

# **JIFSAN Good Aquacultural Practices Program**

---

## **Prerequisite Programs for Good Manufacturing Practices (GMPs)**



By Thomas Rippen



## **Prerequisite Programs for GMPs**

Prerequisite programs are procedures, including GMPs, that address operational conditions providing the foundation for HACCP.

Certain programs and activities are required and must be in place if a HACCP program is to be effective. In this chapter we introduce these prerequisite programs, with emphasis on the Current Good Manufacturing Practices. In the U.S., when we reference GMPs, we are most often referring to a U.S. Food and Drug Administration regulation that applies to the safe commercial production of all foods overseen by the agency, not just seafood. The GMPs are one of several prerequisites to HACCP, and one component of the Good Aquaculture Practices (GAQPs) described in this course.

HACCP is only one component of an aquaculture food safety program. Without clean working conditions free from microbiological, chemical, and physical contamination from many sources, a HACCP plan cannot be effective.

U.S. GMPs address cleanability of processing areas, cleanliness and sanitation of processing areas, prevention of microbial contamination, and prevention of chemical contamination. Most GMP requirements are general and apply to minimum conditions necessary for the production of safe, wholesome foods. However, some references are quite specific, such as thermometer use and the type of valves used on handwashing sinks. The current GMPs are under extensive review and may change in the near future.

The U.S. Food and Drug Administration reviewed years of inspection reports and identified these eight areas as the major GMP compliance problems for seafood companies. They included them in the seafood HACCP regulations and require monitoring for all that apply to company operations. Time does not permit detailed discussion of each of the eight conditions in this course.

The National Seafood HACCP Alliance offers a course dedicated to the topic: Sanitation Control

### **Examples of Common Prerequisite Programs**

- Facilities and grounds
- Supplier control
- Specifications
- Production equipment
- Cleaning and sanitation
- Personal hygiene
- Training
- Chemical control
- Receiving, storage and shipping
- Traceability and recall
- Pest control

### **Specific references to...**

- Food worker health
- Food worker hygiene
- Handwashing and toilet facilities
- Safety of water and ice
- Building design/construction and grounds
- Cleaning and sanitizing
- Pest control
- Sewage and waste disposal
- Equipment design and condition
- Use of thermometers on refrigeration units
- Safety of ingredients
- Protecting finished food from contact with raw ingredients or waste (direct/indirect)
- When food moisture content, salt or other food property is necessary to prevent bacterial growth, adequate control must be demonstrated

Procedures for Processing Fish and Fishery Products. For more information, contact the Association of Food and Drug Officials (York, Pennsylvania, USA 717-757-2888 phone), or go to the Seafood HACCP Alliance website at <http://seafood.ucdavis.edu/haccp/scp.htm>. This website is an excellent source of sanitation and HACCP information.

### **GMPs—What They Don't Say**

The Good Manufacturing Practices give few details as to what specific procedures must be followed to comply with the regulation. Standard operating procedures (SOPs) are the steps your company takes to assure that the GMPs are met. They include stepwise procedures, employee training, monitoring methods, and records used by your company. A chapter later in this manual provides guidance for writing SOPs and forms for recording observations during routine monitoring. For purposes of this course, these SOPs are part of the Good Aquaculture Practices (GAQPs) for aquaculture operations.

### **Key Sanitation Condition No.1- Safety of Water**

Safety of water and ice is key sanitation condition number one. Safe, potable water is essential for rinsing seafood and for washing seafood handling equipment/surfaces.

Water is of major importance because of its broad use and application in food processing. A primary safety concern for any food processing operation should be the safety of water.

#### **Monitoring—Sources:**

Monitoring of the water source must be done with sufficient frequency to assure that the water is safe for use.

#### **Monitoring—Plumbing:**

Monitoring should be done for cross connections between potable water lines and non-potable water or sewer lines.

#### **Monitoring—Ice:**

The safety of ice made from the water supply and its storage and handling conditions should also be monitored.

#### **Corrections:**

When monitoring detects a problem with the water source, corrective action must be taken

### **Eight Key Sanitation Conditions and Practices:**

Safety of water

Condition and cleanliness of food-contact surfaces

Prevention of cross-contamination

Maintenance of hand-washing, hand-sanitizing and toilet facilities

Protection from adulterants

Labeling, storage and use of toxic compounds

Employee health conditions

Exclusion of pests

and recorded on the appropriate Daily Sanitation Control Record.

#### **Records:**

Records are necessary to document that the processor is conforming to sanitary conditions and practices.

