must not be admitted;
 - (f) be cleaned regularly and at least after each sale; crates must, after each sale, be cleaned and rinsed inside and outside with drinking water or clean seawater; where required, they must be disinfected;
 - (g) have displayed in a prominent position signs prohibiting smoking, spitting, eating and drinking;
 - (h) be closeable and be kept closed when the competent authority considers it necessary;
 - (i) have facilities to provide adequate water supplies satisfying the conditions laid down in Chapter III, section I, point 7 of this Annex;
 - (j) have special watertight receptacles made of corrosion-resistant materials for fishery products which are unfit for human consumption;
 - (k) insofar as they do not have their own premises on-the-spot or in the immediate vicinity on the basis of the quantities displayed for sale, have, for the purposes of the competent authority, an adequately equipped lockable room and the equipment necessary for carrying out inspections.
4. After landing or, where appropriate, after first sale, fishery products must be transported without delay, under the conditions laid down in Chapter VIII, of this Annex, to their place of destination.
 5. However, if the conditions laid down in point 4 are not fulfilled, the markets in which fishery products may be stored before being displayed for sale or after being sold and pending transport to their place of destination must have sufficiently large cold rooms which satisfy the conditions laid down in Chapter III, section I, point 3 of this Annex. In such cases, fishery products must be stored at a temperature approaching that of melting ice.
 6. The general conditions of hygiene laid down in Chapter III, section II — with the exception of point B 1(a) — of this Annex shall apply *mutatis mutandis* to the markets in which fishery products are displayed for sale or stored.
 7. The wholesale markets in which fishery products are displayed for sale or stored shall be subject to the same conditions as those laid down in points 3 and 5 of this Chapter and to those set out in points 4, 10 and 11 of Chapter III, section I of this Annex.

The general conditions of hygiene laid down in Chapter III, section II of this Annex shall apply *mutatis mutandis* to wholesale markets.

CHAPTER III

GENERAL CONDITIONS FOR ESTABLISHMENTS ON LAND

I. General conditions relating to premises and equipment

Establishment shall afford at least the following facilities:

1. working areas of sufficient size for work to be carried out under adequate hygienic conditions. Their design and layout shall be such as to preclude contamination of the product and keep quite separate the clean and contaminated parts of the building;
2. in areas where products are handled, prepared and processed:
 - (a) waterproof flooring which is easy to clean and disinfect and laid down in such a way as to facilitate the drainage of the water or provided with equipment to remove water;

- (b) walls which have smooth surfaces and are easy to clean, durable and impermeable;
 - (c) ceilings or roof linings which are easy to clean;
 - (d) doors in durable materials which are easy to clean;
 - (e) adequate ventilation and, where necessary, good steam and water-vapour extraction facilities;
 - (f) adequate natural or artificial lighting;
 - (g) an adequate number of facilities for cleaning and disinfecting hands. In work rooms and lavatories taps must not be hand-operable. These facilities must be provided with single use hand towels;
 - (h) facilities for cleaning plant, equipment and utensils;
3. in cold rooms where fishery products are stored:
 - the provisions set out under point 2 (a), (b), (c), (d) and (f);
 - where necessary, a sufficiently powerful refrigeration plant to keep products at temperatures prescribed in this Directive;
 4. appropriate facilities for protection against pests such as insects, rodents, birds, etc.;
 5. instruments and working equipment such as cutting tables, containers, conveyor belts and knives made of corrosion-resistant materials, easy to clean and disinfect;
 6. special watertight, corrosion-resistant containers for fishery products not intended for human consumption and premises for the storage of such containers if they are not emptied at least at the end of each working day;
 7. facilities to provide adequate supplies of drinking water within the meaning of Directive 80/778/EEC, or alternatively of clean seawater or seawater treated by an appropriate system, under pressure and in sufficient quantity. However, by way of exception, a supply of non-drinking water is permissible for the production of steam, fire-fighting and the cooling of refrigeration equipment, provided that the pipes installed for the purpose preclude the use of such water for other purposes and present no risk of contamination of the products. Non-drinking-water pipes must be clearly distinguished from those used for drinking water or clean seawater;
 8. hygienic waste water disposal system;
 9. an adequate number of changing-rooms with smooth, water-proof, washable walls and floors, wash basins and flush lavatories. The latter may not open directly onto the work rooms. The wash basins must have materials for cleaning the hands and disposable towels; the wash basin taps must not be hand-operable;
 10. if the volume of products treated requires regular or permanent presence an adequately equipped lockable room for the exclusive use of the inspection service;
 11. adequate facilities for cleaning and disinfecting means of transport. However, such facilities are not compulsory if there is a requirement for the means of transport to be cleaned and disinfected at facilities officially authorized by the competent authority;
 12. establishments keeping live animals such as crustaceans and fish must have appropriate fittings ensuring the best survival conditions provided with water of a quality such that no harmful organisms or substances are transferred to the animals.

II. General conditions of hygiene

A. General conditions of hygiene applicable to premises and equipment

1. Floors, walls and partitions, ceilings or roof linings, equipment and instruments used for working on fishery products must be kept in a satisfactory state of cleanliness and repair, so that they do not constitute a source of contamination for the products.
2. Rodents, insects and any other vermin must be systematically exterminated in the premises or on the equipment; rodenticides, insecticides, disinfectants and any other potentially toxic substances must be stored in premises or cupboards which can be locked; their use must not present any risk of contamination of the products.

3. Working areas, instruments and working equipment must be used only for work on fishery products. However, following authorization by the competent authority they may be used at the same time or other times for work on other foodstuffs.
4. Drinking water, within the meaning of Directive 80/778/EEC, or clean seawater must be used for all purposes. However, by way of an exception, non-drinking water may be used for steam production, fire-fighting and the cooling of refrigeration equipment, provided that the pipes installed for the purpose preclude the use of such water for other purposes and present no risk of contamination of the products.
5. Detergents, disinfectants and similar substances must be approved by the competent authority and used in such a way that they do not have adverse effects on the machinery, equipment and products.

B. General conditions of hygiene applicable to staff

1. The highest possible standard of cleanliness is required of staff. More specifically:
 - (a) staff must wear suitable clean working clothes and headgear which completely encloses the hair. This applies particularly to persons handling exposed fishery products;
 - (b) staff assigned to the handling and preparation of fishery products must be required to wash their hand at least each time work is resumed; wounds to the hands must be covered by a waterproof dressing;
 - (c) smoking, spitting, eating and drinking in work and storage premises of fishery products must be prohibited.
2. The employer shall take all the requisite measures to prevent persons liable to contaminate fishery products from working on and handling them, until there is evidence that such persons can do so without risk.

