Aquaculture Facility Certification

Feed Mill
Best Aquaculture Practices
Certification Standards, Guidelines

Community • Environment • Animal Welfare • Food Safety • Traceability
BEST AQUACULTURE PRACTICES CERTIFICATION

The following Best Aquaculture Practices standards and guidelines apply to facilities that process and manufacture finished feeds for the culture of fish, crustaceans and other aquatic animals.

The BAP standards are achievable, science-based and continuously improved global performance standards for the aquaculture supply chain that assure healthful foods produced through environmentally and socially responsible means. They are designed to assist program applicants in performing self-assessments of the environmental and social impacts, and food safety controls of their facilities, and to lead to third-party certification of compliance. For further information, please refer to the additional resources listed.

BAP standards demand compliance with local regulations as the first step toward certification. However, not all regulations are equally rigorous. For this reason, BAP standards set out requirements for documentation and procedures that must be in facility management plans, whether they are prescribed by local regulations or not. By so doing, they seek, where possible, to impose consistency in performance among facilities in different producing regions and to engage the industry as a whole in a process of continuous improvement.

In common with ISO usage, these standards use the words “shall” to mean compliance is required and “should” to mean compliance is recommended. Auditable points are “shall” statements listed at the end of each standard.
To obtain BAP certification, applicants shall be audited by an independent, BAP-approved certification body. To apply for certification, contact:

Best Aquaculture Practices Management
2 International Drive
Portsmouth, NH 03801
info@bapcertification.org
Telephone: 603 – 317 – 5000
Web: www.bapcertification.org - Email: info@aquaculturecertification.org

The audit consists of an opening meeting, a site assessment, the collection of necessary samples, a review of management records and procedures, and a closing meeting. All points in the standards shall be addressed. Any non-conformity raised during the evaluation is recorded by the auditor in the formal report as:

**Critical** – When there is a failure to comply with a critical food safety, social accountability or legal issue, or a risk to the integrity of the program, the auditor immediately informs the certification body, which then informs BAP Management. Pending clarifications, failure to certify or immediate temporary suspension can ensue.

**Major** – When there is a substantial failure to meet the requirements of a standard but no food safety risk, social accountability, or immediate risk to the integrity of the program, the auditor notifies the certification body and records this in the report. Verification of the implementation of corrective actions shall be submitted to the certification body within 28 days of the evaluation. (Major non-conformities typically reflect issues with general policies.)

**Minor** – When full compliance with the intent of the standards has not been demonstrated, the auditor notifies the certification body and records this in the report. Verification of the implementation of corrective actions shall be submitted to the certification body within 28 days of the evaluation. (Minor non-conformities typically reflect general housekeeping issues.)

BAP standards are developed by committees of technical experts following a process aligned to the FAO Technical Guidelines on Aquaculture Certification. See www.gaalliance.org/bap/standardsdevelopment.php.
1. Community
Property Rights and Regulatory Compliance

Feed mills shall comply with local and national laws and environmental regulations, including those related to product exportation, if applicable, and provide current documentation that demonstrates legal rights for land use, water use, construction, operation and waste disposal.

Reasons for Standard
Certified feed mills shall comply with applicable business-related laws and environmental regulations dealing with, for example, waste disposal, effluents and pest control. Facilities shall also meet established standards for product safety, complying with local and national regulations and the requirements of export markets.

These regulations are needed to assure that feed mills provide pertinent information to governments and pay fees to support relevant programs.

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

- Business licenses
- Land deeds, leases or concession agreements
- Land use taxes
- Construction permits
- Water use permits
- Effluent permits
- Landfill operation permits
- Clearances to use medicated ingredients
- Air quality assessments
- Environmental impact assessments

BAP auditors cannot know all laws that apply to feed manufacturing in all nations. Participating feed mills 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 a variety of governmental agencies dealing with business and the environment. BAP auditors must also become familiar with the legal requirements within the areas they service.

During the BAP site inspection, the representative of the feed mill shall present all necessary documents to the auditor. All documents shall be current, and feed mills shall be in compliance with the requirements stipulated by the documents. In cases where governmental agencies have waived one or more permits, proof of these waivers shall be available.
Standards

1.1: Current documents shall be available to prove legal land and water use by the applicant.
1.2: Current documents shall be available to prove all business and operating licenses have been acquired.
1.3: Current documents shall be available to prove compliance with applicable environmental regulations for construction and operation.

2. Community
Community Relations
Worker Safety and Employee Relations

Feed mills shall strive for good community relations. They shall also comply with local and national labor laws, including those related to young and/or underage workers, to assure worker safety and adequate compensation.

Reasons for Standard
Feed mills are a critical support industry for aquaculture, with expenditures on feed often the single most important cost of producing aquatic species. Feed mills can represent considerable sources of employment and tax revenue for local communities and national governments.

Feed mill work is potentially dangerous because of the types of machinery employed and the physical bulk of the raw materials and finished products. Workers may not be well educated nor fully appreciate the risks inherent to feed mills, and sometimes safety instruction may not be adequate.

Feed mills in developing countries may operate in weakly regulated business environments in which pay scales may be low, and wage or labor laws may not be consistently enforced. Feed mills need to maintain good working relationships, not only with their employees, but also the communities in which they operate.

Implementation
To avoid possible conflicts with local communities, representatives of feed mills shall regularly communicate with local leaders by, for example, telephone, written correspondence, meetings or other means.

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

Workers shall be given adequate initial training, as well as regular refresher training, on safety in all areas of feed mill operation and on the application of standard operating procedures. Appropriate protective gear shall be provided for workers according to task, including items such as overalls, eye protectors, ear protectors, dust masks, gloves and boots.

Noise levels in feed mills can be high,
particularly due to hammermills and pulverizers. Exposure for more than eight hours a day to sound in excess of 85 dB is potentially hazardous.

Noise levels can be lowered by the use of noise-control enclosures, absorbers, silencers and baffles, and by the use of personal protective equipment, such as earmuffs. Where technical methods are insufficient, noise exposure shall be reduced by use of hearing protection and administrative controls such as limiting the time spent in noisy environments and scheduling noisy operations outside normal shifts or at distant locations.

