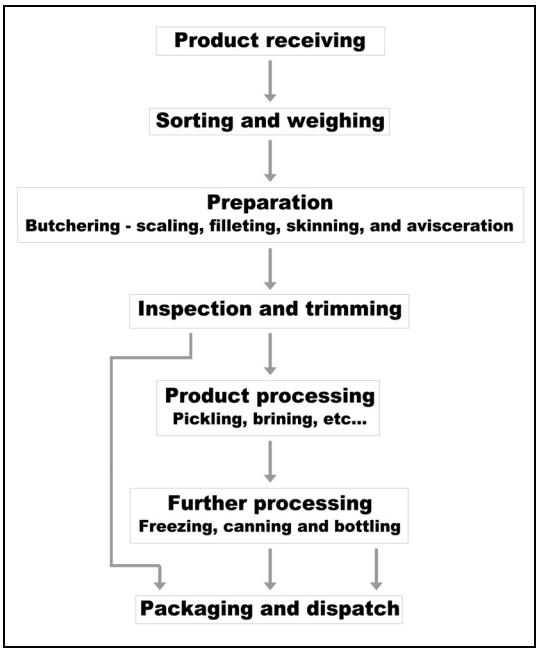
European Bank
for Reconstruction and Development

Sub-sectoral Environmental and Social Guidelines: Fish Processing

PROCESS DESCRIPTION

For the purposes of this guideline 'fish processing' has been categorised as the processing of either fish or shellfish into a variety of fish products, it does not cover the subsequent canning or packaging of these products.

The fish processing process is shown in the figure below.



Typically core processes include fish dressing, freezing, glazing, roe processing, milt processing, salting and smoking. Additional secondary process may include sorting, fish meal production, extraction of oils and packaging. Fish processing plants typically include:

- Docks and receiving area;
- Washing area;
- Dressing area;
- Smoking rooms;
- Salting rooms;
- Refrigeration units;
- Packaging units; and
- Product dispatch area.

The processes utilised in freshwater processing and marine processing are similar, however, the potential receptors for emissions often differ substantially between the two industry sectors. In marine fisheries primary processing is often conducted on ships with wastes typically being disposed of directly into the sea in contrast with freshwater fish facilities which are typically land based.

Processed products are usually distributed from the processing facility or docks by road to consumers, wholesalers and commercial food products manufacturers.

KEY ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Water supply

Fish processing is a water-intensive industry. Process water is used for washing fish, cleaning process areas, cooling and production purposes. These processes typically require the provision of high quality water and can therefore represent considerable costs to the facility.

Effluent Treatment and Discharge

Large quantities of wastewater are generated through activities such as fish unloading, equipment sprays, offal transportation and facility cleaning. The water is often subject to minimal treatment with the exception of primary screening/ filtering to remove solids. Pollutant issues typically relate to:

- High levels of solids in water content and high organic levels.
- Elevated levels of salts;
- Oil and grease;
- Ammonia;
- Cleaning agents (including chlorine bleaches and surfactants).

Wastewater is typically discharged into local water bodies (freshwater or marine) or into municipal sewers. Fish processing effluents can be toxic to fish and other aquatic organisms.

Fish processing activities are subject to monitoring and possible enforcement action to ensure that they meet emission standards fixed under EU Directive 76/464/EEC and the urban wastewater treatment Directive 91/271/EEC. The EU Water Framework Directive 2000/60/EC requires fish processing facilities to meet the environmental objectives for good ecological and chemical status of surface waters by 2015.

Disposal of Solid Wastes

Fish processing can generate varying quantities of solid waste. Many of the waste products of fish dressing can be used as a by-product (e.g. supplements for animal feed or silage).

The disposal of waste must meet the requirements of the governing body and any associated regulations, which may control the collection, transport, storage, handling, processing, use and disposal of animal carcasses or parts of animal carcasses.

Odour

Fish processing plants typically generate strong odours and, depending on the location of the facility, odour can be a significant nuisance issue for neighbouring facilities and residential areas.

Refrigerants

Refrigerants used at fish processing facilities are likely to be either ozone-depleting chemicals (principally chlorofluorocarbons) and/or ammonia. Providing the refrigeration systems are well maintained these materials should remain within a sealed system and would therefore pose little environmental threat. Release of these compounds into the atmosphere, however, would be expected to result in damage to the local and global environment.

Food Hygiene and Product Contamination

As with any food processing activity, the potential exists for impact to the consumer as a result of contamination of the foodstuff either at source or during processing. Common potential

contaminants include micro-organisms, heavy metals, organic compounds and foreign objects. Contamination from a fish processing source may affect consumability and result in associated liabilities.

Directive 2006/88/EC on animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals has implications for the fish processing industry.

Manual Handling

Lifting, repetitive work and posture injuries occur as a result of working in the fish processing industry (e.g. lifting boxes of fishes and repetitive cutting operations). Repetitive tasks can lead to musculoskeletal injuries.