When recruited, any person working on and handling fishery products shall be required to prove, by a medical certificate, that there is no impediment to such employment. The medical supervision of such a person shall be governed by the national legislation in force in the Member State concerned or in the case of third countries by specific guarantees to be fixed under the procedure set out in Article 15.

CHAPTER IV

SPECIAL CONDITIONS FOR HANDLING FISHERY PRODUCTS ON SHORE

1. Conditions for fresh products

1. Where chilled, unpackaged products are not dispatched, prepared or processed immediately after reaching the establishment, they must be stored or displayed under ice in the establishment's cold room. R-icing must be carried out as often as is necessary; the ice used, with or without salt, must be made from drinking water or clean seawater and be stored under hygienic conditions in receptacles provided for the purpose; such receptacles must be kept clean and in a good state of repair. Prepacked fresh products must be chilled with ice or mechanical refrigeration plants creating similar temperature conditions.
2. If they are not carried out on board, operations such as heading and gutting must be carried out hygienically. The products must be washed thoroughly with drinking water or clean seawater immediately after such operations.
3. Operations such as filleting and slicing must be carried out in such a way as to avoid the contamination or spoilage of fillets and slices, and in a place other than that used for heading and gutting operations. Fillets and slices must not remain on work tables any longer than is necessary for their preparation. Fillets and slices to be sold fresh must be chilled as quickly as possible after preparation.
4. Guts and parts that may constitute a danger to public health must be separated from and removed from the vicinity of products intended for human consumption.
5. Containers used for the dispatch or storage of fresh fishery products must be designed in such a way as to ensure both their protection from contamination and their preservation under sufficiently hygienic conditions and, more particularly, they must provide adequate drainage of melt water.

6. Unless special facilities are provided for the continuous disposal of waste, the latter must be placed in leakproof, covered containers which are easy to clean and disinfect. Waste must not be allowed to accumulate in working areas. It must be removed either continuously or as soon as the containers are full and at least at the end of each working day in the containers or to the premises referred to in Chapter III, section I, paragraph 6 of this Annex. The containers, receptacles and/or premises set aside for waste must always be thoroughly cleaned and, if appropriate, disinfected after use. Waste stored there must not constitute a source of contamination for the establishment or of pollution of its surroundings.

II. Conditions for frozen products

1. Plants must have:

- (a) freezing equipment sufficiently powerful to achieve a rapid reduction in the temperature so that the temperatures laid down in this Directive can be obtained in the product;
- (b) freezing equipment sufficiently powerful to keep products in storage rooms at a temperature not exceeding those laid down in this Directive, whatever the ambient temperature may be.

However, for technical reasons related to the method of freezing and to the handling of such products, for whole fish frozen in brine and intended for canning, higher temperatures than those laid down in this Directive are acceptable although they may not exceed -9°C .

2. Fresh products to be frozen or quick-frozen must comply with the requirements of section I of this Chapter.
3. Storage rooms must have a temperature recording device in a place where it can easily be read. The temperature sensor of the recorder must be located in the area furthest away from the cold source, i.e. where the temperature in the storage room is the highest.

Temperature charts must be available for inspection by the supervisory authorities at least during the period in which the products are stored.

III. Conditions for thawing products

Establishments that carry out thawing operations must comply with the following requirements:

1. fishery products must be thawed under hygienic conditions; their contamination must be avoided and there must be adequate drainage for any melt water produced.

During thawing, the temperature of the products must not increase excessively;

2. after thawing, fishery products must be handled in accordance with the requirements of this Directive. When they are prepared or processed, these operations must be carried out without delay. If they are put directly onto the market, particulars as to the thawed state of the fish must be clearly marked on the packaging in accordance with Article 5 (3) of Council Directive 79/112/EEC of 18 December 1978 on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs⁽¹⁾.

IV. Conditions for processed products

1. Fresh, frozen and thawed products used for processing must comply with the requirements of sections I or II of this Chapter.
2. Where the processing treatment is carried out to inhibit the development of pathogenic micro-organisms, or if it is a significant factor in the preservation of the product, the treatment must be scientifically recognized by the law in force, or in the case of a treatment of products referred to in Chapter I Section 1 (b) and (c) of Directive 91/492/EEC which have not been relayed or purified, such treatment must be approved, in accordance with the procedure laid down in Article 15 of this Directive, within four months of receipt of a request from a Member State.

The person responsible for an establishment must keep a register of the processing carried out. Depending on the type of process employed, heating time and temperature, salt content, pH, water content, etc., must be monitored and controlled. Records must be kept at least for the expected storage life of the products and be available to the competent authority.

⁽¹⁾ OJ No L 33, 8. 2. 1979, p. 1. Directive last amended by Directive 91/72/EEC (OJ No L 42, 16. 1. 1991, p. 22).

3. For products which are preserved for a limited period by a treatment such as salting, smoking, drying or marinating, the appropriate conditions for storage must be clearly marked on the packaging, in accordance with Directive 79/112/EEC.

In addition, the following conditions shall be complied with.

4. Canning

In the case of fishery products which have been subjected to sterilization in hermetically sealed containers:

- (a) the water used for the preparation of cans must be drinking water;
- (b) the process used for the heat treatment must be appropriate, having regard to such major criteria as the heating time, temperature, filling, size of containers, etc., a record of which must be kept; the heat treatment must be capable of destroying or inactivating pathogenic organisms and the spores of pathogenic micro-organisms. The heating equipment must be fitted with devices for verifying whether the containers have in fact undergone appropriate heat treatment. Drinking water must be used to cool containers after heat treatment, without prejudice to the presence of any chemical additives used in accordance with good technological practice to prevent corrosion of the equipment and containers;
- (c) further checks must be carried out at random by the manufacturer to ensure that the processed products have undergone appropriate heat treatment, *viz.*:

— incubation tests: incubation must be carried out at 37 °C for seven days or at 35 °C for ten days, or at any other equivalent combination;

— microbiological examination of contents and containers in the establishment's laboratory or in another approved laboratory;

- (d) samples must be taken of production each day at predetermined intervals, to ensure the efficacy of sealing. For that purpose, appropriate equipment must be available for the examination of cross-sections of the can-stems;

- (e) checks are carried out in order to ensure that containers are not damaged;

(f) all containers which have undergone heat treatment under practically identical conditions must be given a batch identification mark, in accordance with Council Directive 89/396/EEC of 14 June 1989 on indications or marks identifying the lot to which a foodstuff belongs⁽¹⁾.

