



# Seafood Processing Plants Guidelines for BAP Standards

## GUIDELINES — SEAFOOD PROCESSING PLANTS

The following guidelines provide perspective and clarification for the standards referenced in the Application/Audit Form. The application and guidelines were designed to assist program applicants in assessing their facilities and developing management systems for compliance with the certification standards.

The word “shall” is used throughout these guidelines to indicate mandatory provisions. For further information, please refer to the additional resources listed.

### Standard 1 – Community Property Rights and Regulatory Compliance

Processing plants shall comply with local and national laws and environmental regulations, including those related to product exportation, and provide current documentation that demonstrates legal rights for land use, water use, construction and operation.

#### Reasons for Standard

Certified processing plants shall comply with applicable business-related laws and regulations for waste disposal, effluents, pest control, etc. These regulations are needed to assure that processing plants provide pertinent information to governments and pay fees to support such programs. BAP requires compliance because it recognizes that not all governmental agencies have sufficient resources to effectively enforce laws.

Processing plants can represent considerable sources of employment and tax revenue for local communities and national governments. Certified facilities should demonstrate management commitment to both fiscal responsibility and community good. Facilities shall meet established export, sanitation and food safety standards through compliance with local and national regulations or importer review.

#### Implementation

Regulations regarding the operation and resource use of processing plants vary significantly from place to place. Among other requirements, such laws can call for:

- business licenses
- aquaculture licenses
- land deeds or lease agreements
- land use taxes
- construction permits
- water use permits
- mangrove protection
- effluent permits
- predator control permits
- well operation permits
- landfill operation permits
- waste treatment disposal permits.

ACC evaluators cannot know all laws that apply to seafood processing in all nations. Processing plants have the responsibility to obtain all necessary documentation for siting, constructing and operating their facilities.

Assistance in determining these necessary permits and licenses can be sought from governmental agencies responsible for environmental protection, water management and transportation. ACC evaluators shall also become familiar with the legal requirements within the areas they service.

During the ACC audit, the plant representative shall present all necessary documents to the evaluator. All documents shall be current, and processing plants shall be in compliance with the requirements stipulated by the documents. In some cases, governmental agencies may have waived one or more permits. Letters granting the waivers or other proof of waivers shall be available.

## Standard 2 – Community Worker Safety and Employee Relations

Processing plants shall comply with local and national labor laws to assure worker safety and adequate compensation.

### Reasons for Standard

Processing work is potentially dangerous because of the types of machinery needed and the use of potentially hazardous materials, especially refrigerants. It is the responsibility of processing plants to provide safe and healthy working conditions and training on worker safety.

Most processing of aquaculture products for export to Europe and the United States is conducted in tropical nations where wage or other labor laws are not always consistently enforced. Since processing plants can be a major source of job opportunities, they should maintain a good working relationship with not only employees but the communities in which they operate.

### Implementation

To receive BAP certification, processing plant management shall show both compliance with labor laws and a commitment to worker safety. Certified processing plants shall provide legal wages and a safe working environment, and efforts should be made to exceed these minimum requirements.

Workers should be given adequate initial training, as well as regular refresher training, on safety in all areas of plant operation. Safety equipment such as machine guards, safety goggles and respirators, as well as training in their use, should be

given to workers who operate cutting machines and other dangerous equipment.

Workers should be trained in the first aid of electrical shock, profuse bleeding, and other possible medical emergencies. They must also be informed of emergency evacuation procedures in case of fire or release of toxic gases.

In some locations it is necessary for plants to provide meals for workers. In such cases, food services should provide wholesome meals for workers, with food storage and preparation done in a responsible manner. Safe drinking water shall be available at all times to employees working at the facility.

An adequate number of working toilets and hand-washing facilities shall be available. If living quarters are provided, they should be well ventilated and have adequate shower and toilet facilities. Trash and garbage should not accumulate in living, food preparation or dining areas. Health screening with documented results by employee should be conducted at least every six months.

During the facility audit, the ACC evaluator will evaluate whether conditions comply with labor laws. The evaluator will also interview a random sample of workers to obtain their opinions about wages and safety conditions.

