

HACCP implementation in the Thai fisheries industry

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Abstract

As the implementation of HACCP is making headways in food safety management systems of fishery industry in Thailand, the role of the department of Fisheries is also changing. In addition to the inspection for compliance to GMPs, other regulatory requirements, the fish inspectors have to assume new responsibilities and these include validation and verification of the HACCP plan and implementation of the HACCP system.

1. Introduction

The Department of Fisheries (DOF) is a main organization providing service to the export industry on fish inspection and quality assurance. Importing countries worldwide recognize the fish inspection service of the Department especially the EU, Canada, Australia, New Zealand, USA, Japan, etc. Since the 1960s, the fish inspection and quality control services of the department has been engaged mostly in pre-shipment inspection and facilities inspection, which is the principle means used by most governmental agencies in the world to control safety of food. The DOF inspects exported fishery products for compliance with international standards and where applicable, the importers' requirements related to health, safety, quality, identity, process and handling. The fact that Thailand is one of the major exporters of fishery products, exporting to major markets like Japan, North America and Europe and other markets e.g. middle-east, Australia, New Zealand and South American countries, with approximately 200 registered operations producing nearly 800,000 tones of export products annually, combined with the fact that personnel directly responsible for inspection and quality control at the Fish Inspection and Quality Control Division of DOF has a total person year compliment of 288 (including inspectors, laboratory support, clerical and administrative support and management) means only a small percentage of what is produced and only

what is exported is actually inspected by the Department. Even so, 1–2% of the lots DOF inspects are rejected, indicating that there may be potential threat to consumer health, safety and satisfaction.

The DOF along with inspection authorities and regulatory agencies in importing countries are being pressurized to do more. In a period of government fiscal restraints, DOF cannot by itself provide the level of inspection required. There is a need for joint action by the industry and Government to meet the challenge. Moreover, it is of utmost importance to promote the establishment of Agreement on Equivalent of Fish Inspection System or at least Certification Agreement with importing countries.

It was recognized that traditional inspection has certain limitations, one of which is the rapid turn-over of personnel. This means that education and training must be a continuing exercise, which is rarely the case. Inspection of facilities and operation are carried out with reference to various guidelines, standards and Codes of Practices. In many cases these documents fail to indicate the relative importance of various requirements and the requirements are stated in very imprecise terms such as satisfactory, adequate, suitable, if necessary, etc. This leaves interpretation to the inspector who may place too much emphasis on relatively unimportant factors and thus increase the cost without reducing hazards. Microbiological testing also has some limitations as a control option. These are constraint of time, difficulties relating to sampling, analytical methods and use of indicator organisms.

Since 1991, the Department of Fisheries, Thailand implemented voluntary HACCP fish inspection pro-

grams. The program has been involved with pilot HACCP implementation by the industry, reviewing inspection procedures and training for inspectors and industry. Generic HACCP plans have been developed for major commodities, through workshops and working groups with the industry. Guidelines for development of documented program or quality manual have been provided and updated to meet with international guidelines and importing countries requirement on HACCP. Close monitoring of the processing industry performance in the HACCP program has been carried out by inspection of facilities, control at critical control points, record review and quality program verification. Implementation by the industry is classified into three stages; initial stage, development stage and fully implemented (Suwanrangsri, 1996a,b).

In 1996, the program is mandatory for approved fish processors under jurisdiction of the Department. Approved processors must have the HACCP program implemented, documented and verified by the Department. HACCP inspection procedures are developed and updated.

Other food industries such as meat, poultry, vegetables and fruit products have already started implementing HACCP. HACCP audits for those are performed by many government agencies and institutes such as Department of Livestock Development, Food and Drug Administration, Thai Industrial Standard Institute and the National Food Institute.

1.1. HACCP approaches (Suwanrangsri, 1996a,b)

The Department of Fisheries HACCP Program (Department of Fisheries, 1996a,b) is focused on product safety. Other quality-related elements, hygiene and Good Manufacturing Practices (GMP) are to be met by pre-requisite program.

HACCP program is comprehensive covering productions, processing, input materials, products and personnel at critical control points. In many cases what the program demands is already being done; it can be described as a formulation of good manufacturing practices. Each processing establishment must develop an HACCP plan appropriate to their processing practice, hygiene and sanitation status. The processor must identify hazards associated with the products and processing environment. Hazard analysis and risk assessment should be conducted extensively. The processor must have basic sanitation, hygiene control and GMPs as pre-requisite program. Once the hazards are identified, critical control points can be easily determined using a decision_tree approach, keeping critical control points to a minimum as to control product safety. By this approach, confusion between critical control points (CCP) and control points (CP) is greatly reduced.