#### **Water Standards:**

Total coliforms are a useful indicator of potential sewage contamination

#### **In-Plant Water Contamination:**

May occur from cross connections and backflow problems.

Source: National Seafood HACCP Alliance website—<http://seafood.ucdavis.edu> (sanitation, SCP Teaching Points).

Ice is a common source of contamination. Specify that water and ice meet potable water standards. Periodically test ice to be sure that standards are met. Contamination during storage and handling is often responsible for coliforms and pathogenic microorganisms in ice. Potable water standards are discussed later in this presentation.

The U.S. Environmental Protection Agency sets standards for drinking water and potable ice. These are provided here for reference and may differ from your local requirements. Regardless of specific standards, safe ice is important, even for killing and holding shrimp and fish immediately after harvest. Only by knowing its microbiological quality will the aquaculturist know that the ice, which is usually brought in from off-site, will not contaminate his products.

## Private Water Monitoring

Private water monitoring should be conducted before any new service is used for processing operations and then at least on a semi-annual basis or more frequently for suspect sources. No suspect sources should be used. Monitor at least annually for organic and inorganic parameters, and bi-monthly or more for coliforms.

Monitor the eight key sanitation conditions that apply to your operation. Keep a record of monitoring activities on a simple form like the one on this page. This example is part of a larger form, containing the section for entering observations related to safety of water.

## Seawater

Seawater from near shore areas is often contaminated with hazardous microorganisms, chemicals, and elements. Seawater is not recommended for product or equipment washing. High coliform counts and pathogenic organisms in coastal seawater are so common that we cannot recommend its use in shoreside facilities. It may be suitable for use on boats at sea.

## Chemical and Microbiological Contamination of Well Water

Contamination of potable water supplies by fecal bacteria is quite common, a serious health hazard, and preventable. Chemical contamination through runoff from agricultural, mechanical, or industrial areas may also occur if not controlled. Inspect potable water sources and surrounding land routinely. Causes of contamination may include flood or heavy rains, location too close

## U.S. National Drinking Water Regulations for Microorganisms.

	MCL Goal	MCL*
Total coliforms (including fecal coliforms & E. coli)	zero	5%
Viruses	zero	99.99% killed or inactivated
Giardia lamblia	zero	99.99% killed or inactivated

MCL - Maximum Contamination Level

\*No more than 5.0% of the water samples are total coliform-positive in a month. Every sample that has total coliforms must be analyzed for fecal coliforms. The presence of any fecal coliforms is unacceptable in drinking water.

## Common sources for water used in seafood processing

Public water systems

Private wells

Seawater

### Monthly Sanitation Control Record

Report Date: 3/01/00

Firm Name : Any Seafood Co., Inc.

Firm Address: Anywhere, USA

<b>1) Safety of Water</b> ? Safe and sanitary source (S/U) (Annual) ? No cross-connections in hard plumbing (S/U)	<input checked="" type="checkbox"/> S  <input checked="" type="checkbox"/> U	Municipal water bill and analysis on file (1/10/00) Requested installation of air gap in water line used to fill new thaw tank.
<b>2) Condition and Cleanliness of Food Contact Surfaces</b> ? Processing equipment and utensils in suitable condition (S/U)	<input type="checkbox"/>	
<b>3) Prevention of Cross-contamination</b> ? Physical conditions of plant and layout equipment (S/U)	<input type="checkbox"/>	

S = Satisfactory / U = Unsatisfactory, requires correction

Additional Comments:

Air gap installed 03/02/00

Signature or initials RJP

to cesspools, septic tanks, agricultural sites, or associated drainage fields, or cracked or improperly sealed well casings or liners.

Leaking from around the well head, poor drainage, other uses (horse trough), and chemical storage should raise concerns about this private well as a source of water for food.





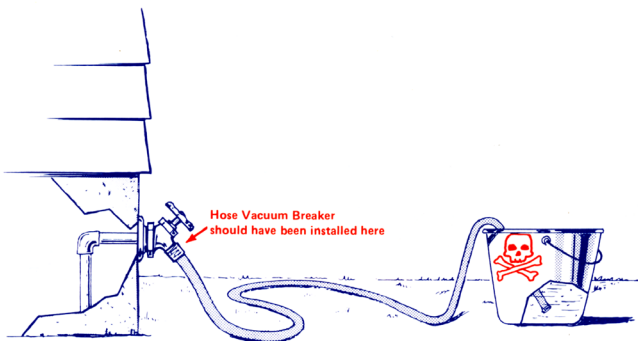
### Causes of In-Plant Water Contamination

Backpressure can be a source of contamination. For example, when a potable system is connected to systems operating under higher pressure by means of a pump, boiler, elevation difference, or air or steam pressure. Monitoring should focus on systems that automatically mix water with steam, detergents or sanitizers, or have reservoirs from which water is pumped for cooling, spraying, or supply. Manufacturers of backflow prevention devices (air gap, vacuum breaker, check-valve) will often supply diagrams, brochures, and examples for training purposes.