### For Additional Information

#### Safety for Fish Farm Workers

D. C. Minchew – 1999

USDA/Cooperative State Research and Extension Service  
Washington, D.C., USA

## Standard 3 – Environment Effluent Management

Processing plants shall dispose of process water and sewage in a responsible manner that does not create pollution, cause excessive odor or spread disease. Water quality measurements of plant effluents that enter natural bodies of

water shall comply with government regulations or the BAP criteria below, whichever are more strict. Plants shall continue compliance with these criteria to maintain certification.

BAP Water Quality Criteria – Processing Plants

Variable (units)	Initial Value	Final Value (After 5 years)	Collection Frequency
pH (standard units)	6.0-9.5	6.0-9.0	Monthly
Total suspended solids (mg/L)	100 or less	50 or less	Quarterly
Soluble phosphorus (mg/L)	5 or less	3 or less	Monthly
Total ammonia nitrogen (mg/L)	10 or less	5 or less	Monthly
5-day biochemical oxygen demand (mg/L)	50 or less	30 or less	Quarterly
Oil and grease (mg/L)	10 or less	7 or less	Quarterly
Salinity Water with less than 1 ppt salinity or specific conductance below 1,500 µmhos/cm is considered fresh.	No water discharge above 1.5 ppt into freshwater	No water discharge above 1.0 ppt into freshwater	

### Reasons for Standard

Processing plants discharge not only sewage from employee toilet facilities, but effluents from ice baths, cleaning and sanitizing. Effluents from packing processes can include organic matter, offal/viscera from fish and shellfish, high residual levels of chlorine, phosphorus detergents and other nutrients. These substances can contribute to eutrophication, sedimentation, high oxygen demand and pollution in receiving water. They can also transmit diseases to wild aquatic animals.

Processing by-products and other plant waste can create a significant odor when not disposed of properly. Such odors shall not be a nuisance for neighboring communities or businesses.

### Implementation

Processing plants shall determine the levels of soluble phosphorus, ammonia nitrogen, suspended solids, BOD, pH and salinity of the source water used in processing. When sampling, plants should record the source water volume, influent (untreated process water) and effluent discharged after treatment.

Processing plants should implement best management practices to treat wastes with a goal of meeting or exceeding industry standards in the countries in which they are located. Plants shall not exceed permitted load levels when effluents are discharged into public/municipal water treatment systems or pollute receiving water into which they are discharged. For plants that treat their own effluents and/or sewage in settling ponds or oxidation lagoons, water discharged into

sewer systems, canals or other waterways shall not cause deterioration of ambient conditions.

To eliminate the chance of disease transmission from effluents discharged to natural waters, plants should screen out solids and hold effluents in oxidation ponds or tanks before release. Steps shall also be taken to control odors.

Facilities shall verify that the quality of their discharge water complies with all permitted standards. Plants that discharge water directly into streams, rivers or estuaries shall have government permits authorizing the activity and test results that demonstrate they are in compliance with the standards. Samples should be taken during periods of processing, rather than inactive periods at the plant.

The BAP water quality criteria for processing plants are different from those for other aquaculture facilities because of the plants' common pretreatment of effluents before release. In addition, although effluents from plants can be more concentrated than those from other facilities, this is mitigated by the much lower volumes released by the plants.

### For Additional Information

#### Global Aquaculture Advocate

Volume 3, Issue 5, 2000, pp. 61-66

"Effluent Composition and Water Quality Standards"

C. E. Boyd and D. Gautier

## Standard 4 – Environment

### Storage and Disposal of Plant Supplies

**Fuel, lubricants, plant chemicals and potentially toxic or dangerous compounds shall be properly labeled, stored, used and disposed of in a safe and responsible manner.**

#### Reasons for Standard

Processing plants regularly use a variety of chemicals and toxic substances that can cause damage to products, workers or the environment.