5. Smoking

Smoking must be carried out in separate premises or a special place equipped, if necessary, with a ventilation system to prevent the smoke and heat from the combustion from affecting other premises or places where fishery products are prepared, processed or stored.

- (a) Materials used to produce smoke for the smoking of fish must be stored away from the place of smoking and must be used in such a way that they do not contaminate the products.
- (b) Materials used to produce smoke by burning wood that has been painted, varnished, glued or has undergone any chemical preservation treatment must be prohibited.
- (c) After smoking, products must be cooled rapidly to the temperature required for their preservation before being packaged.

6. Salting

- (a) Salting operations must take place in different premises and sufficiently removed from the premises where the other operations are carried out.
- (b) Salt used in the treatment of fishery products must be clean and stored in such a way as to preclude contamination. It must not be re-used.
- (c) Any container used for salting or brining must be constructed in such a way as to preclude contamination during the salting or brining process.
- (d) Containers or areas used for salting or brining must be cleaned before use.

⁽¹⁾ OJ No L 186, 30. 6. 1989, p. 21.

7. Cooked crustacean and molluscan shellfish products

Crustaceans and molluscan shellfish must be cooked as follows:

- (a) any cooking must be followed by rapid cooling. Water used for this purpose must be drinking water or clean seawater. If no other method of preservation is used, cooling must continue until the temperature approaching that of melting ice is reached;
- (b) shelling or shucking must be carried out under hygienic conditions avoiding the contamination of the product. Where such operations are done by hand, workers must pay particular attention to the washing of their hands and all working surfaces must be cleaned thoroughly. If machines are used, they must be cleaned at frequent intervals and disinfected after each working day.

After shelling or shucking, cooked products must immediately be frozen or kept chilled at a temperature which will preclude the growth of pathogens, and be stored in appropriate premises;

- (c) every manufacturer must carry out micro-biological checks on his production at regular intervals, complying with the standards to be fixed in accordance with *Chapt V*, Section 4 of this Annex.

8. Mechanically recovered fish flesh

The mechanical recovery of fish flesh must be carried out under the following conditions:

- (a) mechanical recovery of gutted fish must take place without undue delay after filleting, using raw materials free of guts. Where whole fish are used, they must be gutted and washed beforehand;
- (b) the machinery must be cleaned at frequent intervals and at least every two hours;
- (c) after recovery, mechanically recovered flesh must be frozen as quickly as possible or incorporated in a product intended for freezing or stabilizing treatment.

V. Conditions concerning parasites

- 1. During production and before they are released for human consumption, fish and fish products must be subject to a visual inspection for the purpose of detecting and removing any parasites that are visible.

Fish or parts of fish which are obviously infected with parasites, and which are removed, must not be placed on the market for human consumption.

The detailed rules for this inspection shall be adopted in accordance with the procedure laid down in Article 15 of this Directive, on a proposal from the Commission to be submitted before 1 October 1992.

- 2. The fish and fish products referred to in point 3 which are to be consumed as they are must, in addition, be subjected to freezing at a temperature of not more than $-20\text{ }^{\circ}\text{C}$ in all parts of the product for not less than 24 hours. Products subjected to this freezing process must be either raw or finished.
- 3. Fish and products subject to the conditions in point 2:
 - (a) fish to be consumed raw or almost raw, e.g. raw herring 'maatje';
 - (b) the following species, if they are to undergo a cold smoking process at which the internal temperature of the fish is less than $60\text{ }^{\circ}\text{C}$:
 - herring,
 - mackerel,
 - sprat,
 - (wild) Atlantic and Pacific salmon;
 - (c) maturated and/or salted herring where this process is insufficient to destroy the larvae of nematodes.

This list may be amended, in the light of scientific data, in accordance with the procedure laid down in Article 15 of this Directive. In accordance with the same procedure, criteria will be laid down which must enable the processes which are deemed sufficient or insufficient to destroy nematodes to be defined.

4. *Manufacturers must ensure that fish and fish products listed in point 3 or the raw materials for use in their manufacture are subjected to the treatment described in point 2, prior to their release for consumption.*
5. *The fishery products listed in point 3 must, when they are placed on the market, be accompanied by a document from the manufacturer stating the type of process they have undergone.*

CHAPTER V

HEALTH CONTROL AND MONITORING OF PRODUCTION CONDITIONS

I. General monitoring

Arrangements for checking and monitoring must be made by the competent authorities in order to establish whether the requirements laid down in this Directive are complied with.

Such arrangements will include, in particular:

1. a check on the fishing vessels, on the understanding that such a check may be carried out during the stay in port;
2. a check on the conditions of landing and first sale;
3. an inspection at regular intervals of establishments to check, in particular:
 - (a) whether the conditions for approval are still fulfilled;
 - (b) whether the fishery products are handled correctly;
 - (c) the cleanliness of the premises, facilities and instruments and staff hygiene;
 - (d) whether identification marks are put on correctly;
4. an inspection of the wholesale and auction markets;
5. a check on storage and transport conditions.

II. Special checks

1. Organoleptic checks

Without prejudice to the derogations provided for by Council Regulation (EEC) No 103/76 of 19 January 1976 laying down common marketing standards for certain fresh or chilled fish⁽¹⁾, each batch of fishery products must be submitted for inspection by the competent authority at the time of landing or before first sale to check whether they are fit for human consumption. This inspection comprises an organoleptic check carried out by sampling.

Fishery products complying, as far as the freshness criteria are concerned, with the common marketing standards already laid down pursuant to Article 2 of Regulation (EEC) No 3796/81 are considered to fulfil the organoleptic requirements necessary for compliance with the provisions of this Directive.

The Commission may, where necessary, in accordance with the procedure referred to in Article 15 of this Directive, lay down specific organoleptic requirements for fishery products not harmonized under Regulation (EEC) No 3796/81.

The organoleptic examination must be repeated after the first sale of fishery products, if it is found that the requirements of this Directive have not been complied with or when considered necessary. After the first sale, fishery products must at least comply with the minimum freshness requirements of the aforementioned Regulation.

If the organoleptic examination reveals that the fishery products are not fit for human consumption, measures must be taken to withdraw them from the market and denature in such a way that they cannot be re-used for human consumption.

If the organoleptic examination reveals any doubt as to the freshness of the fishery products, use may be made of chemical checks or microbiological analyses.

2. Parasite checks

Before they are released for human consumption, fish and fish products must be subject to a visual inspection, by way of sample, for the purpose of detecting any parasites that are visible.

⁽¹⁾ OJ No L 20, 28. 1. 1976, p. 29. Regulation last amended by Regulation (EEC) No 33/89 (OJ No L 5, 7. 1. 1989, p. 18).