Workers shall be trained in the first aid of electrical shock, profuse bleeding and other possible medical emergencies. A plan shall be available for obtaining prompt medical assistance for injured or ill workers.

If meals are provided for workers they shall be wholesome, with food storage and preparation performed in a responsible manner. Safe drinking water shall be available free of charge at all times.

Manuals shall be available to identify standard operating procedures. Safe working practices shall be documented for dangers such as dislodging of bridged grain or meal in bins. Tramp iron and other metal fragments need to be removed by magnets because they can result in injury to personnel and cause serious damage to equipment.

Routine maintenance has an important bearing on the safety of employees. Worn chain and belt drives, for example, can become dangerous, so maintenance procedures are needed to keep workers safe. Uncovered belts or chains are prohibited with the provision of proper driveshafts and/or drive belt safety guards.

Feed mill operators shall appoint an employee safety committee to review work practices and work conditions, and hold regular safety meetings where employees can draw attention to safety problems in need of correction. A log or journal shall be kept to record accidents and issues presented at safety meetings.

During facility inspection, the auditor will determine whether conditions comply with labor laws and safety requirements. The auditor will also interview a random sample of workers to obtain their opinions about wages and safety conditions. Any discrepancies will be investigated.

For Additional Information

Feed Manufacturing Technology V
Safety and Health Loss Control Management
American Feed Industry Association — 2005
Arlington, Virginia, USA

9th International Congress on Noise as a Public Health Problem
Foxwoods, Connecticut, USA
Standards

2.1: The applicant shall provide evidence of meetings, committees, correspondence, service projects or other activities that demonstrate commitment to regular interaction with the local community to avoid or resolve conflicts.

2.2: The applicant shall meet or exceed the minimum wage rate, including benefits, required by local and national labor laws.

2.3: The applicant shall not engage in or support the use of child labor. The applicant shall comply with national child labor laws regarding minimum working age or ILO Minimum Age Convention 138, whichever is higher. ILO Minimum Age Convention 138 states the minimum age shall be 15, unless local law in developing nations is set at 14 – in accordance with developing nations exceptions under this convention.

2.4: The employment of young workers above the minimum age but under 18 years old shall be in compliance with local laws, including required access to compulsory school attendance and any restrictions on hours and time of day.

2.5: Young workers above the minimum age but under 18 years old shall not be subjected to hazardous work that can compromise their health and safety.

2.6: All work, including overtime, must be voluntary. The facility shall not engage in any form of forced or bonded labor. This includes human trafficking, the holding of original identity papers, prohibiting workers from leaving the premises after their shift or other coercion intended to force anyone to work. Where the holding of original identity papers is required by national law, such papers must be immediately returned to employees upon request and readily available to them at all times.

2.7: The applicant shall abide by the national mandated work week where applicable.

2.8: The applicant shall comply with national labor laws for pay, overtime and holiday compensation for hours worked beyond the regular work day or week.

2.9: The facility shall not require the payment of deposits, deduction from wages or withholding of pay that is not part of a legal contractual agreement with the employee and/or that is not provided for or permitted by national law.

2.10: The facility shall not make deductions from wages as part of a disciplinary process.

2.11: The applicant shall only employ legally documented workers, whether nationals or migrants.

2.12: The facility shall maintain all relevant documents that verify any contracted/subcontracted workers, whether contracted through a labor service or otherwise, are paid in compliance with all local wage, hour and overtime laws.

2.13: All labor, recruiting or employment services used by the facility must be licensed to operate by the local or national government as a labor provider.

2.14: The facility shall maintain all relevant documents that verify piece workers (those paid a fixed “piece rate” for each unit produced or action performed regardless of time) are paid in compliance with local law, including regulations regarding equivalence to or exceeding minimum requirements for wages, hours, overtime and holiday pay.

2.15: The facility shall provide to all workers, whether hourly, salaried, piece-rate, temporary, seasonal or otherwise, prior to hire and during employment, written and understandable information regarding the terms of employment, worker rights, benefits, compensation,
hours expected, details of wages for each pay period and facility policies regarding disciplinary actions, grievance procedures, authorized deductions from pay and similar labor-related issues. This information must be provided in the prevalent language of the majority of employees.

2.16: Where contracted/subcontracted or temporary workers are hired through a labor or employment service, the facility shall ensure that the labor or employment service provides the above information prior to and during hire, in appropriate languages, to ensure workers are aware of their rights and conditions of employment as described above.

2.17: Workers shall have the right to terminate their employment after reasonable notice.

2.18: The facility shall appoint a management person responsible for ensuring worker health, safety and training.

2.19: Workers shall have the right to collective bargaining, or at least one employee shall be elected by the workers to represent them to management.

2.20: There shall be a written worker grievance process, made available to all workers, that allows for the anonymous reporting of grievances to management without fear of retaliation.

2.21: The facility shall provide for equal opportunity with respect to recruitment, compensation, access to training, promotion, termination and retirement.

2.22: The facility shall treat workers with respect and not engage in or permit physical, verbal or sexual abuse, bullying or harassment.

2.23: If provided, employee housing shall meet local and national standards (e.g., water-tight structures, adequate space, heating/ventilation/cooling), and shall be free of accumulated trash and garbage.

2.24: Safe drinking water shall be readily available to employees. If meals are provided, they shall be wholesome and commensurate with local eating customs.

2.25: Running water, toilets and hand-washing facilities shall be readily available to employees.

2.26: In the event of accidents or emergencies, the applicant shall provide basic medical care, including access to or communication with medical authorities. Additionally, first aid kits shall be readily available to employees, and any expired content shall be replaced.

2.27: The applicant shall provide training in general health, personal hygiene and safety, first aid and contamination risks to all employees. Safety documents must be available in a language understood by the workforce.

2.28: An emergency response plan shall be prepared for serious illnesses or accidents, including measures to be taken in case of fire.

2.29: Select workers shall be made familiar with details in emergency response plans and trained in the first aid of electrical shock, profuse bleeding, drowning and other possible medical emergencies.

2.30: Protective gear and equipment in good working order shall be provided for employees (e.g., eye protection for welding, gloves for shop work, boots for wet areas, ear protection near hammer mills and pulverizers). Auditor shall verify deployment.