Gaseous ammonia and refrigerants can be dangerous to workers and contaminate the environment, while chemicals like sodium metabisulfite and chlorine, if not used at safe levels, are a potential hazard to both the health of workers and the safety of the plant's products. Fuel and oil spills, ammonia leaks and the improper use of pesticides and other chemicals can result in water pollution and cause toxicity to aquatic organisms and wildlife.

#### Implementation

Potentially toxic compounds and chemicals shall be properly labeled, stored and used according to instructions. All government regulations relating to the use or handling of the products shall be followed. Disposal of unwanted lubricants and outdated chemicals shall be carried out in a safe, responsible manner to prevent environmental contamination.

Oil leaks and spills from equipment should be prevented through good maintenance. Used oil and contaminated refrigerants should be removed and disposed of properly. Outdated chem-

icals and wastes collected after spills should be properly confined, labeled and disposed of in a safe place to avoid environmental damage or danger to animals or humans.

Hazardous chemicals such as insecticides, chlorides and sodium metabisulfite shall be stored in locked, well-ventilated, water-tight buildings. The buildings' concrete floors should slope to a center basin for containing spills. Warning signs shall be posted. Oxidants shall be stored in a safe area where they will not come into contact with diesel or other oils to avoid explosion. Secondary containment for fuel storage is required, and "flammable material" and "no smoking" signs shall be installed at fuel storage sites.

Procedures should be developed for managing spills or leaks of oil, fuel, gases, chemicals and other products. The equipment and supplies needed for managing and cleaning up these spills shall be readily available and accessible. Workers should be trained to properly use the equipment and handle the contained waste. In particular, ammonia shall be properly stored and workers who use it trained to handle the gas if it escapes into the atmosphere.

### For Additional Information

#### Sanitation Control Procedures for Processing Fish and Fishery Products

National Seafood HACCP Alliance – 2000

#### USDA NRCS AL Guide Sheet No. AL 701

Spill Prevention Control and Countermeasures

Available online at <http://www.al.nrcs.usda.gov/SOsections/Engineering/BMPindex.html>

## Standard 5 – Environment

### Waste Management

Processing by-products, garbage, and paper and plastic refuse shall be disposed of in a sanitary, responsible and biosecure manner.

#### Reasons for Standard

Improper disposal of trash and garbage – especially processing by-products such as heads, scales, bones, shells, offal/viscera, etc. – can create ecological nuisances in surrounding areas and attract rats, insects and other pests. Poorly handled processing by-products can also transmit diseases to wild aquatic stocks.

The smell of decomposition can become a serious nuisance for neighboring communities. Runoff from refuse piles can cause pollution and contaminate ground water.

Empty plastic bags and other containers do not decompose quickly. They can be a hazard to animals that become entangled in them.

#### Implementation

Processing by-products generally represent the largest challenge in waste disposal for plants, so a rigorous program of by-product removal shall be in place. Processing by-products shall be stored in covered containers or silos, removed fre-

quently and disposed of properly. Some by-products can be used as animal feed or dried for use as feed ingredients. If such uses are not suitable, the by-products shall be boiled, burned and/or buried at least two feet deep. If required by local authorities, plants must be properly licensed to dispose of wastes. Solid wastes should be removed before they become part of the facility effluent.

Trash and garbage may not be dumped on vacant land. Such waste shall be burned, composted or put in a landfill in accordance with local laws. Composting procedures shall not create odor problems or attract wild animals.

The BAP program encourages recycling of paper and plastic waste where it is possible. Effective management of these wastes depends upon the availability of convenient waste containers that are serviced at regular intervals.

### For Additional Information

#### Environmental Engineering

P. A. Vesilind, J. J. Peirce, R. F. Weiner – 1994  
Butterworth-Heinemann  
Boston, Massachusetts, USA

#### Composting

U.S. Environmental Protection Agency  
<http://www.epa.gov/compost/>

## Standard 6 – Food Safety

### Food Safety and Quality Assurance

Processing plants shall have a current HACCP plan and process control program to control food hazards and ensure product safety. Production process controls that ensure product quality shall be documented.