### Key Sanitation Condition No. 2— Condition and Cleanliness of Food Contact Surfaces

Food contact surfaces, like shrimp baskets and tables, must be clean and sanitary. They must be made of proper materials and be in good condition so that it's possible to easily clean and sanitize them.

Food contact surfaces that food directly or indirectly contacts during normal operations



- include utensils, knives, tables, cutting boards,
- conveyor belts, ice makers, ice storage bins, hands,
- gloves, and aprons. Even an overhead ceiling, cold
- pipe, or condenser unit would be a food contact
- surface if condensate forms and drips onto a
- processing table below.

### General Requirements for Food Contact Surface

- Make sure that seafood handling equipment is
- cleanable and free from sharp edges, pits, or rough
- surfaces. Natural materials, like reed baskets, absorb
- water and soils and cannot be effectively sanitized
- for reuse. Safe material should be non-toxic (no
- leaching of chemicals), nonabsorbent (can be
- drained and/or dried), resist corrosion, and should
- also be inert to cleaning and sanitizing chemicals.
- When surfaces are designed or fabricated, make
- sure that they can be adequately cleaned and
- sanitized, and ensure that all surfaces are smooth,
- including seams, corners, and edges.

### What to Monitor

- Monitor the condition of food contact surfaces,
- as well as the cleanliness and sanitation of
- food contact surfaces. Also watch the type and
- concentration of sanitizers used. Regularly inspect
- gloves and outer garments that might contact food.

### How to Monitor

- Monthly visual inspections are used to ensure
- that food contact surfaces are in good condition
- and can be properly cleaned and sanitized. The
- adequacy of cleaning and sanitizing should be
- monitored after each cleaning and sanitizing
- operation. Gloves and aprons should be checked
- daily for cleanliness and good repair. Sanitizer
- strength should be checked before the sanitizer
- is applied. Verification checks (for example,
- microbiological sampling) for sanitation are
- recommended, but not required. Problems with
- food contact surfaces that are not easily cleaned
- should be corrected in a timely manner. Problems
- with improperly cleaned and sanitized equipment,
- employee gloves and outer garments, and sanitizer
- strength should be corrected before work begins.
- Monitoring should be more frequent for food
- contact surfaces associated with ready-to-eat

products than for surfaces associated with raw, to-be-cooked seafoods.

### Typical Corrections

**Observation:** Sanitizer concentration from dispenser varies day to day.

**Correction:** Repair or replace chemical proportioning equipment and train cleaning crew in its proper use.

**Observation:** Juncture of two tabletops traps food debris.

**Correction:** Separate tables to allow access for cleaning.

**Observation:** Table work surfaces show signs of corrosion.

**Correction:** Refinish or replace damaged equipment and switch to less corrosive cleaning compound.

Food contact equipment should be designed and installed to drain and not entrap soils. It should provide access for cleaning and inspection, and should be able to withstand the plant environment.

Special cleaning may sometimes be necessary. As an example, consider that *listeria* often grow in a microscopic film (biofilm). *Listeria* are 1,000 times more resistant to common sanitizer (chlorine) when in this film. They form an invisible layer of bacteria interlocked with grapevine like tendrils requiring extraordinary cleaning procedures. Alkaline detergents are far more effective than general purpose detergents for lifting biofilms.

### Key Sanitation Condition No. 3— Prevent cross-contamination

Cross-contamination is the transfer of biological or chemical contaminants to food products from other foods, food handlers, or food handling environment. Preventing cross-contamination from unsanitary or potentially toxic sources to food contact surfaces or aquacultured products is essential and a very high priority in any GMP compliance program. Employee practices to

### Examples of Poor Employee Practices

Handling raw product, then handling cooked product.

Working near or on the floor, then handling product.

Returning from restrooms without washing hands.

Shovel used to handle floor waste, also used to handle product or ice.

Scratching face, then handling product.

Touching unclean door handle, then handling product.

prevent cross-contamination include separation of products from nonfood items and surfaces, and plant design to prevent cross-contamination.