Fish or parts of fish which are obviously infested with parasites, and which are removed, must not be placed on the market for human consumption.

The detailed rules for this inspection shall be established in accordance with the procedure laid down in Article 15.

3. Chemicals checks

A. Samples must be taken and subjected to laboratory analysis for the control of the following parameters:

(a) TVB-N (Total Volatile Basic Nitrogen) and TMA-N (Trimethylamine-Nitrogen)

The levels of these parameters must be specified for each category of species in accordance with the procedure laid down in Article 15 of this Directive.

(b) Histamine

Nine samples must be taken from each batch. These must fulfil the following requirements:

- the mean value must not exceed 100 ppm;
- two samples may have a value of more than 100 ppm but less than 200 ppm;
- no sample may have a value exceeding 200 ppm.

These limits apply only to fish species of the following families: Scombridae and Clupeidae. However, fish belonging to these families which have undergone enzyme ripening treatment in brine may have higher histamine levels but not more than twice the above values. Examinations must be carried out in accordance with reliable, scientifically recognized methods, such as high-performance liquid chromatography (HPLC).

B. Contaminants present in the aquatic environment

Without prejudice to the Community rules concerning water protection and management, and in particular those concerning pollution of the aquatic environment, fishery products must not contain in their edible parts contaminants present in the aquatic environment such as heavy metals and organochlorinated substances at such a level that the calculated dietary intake exceeds the acceptable daily or weekly intake for humans.

A monitoring system must be established by the Member States to check the level of contamination of fishery products.

C. In accordance with the procedure laid down in Article 15 of this Directive, the following shall be decided on by not later than 31 December 1992:

- (a) the methods of analysis to be used to check the chemical parameters, as well as the sampling plans;
- (b) the acceptable levels for the chemical parameters.

4. Microbiological analyses

In accordance with the procedure laid down in Article 15 of this Directive, microbiological criteria, including sampling plans and methods of analysis, may be laid down when there is a need to protect public health. The Commission will to this end submit appropriate proposals for measures by 1 October 1992.

CHAPTER VI

PACKAGING

1. Packaging must be carried out under satisfactory conditions of hygiene, to preclude contamination of the fishery products.
2. Packaging materials and products liable to enter into contact with fishery products must comply with all the rules of hygiene, and in particular:
 - they must not be such as to impair the organoleptic characteristics of the fishery products;
 - they must not be capable of transmitting to the fishery products substances harmful to human health;
 - they must be strong enough to protect the fishery products adequately.

3. With the exception of certain containers made of impervious, smooth and corrosion-resistant material which are easy to clean and disinfect, which may be re-used after cleaning and disinfecting, packaging materials may not be re-used. Packaging materials used for fresh products held under ice must provide adequate drainage for melt water.
4. Unused packaging materials must be stored in premises away from the production area and be protected from dust and contamination.

CHAPTER VII

IDENTIFICATION MARKS

Without prejudice to the requirements laid down in Directive 79/112/EEC, it must be possible to trace for inspection purposes the establishment of dispatch of consignments of fishery products, by means of either labelling or the accompanying documents. For that purpose, the following information must appear on the packaging or in the accompanying documents:

- the country of dispatch;
- identification of the establishment by its official approval number or, in the case of separate registering of auction or wholesale markets as laid down in Article 7 (1), third subparagraph of this Directive, the registration number of the auction or wholesale market.

CHAPTER VIII

STORAGE AND TRANSPORT

1. Fishery products must, during storage and transport, be kept at the temperatures laid down in this Directive and in particular:
 - fresh or thawed fishery products and cooked and chilled crustacean and molluscan shellfish products must be kept at the temperature of melting ice;
 - frozen fishery products, with the exception of frozen fish in brine intended for the manufacture of canned foods, must be kept at an even temperature of -18°C or less in all parts of the product, allowing for the possibility of brief upward fluctuations of not more than 3°C , during transport;
 - processed products must be kept at the temperatures specified by the manufacturer, when the circumstances so require, prescribed in accordance with the procedure laid down in Article 15 of this Directive.
2. Where frozen fishery products are transported from a cold-storage plant to an approved establishment to be thawed on arrival for the purposes of preparation and/or processing and where the distance to be covered is short, not exceeding 50 km or one hour's journey, the competent authority may grant a derogation from the conditions laid down in point 1, second indent.
3. Products may not be stored or transported with other products which may contaminate them or affect their hygiene, unless they are packaged in such a way as to provide satisfactory protection.
4. Vehicles used for the transport of fishery products must be constructed and equipped in such a way that the temperatures laid down in this Directive can be maintained throughout the period of transport. If ice is used to chill the products, adequate drainage must be provided in order to ensure that water from melted ice does not stay in contact with the products. The inside surfaces of the means of transport must be finished in such a way that they do not adversely affect the fishery products. They must be smooth and easy to clean and disinfect.
5. Means of transport used for fishery products may not be used for transporting other products likely to impair or contaminate fishery products, except where the fishery products can be guaranteed uncontaminated as a result of such transport being thoroughly cleaned and disinfected.

6. Fishery products may not be transported in a vehicle or container which is not clean or which should have been disinfected.
7. The transport conditions of fishery products to be placed on the market alive must not adversely affect the products.

CHAPTER IX

POINTS OF ANNEX I WHICH MAY BE SUBJECT TO DEROGATIONS AND POSSIBLE CONDITIONS
APPLICABLE IN THE CASE OF DEROGATIONS

Re Chapter I Part I of the Annex

1. *Point 1 (a)*
provided products are sheltered from the sun and the elements and from any source of dirt or contamination.
2. *Point 1 (c)*
provided any contamination of the products is prevented.
3. *Point 1 (d), first sentence*
provided the finished products are stored on board at the required temperature.
4. *Point 1 (g), last sentence*
provided products cannot be contaminated by waste water, waste or engine coolant.
5. *Point 1 (h)*
provided staff handling fishery products can wash their hands after using the toilet.
6. *Point 2 (a)*
provided floors are properly cleaned and disinfected.
7. *Point 2 (b), (c) and (d)*
8. *Point 2 (g) on taps and towels*
9. *Point 3*
provided equipment and tools are well maintained.

Re Chapter II of the Annex

10. *Point 3 (a)*
provided the walls are kept clean.
11. *Point 3 (b)*
provided the flooring is kept clean after every sale.
12. *Point 3 (c), first sentence*
13. *Point 3 (e): vehicles emitting exhaust fumes*
provided products contaminated by exhaust fumes are withdrawn from the market.
14. *Point 3 (j)*
provided that products which are not fit for human consumption cannot contaminate or be mixed with fishery products.