Electric Shock and Equipment Safety

The use of electrical devices in the fish processing facility (pumping facilities and lighting operations) means that the risk of electrical shock is present during a variety of operations. The use of knives and other sharp tools presents a physical hazard.

Slips and Trips

The wet environment in fish processing facilities means that there is a high risk of slips, trips and falls near any wet areas or areas of spillage.

Infections and Allergic Reactions

The workforce involved in the handling of fish and shellfish may develop infections and or allergies resulting from the direct exposure to fish. Additionally within contained facilities, water-spraying techniques may result in the inhalation of associated bacteria other foreign material containing disease.

OTHER ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Materials Storage

Materials stored and used on fish processing sites have the potential to impact human health and the environment. The most significant of these materials are likely to be:

- Bleaches and cleaning fluids;
- Caustic soda;
- Oils and greases;
- Fuels (particularly in instances where transportation fleets are based at the facility).

Polychlorinated Biphenyls (PCBs) & Asbestos

Neither PCB's nor asbestos are likely to be principal issues of concern in relation to fish processing facilities, however either material may be present and may therefore pose some potential for environmental and/or health and safety impacts.

With respect to these materials, particular attention should be paid to facilities constructed prior to the 1980s. Typically, PCBs may be present as constituents of hydraulic oils or dielectric fluids in electrical switchgear, transformers and fluorescent light starters. Electrical equipment should be briefly inspected for signs of leaks, cracks, etc and

staff questioned about the likelihood of fluids containing PCBs.

Asbestos may be encountered in a wide range of forms including asbestos cement boards (often used as roofing material), as fire retardant gaskets in pipework and as fire retardant insulation around boilers and furnaces.

Fish Processing Facility Development

Most new or extended fish processing sites will require an Environment Impact Assessment (EIA).

Air Emissions

Attention should be paid to the operation and monitoring of smoking units, boilers and engines. Such units may have the potential for creation of atmospheric emission problems relating to organic compounds and particulates. Within processing areas, respiratory illnesses have been known to occur in workers.

Extreme Temperature Exposure

Fish processing is often undertaken in temperature extremes, therefore appropriate clothing and PPE is required. Exposure to such conditions can aggravate existing physical conditions.

Chemical Exposure

The variety of chemicals used in the cleaning process leads to the potential exposure to hazardous substances (e.g. chlorine and acids). As part of the smoking process, employees may become exposed to carcinogens which are hazardous.

Noise and Vibration

Exposure to high and continuous levels of noise can lead to impacts on the health of the workforce.

KEY SOCIAL, LABOUR, AND COMMUNITY RISK/LIABILITY ISSUES

Noise and Vibration

Noise generation from fish processing facilities are generally low, however the process can result in localised impacts resulting directly from the type and form of generators and pumping systems employed.

FINANCIAL IMPLCATIONS

The principal financial issues associated with water supply are the direct costs of supply (payment to water suppliers, costs of abstraction from groundwater or surface water bodies, sampling and analytical costs). The use of water leads to the generation of effluent and unnecessary consumption therefore can have knock-on implications for effluent discharge.

In most areas effluent discharge has direct financial implications for the processing plant through:

- Fees for discharge licences and permits;
- Monitoring costs;
- Fines and penalties for negative environmental impacts or breaches of permit limits.

In many instances, the costs associated with upgrading facilities to meet the industry best practice standards are considered to be prohibitive and many processors have been prepared to pay the penalties imposed by regulators rather than invest in new systems. More stringent environmental legislation may make this approach less viable and companies may need to spend considerable sums in order to achieve acceptable effluent discharge quality.

Fish and fish products can be contaminated at source or during processing. In either case, the potential exists for substantial liabilities to be incurred by the processing and packaging company. Typically, the liabilities take the following forms:

- Civil liabilities resulting in compensation claims from injured parties;
- Criminal liabilities, usually resulting from some form of negligence, resulting in fines and prohibitions;
- Diminished reputation and sales as a result of damage to public perception of the company and/or the industry as a whole.

Depending on the location of the facility and the surrounding land use, financial liabilities relating to odour may be a significant factor for fish processing facilities. Odour control equipment can prove costly and improvements to waste management and storage procedures may provide substantial improvements to odour emissions for relatively limited costs.

IMPROVEMENTS

Potential environmental improvements may include:

- Screening of raw materials and water used in the process for potential contaminants;
- Implementation of a waste minimisation and management system, for residual wastes, the possibility of re-using wastes for animal feed or silage should be investigated;
- Potential for reuse of wastewater within processing through recycling, thus minimising final wastewater volumes;
- Installation/improvement of wastewater/effluent monitoring and treatment plant;
- Install grids to reduce or avoid introduction of solid materials into the wastewater drainage system;
- Use of re-circulated chilled water systems where practicable;
- Regular integrity testing of underground storage tanks and bulk storage tanks to reduce potential for pollution and accident/fire/explosion precautions and emergency procedures;
- Improvement or replacement of drainage systems to improve effluent management;
- Install mechanical lifting aids where possible and rotate work tasks to reduce repetitive activities;