#### Reasons for Standard

To comply with European Commission Health and Consumer Protection Directorate General (EC/DG), United States Food and Drug Administration (USFDA) and Canadian Food Inspection Agency (CFIA) regulations, food production processors shall assure consumers that the food they produce is pure and wholesome, safe to consume and produced under sanitary conditions. To better protect consumers and assure food safety, EC/DG, USFDA and CFIA legally mandated in 1999 that the hazard analysis critical control point (HACCP) system be implemented for processing all seafood products sold in the European Community, United States and Canada.

HACCP and complementary standard sanitation operation procedures (SSOPs) are designed to minimize the risk of food safety hazards by controlling both the production process and the environment in which that process takes place. A complete HACCP plan includes SSOPs to ensure that processing plant environs are adequately cleaned and maintained. Although HACCP focuses primarily on risk-prevention measures implemented through the control of processes, in and of itself, a HACCP plan is inadequate to guarantee food safety without complementary SSOPs.

SSOPs are based on good manufacturing practices (GMPs, called codes of practice by the EC/DG) and are considered “nonprocess” environmental controls that prevent adulteration of products during processing through rigorous cleaning, sanitizing, plant maintenance, exclusion of pests, control of wastes and employee hygiene. The key to maintaining the safety and cleanliness of the plant environment is in controlling the movement of product, ingredients, packaging and personnel into and out of processing areas.

Examples of food hazards addressed by HACCP and common to most seafood processing facilities include:

- physical hazards
- microbiological contamination
- chemical contamination
- pesticides and drug residues
- natural toxins
- decomposition in scombroid toxin-forming species or any species where a food safety hazard such as histamine has been associated with decomposition
- hazards from mechanical processes (metal)
- parasites, where the processor has reason to know that the parasite-containing fish or fishery product will be consumed without a process sufficient to kill the parasite
- unapproved use of direct or indirect food and color additives, or use of adulterated food additives
- possible allergens
- contamination from nonfood-grade lubricants in processing equipment.

## Sanitation Control Procedures

1. Ensure the safety of water and ice in contact with food and food contact surfaces.
2. All surfaces and substances in contact with food or in food production areas that might come in contact with product must be food grade and/or made of impermeable, easily cleaned and sanitized materials or materials that will not shatter and adulterate product. (Glass is an example of a material that can shatter and create a food hazard.)
3. Maintain and clean food contact surfaces, equipment and clothing.
4. Prevent cross-contamination between raw and cooked products and from unsanitary contact surfaces, clothing and equipment.
5. Maintain hand-washing and toilet facilities.
6. Protect food, packaging materials and food contact services from adulteration with chemical, biological and physical contaminants.
7. Properly label, store and use chemical and toxic compounds.
8. Control employee health conditions to avoid contamination of food, packaging or contact surfaces.
9. Exclude and control animal pests.
10. Remove all spoiled, decomposed or adulterated products and materials.
11. Monitor cleaning and sanitizing activities that directly contact food and food contact surfaces.
12. Verify the efficacy of cleaning and sanitation procedures, and food safety through product analysis carried out at a frequency specified by the processor and showing to ACC satisfaction that control is sufficient to prevent adulteration for those hazards the processor has identified as controlled by SSOPs.

*Salmonella* and other microbiological adulterants, as well as physical adulteration with glass, insects and other filth, may be controlled by SSOPs. Sanitation controls are as necessary as HACCP controls to assure the safety of all seafood products.

Since product quality is essential to maintaining value and food safety, certain controls must be used to meet consumer expectations and buyer specifications. Calibration of process-control instruments used at critical control points and periodic end-product or in-process testing are the responsibility of the processors.

Some important quality issues that often cause rejection by buyers are:

- decomposition
- presence of extraneous materials and filth
- product appearance, texture, taste and odor
- improper use and labeling of sulfites and moisture-retaining agents
- use of non-food grade or adulterated moisture-retaining agents
- mislabeling of product
- processing defects like short weight, off-count, lack of uniformity, dehydration and the presence of bone and/or skin in fish.