Proper controls ensure that aquaculture procedures prevent the cross-contamination of products by raw materials, ingredients, chemicals or unsanitary operations. This includes contamination of food handling equipment, utensils, gloves and outer garments, and raw product contact with finished products, especially cooked or other ready-to-eat products. Any equipment used for purposes other than aquaculture must not be used for shrimp without thoroughly washing first. Wash shrimp handling equipment separately from other equipment. Do not cross livestock areas, manure compost sites, etc., with shrimp transport equipment. Ensure adequate separation or protection of products in storage.

Store clothing and gloves in clean and dry locations. Ensure that clothing and gloves are not exposed to splash, dust, or other contaminants. Store clean garments separately from soiled garments and gloves.

Bare skin, hair, saliva, and jewelry often harbor very large numbers of microorganisms, some of which cause disease. Any hand to body contact, like touching the face, nose, or mouth contaminates hands that can then be transferred to food or food handling equipment. Hair nets may be unnecessary when outside working ponds, but be aware of the concern and at least wear a hat when harvesting or grading shrimp. Employees

often track contaminants onto aquaculture premises on shoes and clothing. Employer-issued clothing that is cleaned, maintained, and stored on the premises significantly reduces this source of cross-contamination. Boot dips (footbaths) containing double strength sanitizer (800 ppm quaternary ammonium compounds, for example) may be necessary before entering shrimp packing rooms and other sensitive areas

The contamination of ready-to-eat seafood, like cooked shrimp, with drip from raw seafood is a major health hazard, and is responsible for numerous illness outbreaks worldwide. If you ever handle ready-to-eat products, be sure company procedures are in place and monitored to prevent such cross-contamination. Separate raw and ready-to-eat products. Prevent cross-contamination during handling by designating separate areas for handling raw and ready-to-eat products, controlling the movement of equipment from one area to another; and controlling the movement of employees from one area to another.

Proper handwashing is essential for the production of safe aquacultured products. Handwashing is a well-researched topic and much is known about its importance, the steps required to clean hands effectively, and people's handwashing habits. Investigators estimate that 30-40 percent of foodborne illness results from inadequate handwashing. Many people do not routinely wash their hands after visiting the toilet. They must be required to do so as a condition of employment, and remember, the policy also applies to managers and facility guests. Handwashing at the beginning of each workday and after every break also helps in the control of prohibited substances, such as antibiotics like chloramphenicol. Very thorough double washing is usually necessary to remove these compounds when present on hands.

Proper handwashing takes training and monitoring to assure that it is properly performed. Very warm water is more effective than cold water and should be available at handwashing stations whenever possible. After wetting hands and applying hand soap, rub all surfaces for 30 seconds, including between fingers, under nails, the wrist, and lower forearm. Use only clean water from a potable water source for handwashing. Dipping hands in an approved sanitizer such as 100 ppm chlorine or 25 ppm iodine

## How to wash hands (a GAQP)

Remove jewelry;

Wet hands with warm water (110° F);

Lather and rub all surfaces thoroughly;

Rinse;

Dry with disposable paper towels; and

Avoid recontamination.

provides additional pathogen control in hatcheries and when handling finished products. Drying hands with single-use toweling is effective and sanitary. In certain settings, waterless hand cleaners can be used to kill some disease-causing bacteria but washing with soap and water is more effective at removing soils, and is the preferred method.

Handwashing facilities must be located where they are convenient, close to employee work sites and such that detours are not required getting to them from toilet, entry, or employee changing areas. They should also be located where supervisors can monitor their use. Be sure that handwashing stations are working properly, supplied with potable water (warm water is preferred to cold water), and supplied with hand soap and paper towels (preferred) or electric driers.

Maintenance of toilets, privies and handwashing facilities are functions under key sanitation condition No. 4 of the U.S. HACCP regulation and the National Seafood HACCP Alliance's Sanitation Control Procedures course. The topic is combined with key condition No. 3 for our discussions on GAQPs. Handwashing, hand sanitizing and toilet facilities are essential parts of the handwashing program in order to prevent cross contamination.

Handwashing, hand sanitizing and toilet facilities should be checked and documented on the Daily Sanitation Control Record at least once per day (preferably during pre-op) for cleanliness, proper function, and adequate supplies; hot water (110° F or 43°C) should be checked weekly.



Eagle® Group



Hand sanitizer concentrations should be checked:

- In ready-to-eat food plants at least every 4 hours,
- In raw, to-be-cooked seafoods, at least during pre-op check.

When monitoring of toilet and handwashing facilities indicates that supplies are lacking or they are not functioning properly, fix the problem immediately.