15. *Point 3 (k)*

16. *Point 7*

insofar as it refers to point 3 of the same Chapter and point 10 of Chapter III, section I.

Re Chapter III Part I of the Annex

17. *Point 1*

provided finished products cannot be contaminated by raw materials or waste.

18. *Point 2 (a)*

provided the flooring is cleaned and disinfected accordingly.

19. *Point 2 (b)*

provided the walls are kept clean.

20. *Point 2 (c)*

provided the ceiling is not a source of contamination.

21. *Point 2 (d)*

22. *Point 2 (e)*

provided products cannot be spoilt or contaminated by the steam.

23. *Point 2 (g)*

provided there are facilities available for staff to wash their hands.

24. *Point 3*

25. *Point 5*

insofar as it relates to corrosion-resistant materials provided instruments and working equipment are kept clean.

26. *Point 6*

provided products cannot be contaminated by waste or leakage therefrom.

27. *Point 10*

Re Chapter IV of the Annex

28. *Part I, point 1*

in respect of the requirement for products being held over to be put in the establishment's cold room provided the products are re-iced as often as necessary during a period not in excess of 12 hours or that a nearby cold room not belonging to the establishment can be used.

29. *Part I, point 6*

in respect of the requirement for waste to be put in leakproof covered containers provided products cannot be contaminated by waste or leakage therefrom.

30. *Part IV, points 5, first paragraph*

provided that every precaution is taken to prevent fishery products that are being prepared or stored from being affected by the smoke.

31. *Part IV, point 6 (a)*

provided fishery products that are being prepared or stored are not affected by salting operations.

ANNEX III

LIST OF PARTICIPANTS

Bangladesh

A.K.M. Shamsul Huda, Executive Director, Shrimp and Fish Processing Plant Ltd., Jahan Bldg. No. 1, 23, Agrabad Commercial Area, Chittagong

Muhammad Muzaffar Hussain, Director, Purchase and Marketing, Bangladesh Fisheries Development Corporation, 24-25, Dilkusha Commercial Area, Motijheel, Dhaka-1000

China

Li Xiao Chuan, Vice-Director, National Centre for Quality Supervision and Test of Aquatic Products, 106, Nanjing Road, Qingdao 266071

Denmark

Andreas Villadsen, MATCON Consulting Engineers and Planners Ltd., Generatorvej 45, DK-2730 Herlev

Guinea-Bissau

Adulai Djaló, Technologist of Food Industry, Centro de Investigaçao e Tecnologia Aplicada, Ministerio dos Recursos Naturais e Industria, Bissau

Guyana

Jennifer Vanessa Bentick, Guyana National Bureau of Standards, 77 W^h Hadfield Street, Georgetown

India

K. Vasagan, Techno-Commercial Executive in Seafood, Tata Exports Ltd., Block A, Shivsagar Estate, Dr. Annie Besant Road, Worli, Bombay 400 018

Indonesia

Rossu Hutabarat, Director of Operation, Usaha Mina, Pt (Persero), Indonesian Government Fishery Enterprise, Jalan Raya 16, Jakarta Pusat 10430

Italy

David B. Thomson, Istituto Culturale Italiano, P.O. Box 91, 63039 San Benedetto del Tronto

Maldives

Hamid Ahmed, Production Assistant Manager, Fisheries Projects Implementation Department, H. Meenaz, Malé 20-06

Mozambique

Luisa Arthur, Secretary of State of Fisheries, Departamento de Inspeccao do Pescado, Secretaria de Estado das Pescas, P.O. Box 1723, Maputo

Saint Lucia

Horace D. Walters, Chief Fisheries Officer, Department of Fisheries, Ministry of Agriculture, Lands, Forestry and Fisheries, Sans Souci, Castries

Senegal

Ndiaga Gueye, Chief, Industrial Fisheries Division, Direction de l'Océanographie et des Pêches Maritimes, 1, rue Joris, B.P. 289, Dakar

Shetland

E. Barclay, Shetland Smoked Salmon Ltd., Browns Road, Lerwick ZE1 OND

J. Burgess, Chief Executive, Shetland Fish Processors Association, 63b Gilbertson Road, Lerwick ZE1 OHN

Magnus Flaws, Chairman, Shetland Islands Council's Development Committee, 93 St. Olaf Street, Lerwick ZE1 OES

Charles Alexander Goodlad, Director, Saga Seafoods Ltd., Trondra ZE1 OXL

John Goodlad, Chief Executive, Shetland Fishermen's Association, Alexandra Buildings, Lerwick ZE1 OLL

Jim Henry, Fisheries Development Officer, Development Department, 93 St. Olaf Street, Lerwick ZE1 OES

W. Henry, Saga Seafoods Ltd., Browns Road, Lerwick ZE1 OND

Bobby McLeod, Shetland Catch, Gremista, Lerwick ZE1 OPX

James Moncrieff, Chief Executive, Shetland Salmon Farmers Association, 18 Alexandra Buildings, Lerwick ZE1 OLL

Robert Sinclair MNI, Principal, North Atlantic Fisheries College, Port Arthur, Scalloway ZE1 OTQ

Sierra Leone

Naib B. Iscandari, Deputy Director of Fisheries, Ministry of Agriculture, Forestry and Fisheries, Fisheries Division, Youyi Building, Freetown

Thailand

Montri Klitsaneephaiboon, Chief, Fish Inspection and Quality Control Unit, Fishery Technological Development Division (FTDD), Department of Fisheries, Chareonkrung Rd. 64, Yanawa, Bangkok 10120

Thailand (continued)

Jonathan Craig Ashcroft, Kingfisher Holdings Ltd., 7(a) The Broadway,
Highams Park, London EL1 9LQ

Wichien Chantayasakorn, Chaivaree Marine Products Co. Ltd., 29/1
Ekachai Rd., Nadee, Amphur Muaeng, Samutsakhon

Patrathip Vacharakomolphan, Chief of Commodity Standards Section,
Office of the National Codex Alimentarius Committee, Thai Industrial
Standards Institute, Ministry of Industry, Rama VI St., Bangkok 10400

Lecturers

Henri Belveze, Administrateur Principal, Service de la Législation,
Direction-Générale de l'Agriculture, Commission des Communautés
Européennes, 200, rue de la Loi, 1049 Brussels, Belgium

Charles Alexander Goodlad, Director, Saga Seafoods Ltd.,
Trondra ZE1 OXL, Shetland, United Kingdom

Peter F. Howgate, FAO Consultant, 3 Kirk Brae, Cults,
Aberdeen AB1 9SR, Scotland, United Kingdom