## HACCP Requirements

1. Organizational charts of all processing plant employees, including management personnel.
2. Process flow chart showing all steps in the process including the addition of ingredients and additives.
3. Description of product and its presentation(s) that identify intended use(s) and method(s) of distribution.
4. Hazard analyses must include at least those hazards outlined in the "Potential Species-Related & Process-Related Hazards" section of the USFDA/CFSAN Fish and Fisheries Products Hazards and Controls Guidance, and/or those outlined in the FAO/WHO Codex Alimentarius Commission (Codex Standard 092-1981, Rev. 1-1995), depending on importing country and local regulations.
5. Preventative measures for each identified hazard at each critical control point.
6. Monitoring procedures for each identified hazard at each critical control point that include frequency, assignment of task, monitoring method and record-keeping method.
7. Corrective actions that will be implemented when a critical level has been exceeded for any identified hazard must be identified, implemented and monitored.
8. Verification procedures for all monitoring, corrective actions and preventative measures that demonstrate safety of product by revision of HACCP procedures through product analysis at a frequency specified by the processor and showing to ACC satisfaction that control is sufficient to prevent adulteration. Verification should include chemical testing of food additives for purity to assure only food-grade additives are used.
9. Recall procedures should be in place in case adulterated product leaves the processing plant.

## Implementation

A current HACCP plan and SSOP manuals shall be available to the evaluator. The HACCP plan shall identify critical control points, preventative measures, monitoring and verification procedures, corrective actions, and product recall procedures. It shall also include information on the process itself through flow charts and organizational charts of management and employee authority structure.

The SSOPs shall specify how the processor cleans, sanitizes and maintains the facility in the condition required to ensure food safety, as well as outline procedures for maximum employee hygiene. "Adequate" SSOPs also include monitoring procedures for cleaning and sanitizing activities. See the tables above for necessary sanitation control procedures and minimum required HACCP hazard controls. The frequency of cleaning and sanitizing actions, and types of records used to monitor the sanitation control measures shall be stipulated in the processor's SSOP.

Processing facilities shall have a properly functioning metal detector in place to check all finished product.



Cross-contamination in seafood is one of the most common causes of foodborne illness. While being processed, product can be exposed to many potential sources of cross-contamination that can promote the growth of pathogens.

Common routes of cross-contamination include product-to-product transfer of bacteria from contaminated raw product to cooked or ready-to-eat product; equipment-to-product transfer of bacteria from contaminated equipment, work surfaces or utensils to food; and people-to-product transfer of bacteria from workers' bodies or clothes to product.

Cross-contamination can be prevented by effectively separating raw materials or ingredients from cooked or ready-to-eat products during processing, handling and storage; and controlling the movement of goods and people within the factory. Additional measures include the implementation of personal hygiene and contamination control training, procedures and cleaning systems at the plant and assuring that water and ice are free of pathogens.

Record keeping is the basic tool that an evaluator uses to audit a facility. Hence, complete and accurate documentation as outlined in the plant's HACCP/SSOPs is fundamental. For certification, plants shall make available updated records that show all monitoring, verification and corrective actions taken, and documentation for process and environmental/sanitation controls. These should be updated and shall be no less than 90% complete.

Adequate HACCP and SSOP programs include verification of sanitation and process controls through periodic testing for biological, microbiological and chemical contamination, mislabeled products and levels of additives. A particular concern of importing countries is adulteration with banned antibi-

otics such as chloramphenicol and nitrofurantoin and its derivatives. BAP requires that processing plants consider antibiotics in their hazard analyses and show that adulteration with these substances has been controlled and that the control has been verified.

Processing plants shall also maintain copies of supplier certificates from farms regarding growout and production hazards that assure the processor that no banned chemicals or antibiotics were used during farm production and that other chemical and antibiotic treatments were carried out in a responsible fashion. BAP strongly recommends that participating plants establish internal audit plans for verification of this data through laboratory analysis of incoming product.

During the audit, the ACC evaluator will examine the physical plant and review records to verify that the food safety and quality controls outlined in the plant HACCP and SSOPs are maintained, and that the controls meet the regulatory standards of USFDA, EC/DG and/or CFIA. The evaluator may also take finished product samples for laboratory analysis to verify standards compliance.