When hand sanitizer concentrations are incorrect, a new hand dip with the proper concentrations should be provided and a responsible individual should determine 1) whether employees need to rewash and sanitize their hands, and 2) what to do with the affected product. The Daily Sanitation Control Record should identify where and when each observation was made, whether the conditions observed were satisfactory or unsatisfactory, actual concentration of any sanitizers observed, any necessary corrections, and the person making the observations.

Toilets are permanent fixtures plumbed for discrete waste disposal to a wastewater treatment facility. Water is used for flushing. Waste treatment facilities may be private onsite systems or serve a larger community (municipal waste treatment). They must be properly located and designed, and usually utilize a combination of solids settling, and aerobic and anaerobic bacterial digestion. Release of the effluent through spreader pipes into a vegetation basin may further improve the quality of discharge water but human pathogens may not be destroyed by this practice alone.

Another approach is to treat wastes with lime, formaldehyde or a commercial liquifier/stabilizer to destroy human pathogens prior to discharge. If used in combination with bacterial digestion, such treatments should occur in a tank downstream from any digestion tanks, prior to discharge. Hydrated lime (calcium hydroxide, sometimes called slake lime) is frequently used in pond aquaculture operations and is an effective treatment for human wastes. Sufficient lime should be added to raise the pH (alkalinity) of waste to pH 12 for a minimum of 30 minutes. Certain chemical stabilizers may be unacceptable in some areas due to environmental concerns. Hydrated lime is generally safe to the environment but, due to its high pH, may kill plants or aquatic animals in the discharge area unless first diluted.

- Privies may be either vault or earthen pit types. No water is used for flushing. A vault privy contains a waste-holding vessel that is completely sealed. Wastes must be periodically pumped out and disposed in an accepted, safe manner at least 500 meters from streams, water supplies, ponds, and aquaculture or food handling facilities.

- Earthen pit privies are temporary structures and must be periodically moved to a new site, always located where spring or rainwater flooding of the pit is avoided. Old sites are backfilled with soil. This type of privy must be carefully located to prevent seepage of wastes into potable or pond supply waters. Privy buildings must be on a foundation, vented and screened to keep out flies, rodents, and other pests. Details for locating, designing, constructing, and maintaining privies are provided in the course reference materials.

- Maintenance of toilets, privies, and handwashing facilities are functions under key sanitation condition No. 4 of the U.S. HACCP regulation and the National Seafood HACCP Alliance's Sanitation Control Procedures course. The topic is combined with key condition No.3 for our discussions on GAQPs.

### **Key Sanitation Condition No. 5— Protection from adulterants**

- Procedures must be in place and routinely monitored to assure that aquacultured products are not contaminated by materials harmful to consumers. Examples of such contaminants include, lubricants, fuel, pesticides, cleaning compounds, sanitizing agents, condensate, and floor splash. Note that sanitation chemicals may be approved for food contact surfaces but surfaces must drain and chemicals must be used at proper concentration.

- Check for location of hand sanitizing dips that may contaminate food and food contact surfaces through splashing at pre-op or start-up, after every 4 hours, and at post-op.

- Check for accumulation of condensate on ceiling at pre-op or start-up, after every 4 hours, and at end of production day. When an adulterant is discovered, stop, correct, prevent from recurring, evaluate product safety, and document corrections. Some examples of this are to relocate hand sanitizing dips to prevent adulteration of food



and food contact surfaces by splashing, remove condensate from unsanitary surfaces, correct air flow and room temperature to reduce condensate, install covers to prevent condensation from falling on food, packaging materials, or food contact surfaces, or even simply squeegee the floor to remove standing water.

Record monitoring results and corrections taken in the Daily Sanitation Record. The person responsible for monitoring should record the time and date of the activity, and initial the form.

### **Key Sanitation Condition No. 6—Labeling, Storage and Use of Toxic Compounds.**

Ensure that the labeling, storage, and use of toxic compounds are adequate to protect food. Implement procedures and routinely monitor to assure that aquacultured products are not contaminated by materials harmful to consumers.

The improper use of toxic compounds (e.g., cleaners, sanitizers, rodenticides, insecticides, machine lubricants, and some food additives) may lead to product adulteration. Toxic compounds must be properly labeled, stored, and used to prevent contamination of food, food contact surfaces, packaging materials, and ingredients.

Check proper labeling at least once per day.