Bjorn Rothe Knudtsen, Chief of District, Quality and Inspections
Control Service, Norwegian Directorate of Fisheries, Strandgaten 229,
P.O. Box 185, 5002 Bergen, Norway

Brian Smith, Senior Inspector, Shetland Seafood Quality Control,
North Atlantic Fisheries College, Port Arthur, Scalloway ZE1 0TQ

INFORMATION ON THE NORTH ATLANTIC FISHERIES COLLEGE

Port Arthur, Scalloway, Shetland

NORTH ATLANTIC FISHERIES COLLEGE

SHETLAND FISHERIES TRAINING CENTRE TRUST

COURSES CURRENTLY ON OFFER

Vocational Aquaculture Training - 1 year

Fish Biology - 1 day

Farming Other Species - 2 days

Shellfish Farming - 1 day

Environmental Aspects of Aquaculture - 2 days

Aquaculture Science - 3 days

Fish Health - 2 days

COSHH Health and Safety - 1 day

REHIS Food Hygiene - 1 day

Basic Sea Survival - 1 day

Vocational Fish Catching - 1 year (including college training and work placement)

Class I Fishing Certificate of Competency - 15 weeks (for skippers of all vessels worldwide)

Class II Fishing Certificate of Competency - 16 weeks (for mates/skippers on vessels less than 24.4m operating in home waters)

Fisheries Simulation Training (to customers requirements)

Class II Engineering - 1 week

Basic Diesel Engine Maintenance - 2 weeks

Basic Welding - 2 days (ATB approved)

Forklift Truck (Operator) - 3 days (ATB approved)

Basic First Aid - 1 day

First Aid at Sea - 2 days

Part IV Diving: First Aid - 2 day

Quality Control in Fisheries Production

(In addition, courses in the above subjects can be tailored to suit individual clients requirements.)

General Introduction

Shetland has a long history of expertise in traditional fishing and now supplies 30% of the UK's farmed salmon. The islands occupy a strategic geographic position in the rich fishing grounds of the North Atlantic and has always welcomed cosmopolitan visitors.

The North Atlantic Fisheries College will be completed in early 1992 and aims to provide high quality validated training (DOT, SCOTVEC etc.) in all aspects of fish catching, processing and aquaculture. The repertoire of courses will cover technical and vocational professional certificates and supervision and bench space can be offered for higher level graduate/postgraduate projects.

This £6 million industry-led

Aquaculture

From its beginnings in 1982, salmon farming in Shetland has grown rapidly. Currently 64 companies produce 8,000 tonnes — 30% of the UK production.

Shetland's coasts provide an ideal growing environment — plenty of clean water with constant salinity and temperature. The industry is supported by local hatcheries and manufacturers of ancillary equipment. Fish farming is now an integral part of Shetland life providing an important source of revenue and equipment.

The College offers first class training for both fish farm workers and managers. Its YT new entrants scheme will provide trainees with a sound understanding of the principles of aquaculture including biology; water

Fish Processing

Included in the college is a spacious purpose-built fish processing plant for training and experimentation in a full range of techniques applicable to demersal and pelagic species, as well as salmon and shellfish. A well-equipped laboratory, designed for training and applied research and development in the processing sector is attached to it.

Modular courses will be offered, to cover filleting, freezing, packing, salting, smoking, marinating, etc. To supplement existing SCOTVEC modules used in fish processing training, modules are being developed specifically to meet the training demands of salmon processors.

In line with the very high standard of quality control at present observed

establishment offers up to date training keeping abreast with advancing technology. A range of sophisticated facilities includes purpose designed workshops in Marine Engineering & Gear Technology; Radar & Fish Simulation; and well equipped laboratories for the chemical, bacteriological and histological investigations necessary for disease diagnosis, quality control and research and development.

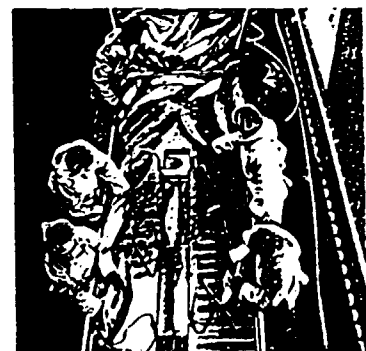
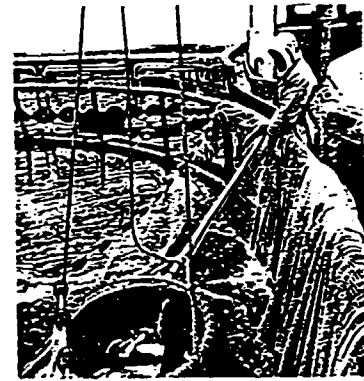
As well as the benefits of getting away from the crowds, traffic and pollution of the city environment, Shetland can offer a unique "quality of life" experience coupled with excellent sports and leisure facilities and first class training in a primary industry. The NAFC is highly tuned to environmental and conservation issues, and conferences can be catered for with accommodation being arranged through local landlords.

chemistry; cage technology; health; nutrition; on-growing and hatchery operations. Associated skills, such as boat handling, safety and survival, and welding, will also be covered.

Specialist courses will be run to fit in with the demands of the industry. Projected topics include fish biology, farming of other species, disease diagnosis and treatment, etc. Since the NAFC is fostering links with Universities, it is anticipated that exemption from the first year of specific University courses will be an option for those students wishing to go on for a higher degree.

throughout the Shetland fishing industry, particularly in processing, the college will lay emphasis in its training programme on the maintenance of safe hygienic practices at work and on the prevention of potential environmental damage from processing activities.

As well as longer periods of training, for example for YT, shorter courses of one or two days duration will be provided in response to the ongoing demands of the industry and to the requirements of government and EC legislation.



Nautical Studies

Course Details:

Courses offered will include the following Deck Officer Certificates of Competency.

(Fishing Vessel) Class 1
 (Fishing Vessel) Class 2
 (Fishing Vessel) Class 3
 First Aid at Sea Certificate
 Navigation Control (Fishing) Certificate
 Electronic Navigation Systems (Fishing) Certificate
 Restricted Radiotelephony Certificate
 Basic Sea Survival Course Certificate
 Fishermen's Safety Training
 Small Vessels Navigation & Radar Training

Marine Engineering

Recent legislative requirements in the field of marine engineering for fishing boats means that the industry is in a state of changing and tightening legal requirements.

The college will be capable of running courses for the full range of engineering certificates required by fishing boat engineers.

To cover the "hands on" practical side of engineering the college will have a number of engines, alternators, refrigeration and hydraulics along with typical working piping systems and a welding shop.