### For Additional Information

#### Fish and Fisheries Products, Hazards and Controls Guidance

Environmental Chemical Contaminant and Pesticide Tolerances, Action Levels and Guidance Levels (Table 9-1) Third Edition, June 2001

#### Current Good Manufacturing Practices in Manufacturing, Packing or Holding Human Food

Codes of Federal Regulations 21 – Part 110, Food and Drugs

## Product Testing

### Verification Requirement

**Random samples of finished product shall be analyzed for bacterial contamination and antibiotic residues by both the processing plant and third-party laboratories to verify that the control processes used by the plant are effective and finished products are safe and wholesome.**

### Reasons for Requirement

Particularly when dealing with ready-to-eat products, food processors must assure consumers that the food they produce is wholesome and safe. Programs established by the United Nations Food and Agriculture Organization, European Union, United States Food and Drug Administration, and other agencies require processors to implement plans and controls that maintain food safety. Verification is an ongoing review process that ensures plants' food safety plans function effectively.

BAP verification requires that random samples of finished product be collected and analyzed for compliance with BAP

standards by third-party laboratories. Analyses include microbiological testing for bacterial pathogens as well as analytical testing for antibiotic residues.

To reduce cost and improve efficiency, a two-tiered hierarchy of analytical testing is used. Most samples are analyzed locally using inexpensive "rapid screening" tests conducted by laboratories in each seafood-producing country. Less-frequent "confirmatory" tests using official methods are conducted by ISO-approved reference labs in each region. A list of approved local and reference laboratories is currently being compiled. Test frequency and procedures may be modified and tests added as needed, with notice given on the ACC website.

### Implementation

Product analyses are carried out in three ways.

#### NEW APPLICANTS – Plants submit samples

As a prerequisite for certification, processing plants shall provide analyses of end product samples representing five lots for every product form collected during the previous six

### Required Tests – Raw Seafood

Component	Limit	Acceptable Tests
Fecal coliforms	Less than 20 CFU/g	BAM, AOAC
<i>Staphylococcus aureus</i>	Positive for staphylococcal enterotoxin or <i>S. aureus</i> level equal to or less than 10 <sup>4</sup> /g (MPN)	BAM, AOAC
<i>Salmonella</i> sp.	Presence of organism	BAM, AOAC FSIS
Chloramphenicol	Detectable limit, 0.3 ppb	Biopharm Ridascreen ELISA *
Nitrofurans	Detectable limit of component/metabolites, 1.0 ppb	Biopharm Ridascreen ELISA *
Malachite Green, Leucomalachite Green (for finfish)	Detectable limit, 2.0 ppb	LC/MS <sup>n</sup> or LC/VIS HPLC/MS/MS
Fluroquinolones/Quinolones		
Sarafloxacin	Detectable limit, 1.25 ppb	HPLC/MS/MS
Ciprofloxacin	Detectable limit, 1.25 ppb	HPLC/MS/MS
Endrofloxacin	Detectable limit, 1.25 ppb	HPLC/MS/MS
Flumequine	Detectable limit, 2.5 ppb	HPLC/MS/MS (HPLC-FLD)
Oxolinic acid	Detectable limit, 2.5 ppb	HPLC/MS/MS (HPLC-FLD)

### Required Tests – Cooked and Raw Ready-to-Eat Seafood

Component	Limit	Acceptable Tests
Fecal coliforms	Less than 10 CFU/g	BAM, AOAC
<i>Escherichia coli</i>	Enterotoxigenic <i>E. coli</i> (ETEC) – 1 x10 <sup>3</sup> ETEC/g, LT or ST positive; generic <i>E. coli</i> less than 5 CFU/g	BAM, AOAC
<i>Staphylococcus aureus</i>	Positive for staphylococcal enterotoxin or <i>S. aureus</i> level equal to or less than 10 <sup>4</sup> /g (MPN)	BAM, AOAC
<i>Salmonella</i> sp.	Presence of organism	BAM, AOAC FSIS
<i>Listeria monocytogenes</i>	Presence of organism	BAM, AOAC
Chloramphenicol	Detectable limit	Biopharm Ridascreen (ELISA)*
Nitrofurans	Detectable limit of component/metabolites	Biopharm Ridascreen (ELISA)*
Malachite Green, Leucomalachite Green (finfish)	Detectable limit	HPLC/MS/MS LC/MS <sup>n</sup> or LC/VIS

\* Ridascreen quick test for initial screening and LC/MS/MS for confirmation of positives.

