



PROCESS DESCRIPTION

Poultry processing has many similarities to slaughterhouses and meat processing (see these separate). This guideline covers the slaughtering of poultry, game birds and the processing into poultry meat products.

When birds reach their desired market weight they are moved from the farms to the processing plant by lorry. Normally the farms are located close to the plant keeping journey times short. In a fully automated system, the birds are normally hung upside down in specially designed shackles on a moving chain, where they are stunned unconscious and killed. The dead birds are then dipped in a scald tank of hot water to loosen the feathers. Still attached to the shackle the feathers are removed mechanically and the feathers carried away by a water flume.

The head is then removed and an eviscerating machine removes the intestines and internal organs. The carcasses are then washed using potable water and chilled using cold air or cold water sprays. Still on the shackles the birds hang for a period to mature (usually 8 to 10 hours) which tenderises the meat. The birds may then be dressed and prepared as oven ready birds; cut into portions and packaged for supermarkets; processed into poultry meat products and ready meals. In less automated systems, some or all of these processes may be performed by hand.

KEY ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Product Contamination

Poultry products can become contaminated through:

- Contaminated poultry having been received from the farm or slaughterhouse; drug and

chemical residues used in rearing birds; from contamination of other raw ingredients used in poultry products (e.g. dioxins and other fat soluble pesticides);

- Lack or inadequate veterinary inspection;
- Poor food hygiene standards within the processing operations, e.g. unclean machines, unhygienic handling;
- Failure in the processing operation, e.g. under cooking, failure to maintain chilled conditions, sterilisation failure, and poor seals on vacuum packs etc.

A system of food traceability should be present to enable product recall if required. This may be a legal requirement in some territories.

Water Supply and Effluent Treatment

Poultry processing plants use large quantities of fresh water for cleaning vehicles, rinsing carcasses and by-products, cooling, transporting the product through the production process and for cleaning and sterilising. The resulting effluent may generate pollution problems due to the high content of fat, flesh, blood, excreta, pathogens and chemicals used for cleaning.

Discharge of the effluent directly to water bodies will cause pollution. Effluent from the process may also contain harmful viruses, bacteria, and parasite eggs.

Many facilities have on site wastewater treatment plants which may utilise mechanical and chemical means of treatment. Solids retrieved from the plant may either be rendered to make blood and bone meal, or be disposed of as solid waste.



A permit with specific discharge parameters from the regulatory authorities will normally be required.

Energy

Energy is consumed in abattoirs in two ways:

- Thermal energy in the form of steam and hot water used for cleaning, sterilising and rendering;
- Electricity for machinery operation, refrigeration, lighting and production of compressed air. Minimum refrigeration requirements are normally determined by regulation.

Energy usage has a direct correlation to the operating costs of the company and energy generation and consumption may be regulated or taxes/levies applied to reduce energy use and associated emissions of gases such as carbon dioxide.

In some territories, countries may have to invest in new equipment to meet mandatory targets to reduce energy and carbon emissions.

Refrigerants

Poultry processing plants rely heavily on chilling facilities to preserve the products. The refrigerants used may be ozone depleting chemicals, such as Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs) the production of which, are being phased out under an international treaty called the Montreal Protocol. Releases of these types of refrigerant gases should be avoided. Ammonia is becoming a more commonly used alternative refrigerant, which has no such restriction but does have health and safety issues.

Odour

Odour can be a serious problem for meat processing plants if effluent streams are not managed correctly, particularly when located near a residential area or in a hot climate.

The main sources of atmospheric odour are:

- Scalding (where birds are dipped in hot water to loosen feathers);
- Live bird handling;
- Wastewater treatment including overloading of effluent treatment systems which can result in foul odours;
- Untreated effluent;
- Rendering;
- Cooking of animal materials;
- By-products;
- Animal residues, e.g. blood collection tanks, manure piles and fat traps.

Solid Organic Wastes

The average carcass yield is about 75% of the live weight and therefore significant quantities of organic waste material may be generated. The amount that requires disposal is dependent upon how much of the waste can be converted into saleable by-products. Organic waste is defined as low and high-risk material:

- *Low risk:* from healthy birds;
- *High risk:* from birds condemned as unfit for human consumption; those that died before slaughter; birds suspected of carrying disease.

High-risk material is typically reprocessed by energy intensive off-site meat waste processing (rendering) plants whereas uses for the majority of low-risk material include feathers and down in garments and household items, and animal feed for pigs and fish.



Low risk material that cannot be reprocessed into saleable products can be composted, used in fertiliser or incinerated.