2.31: The applicant shall limit worker exposure to sound in excess of 85 dB to less than eight hours a day or apply a stricter national standard.

2.32: Manuals that identify standard operating procedures shall be written in the employees’ main language.
2.33: Safe working practices shall be documented for such dangers as feedmill fire hazards, “bridging,” tramp iron, worn chains and belts. Machinery shall have proper driveshaft and/or drive belt safety guards.

2.34: The facility shall identify and eliminate or minimize any workplace health and safety hazards by conducting a thorough risk assessment. This includes a requirement for accident investigation.

2.35: An employee safety committee shall regularly meet to review work practices and maintain a log of accidents.

3. Environment
Sustainability of key inputs: Fishmeal, Fish Oil and Soy

Feed mills shall strive to reduce dependence on wild fisheries and obtain marine meals and oils from sustainable sources. Certified mills shall provide reliable information on inclusion of such ingredients in compound feeds. Feed mills shall also develop sourcing policies that actively favour responsibly produced terrestrial plant ingredients including soybeans.

Reasons for Standard
The majority of feeds manufactured for use in aquaculture contain fishmeal and fish oil as protein and lipid sources. Although fishmeal and fish oil are renewable resources, there are limits to the amounts of these products the world’s oceans can supply.

The BAP program therefore supports the use of feed ingredients derived from terrestrial sources, as well as fishmeal and fish oil produced from by-products. Ingredients of wild fishery origin that are not by-products shall come from certified sustainable sources or fisheries improvement projects. This standard is concerned with meals and oils derived from wild, marine sources including fish, squid and krill. Where the words “fishmeal” and “fish oil” are used, they refer to the broader category of marine meals and marine oils.

Also, in this standard, “by-product” refers to materials of either fishery or aquaculture origin produced as a residual of or incidental to any processing operations except sorting.

“By-product” does not include “bycatch,” which is defined as fish and other marine life that are incidentally caught while fishing for a target species. “Reduction fisheries” are fisheries that “reduce” or turn their catch into fishmeal and fish oil.

Feed mills shall adopt preferential sourcing of responsibly produced soymeal and soy derived ingredients such that a minimum of 50% (calculation based on mass balance) are derived from certified sources by June 2022. Acceptable certifications include ProTerra, RTRS (Round Table for Responsible Soy), and SSAP (Soybean Sustainability Assurance Protocol).

Implementation
Aquafeed producers have an important role...
to play in adopting sustainable sourcing policies, formulating and manufacturing nutritionally balanced diets that increase feed efficiency, and providing reliable information to their customers.

Important substitutes for proteins and oils from reduction fisheries include meals and oils from plants, rendered animal proteins and fish-processing by-products from sustainable or non-threatened fisheries.

The evaluation of the sustainability status of reduction fisheries is evolving, and certification programs are developing accordingly. This standard requires development of a plan to avoid unsustainable sources and transition to certified sources as they become available. Facilities shall create and implement clear, written plans of action that define policies for sourcing all fishmeal and fish oil from responsibly managed fisheries.

The plans of action must address how to avoid:

- use of fishmeal or fish oil sourced from illegal, unreported or unregulated fisheries, or by-products from such fisheries
- fishmeal or fish oil sourced from fish or fish by-products from fisheries designated by the International Council for the Exploration of the Sea (ICES), Food and Agriculture Organization (FAO) of the United Nations, National Marine Fisheries Service of the United States, International Union for Conservation of Nature or Commission for the Conservation of Antarctic Marine Living Resources as “subject to overfishing,” “overfished,” “harvested unsustainably,” “fishery closed,” “stock overexploited,” “no fishing recommended,” “stock critical,” “endangered” or “critically endangered”
- any products of the same genus as the species for which the feed is intended.

Aquafeed producers shall actively favor marine oils and proteins derived from fisheries that are classified by reputable international third parties such as the FAO and ICES as sustainably fished, fully fished or underexploited. One example of an appropriate tool for developing a responsible sourcing plan is the FishSource data bank created by the Sustainable Fisheries Partnership (http://www.fishsource.com).

After June 2015, for fishmeal and fish oil derived from reduction fisheries, at least 50% (calculation based on mass balance) shall come from sources that are certified by either the Marine Stewardship Council (MSC) or to the International Fishmeal and Fish Oil Organization Responsible Supply standards (IFFO RS). Alternatively, where MSC- or IFFO RS-certified fishmeal and fish oil are not produced nationally, the above minimum percentage can comprise material from active approved improvers programs as verified by IFFO (http://www.iffo.net/node/493), the Sustainable Fisheries Partnership (SFP, http://fisheryimprovementprojects.org/view-fips/) or World Wildlife Fund (WWF, https://sites.google.com/site/fisheryimprovementprojects/home). This 50% target will be periodically reassessed with the ultimate goal that all fishmeal and fish oil are derived from certified sources.

The primary approved standard for demonstrating compliance is the Marine Stewardship Council Environmental Standard for Sustainable Fishing (ISEAL compliant), provided it is combined with the MSC chain of custody compliance for the
producing factory. The secondary approved standard is the Global Standard for Responsible Supply of the International Fishmeal and Fish Oil Organization (ISO 65 compliant), which includes the fishery as well as traceability, and good manufacturing practice for the producing factory.

Feed mills shall indicate on product labels, packaging, shipping documents or invoices, or in written declarations for all aquaculture feeds the relative content of marine proteins and oils derived from industrial capture fisheries in the feeds. These data shall be expressed as a feed fish inclusion factor defined by the following equation:

**Equation 1**

Feed fish inclusion factor = \[\left(\text{Level of fishmeal in diet (\%)} + \text{Level of fish oil in diet (\%)}\right) ÷ \left(\text{Yield of fishmeal from wild fish (\%)} + \text{Yield of fish oil from wild fish (\%)}\right)\]

The levels in Equation 1 shall include any meal or oil derived from whole wild-caught fish, squid, krill, mollusks or any other wild marine animals. However, they shall exclude meal or oil derived from by-products such as trimmings, offal and their derivatives such as squid liver powder, and aquaculture by-products such as shrimp head meal.