#### **What to check (a GAqP):**

##### **If in the original container**

- a) Name of the compound in the container
- b) Responsibility statement: Manufacturer name and address or second party manufacturer/packer/distributor
- c) Appropriate approvals (EPA registration)
- d) Instructions for proper use

##### **If in a working container**

- a) Name of the compound in the container
- b) Instructions for proper use

Check proper storage at least once per day including:

1. Placing in an area with limited access (e.g., under lock and key given only to certain personnel).

2. Separating food-grade from non-food-grade materials (original containers are useful).
  3. Keeping away from food, food contact surfaces, packaging materials, and ingredients.
  4. Using food containers ONLY for food.
- Check proper use at least once per day including:
1. Following the manufacturer's instructions or recommendation and as provided on the EPA registered label.
  2. Using in a manner that will not result in food adulteration.
- If original container is improperly labeled, set aside and return supplies to the supplier in a timely fashion. Containers for potentially toxic compounds, such as those used to hold cleaners or other nonfood items, must be labeled to identify their contents and provide instruction in proper usage. Such containers must not be food containers that could inadvertently be used to pack an aquacultured product. If working container is improperly labeled, replace with proper labels immediately. If working container is inappropriate or damaged, destroy or discard container immediately. If chemicals are improperly stored, move to proper storage location immediately. If chemicals are improperly used, immediately assign other previously trained employees to use the chemicals, then retrain those who were not using them properly.
- Record monitoring results and corrections taken on the Daily Sanitation Record. The person responsible for monitoring should record the time and date of the activity, and initial the form.

### **Key Sanitation Condition No.7- Employee health**

Employee health and hygiene are major components of a company's sanitation control program. Monitoring employees for symptoms of illness and for wounds that could potentially contaminate food should be observed during pre-op or at the start of each shift. Because a person's health can change overnight, it is important to monitor employee health on a daily basis. Employees must report if they have a diagnosed illness, a symptom, or a high-risk condition.

Manage people who are diagnosed with or have symptoms of an illness, wounds or other afflictions that could be a source of microbial contamination. Employees must be trained and know their responsibilities for preventing contamination.

If an employee has symptoms of a disease or infection that could contaminate food products, supervisors should (depending on the situation) reassign, relocate, send home, or require that an impermeable cover be placed over lesions. All unsatisfactory conditions must be recorded including the corrective action taken to reduce or eliminate the problem.

Emphasize to employees that any of these signs or symptoms (diarrhea, vomiting, open skin sores, boils, fever, dark urine or jaundice) may indicate infection by a pathogen that can be transmitted to others through food handling. Management should have a written health policy that requires reporting, work restrictions and exclusions for employees who have symptoms or high-risk conditions. Employees should practice good hygiene and report any illness or lesions to the supervisor before working with food.

### **Key Sanitation Condition No. 8- Exclusion of Pests from Food Processing Areas**

Animals of all kinds are potential sources of pathogenic microorganisms, even a guard dog. Exclusion of rodents, other mammals, insects, birds, and reptiles is an important part of any sanitation program. Flies and cockroaches may transmit *Salmonella*, *Staphylococcus*, *C. perfringens*, *C. botulinum*, *Shigella*, *Streptococcus*, and other pathogens. Rodents are sources for *Salmonella* and parasites, and birds are hosts for a variety of pathogens such as *Salmonella* and *Listeria*.

There are 3 phases of a pest control program. The first step is the elimination of the pest's shelter, and those items that attract the pest. The second is the exclusion of the pest from buildings. And finally, there is the elimination of any pests that gain entry.

Look for signs of pest activity, not just the pests themselves. Conditions that allow pests to hide, breed, feed, and drink must be controlled if other pest control measures are to work effectively.

- Example monitoring checklists are shown in the slides accompanying this lesson.
- In many countries, including the United States and Europe, pesticides are carefully regulated. They must be prepared and applied as labeled by the manufacturer in accordance with federal restrictions. These requirements are often highly specific to, for example, the intended pest, locations, chemical concentration, method of application, application frequency, and whether special training is required of the applicator.

### **Summary**

As we have learned, the Good Manufacturing Practices involve many essential concerns for aquaculture companies. The topic is large and students are encouraged to review references provided in this manual. Other prerequisites to HACCP, such as product traceability and recall programs are equally important so that you know where your products are grown, under what conditions, their status at all times while under your control, and where they go when they leave your firm.

Example GAqP for Privy style toilets (from U.S. state of Utah regulations, Utah Division of Water Quality)

#### **R317. Environmental Quality, Water Quality.**

#### **R317-560. Rules for the Design, Construction, and Maintenance of Vault Privies and Earthen Pit Privies.**

##### **R317-560-1. Definitions.**

The following definitions shall apply in the interpretation and enforcement of these rules. The word "shall" as used herein means a mandatory requirement. The term "should" is intended to mean a recommended or desirable standard.