CFU/g = Colony-forming units per gram sample

MPN = Most probable number

BAM = Bacteriological Analytical Manual

AOAC = Association of Official Analytical Chemists

FSIS = Food Safety and Inspection Service

ELISA = Enzyme-linked immunosorbent assay

LC/MS/MS = Liquid chromatography/mass spectrometry

LC/MS<sup>n</sup> = Liquid chromatography/mass spectrometry

LC/VIS = Liquid chromatography/visual detection

HPLC= High-performance liquid chromatography

months. A lot is defined as a processed batch of shrimp or fish harvested from a single pond or other culture system on a single day. As defined in the tables above, tests required for raw, cooked and ready-to-eat products shall be conducted by third-party laboratories, and results shall be documented. Plants are responsible for testing costs related to certification.

#### ANNUAL AUDITS – Evaluator collects samples

During the auditing of processing plants, ACC evaluators or laboratory personnel authorized by ACC shall collect samples of each finished product and forward them to ACC-approved laboratories for testing. Each type of product produced shall have three samples, with one sample each from three different lots. Analytical results will be documented in the certification records, and copies will be sent to facilities. Plants are responsible for testing costs.

#### ONGOING IN-PLANT MONITORING

Once a plant is certified, ongoing in-plant testing is required to insure compliance. As shown in the table on page 24, the testing frequency is initially monthly, but reduces over time if results are within acceptable tolerances.

When composite testing is negative for six consecutive months, the frequency can be reduced to quarterly testing for each product form and species. If composite testing is negative for 12 months, testing frequency can be reduced to twice per year for each product form and species. If any test shows positive results, testing frequency reverts back to monthly on the component that tested positive, and ACC will require confirmation testing at third-party laboratories.

Sample collection and compositing is only to be done by properly trained individuals to prevent contamination of the product. If plants have a properly equipped laboratory and duly trained personnel, monitoring can be done by the plants. Alternatively, plants can submit samples to an independent lab.

### Required Monthly Sampling for Bacterial Contamination and Antibiotics

Contaminant	Product Form	Species	Sampling Process	Tests Required
<i>Salmonella</i>	Raw	Shrimp	Composite 15, 25-g samples into 1, 375-g unit	1 x 3 lots
<i>Salmonella</i>	Ready-to-eat	Shrimp	Composite 30, 25-g samples into 2, 375-g units	2 x 3 lots
<i>Staphylococcus aureus</i>	Raw, cooked, breaded	Shrimp, fish	Composite 10, 25-g samples into 2, 125-g units	2 x 3 lots
<i>Listeria monocytogenes</i>	Ready-to-eat	Shrimp, fish	Composite 10, 25-g samples into 2, 125-g units	2 x 3 lots
Chloramphenicol*	All types	Shrimp, fish	Composite 10, 25-g samples into 2, 125-g units	1
Nitrofurans*	All types	Shrimp, fish	Composite 10, 25-g samples into 2, 125-g units	1
Malachite Green, Leucomalachite Green*	All types	Fish	Composite 10, 25-g samples into 2, 125-g units	1

\* Testing for chloramphenicol, nitrofurans, malachite green or leucomalachite green can be made from one 125-gram composite sample for either shrimp or fish.

#### Example process: Ready-to-eat shrimp

Aseptically collect 30 random samples of 25 grams each. Aseptically combine the samples into two 375-gram composite samples for testing. All samples must be properly marked according to the lot number and product type.

The analytical regimes shall consist of quick tests in the plant or at local laboratories for microbiological contamination and antibiotic residues. Confirmatory tests shall be conducted by ACC-approved regional reference laboratories using official protocols of the U.S. Environmental Protection Agency and Food and Drug Administration as specified in guidance documents.