It is required that the HACCP plan and pre-requisite program be documented. Guidelines for program development and documentation are also provided and handbooks are available to the industry in local language.

1.2. Role of industry

Each operation *must* institute a prerequisite program and an HACCP program. They must also verify by the HACCP plan or prerequisite program that regulatory requirements are being met. For each critical control point the company must analyze hazards; establish preventive measures, monitoring procedures, critical limits, corrective action and verification procedures. Most importantly, a system of record keeping must be established to indicate activities done, instances of non-compliance found, and corrective actions and verification taken.

1.3. Role of the Department of Fisheries

DOF will assess the HACCP programs of the processing plants in three ways:

1. By verify the design and appropriateness of the documented HACCP program to processing condition of the establishment.
 - 1.1. The Department of Fisheries will validate the documented HACCP program (HACCP Quality Manual) of approved processors based on the HACCP Program Rating Report (Department of Fisheries, 1996a,b).
 - 1.2. The program shall meet a minimum rating of 70%.
 - 1.3. Processors will have a maximum of three months to correct deficiencies identified, and re-submit the plan for validation.
2. By conducting independent inspection of products and facilities, as is the case at present to evaluate adequacy of the prerequisite program.
 - 2.1. Inspection will be carried out using the Plant Inspection Rating Report. (Department of Fisheries, 1996a,b).
 - 2.2. Processors shall meet a minimum of B for the prerequisite program.
3. By auditing the processors' HACCP activities. This third method relies heavily on inspection of CCPs activities and the plants' record. DOF will examine the record and will perform independent inspections to verify their accuracy. The result of these three types of inspections taken together will determine how effectively the plant HACCP program is operating and this, in turn, will determine the frequency of the regular inspection of the plant and of the products.

3.1. Inspection will be carried out using the HACCP Implementation Rating Report (Department of Fisheries, 1996a,b).

3.2. The program shall meet a minimum rating of 80%.

3.3. Processors will have a maximum of three months to correct deficiencies identified.

This has been done in certain cases, under an agreement and a memorandum of understanding with foreign countries, by DOF. The amount of DOF activity or involvement in the plant and in end-product inspection will vary directly with the effectiveness of the HACCP program and the processors' hygiene standard and also product compliance.

The most important HACCP activities focused by the Department has been training on the principle and application of HACCP in the fish processing industry, however, since 1998, the focus has been on HACCP audit. Various government agencies, universities and private HACCP consulting firms currently offer training on HACCP.

HACCP audit policy and procedures are developed for the field inspectors. Training on HACCP verification or HACCP system audit are provided for the inspectors as well as harmonization meeting among regional inspectors to ensure consistency and competency. Inspectors are also trained specifically on HACCP audit and ISO 9000 Lead Assessor Training, to build up their audit skill.

1.4. Benefit of HACCP

For many companies that have a basic quality program, the cost associated with the HACCP program should be minimal. Those companies with less structured quality program will incur some cost. However, the exact amount depends upon the size type of operation and the number of personnel employed.

Regardless of the cost involved, there are benefits both industry wide and company specific. The Thai fishery industry as a whole projects a stronger quality image and is able to withstand and respond to public scrutiny and international market requirements.

HACCP enables DOF to direct resources towards problem areas, the existence of which often damages the reputation and viability of the industry as a whole.

Major importing countries are moving towards HACCP requirements for import. Among major importing countries HACCP of DOF is being recognized, DOF approved processors have the privilege of reduced rate inspection in those countries.

Implementation of HACCP has led DOF to equivalency agreement with importing countries. Agreement with Canadian Food Inspection Agency is the first Agreement that recognizes equivalency of the fish in-

spection system. Such agreement is being negotiated with USFDA, EU and others.

1.5. Progress on HACCP implementation by the industry

The results of the implementation of program since 1991–1995 showed rapid development of the industry towards HACCP implementation. The industry quality control staff was formally trained by DOF HACCP training module. During 1997–1998, both DOF and industry were trained on HACCP audit.