The feed fish inclusion factor estimates the combined fishmeal and fish oil concentration of the feed on a dry-weight basis relative to the wild fish. Thus, an FFIF value of 2 signifies that the feed is twice as concentrated in marine protein and oil as wild fish. It must be declared with enough precision that the sum of fishmeal and fish oil percentages in the aquafeed does not vary by more than ± 2 percentage points from its actual value calculated on an average monthly basis.

The average processing yields from whole fish derived from industrial capture fisheries have been determined to be 22.5% for fishmeal and 5.0% for fish oil. Feed manufacturers must use these default values in the above equation to calculate the FFIF values for the feeds they produce, unless actual, verifiable yield figures are available from their suppliers.

For example, if a feed contains 10% fishmeal, 5% fish oil and 12% fishmeal from by-products, and yields for fishmeal and oil are the default 22.5% and 5%, the feed fish inclusion factor would be calculated as follows:

\[
(10\% + 5\%) ÷ (22.5\% + 5\%) = 0.55
\]

Note that the 12% of fishmeal coming from by-products was not included in the calculation.

At the farm level, a “fish in:fish out” ratio can then be determined by multiplying the feed fish inclusion factor of the feed by the feed-conversion ratio. For example, for the feed above and a farm FCR of 1.8, the fish in:fish out ratio is: 0.55 x 1.8 = 0.99.

To protect proprietary information, feed mills are not required to provide physical or digital copies of documents such as feed formulas. Auditors recognize that such information is confidential and will not make copies or share confidential information with third parties.

For feed batches, values for yields and
inclusion levels of fishmeal and fish oil originating from wild fish shall be verified during the inspection of the feed mill by the comparison of three randomly selected declaration documents from the previous 12 months with their associated formulas.

If printed formulation sheets are used, feed manufacturers may “black out” elements of the requested formulas that are not specifically related to the marine ingredient content.

If computerized formulation programs are used to archive data from production runs, feed mills can print out only those details related to the inclusion rates of fishmeal and oil in their formulas.

Additional Information

The State of World Fisheries and Aquaculture
FAO Fisheries and Aquaculture Department - 2012
http://www.fao.org/docrep/016/i2727e/i2727e00.htm

Fish In:Fish Out Ratios and Improvers
Program Explained
International Fishmeal and Fish Oil Organisation

FishSource Program and FIPs
Sustainable Fisheries Partnership
http://www.fishsource.com
http://www.sustainablefish.org/fisheries-improvement

Essential Rendering
National Renderers Association
Alexandria, Virginia, USA
http://www.nationalrenderers.org/publications/essential-rendering/

Crustacean Nutrition
Advances in World Aquaculture, Volume 6
World Aquaculture Society
Baton Rouge, Louisiana, USA

Fish Nutrition
Editors: J. E. Halver and R. W. Hardy -- 2002
Academic Press, Inc.
San Diego, California, USA

Standards

3.1: The applicant shall obtain declarations from suppliers on the species and fishery origins of each batch of fishmeal and fish oil.
3.2: The applicant shall indicate a feed fish inclusion factor on product labels, packaging, shipping documents or invoices, or in written declarations for all feeds produced.
3.3: The applicant shall develop and implement a clear, written plan of action defining policies for responsibly sourcing fishmeal and fish oil.

3.4: For fishmeal and fish oil derived from reduction fisheries, at least 50% shall come from sources that are either MSC- or IFFO RS-certified. Alternatively, where MSC- or IFFO RS-certified fishmeal and fish oil are not produced nationally, the above minimum percentage can comprise material from active, approved improvers programs as verified by IFFO, SFP or WWF.

**Applicable after June 30th 2022**

3.5: For soymeal and other soy derived ingredients, at least 50% shall come from sources that are certified to either ProTerra, RTRS or SSAP.

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### 4. Environment

#### Storage and Disposal of Supplies

Fuel, lubricants, feed mill 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**

Feed mills routinely use a variety of chemicals and toxic substances that can cause damage to products, employees or the environment. Such chemicals include insecticides, rodenticides, fumigants, organic acids and other fungicides.

If not used at safe levels, chemicals are a potential hazard to both the health of workers and the safety of feed mills’ products. Fuel and oil spills, and improper use of pesticides and other chemicals can result in water pollution and cause toxicity to aquatic organisms and wildlife.

**Implementation**

Fuel, lubricants and chemicals shall be labeled and stored in a manner to prevent fires, explosions and spills. Used lubricants and unwanted or out-of-date chemicals shall be disposed of in a responsible manner.

Secondary containment shall be provided for individual or multiple fuel storage tanks. The containment volume shall be equivalent to the total stored volume plus 10%.

“Flammable Material” and “No Smoking” warning signs shall be installed at fuel storage sites.

Oil leaks and spills from equipment shall be prevented through good maintenance. Used oil and contaminated refrigerants shall be removed and disposed of properly. Outdated chemicals and wastes collected after spills shall be properly confined, labeled and sent to a hazardous waste disposal site.

Hazardous chemicals 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.

Although feed mills generally do not store large quantities of hazardous materials, procedures shall 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. Workers shall be trained to properly use the equipment and handle the contained waste.

For Additional Information

U.S. EPA Spill Prevention, Control and Countermeasure (SPCC) Rule
http://www.epa.gov/oem/content/spcc/index.htm

Standards

4.1: Fuel, lubricants and potentially dangerous or toxic chemicals shall be stored and disposed of in a safe and responsible manner.
4.2: Fuel, lubricants and potentially dangerous chemicals shall not be stored near feed ingredients, in employee housing or in kitchen areas.
4.3: Fuel, lubricant and chemical storage areas shall be marked with warning signs.
4.4: Precautions shall be taken to prevent spills, fires and explosions, and procedures and supplies shall be readily available to manage chemical and fuel spills or leaks. Designated staff shall be trained to manage such spills and leaks.
4.5: Secondary fuel containment shall conform to BAP guidelines for fuel storage.