DTp approved courses are under preparation at the moment, for both

Automatic Radar Plotting Aids (ARPA)

Facilities:

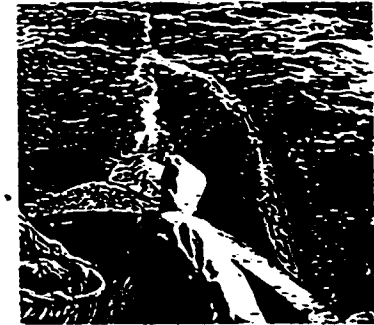
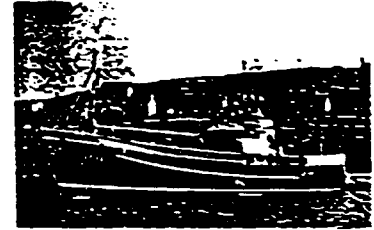
Navigation and Fishing Simulators.

Radar, Decca, Loran, DF and Satellite Navigation.

Seamanship Workshops.

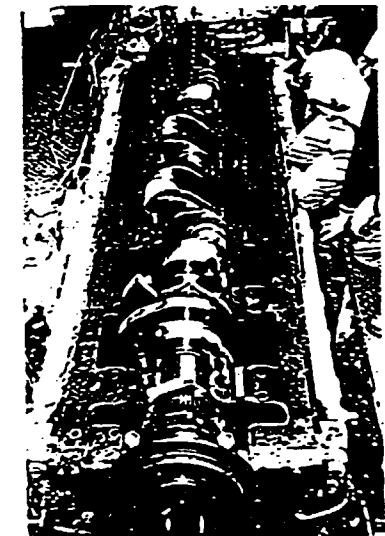
Entry Requirements:

Candidates for certificates of competency must be not less than 19 years of age and have had certain minimum seagoing experience. Candidates will have to take a sight test examination. It is therefore desirable that before embarking upon a sea career in a deck capacity, every person in their own interest, undergo a thorough examination of his sight by an ophthalmologist.



practising engineers and pre-sea entrants. These will ensure a reduction in sea time requirements of up to nine months, for the participating student.

The Shetland fishing industry abounds in sea and shore-based technical expertise, and plans are well forward to formalise the present ad-hoc links, and make this expertise and experience more available to the fishing boat engineer.



ANNEX V

FACTORIES VISITED DURING THE WORKSHOP ON
QUALITY AND HYGIENE REGULATIONS IN THE FISHERIES INDUSTRY

ROBERT McLEOD
SHETLAND CATCH - Gremista, Lerwick, Shetland
Tel: +44 595 5740
Fax: +44 595 5761

Pelagic fish processing plant processing herring and mackerel
Capacity 20,000 tons p.a.
No. dr. personnel - seasonal up to 150
Product source - fresh from Shetland waters
Main markets - UK, EEC, Japan, Africa

Wm HENRY
SAGA SEAFOODS - Brown's Road, Lerwick, Shetland
Tel: +44 595 4444
Fax: +44 595 4672

Salmon packing plant handling 2,000 tons p.a. of salmon from
Shetland salmon farmers
Preparing and packing for export to EEC, USA
30 employees

EDWARD BARCLAY
SHETLAND SMOKED SALMON LTD - Browns Road, Lerwick, Shetland

Salmon filleting, smoking and packing for export internationally
Production 500 tons p.a.
Employees c. 30
Export to EEC, Singapore, Indonesia

ANNEX VI

BIBLIOGRAPHY

1. TECHNOLOGY OF FISH PROCESSING, HANDLING AND STORAGE

- Aitken, A., Mackie, I.M., Merritt, J.H. & Windsor, M.L. (1982). Fish Handling & Processing. HMSO, Edinburgh, Scotland, UK
- Brox, J., Kristiansen, M., Myrseth, A. & Aasheim, P.W. (1984). Planning and engineering data 4. Containers for Fish Handling. Fisheries Circular No. 773. FAO, Rome, Italy
- Coackley, N. & Karnicki, Z.S. (1985). Construction of on-board insulated fish containers for pirogues. FAO Fisheries Circular No. 775. FAO, Rome, Italy.
- Eddie, G.C. (1983). Road Transport of Fish and Fishery Products. Fisheries Technical Paper No. 232. FAO, Rome, Italy.
- FAO (1988). Small-scale fish landing and marketing facilities. Fisheries Technical Paper No. 291. FAO, Rome, Italy.
- FAO (1982). Proceedings of the FAO expert consultation on fish technology in Africa. Casablanca, Morocco, 7-11 June 1982. FAO Fisheries Report 268 Suppl. FAO, Rome, Italy.
- FAO (1981). The Prevention of Losses in Cured Fish. Fisheries Technical Paper No. 219. FAO, Rome, Italy.
- FAO (1977). Freezing in Fisheries. Fisheries Technical Paper No. 167. FAO, Rome, Italy.
- FAO (1970). Smoke Curing of Fish. Fisheries Report No. 88. FAO, Rome, Italy.
- FAO (1975). Ice in Fisheries. Fisheries Reports No, 59, Rev 1. FAO, Rome, Italy.
- Graham, J. (1984). Planning and Engineering Data 3. Fish Freezing. Fisheries Circular No. 771. FAO, Rome, Italy.
- Huss, H.H. (1988). Fresh Fish - Quality and quality changes. A training manual prepared for the FAO/DANIDA training programme on fish technology and quality control. FAO, Rome, Italy.
- James, D. (1983). The production and storage of dried fish. Proceedings of the workshop on the production and storage of dried fish. Universiti Pertanian Malaysia, Serdang, Malaysia, 2-5 November 1982. FAO Fisheries Report 279 Suppl. FAO, Rome, Italy.
- Lima dos Santos, C.A.M., James, D. & Teutscher, F. (1984). Guidelines for Chilled Fish Storage Experiments. Fisheries Technical Paper No. 210. FAO, Rome, Italy.
- Morrissey M.T. 1988. Post Harvest Fishery Losses. Proceedings of an international workshop, 12-16 April 1987, University of Rhode Island, Kingston, USA. International Centre for Marine Resource Development, The University of Rhode Island, Kingston, RI, USA.

Myers, M. (1981). Planning and Engineering Data. 1. Fresh Fish Handling. Fisheries Circular No. 375. FAO, Rome, Italy.

Myersth, A. (1985). Planning and Engineering Data 2. Fish Canning. Fisheries Circular No. 784. FAO, Rome, Italy.

Reilly, A. & Barile, L.E. (1986). Cured Fish Production in the Tropics. Proceedings of a Workshop on the production of cured fish. University of the Philippines in the Visayas, 14-25 April, 1986. College of Fisheries, University of the Philippines in the Visayas, Philippines.