- 1.1 "Division" - means the Utah Division of Water Quality
- 1.2 "Earthen Pit Privy" - means a toilet facility consisting of a pit in the earth covered with a privy building affording privacy and shelter and containing 1 or more stools with an opening into the pit.

1.3 "Health Officer" - means the Director of a local health department or his authorized representative.

1.4 "Local Health Department" - means a city-county or multi-county local health department established under Title 26A.

1.5 "Vault Privy" - means a toilet facility wherein the waste is deposited without flushing into a permanently installed, watertight vault or receptacle. Vault wastes must be periodically removed and disposed of in accordance with these rules.

### **R317-560-2. General Requirements.**

2.1 Vault privies and earthen pit privies are permitted as a substitute for water closets, for temporary or limited use in remote locations where provisions for water supply or wastewater disposal pose a significant problem. The intended primary use of vault and pit privies in this rule is for facilities such as labor camps, semi-developed and semi-primitive recreational camps, temporary mass gatherings, and other approved uses. Potable water under pressure may or may not be available.

2.2 Requests for the use of vault privies or earthen pit privies shall be evaluated on a case-by-case basis by the local health department having jurisdiction and must receive the written approval of the local health officer or his designated representative prior to the installation of such devices.

2.3 Vault privies and earthen pit privies shall be located and constructed in such a manner to prevent the entrance of precipitation or surface water into the vault or pit, either as runoff or as flood water.

2.4 All vault privies shall comply with the following:

A. They shall be located a minimum of:

- (1) 10 feet from property lines and water distribution pipes.
- (2) 15 feet and not more than 500 feet from any living or camping spaces served.
- (3) 50 feet from any nonpublic culinary water source and from any lake, stream,

river, or watercourse, measured from the high water line.

B. They shall be located at least 100 feet from "deep" public water supply wells. It is recommended that vault privies be located at least 1500 feet from "shallow" wells and springs used as public water sources. Any proposal to locate closer than 1500 feet must be reviewed and approved on a case-by-case basis by the health authority, taking into account geology, hydrology, topography, existing land use agreements, and potential for pollution of water source. Any person proposing to locate a vault privy closer than 1500 feet to a public "shallow" well or spring must submit a report to the health authority which considers the above items. The minimum required isolation distance where optimum conditions exist and with the approval of the health authority may be 100 feet. R309-106 requires a protective zone, established by the public water supply owner, before a new source is approved. Public water sources which existed prior to the requirement for a protective zone requirement may not have acquired one. Such circumstances must be reviewed on a case-by-case basis by the health authority. "Deep" wells and "shallow" public water supply sources are as defined in R309-106.

C. The maximum high water table shall be at least 2' below the maximum depth of the vault.

2.5 All earthen pit privies shall comply with the following:

A. They shall be located a minimum of:

- (1) 25 feet from property lines and water distribution pipes.
- (2) 25 feet and not more than 500 feet from any living or camping spaces served.
- (3) 100 feet from any lake, stream, river, or watercourse, measured from the high water line.

B. They shall be located at least 100 feet from "deep" wells that are nonpublic water supply sources. They shall be located at least 200 feet from "shallow" wells and springs that are nonpublic water supply sources. Although this latter separation distance shall be generally adhered to as the minimum required separation

distance for “shallow” nonpublic water supply sources, exceptions may be approved on a case-by-case basis by the health authority, taking into account geology, hydrology, topography, existing land use agreements, and potential for pollution of water source. Any person proposing to locate an earthen pit privy closer than 200 feet to an individual or nonpublic “shallow” well or spring must submit a report to the health authority which considers the above items. In no case shall the health authority grant approval for an earthen pit privy to be closer than 100 feet from a “shallow” well or spring. “Deep” wells and “shallow” nonpublic water supply sources shall be defined as for public water sources in R309-106.

C. They shall be isolated from public water supply sources as specified for vault privies in R317-560-2.4.B.

D. The maximum high water table shall be at least 4’ below the maximum depth of the pit.

### **R317-560-3. Design and Construction Requirements.**

3.1 All vault privies shall have vaults or receptacles which are watertight and shall be constructed of reinforced concrete, metal or other material of equal durability which has been approved by the local health department. Inside and outside surfaces of metal vaults shall be thoroughly coated with a good quality asphalt-base material.

3.2 For all earthen pit privies, pit cribbing shall be installed in the pit to prevent caving of soil into the pit and to insure a firm foundation for the building. The pit cribbing shall fit firmly, be in uniform contact with the earth walls on all sides, and shall descend to the full depth of the pit and rise flush with the ground surface.