5. Environment

Waste Management

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

Reasons for Standard

Feed mills generate waste that can cause pollution, odors and health hazards when not disposed of properly. Human food scraps, out-of-date feed and other organic waste can attract scavengers. 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

Unwanted or expired ingredients and unwanted finished product generally present the greatest challenges in waste disposal, so a rigorous program for their removal shall be in place. Such materials shall be kept in covered containers or storage areas, removed frequently and disposed of properly.
Waste ingredients and unsellable material shall be isolated and identified, and shall only recovered as feed after the absence of hazardous contamination has been assured. Waste and unsellable material containing hazardous levels of veterinary drugs, contaminants or other hazards shall be disposed of in an appropriate and, where applicable, statutory manner and not used as feed.

Trash, garbage and other wastes may not be dumped on vacant land. It shall be dealt with according to local law by composting, putting in a landfill or burning after excluding plastics. Composting shall be done by a procedure that does not create odor problems or attract wild animals.

Paper and plastic should be recycled if possible. Collection of wastes for recycling requires readily accessible waste containers that are serviced at regular intervals.

For Additional Information

Environmental Engineering
Butterworth-Heinemann
Boston, Massachusetts, USA

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

Standards

5.1: Expired ingredients and unwanted finished product shall be kept in covered containers or storage areas, and disposed of frequently and properly.
5.2: Waste ingredients and unwanted finished product shall be recovered as feed only after confirmation that hazardous contamination is not present.
5.3: Waste materials that contain hazardous levels of drugs or other contaminants shall be disposed of properly.
5.4: Garbage and other solid waste shall be disposed of to comply with local regulations and avoid environmental contamination and odor problems (e.g., by recycling, burning, composting or placing in a landfill).

6. Food Safety
HACCP Process Controls, Good Manufacturing Practices

Feed mills shall have current, systematic and documented process controls combined with good manufacturing practices that minimize or eliminate food safety hazards. Food safety hazards shall be identified and corresponding risks managed effectively through a HACCP-based or equivalent system.

Reasons for Standard
There are potential risks to human health associated with the contamination of aquafeeds by chemical or biological agents.
The ultimate safety of aquaculture products cannot be guaranteed unless feed producers control what is incorporated into their feeds.

Food safety issues and biosecurity concerns have highlighted the importance of continually evaluating and improving food safety programs in order to enhance consumer confidence and facilitate domestic and global trade. As a result, most countries have strict safety specifications defined by health or food safety authorities for feeds consumed by aquatic species destined for human consumption.

**Implementation**
The most effective way to ensure food safety is through a systematic appraisal of the hazards involved and the adoption of appropriate process controls. To this end, the most commonly applied tool is hazard analysis, critical control points (HACCP), for which principles have been defined by the Codex Alimentarius Commission. At a minimum, the hazard analysis shall address:

- risks of chemical contamination of ingredients and/or finished products with dioxin/PCBs, medicinal substances, feed additives, heavy metals (including lead, mercury and cadmium), mycotoxins, pesticides and industrial contaminants
- biological hazards arising from the use of feed ingredients derived from certain non-processed and/or processed aquaculture products, and from contamination by restricted-use protein or pathogenic enteric microbes such as *Salmonella* or *Campylobacter* species, or *Escherichia coli*
- for medicated feed producers, the risk of incorrect dosing or mislabeling.

Feed mill operators shall provide the BAP auditor a documented HACCP plan or equivalent documented feed safety plan. This shall cover:

- standard operating procedures based on good management practices (GMPs)
- detailed accounts of process controls in terms of critical control points, preventive measures, monitoring and verification procedures, corrective actions and product recall procedures
- feed production process flow charts that include critical control points
- organizational charts of management and employee authority structure.

A quality management plan shall also be provided.

**Good Management Practices**
Good management practices are designed to address issues such as cleanliness and maintenance to create an environment in which safe feed can be produced. They cover all stages of the production process from procurement through handling, storage, processing and eventual distribution of finished products. The GMPs shall specifically identify:

- the methods for maintaining isolation between different ingredients and between ingredients and finished products
- how ingredients, feeds and feed contact surfaces are protected from adulteration with chemical and physical contaminants
- the methods adopted for excluding animal pests using approved pest control methods by trained personnel or a licensed pest control service, including how the plant...
and warehouse are baited and fumigated
• routine cleaning operations and how they are monitored
• how containers and equipment used for transport, storage, conveying, handling and weighing are kept clean
• procedures for verifying through product analysis that the GMPs are controlling the hazards they are designed to address
• procedures for managing bulk and bagged ingredients on a rotational, first-in-first-out basis
• procedures for checking ingredient routings before incoming ingredients are unloaded to avoid cross-contamination
• how processed feeds are separated from unprocessed ingredients and how misformulated, damaged or returned feed is stored so that it cannot contaminate other feedstuffs
• how labels are received, handled and stored to prevent mislabeling and assure the correct labels are placed on the correct feed.

Process Controls
The process controls focus on the production system and the prevention of specific risks. They shall identify:

• management and employee authority structure, depicted in organizational charts
• critical control points, depicted in an overall process flow chart
• finished products and their presentations
• preventive measures for each identified hazard at each critical control point
• monitoring procedures for each identified hazard at each critical control point that include frequency, assignment of task, scientifically derived critical limits, monitoring method and record-keeping method
• corrective actions to be implemented when a critical limit has been breached for any identified hazard
• verification procedures for all monitoring, corrective actions and preventive measures that demonstrate product safety by revision of procedures through product analysis at a frequency specified by the feed producer
• recall procedures in case adulterated product leaves the feed plant.

Incoming Ingredients
All incoming ingredients shall be inspected and tags or labels checked for medications, trace minerals and other additives. Grain or feedstuffs that are moldy, treated/dyed or otherwise discolored should not be used. Brightly colored grain, which usually indicates seeds treated for use as rodenticides or other pest control, can be highly toxic to aquatic animals and humans.

The BAP standards require that feed mills consider antibiotics in their hazard analyses and show that adulteration with these substances is controlled through verified controls. Feed mills shall also maintain copies of supplier certificates that indicate no banned chemicals or antibiotics were applied to the incoming raw materials. Feed mills shall establish internal audit plans for verification of these data through laboratory analysis of incoming raw materials.