Rogers J.F. Cole R.C. Smith J.D. (1975). An Illustrated Guide to Fish Preparation. G83. Ministry of Overseas Development, Tropical Products Institute, 56/62 Gray's Inn Road, London.

Sikorski, Z.E. (1989). Seafood: Resources, Nutritional Composition, and Preservation. CRC Press, Inc., Florida, USA.

Tropical Products Institute. (1977). Proceedings of the Conference on the handling, processing and marketing of tropical fish, London 5-9 July, 1976. Tropical Products Institute, 65/62 Gray's Inn Road, London, England.

Walker, D.J. (1987). A Review of the Use of Contact Insecticides to Control Post-Harvest Insect Infestation of Fish and Fish Products. Fisheries Circular No. 804. FAO, Rome, Italy.

Warne, D. (1988). Manual on fish canning. FAO Fisheries Technical Paper 285. FAO, Rome, Italy

Waterman, J.J. (1976). The Production of Dried Fish. Fisheries Technical Paper No. 160. FAO, Rome, Italy.

2. FISH SAFETY, HYGIENE AND SANITATION

Ahmed, F. E., ed. (1991). Seafood Safety. Committee on evaluation of the safety of fishery products. National Academy Press, Washington, D.C., USA.

Anon (1975). Microbiological specifications for foods. Report of a joint FAO/WHO expert consultation held in Geneva, 7-11 April 1975. FAO, Rome, Italy

Anon (1977). Microbiological Specifications for Foods. Report of the second joint FAO/WHO expert consultation held in Geneva, 21 February - 2 March 1977. FAO, Rome, Italy.

Anon. (1985). An evaluation of the role of Microbiological criteria for foods and food ingredients. Subcommittee on microbiological criteria, Committee on food protection, Food and Nutrition Board, National Research Council. National Academy Press, Washington, D.C., USA.

Blackwood, C.M. (1978). Water in Fish Processing Plants. Fisheries Technical Paper No. 174. FAO, Rome, Italy.

FAO (1989). Food safety regulations applied to fish by the major importing countries. FAO Fisheries Circular no. 825. FAO, Rome, Italy

Huss, H. H. (1991). Public health aspects of seafood consumption. INFOFISH International, 3/91, 27-32.

Pan, Bonnie Sun & James, D. (1985). Histamine in marine products: production by bacteria, measurement and prediction of formation. FAO Fisheries Technical Paper 252. FAO, Rome, Italy.

3. FISH INSPECTION, HACCP AND QUALITY ASSURANCE

Anon. (1987). Cleaning and sanitizing of plant and equipment in the seafood industry. Australian Standard AS 2995-1987. Standards Association of Australia, North Sydney, Australia.

Bryan, F. L. (1992). Hazard Analysis Critical Control Point Evaluations. A Guide to Identifying Hazards and Assessing Risks Associated with Food Preparation and Storage. WHO, Geneva.

Connell, J.J. (1990). Control of Fish Quality. Fishing News Books Ltd, Blackwell Scientific Publications, Oxford, England.

FAO (1982). Reference manual to codes of practice for fish and fishery products. FAO Fisheries Circular no. 750. FAO, Rome, Italy.

FAO/WHO (1976). Guidelines for Developing an Effective National Food Control System. FAO Food Control Series No. 1. FAO, Rome, Italy.

Goulding, I. (1988). A code of recommended practices for the processing of shrimp. Boletín Científico y Técnico, Vol 9, No. 7. Instituto Nacional de Pesca, Guayaquil, Ecuador.

Goulding, I. & Castello, M. (1988). A Code of recommended practices for the processing of canned fish. Boletín Científico y Técnico Vol. 9 No. 8. Instituto Nacional de Pesca, Guayaquil, Ecuador.

Harrigan, W.F. & Park, R.W.A. (1991). Making Safe Food. A management guide for microbiological quality. Academic Press Ltd, London.

Howgate, P. (1984). Report on quality control and inspection systems for fish products in INFOFISH member countries. INFOFISH Report no. 13. INFOFISH, P.O. Box 10899, Kuala Lumpur, 01-02, Malaysia.

Huss, H. H. (1991). Use of HACCP in seafood production. INFOFISH International, 3/91, 27-32.

INFOFISH (1987). Report on the FAO/INFOFISH technical consultation on fish inspection and quality assurance for Asia and Pacific, Cochin, India, 16-19 February 1987. INFOFISH, P.O. 10899, Kuala Lumpur, 01-02, Malaysia.

International Commission on Microbiological Specifications for Foods (ICMSF) (1988). Microorganisms in Foods. 4 Application of the hazard analysis critical control point (HACCP) system to ensure microbiological safety and quality. Blackwell Scientific Publications, Oxford, England.

4. CODEX ALIMENTARIUS STANDARDS AND CODES OF PRACTICE

Codex Alimentarius Commission. (1981). Codex Alimentarius, volume V. Codex Standards for Fish and Fishery Products. CAC/VOL. V - Ed. 1. FAO, Rome, Italy. (All the fishery products standards are currently under review.)

Codex Alimentarius Commission. (1969). Recommended international general standard for the labelling of prepackaged foods. FAO, Rome, Italy.

Codex Alimentarius Commission. (1969). Recommended international code of practice - general principles of food hygiene. FAO, Rome, Italy.

Codex Alimentarius Commission. (1980). Proposed draft code of practice for crabs. FAO, Rome, Italy.

Codex Alimentarius Commission. (1979). Recommended international code of practice for smoked fish. FAO, Rome, Italy.

Codex Alimentarius Commission. (1977). Recommended international code of practice for fresh fish CAC/RCP 9-1976. FAO, Rome, Italy.

Codex Alimentarius Commission. (1977). Recommended international code of practice for canned fish. CAC/RCP 10-1976. FAO, Rome, Italy.

Codex Alimentarius Commission. (1980). Recommended international code of practice for frozen fish. CAC/RCP 16-1976. FAO, Rome, Italy.

Codex Alimentarius Commission. (1980). Recommended international code of practice for shrimps or prawns. CAC/RCP 17-1976. FAO, Rome, Italy.

Codex Alimentarius Commission. (1979). Recommended international code of hygienic practice for molluscan shellfish. CAC/RCP 18-1976. FAO, Rome, Italy.

Codex Alimentarius Commission (1983). Recommended international code of practice for lobsters. CAC/RCP 24-1976. FAO, Rome, Italy.

Codex Alimentarius Commission (1983). Recommended international code of practice for salted fish. CAC/RCP 26-1976. FAO, Rome, Italy.