3.3 All vault privies and earthen pit privies shall comply with the following:

A. A sill or foundation constructed of concrete or treated lumber shall be placed on the ground surface around the vault or pit so as to underlie the floor area of the privy building.

B. A floor and riser of impervious material shall be placed over the sill and vault or pit in such a

manner to prevent access of rodents and insects into the vault or pit.

C. The privy building shall be firmly anchored, rigidly constructed, free from hostile surface features such as sharp edges and exposed nail points, and shall afford complete privacy and protection from the elements. The building shall be of fly-tight construction. The door(s) shall be self-closing and provided with an inside latch. Interior floors, walls, ceilings, partitions, and doors shall be finished with readily cleanable materials resistant to wastes and cleaners.

D. The building shall be ventilated by leaving approximately 4-inch openings at (1) the top of two opposite walls just beneath the roof, and (2) at the bottom of two opposite walls just above the floor, all of which are screened with 16-mesh screen or smaller of durable material. Hardware mesh with 1/4” openings may be placed on the inside and outside of the screened openings to protect the smaller mesh screen. Direct line of sight into the building through the bottom ventilation openings shall be effectively obstructed with a louver or other suitable means.

E. Each vault or pit shall be vented to atmosphere with a minimum of 100 square inches of vent area for each seat connected to the vault. (One hundred square inches is equivalent to two 8-inch pipes, or one 12-inch pipe.) Roof vents must extend at least 12 inches above the highest point of the roof and shall be provided with a rain cap and screened with 16-mesh screen or smaller of durable material. Venting to an attic vent may be provided for by utilizing the space between an inside and outside wall if that space provides sufficient area.

F. The seat should be so spaced as to provide a minimum clear space of 24 inches between each seat opening in multiple unit installations, and should provide 12 inches clear space from the seat opening to the sidewall in single and multiple units. In multiple unit installations, partitions should be provided between risers to afford user privacy.

G. The seat riser should have an inside clearance of not less than 21 inches from the



front wall and not less than 24 inches from the rear wall of the privy building.

H. The seat top should be not less than 12 inches nor more than 16 inches above the floor.

I. The seat opening shall be covered with an attached, movable toilet seat and lid of easily cleanable, impervious material that can be raised to allow sanitary use as a urinal and can be closed when not in use. Privy buildings for public use shall be provided with open-front seats.

J. Commercially preconstructed vault privy buildings not incorporating all of the requirements of these rules may be evaluated for approval on a case-by-case basis by local health departments.

**R317-560-4. Maintenance Requirements.**

4.1 Odor-control chemicals or disinfectants may be added to the vault or pit at frequent intervals to prevent bacterial decomposition and resulting odors. Extreme caution should be exercised to insure that these chemicals are not spilled on or allowed to remain on the seat. Garbage, ashes, oil, hazardous or toxic wastes, or other wastes not normally deposited in vault privies or earthen pit privies shall not be disposed of therein.

4.2 All vault privies and earthen pit privies shall be maintained in a satisfactory manner to prevent

the occurrence of a public health nuisance or hazard or to preclude any adverse affect upon the quality of any waters of the State.

4.3 Toilet paper with a holder should be provided for every seat. An adequate supply of toilet paper should be maintained at all times.

4.4 All vault privies shall comply with the following:

A. The vault or receptacle is not permitted to be filled to a point higher than 12 inches below the floor surface of the privy building.

B. Vault wastes shall be periodically emptied at sufficiently frequent intervals to prevent creation of an insanitary condition, and shall be transported in an acceptable manner to a disposal site approved by the Division. Where disposal in a public sewer system is not possible, vault wastes must be deposited in approved sanitary landfills.

4.5 All earthen pit privies shall comply with the following:

A. When the pit becomes filled to within 18 inches of the ground surface, a new pit shall be excavated and the old one shall be backfilled with approximately 2 feet of compacted earth and mounded slightly to allow for settlement and to prevent depressions for surface ponding of water.

Type of Camp	Source	Storage
Modern camps with full facilities	60 gal/day/person	30 gal/person
Semi-developed camps, and day-use areas with limited facilities	Minimum 5 gal/ day/person	Minimum 2.5/ gal/person
Semi-developed camps, and day-use areas (with flush type toilets)	20 gal/day/person	10 gal/person

Date of Enactment or Last Substantive Amendment: 1993

Notice of Continuation: October 7, 2002

Authorizing, and Implemented or Interpreted Law: 19-5-104