Periodic sampling of incoming ingredients shall be carried out to ensure that specifications are respected. Analytical testing for toxicants should follow Association of Analytical Communities or equivalent nationally approved analytical
methods. Ingredients shall meet applicable statutory standards for levels of pathogens, mycotoxins, herbicides, pesticides and other contaminants that can give rise to human health hazards.

Minerals, supplements and other additives should be obtained from reputable manufacturers that guarantee the concentration and purity of ingredients, and provide instructions for correct use. For veterinary drugs, only licensed therapeutic products manufactured in accordance with good manufacturing practices shall be used, with the manufacturer certifying the availability of or providing certificates of analysis. All incoming ingredients shall be verified for correct labeling, purchasing specification, cargo destination, lot number/date and regulatory compliance, as appropriate, especially for medicated feeds.

Production
Pathogen control procedures, such as pasteurization to eliminate *Salmonella enterica*, *Toxoplasma gondii* and *Trichinella spiralis*, or the addition of an organic acid to inhibit mold growth, should be used where appropriate. Results of treatments shall be monitored. Pasteurization can also be achieved by production methods such as elevated temperatures over time.

Equipment manufacturers should be consulted to determine what is required for pathogen control. Work and reports to meet these standards should be developed and used.

The refeeding of a given species back to the same or closely related species in the form of processed and/or non-processed aquaculture feeds shall be avoided to block this possible route for the spread of disease.

Finished Product
Labels and tags for finished product shall conform to legislation in the countries where the feed products are sold.

Process controls shall incorporate periodic testing of finished product to check for chemical contamination and mislabeling. Of particular concern is the inclusion of banned antibiotics such as nitrofurans. Low concentrations of pesticides or veterinary residues can have serious effects, not only on the production of aquaculture species, but accumulation of such residues may render aquatic species hazardous to consumers if action levels are exceeded.

For example, in Europe, manufacturers must make sure permitted levels of undesirable substances mentioned in European Economic Community directives are not exceeded in feed. Other directives regulate the use of additives and veterinary medicines.

In the United States, feed mills that add drugs to feed are subject to the Federal Food, Drug and Cosmetic Act. For medicated feeds, three batches of each type should be tested per year to check concentrations against target concentrations and ensure proper mixing and manufacture. The subject of bovine spongiform encephalopathy is dealt with in rule 21 CFR 589.2000.

Medicated Feeds
To avoid cross-contamination, all medicinal feed additives shall be stored separately from other feed materials, products and premixes. Access to drug storage areas shall be limited to authorized personnel. Use of drugs and other ingredients shall follow ingredient label directions and regulatory
requirements. Products without labels shall not be used.

Feed mills should demonstrate acceptable cleaning procedures between batches of medicated feeds. Production runs of medicated feeds should be grouped together as much as possible. When sequencing is not possible, the processing system should be flushed with ground corn meal or a similar ingredient. Flush material should be routed into the same medicated batch, whenever possible. Bulk feed delivery trucks carrying medicated feeds should be appropriately flushed or sequenced to assure that subsequent deliveries are not cross-contaminated.

Labels and tags for medicated feeds shall conform to legislation in the countries where the aquaculture feed products are sold. Warnings shall be clearly evident, along with specific instructions, including approved withdrawal times, for the species being fed. Medicated feed should be stored under conditions specified on the pharmaceutical product label.

Process Control Documentation
The auditor’s main method of inspecting a facility is through the inspection of documents and records, so accurate and systematic record keeping, as defined in the HACCP plan, feed safety or quality management system, is a fundamental requirement for certification. Feed mills shall make available records that show all monitoring, verification and corrective actions taken. These shall be up to date and no less than 90% complete.

Recall Procedures
Recall procedures shall be planned and documented, for example, following the guidelines provided by the FAO. Shipping and distribution records shall be maintained to facilitate the recall of specific production batches/runs to the mill if and when an error occurs in processing. Refer to the Traceability section below.

For Additional Information

U.S. Food and Drug Administration Code 21 CFR 225
Current Good Manufacturing Practices for Medicated Feeds


Maximum Residue Limits for Veterinary Drugs in Foods
Codex Alimentarius Commission
CAC/MRL 02-2009

Animal Feed Impact on Food Safety
Report of the FAO/WHO Expert Meeting
FAO, Rome; October 8-12, 2007

Codex General Standard for Contaminants and Toxins in Food and Feed
Codex STAN 193-1995, Rev. 2-2006

Code of Practice for the Prevention and Reduction of Dioxin and Dioxin-like PCB Contamination in Foods and Feed
Codex Alimentarius Commission
CAC/RCP 62-2006

AFIA Safe Feed/Safe Food Hazard Guidelines
Recommended International Code of Practice:
General Principles of Food Hygiene
CAC/RCP 1-1969, Rev. 4-2003

Code of Practice on Good Animal Feeding
Codex Alimentarius Commission
CAC/RCP 54-2004

Standards

HACCP Process Controls

6.1: The applicant shall have a documented HACCP plan or equivalent feed safety plan available for inspection.
6.2: A quality management plan shall be available for inspection.
6.3: The HACCP plan or equivalent system shall include an organizational chart that depicts the management and employee authority structure, including the quality control hierarchy.
6.4: The HACCP plan or equivalent system shall adequately address potential chemical, biological and other safety hazards with appropriate preventive measures and monitoring, corrective actions and verification procedures.
6.5: For producers of medicated feeds, the HACCP plan or equivalent system shall address the special risks of incorrect dosing or mislabeling.
6.6: The HACCP plan or equivalent system shall include flow charts on the feed production process that include process specifications and depict critical control points.
6.7: Process controls shall identify preventive measures for each identified hazard at each critical control point.
6.8: Process controls shall identify monitoring procedures for each identified hazard at each critical control point that include frequency, assignment of task, scientifically derived critical limits and monitoring and record-keeping methods.
6.9: The applicant shall be able to demonstrate that process controls that identify corrective actions taken when a critical limit for an identified hazard has been breached are implemented and monitored.
6.10: Process controls shall identify verification procedures for all monitoring, corrective actions and preventive measures to assure safety of product and prevent adulteration.
6.11: Incoming ingredients shall be inspected, and tags or labels shall be checked for medications, trace minerals or other additives.
6.12: The applicant shall maintain copies of supplier certificates that indicate incoming raw materials are free from banned chemicals or antibiotics.