Analytical results shall be recorded and tracked with corresponding lot numbers. Verification data shall be maintained and made available if requested by the Aquaculture Certification Council. ACC reserves the right to conduct a surprise audit at its own cost.

The detection of positive samples shall lead to immediate corrective action for the respective lots and a temporary increase in sampling frequency. In such cases, the facility shall document the source problem(s) and corrective actions taken, and make them available to ACC, if requested.

The Aquaculture Certification Council reserves the right to rescind the certified status of plants at which verification results are out of acceptable ranges. For the period during which the plants undergo corrective actions for contaminated product, the plants will be considered on probation and the BAP logo can not be used on packaging.

ACC will periodically review sampling frequencies, testing requirements and verification protocols to ensure product safety. If necessary, changes will be made in procedures to address deficiencies

### Traceability Record-Keeping Requirement

To establish product traceability, the following information shall be recorded:

- farm name
- BAP-certified farm identification, if applicable
- species
- farm lot number
- BAP-certified processing plant identification
- date and time of product reception at plant
- plant lot number
- finished lot weight
- product form and count.

Additionally, processing plants shall maintain documentation records from producers that verify sources of postlarvae and feed use, and report chemical treatments. Plants shall also keep records of testing data for the presence of microbes, antibiotics and chemicals in raw seafood products.

As lots of seafood from certified farms are sold or shipped to buyers, the processing plant shall record:

- buyer name
- ACC buyer identification, if applicable
- lot quantity shipped
- shipping date
- invoice/transfer number.

The recipient of the product shall maintain all pertinent chain-of-custody records, including those related to shipment and invoicing.

#### Reasons for Requirement

Product traceability is a crucial component of BAP aquaculture facility certification. It interconnects links in the seafood production chain and allows each processed lot to be traced back to the culture system and inputs of origin. Results of food quality and safety analyses by accredited laboratories can also be included. Traceability ultimately assures the purchaser that all steps in the production process were in compliance with environmental, social and food safety standards.



## Sample Processing Plant Product Traceability Form

<b>PROCESSING PLANT</b>		
ACC Plant Number		New Lot Number
Lot Weight		Species
<b>Received From: FARM</b>		Farm Lot Number
ACC Farm Number		Reception Time/Date
Postlarvae Source Statement Available? Y N	Feed Source Statement Available? Y N	
Chemical Treatments Statement Available? Y N		
Antibiotics Testing Statement Available? Y N	Heavy Metals/Pesticides Testing Statement Available? Y N	
Product Form/Count 1		Product Weight
Product Form/Count 2		Product Weight
Product Form/Count 3		Product Weight
Product Form/Count 4		Product Weight
		Total Finished Product Weight
Plant Analysis Results for Microorganisms		Results for Chemical/Antibiotic Residues
Analysis Results for Finished Product		Analysis Results for Cooked Shrimp
<b>Sold To: BUYER</b>		
ACC Buyer Number		Shipping Date
Lot Quantity Shipped		Invoice Number
Container Company/Number		Destination

### Implementation

Participating processing plants can maintain paper records of the required data in notebooks or files using the sample Processing Plant Product Traceability Form above. If possible, the information should also be transferred to computer database files, with the original files kept to allow verification of the electronic data. The record-keeping process requires timely, organized, accurate entries ideally performed by a single clerk responsible for collecting the data and transferring it to the database.

All BAP-certified facilities shall also add this data via the Internet to the ACC online database developed by TraceRegister, Inc. TraceRegister securely stores and exchanges the product information necessary to satisfy BAP traceability and chain-of-custody requirements.

Adequate record keeping is only meaningful when combined with procedures that maintain lot separation. Incoming lots of product from BAP-certified farms shall not be stored, mixed or processed with lots from noncertified farms. A production lot is defined as the product harvested from one pond or culture unit on a single day.

Boxes and master cartons shall be accurately labeled, and primary box or bag packaging that is in direct contact with seafood shall be clearly marked with a lot identification number. Monitoring records for microbial and chemical analysis shall be provided for production lots.