Number of personnel trained on HACCP

Year	DOF	Industry
1991	12	96
1992	16	145
1993	18	166
1994	25	199
1995	32	245
1996	40	295
1997	18	40
1998	14	40

In 1997, 100 processors had already implemented the HACCP program – this means the documents are complete and HACCP controls are in place, while 47 processors are at the development stage where in most cases documentation is not complete but HACCP controls are in place and 17 processors are at initial development where the HACCP program was just started. Training for the industry and close collaboration between the industry and government are vital to the success of the program.

In 1998, 141 processors have implemented HACCP. In 1998, the policy on HACCP of DOF was geared toward audit of industry implementation of the program.

1.6. Problems encountered in assessing HACCP

From our experience of three years implementation of the HACCP, there are problems specific to audit as follows:

1. *Audit approach and procedures.* Internationally we have not harmonized our audit approach and procedures though we have harmonized HACCP principles (CODEX, 1997), this results in different procedures being used on audit with different intensity and focus. The emphasis on validation and verification of the HACCP program are also different.

2. *Documented program.* There are different degrees of expectations, from different authorities, countries, buyers or importers on format, depth, structure and details

of the HACCP document. It is of great difficulty to document the program that will meet different standards and expectations.

There are also problems related to how complete the documented program should be before commencing the audit.

3. *Experience and qualification of inspector/auditor.* HACCP audit is novel, most food inspectors are familiar with sanitation inspection, but not on HACCP system audit. What is nice is still focus of inspectors rather than what is necessary for food safety control. Moreover, it is extremely difficult for inspectors when more than food safety is expected from the HACCP program or the quality management system being audited.

Qualification of the HACCP auditor should be unique from the food inspector in that he should have both audit training and experience. Otherwise focus on system audit could be overshadowed by regulatory, quality or sanitation audit. The auditor should have clear understanding on the Principle and Application of HACCP so that he will not be carried with him prescription for hazard, CCP – it is often that an inexperienced auditor would have a preconceived, hazard, CCP for the HACCP plan being audited.

4. *Validation of critical limits.* How well the HACCP plan could provide food safety assurance very much depends upon selection of critical limits. Therefore validation of critical limits is an important part of audit. Currently we based our judgement on regulatory standard, guidelines, scientific literature, experimental studies or in some case qualified experts, yet the information is still rather limited and in most cases regulatory standard and guidelines differ from countries to countries. It is definitely that we need more research support for critical limit validation.

5. *Analysis of results.* Different systems are used for analysis of results to date- non compliance; critical, serious, major; pass or fail; effective and ineffective. There should be guidelines on How a program be determined for its effectiveness.

Recognizing the above problems, the Department is currently developing a HACCP Audit Manual for inspectors which will be followed when carrying out an audit on an HACCP plan, in order to

- ensure that they are consistent with the principles of audit and can be applied uniformly,
- ensure that there is a proper linkage between the policy standard and the compliance standards which will be used for the audit.

DOF intends to further develop standardized procedures, forms and checklist for complete audits of HACCP, which would be consistent with the policies and guidelines, as well as international expectations. It is also our intention to develop training modules for auditing of HACCP systems and to focus training on

validation of critical limits and internal audit for the industry.

2. HACCP audit program of the Department of Fisheries

2.1. HACCP audit policy

1. Ensure that audit procedures are fair, technically appropriate, transparent, conforms to regulatory requirements and the current international standard.
2. Maintain consistency and competency.
3. Maintain confidentiality of audit results.

2.2. Purpose of audit

Audits are conducted to:

1. validate the design of the HACCP plan and that each processor's prerequisite and HACCP program conforms with conditions laid down by DOF and regulatory requirements;
2. verify that the HACCP plan is appropriate for the production condition and the processor is implementing the programs, that would result in the production of safe food.

2.3. Qualification of auditor

Lead auditor:

- Graduated from at least B.Sc. in area of Food Science, Food Technology, Fish Technology, General Sciences, Microbiology, Biochemistry or in other areas but must have training on Food Technology.
- Trained on HACCP Principle and Application and Audit.
- Has experience in inspection of fish/food processing or HACCP audit at least three years.
- Experienced and knowledgeable on fish/food processing.

Auditor:

- Graduated from at least B.Sc. In area of Food Science, Food Technology, Fish. Technology, General Sciences, Microbiology, Biochemistry or in other areas but must have training on Food Technology.
- Trained on HACCP Principle and Application and Audit.
- Has experience in inspection of fish/food processing or HACCP audit at least three years.
- Experienced and knowledgeable on fish/food processing.

Note: Auditor of Low acid canned food operation must have training on Low Acid Canned Food and Container Integrity and experience on inspection or audit not less than 2 yr.