- The upgrade of storage areas of all raw materials, casings and solvents to allow for proper containment of accidental spills and leakages and to minimise odours;
- Upgrading of working area hygiene;
- Improvements to the screening and tracking of product to minimise the potential for food contamination;
- Use of personal protective equipment (PPE) to protect employees and visitors from identified Health & Safety hazard. Specific PPE provided (e.g. allergy barrier creams,);
- Personal protective equipment should be fit for purpose and personnel should be trained in its correct selection, use and maintenance;
- Provide appropriate training to all personnel involved in activities associated with electrical equipment handling;
- Install correct guarding of machinery to reduce risk of entrapment of employees;
- Installation of odour control equipment e.g. carbon filtration units;
- Insulate refrigeration rooms;
- Installation of scrubbing equipment to clear air emissions of odour e.g. Installation of odour control equipment, carbon filtration units;
- Keep floor surfaces free of slippery substances and obstacles and providing slip resistant floor surfaces;
- Situate drainage to avoid soaking of whole floor;
- Install walkways to separate people from vehicle movements to reduce risk of collision;
- Changes to non-CFC coolants and/or sealing of leakages in the refrigeration system;
- Ensure that packaging is either recovered or capable of being recycled;
- Installation of emission control equipment on discharges from smoking units.
- Implement accident reporting and recording regimes.

GUIDE TO INITIAL DUE DILLIGENCE SITE VISITS

During the initial site visit, the issues will vary according to the type of fish processing facility and the type of product being farmed or produced and depending on the level of environment, health & safety management already introduced. While visiting the site it is important to discuss and review the following:

- Permitting requirements and the presence/duration of appropriate permits;
- Any history of breaches of statutory or regulatory requirements;
- Statutory or other land use restrictions (particularly for new plants);
- The surrounding land uses and the potential for impacts associated with these uses;

- The sources, quality and nature of raw materials (including water) used in the site processes, and means of protecting the sources;
- Any noticeable odours and air emissions, what is the zone of influence of these odours/emissions?
- The condition and quality of materials storage facilities for raw materials, caustics and chemical solvents (including underground storage tanks);
- Check that solid waste storage and disposal (storage equipment) is in a good condition;
- Check that waste disposal takes place on a regular basis;
- Check that waste storage areas are clean of debris and that are skips covered to prevent waste escaping, for example, check that waste containers have lids or are stored in an area with a roof;
- What is the standard of "house-keeping" on site? Do areas look clean and tidy? Look for localised spills, leaking pipes, stained ground etc;
- Procedures used to ensure food hygiene, including looking for signs of rodent or insect pest infestation and observations on the cleanliness of worker clothing;
- Screening methods to prevent contamination of raw materials and the finished product;
- Note if areas of the facility appear to be particularly noisy;
- Check the age and condition of buildings and equipment;
- The condition and cleanliness of food processing and handling areas;
- Check whether people are wearing personal protective equipment and determine the availability of such equipment;
- Any history of public complaints relating to the facilities operation;
- Check the signage around the site; does it convey what health & safety risks might exist in areas?
- Check that wages and working hours are consistent with the average for the sector and national standards;
- Is the facility next to any industries which may pollute ground water used in the process?
- Does the organisation have insurance in place to cover the recall of contaminated products? Have there been any recent product recall incidents?
- Have there been any recent (within the last three years) incidents on site such as fatalities, fires/explosions, spills?
- Is the facility subject to any audits by customers? What was the outcome of these audits?;
- Does the business plan have line items for Environment, Health and Safety improvements?

- Check that labour standards, contracting and remuneration are in line with national law and are consistent with the average for the sector.
- Check that hours worked, including overtime, are recorded and staff should receive written details of hours worked and payment received.
- Has the Company received inspections from the local labour inspectorate in the previous three years? Have these resulted in any penalties, fines, major recommendations or corrective action plans?
- Does the organisation have a grievance mechanism which allows employees to raise workplace concerns?
- Are employees free to form, or join, a worker's organisation of their choosing?

Take note/ask questions relating to any activities that address the improvements listed in the improvements section of this document.

It should be recognised that plant operation may be seasonal and visits should be timed accordingly.

ACTION PLANS

Dependent on the individual business, select appropriate improvements from the list above to include in the action plan. As a minimum any business should be required to have the following in place:

- Operational procedures to manage environmental, health & safety risks;
- Monitoring programmes;
- Improvement objectives, targets and project plans;
- A training plan for personnel to include environmental and health and safety issues;
- Regular inspections, checks and audits with records to demonstrate achievement of the required level of performance against legal requirements and improvement action;
- Emergency plans for environment, health & safety accidents;
- Management review/demonstrated involvement in environment, health & safety management;
- A financial plan and budget for environmental management and performance improvement;
- A schedule and procedure for review and updating of the environmental action plan. A review of associated procedures such as hygiene and industrial health and safety procedures may also be of benefit.

REFERENCES AND ADDITIONAL SOURCES

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