6.13: The applicant shall periodically sample and analyze incoming ingredients for adulterants or toxins to comply with applicable statutory standards for pathogens, mycotoxins, herbicides, pesticides and other contaminants.

6.14: The applicant shall respect prohibitions of the refeeding of ingredients from like aquaculture organisms to prevent transmission of disease.

6.15: Process controls shall incorporate periodic testing of finished products for hazards including chemical contamination by such banned substances as antibiotics or pesticides.

6.16: Medicated feeds shall be stored separately from all other feed materials, products and premixes, with access to the drug storage area limited to authorized personnel.

6.17: Warnings and species-specific instructions shall be clearly evident on labels and tags.

6.18: The applicant shall maintain current, accurate records that detail monitoring, verification and corrective actions as required by the HACCP plan or equivalent system.

**Good Manufacturing Practices**

6.19: The applicant shall have a documented manual of standard operating procedures based on good management practices.

6.20: GMPs shall identify effective methods for maintaining isolation between different ingredients and between ingredients and finished products.

6.21: GMPs shall identify how ingredients, feeds and feed contact surfaces are protected from adulteration with chemical and physical contaminants.

6.22: The applicant shall be able to demonstrate the implementation of GMPs that exclude animal pests using approved pest control methods by trained personnel or a licensed pest control service.

6.23: GMPs shall identify how routine cleaning operations are conducted and monitored, and how containers and equipment are kept clean.

6.24: The applicant shall be able to demonstrate the implementation of GMPs that manage bulk and bagged ingredients on a rotational, first-in-first-out basis.

6.25: The applicant shall be able to demonstrate the implementation of GMPs that check ingredient routings for incoming ingredients to avoid cross-contamination.

6.26: The applicant shall be able to demonstrate the implementation of GMPs that segregate processed feeds from unprocessed ingredients and misformulated, damaged or returned feeds.

6.27: GMPs shall identify how labels are received, handled and stored to prevent mislabeling.

6.28: Process controls shall identify finished products and their presentations.

6.29: Tags and labels for finished products shall conform to legislation in the countries where the feed products are sold.

6.30: The applicant shall assure that products without labels are not stored or used.

6.31: Tags and labels for medicated feeds shall conform to legislation in the countries where the feeds are sold.

6.32: Recall procedures shall be identified, planned and documented, and accurate shipping records shall be maintained to facilitate recalls.
7. Traceability

Record-Keeping Requirement

To establish product traceability, specified data shall be recorded for both raw ingredients and finished products.

Reasons for Standard
Product traceability is a crucial component of the BAP certification program. It interconnects links in the seafood production chain and allows each batch of product to be traced back to the inputs of origin. Results of feed 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.

Implementation
Feed mills shall utilize traceability systems that allow accurate and timely tracing of all feed ingredients used in feeds and all finished products. Traceability procedures and systems shall ensure the identification of all outsourced products, ingredients and services. Complete production records of batches and final feed products and packaging shall be maintained, as well as records of feed product purchasers.

To establish traceability for incoming ingredients, the information specified in Standard 7.3 shall be recorded for each shipment received. This data includes ingredient types, sources and lot numbers. (See sample Ingredient Traceability Form, Appendix A.)

Particular attention shall be given to record keeping that relates to animal health products and premixes used in medicated feeds. A daily inventory of drugs and premixes is required with a check on the quantity of drugs used against the quantity of medicated feeds produced. The information specified in Standard 7.4 shall be recorded for each shipment of medicated ingredients received. (See sample Medicated Ingredient Traceability Form, Appendix B.)

For feed output, documentation shall enable the history of each batch, blend or run of product to be determined. The information specified in Standard 7.5 shall be recorded for each shipment of finished feed. (See sample Product Traceability Form, Appendix C.)

To control the potential spread of specific pathogens from raw materials of animal or plant origin, it may be necessary to specify for any given ingredient the country and species of origin and any treatment process used prior to purchase. Care shall be taken to preserve the identity of such material after procurement to facilitate subsequent tracking.

Records shall be retained for at least three years after the date of delivery. For feeds for the United States market, the record-keeping provisions of the Public Health Security and Bioterrorism and Response Act of 2002 need to be satisfied. The U.S. Food and Drug Administration is currently
defining the precise implications of these provisions as they relate to feed, ingredients and pet food.

Feed mills shall maintain paper records of the required data in notebooks or files. This information shall also be transferred to computer database files, with the original files kept to allow verification of the electronic data.

The record-keeping process requires a high degree of care and organization. At large feed mills, managers could collect initial data for ingredient deliveries and feed product shipments. A single clerk could then be given the task of collecting the data and transferring it to a computer database. Plant management shall of course review the effort at intervals to verify it satisfies BAP requirements.

**BAP Logo Use**
Use of the Best Aquaculture Practices logo, a registered trademark of the Global Aquaculture Alliance, for any purpose shall be approved by BAP in advance and used in compliance with the BAP trademark usage agreement.

**Customer Complaints**
The applicant must prepare and implement an effective system for the management of complaints and complaint data to control and correct shortcomings related to its products' compliance with the BAP standards.

**Standards**

7.1: The facility shall operate a record-keeping process that provides timely, organized, accurate entries, performed and overseen by a designated trained person or team responsible for collecting the data, ensuring it is complete and accurate, and that traceability requirements are met.

7.2: A traceability system shall be in place that allows accurate and timely forward and backward tracing of all ingredients used in feeds and all finished product information, including date code and lot information for finished feed products, as well as shipping details.

7.3: Traceability records shall be maintained for all incoming ingredients for each of the following parameters:

- ingredient type
- date received
- shipper’s name, address and contact details
- supplier’s name, address and contact details
- unloading assignment
- bulk quantity or number of bags
- bag size
- packaging type
- unique lot number
- quality comments
• receiver’s signature
• expiration date, if applicable.

7.4: Traceability records shall be maintained for medicated feeds for each of the following parameters:
• drug name, including potency
• date received
• quantity
• supplier’s name
• supplier’s code for drug, if applicable
• supplier’s lot or code number
• return of any damaged or unacceptable drugs.