2.4. Responsibilities of auditor

Auditor is responsible to

1. Co ordinating with processors to prepare the audits.
2. Preparing and planning the audit.
3. Reviewing the HACCP program and quality system-related document.
4. Assessing, observing, collecting objective evidence including record review.
5. Analysing audit results in co ordination with the audit team and determining level of non-compliance.
6. Prescribing time frame for corrective actions.
7. Reporting the audit findings and results and preparing report of audit.
8. Maintaining confidentiality of the processors' information.

2.5. Audit procedures

1. Introduction

1.1. Assessment and verification should concentrate primarily on effectiveness of the sanitation and hygiene control and HACCP system of the establishments rather than on specific commodities of establishments.

1.2. Assessment and verification should be conducted by competent officials.

2. Preparation

2.1. Those responsible for conducting the audit should prepare a plan that covers the following points:

- the subject, depth and scope of the audit and the standards or requirements against which the subject will be assessed;
- the date and place of the audit, along with a timetable up to and including the issue of the final report;
- the identity of the auditors including, if a team approach is used, the leader;
- the language(s) in which the audit will be conducted and the report issued;
- a schedule of meetings with officials and visits to establishments, as appropriate;
- confidentiality requirements.

2.2. This plan should be reviewed in advance with representatives of the establishment and, if necessary, the organization(s) being audited.

2.3. Where different authorities have jurisdiction over different aspects of food control in the country, such authorities should coordinate their conduct of an audit in order to avoid any duplication of visits.

3. *Opening meeting.* An opening meeting should be held with representatives of the establishment, including officials responsible for the inspection and certification programs. At this meeting the auditor will be re-

sponsible for reviewing the audit plan and confirming that adequate resources, documentation and any other necessary facilities are available for conducting the audit.

4. *Examination.* This may comprise both the examination of documentary material and an on-site verification.

4.1. *Document review.* The document review may consist of a preliminary review of the HACCP program with emphasis on the implementation of elements of the system. Based upon this preliminary review, the auditors may examine inspection and certification files relevant to these commodities.

4.2. *On-site verification.* The verification is being conducted to assess the effectiveness of the program.

4.3. *Follow-up audit.* Where a follow-up audit is being conducted in order to verify the correction of deficiencies, it may be sufficient to examine only those points which have been found to require correction.

5. *Working documents.* Forms for reporting assessment findings and conclusions should be standardized as much as possible in order to make the approach to audit, reporting and assessment more uniform and efficient. The working documents also include any checklists of elements to evaluate.

6. *Closing meeting.* A closing meeting should be held with representatives of the establishment. At this meeting, the lead auditor will be responsible for presenting the findings of the audit as well as, where appropriate, an analysis of conformity. The information should be presented in a clear, concise manner so that the conclusions of the audit are clearly understood. If possible, an action plan for correction of any deficiencies should be agreed.

7. *Report.* The draft report of the audit should be forwarded to the appropriate person in the company as soon as possible. It should include a report of the audit findings with supporting evidence for each conclusion, along with any details of significance discussed during the closing meeting.

8. *Frequency of auditing.* The authorities shall decide the frequency of audit. Factors to be taken into account include the findings of previous audits and the existence and effectiveness of self-audit systems or third party audit of the establishment.

3. Conclusion

DOF spent many years promoting HACCP to the export fishery industry, the implementation of HACCP in Thailand has been a success. There has been an increase in knowledge and understanding of HACCP by the fishery industry. Over the past years DOF and the

Thai fish processing industry have built a strong foundation to develop the HACCP program into a more effective and efficient one to ensure food safety. DOF will continue to provide technical assistance to the industry to implement the HACCP quality management system appropriate to their needs. DOF will endeavor to ensure that the application of the HACCP-based inspection system remain consistent with other regulatory authorities and gain international acceptance. Other Government Agencies responsible for food control have also been developing HACCP quality initiatives to assist the food industry. DOF will work closely with these agencies to standardize the application and audit.

While CODEX HACCP principles and application have generally been widely accepted by regulatory authorities worldwide, the challenges that face these regulatory authorities will be harmonization of HACCP audit principles and procedures. There are more works to be done to reach international accepted audit procedures, therefore, regulatory authorities should continue to work closely at the international level to standardize HACCP application as well as audit and that we

maintain a current and accurate understanding of the expectation of international market place. This approach is necessary if we are to achieve equivalency between systems.

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