7.5: Traceability records shall be maintained for finished feed products for each of the following parameters to allow tracing of feed back to the inputs of origin:
• manufacturing date
• ingredient source(s) including all additives
• feed type mixed
• formulation details
• processing conditions
• unique lot number
• actual yield
• mixing personnel
• bin assignment
• drug inclusion(s)
• expiration date for medicated feed, if applicable
• sequencing and flushing
• dispatch date
• name, address and contact details for transporter
• name, address and contact details for destination/purchaser (including BAP certification number, if applicable)
• misformulated, damaged or returned feed status, especially for medicated feed.

7.6: Effective procedures shall be defined and implemented to ensure that batches of feed produced under the BAP program are segregated from all other batches of feed.

7.7: Where a facility’s traceability system consists of paper records and/or files, this information shall be transferred to a computer database or spreadsheet to allow transmission and verification of electronic data.

7.8: Facilities that use an online system or computer database for traceability shall keep copies of the documents or records that were used to transfer data to the electronic system to allow verification of the information in the electronic system.

7.9: Facility procedures shall maintain lot separation during receipt, storage, handling and production of feeds. Lot separation shall also be reflected in records.

7.10: Records of traceability shall be retained for at least three years after the date of delivery of feed products.
7:11: In order to use the BAP logo, facilities shall have such use approved and registered in advance with BAP Management.

7:12: The facility shall keep records of any customer complaints related to its products’ compliance with the BAP standards.

7:13: The facility shall keep records of investigations of such complaints and actions taken to address/correct them.
## Appendix A

**Sample Ingredient Shipment Traceability Form**

<table>
<thead>
<tr>
<th>Feed Mill Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INGREDIENT</strong></td>
<td></td>
</tr>
<tr>
<td>Ingredient Type</td>
<td>Reception Date</td>
</tr>
<tr>
<td>Quantity Received</td>
<td>Unloading Assignment</td>
</tr>
<tr>
<td>Bag Size</td>
<td>Supplier Name</td>
</tr>
<tr>
<td>Package Type</td>
<td></td>
</tr>
<tr>
<td>Bulk Quantity or Number of Bags</td>
<td>Address</td>
</tr>
<tr>
<td>Lot Number</td>
<td>Address</td>
</tr>
<tr>
<td>Quality Comments</td>
<td>Contact/Telephone</td>
</tr>
<tr>
<td></td>
<td>Shipper Name</td>
</tr>
<tr>
<td></td>
<td>Address</td>
</tr>
<tr>
<td>Received By</td>
<td>Address</td>
</tr>
<tr>
<td>Expiration Date</td>
<td>Contact/Telephone</td>
</tr>
</tbody>
</table>
## Appendix B

### Sample Medicated Ingredient Shipment Traceability Form

<table>
<thead>
<tr>
<th>Feed Mill Name</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>MEDICATED INGREDIENT Type</th>
<th>Reception Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity Received</td>
<td>Unloading Assignment</td>
</tr>
<tr>
<td>Bag Size</td>
<td>Package Type</td>
</tr>
<tr>
<td>Drug Name</td>
<td>Address</td>
</tr>
<tr>
<td>Drug Potency</td>
<td>Address</td>
</tr>
<tr>
<td>Supplier Code</td>
<td>Contact/Telephone</td>
</tr>
<tr>
<td>Lot Number</td>
<td>Shipper Name</td>
</tr>
<tr>
<td>Return (Damaged or Unacceptable)</td>
<td>Address</td>
</tr>
<tr>
<td>Received By</td>
<td>Address</td>
</tr>
<tr>
<td>Expiration Date</td>
<td>Contact/Telephone</td>
</tr>
</tbody>
</table>
## Appendix C

### Sample Product Run Traceability Form

<table>
<thead>
<tr>
<th>Feed Mill Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>PRODUCT RUN</strong> Feed Type</th>
<th>Manufacture Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield</td>
<td>Dispatch Date</td>
</tr>
<tr>
<td>Lot Number</td>
<td>Purchaser Name</td>
</tr>
<tr>
<td>Formulation</td>
<td>BAP Certification Number</td>
</tr>
<tr>
<td></td>
<td>Address</td>
</tr>
<tr>
<td></td>
<td>Address</td>
</tr>
<tr>
<td>Drug Inclusion</td>
<td>Contact/Telephone</td>
</tr>
<tr>
<td></td>
<td>Shipper Name</td>
</tr>
<tr>
<td>Ingredient Source(s)</td>
<td>Address</td>
</tr>
<tr>
<td></td>
<td>Address</td>
</tr>
<tr>
<td></td>
<td>Contact/Telephone</td>
</tr>
<tr>
<td>Mixed By</td>
<td>Bin Assignment</td>
</tr>
<tr>
<td>Sequencing/Flushing</td>
<td>Processing Conditions</td>
</tr>
<tr>
<td>Return (Misformulated/Damaged)</td>
<td></td>
</tr>
</tbody>
</table>


BAP Feed Mill Standards - Issue 2.1 Change-Log (23-May-2017)

Approved (SOC March 2017) modification to the BAP Feed Mill Standard regarding the sustainability of soy ingredients

Changes to the opening of Section 3

3. Environment

Sustainability of key inputs: Fishmeal, Fish Oil and Soy

Feed mills shall strive to reduce dependence on wild fisheries and obtain marine meals and oils from sustainable sources. Certified mills shall provide reliable information on inclusion of such ingredients in compound feeds. Feed mills shall also develop sourcing policies that actively favour responsibly produced terrestrial plant ingredients including soybeans.

Text to insert at end of existing guidance:

Feed mills shall adopt preferential sourcing of responsibly produced soymeal and soy derived ingredients such that a minimum of 50% (calculation based on mass balance) are derived from certified sources by June 2022. Acceptable certifications include ProTerra, RTRS (Round Table For Responsible Soy), and SSAP (Soybean Sustainability Assurance Protocol).

New Clause:

Applicable after June 30th 2022

3.5: For soymeal and other soy derived ingredients, at least 50% shall come from sources that are certified to either ProTerra, RTRS or SSAP.

Added “Social Compliance” to definitions of Critical and Major Non-Conformities