Packaging Waste

Except in small butchery operations, packaging is almost universally used to protect and preserve meat products. This may be plastic, tin-plate cans, aluminium cans, cardboard, shrink wrap, glass, polystyrene. This material becomes part of the waste stream. Where possible companies should attempt to recover packaging or should ensure that the packaging is easy to recycle. Solid waste will arise from the packaging process in the form of discarded packaging offcuts and improperly packaged meat products.

Companies operating with the European Union (either as a manufacturer or as a supplier into European Union countries) will be subject to the European Union Packaging and Packaging Waste Directive (94/62/EC), which aims to reduce the amount of packing that is being introduced into waste streams.

Diseases: Avian Influenza

In general, birds suspected of infection with Highly Pathogenic Avian Influenza ('Bird Flu') (HPAI) are isolated and killed as well as those arriving at the slaughterhouse later than the suspected birds. If HPAI is confirmed then the entire carcass is treated as high-risk material and all trucks, equipment and personnel will require thorough cleaning and disinfection. The operation will normally be shut down for at least a 24 hour period. If the transport route has been through an area of high poultry density there is a risk that the virus may be spread to other flocks.

Manual Handling and Repetitive Work

Lifting, repetitive work and posture injuries occur as a result of lifting and carrying heavy or awkward shaped items such as shackling of birds, lifting of boxes and manoeuvring carts/manual forklifts within the plant. Repetitive tasks, such as jointing, boning, operating machinery and cleaning, can lead to musculoskeletal injuries.

Exposure to Biological Hazards

Workers involved in poultry processing will be exposed to dust, biological and microbiological agents. They may develop eye and skin irritations, allergic reactions and lung diseases. They may also be exposed to pathogens such as salmonella.

OTHER ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Noise

The noise generated by equipment such as saws, steam, condensers, ventilation, banging equipment, canning and bottling lines and pressurised air equipment as well as manoeuvring trucks can be a nuisance if the site is located close to residential areas and other sensitive receptors.

Permitting

Large poultry processing facilities in the EU receiving more than 50 tonnes of carcasses per day or producing more than 75 tonnes of finished food products per day are subject to national regulations under the Integrated Pollution Prevention and Control Directive (2008/1/EC). Other smaller facilities within the EU and operations outside the EU will still be subject to local regulation but this will generally



set less stringent requirements on the techniques to be adopted.

Sharp Edges and Machinery

Sharp tools are used to process poultry including knives, mincers and packaging equipment. Cuts may also occur from sharp bones and equipment edges. All equipment should have safety guarding and workers should be issued with appropriate personal protective equipment (PPE).

Slips, Trips and Falls

Slippery floors and surfaces caused by oil and fat deposits present a high risk of slips, trips and falls where spills have not been cleared up or effective cleaning has not taken place.

Hazardous Chemicals

- The cleaning and disinfecting of process areas uses materials that if inappropriately used and stored could result in chemical contact burns, inhalation of harmful/toxic fumes or ingestion of harmful substances;
- Ammonia, which is commonly used as a replacement for Chlorofluorocarbons (CFCs) in refrigeration systems, is toxic if inhaled at high concentrations and can cause frostbite when released to the atmosphere. Facilities using ammonia refrigeration should be aware of the potential hazards of ammonia releases and of the steps that can be taken to prevent such releases e.g. fitting alarms on equipment.. They should be prepared to respond appropriately if releases do occur.

Temperature

- Fluctuating internal climatic conditions ranging from refrigeration areas to scalding

operations. Refrigeration systems will result in very cold temperatures, which can result in frostbite and contact burns. High temperatures can lead to collapse through heat exhaustion and contact burns;

- Ill health can also arise from prolonged working at low temperatures.

Noise

Noise induced hearing loss can occur from working in noisy areas, e.g. powered saws, blast freezers/chillers, bowl choppers, packing machinery.

Hygiene

High standards of hygiene are important and hygiene standards should address treating, handling and storage of meat in all stages of production process.

KEY SOCIAL, LABOUR, AND COMMUNITY RISK/LIABILITY ISSUES

- The supply of contaminated poultry meat could cause food poisoning in the community;
- Poultry processing uses chemicals and substances, for example, ammonia or caustics, which if incorrectly used could release into the surrounding environment resulting in inhalation of harmful fumes by the public;
- Should an employee be infected with the HPAI virus there is a risk that this could combine with the human influenza virus to produce a highly infectious strain of human influenza which could then spread rapidly throughout the local and wider community.



FINANCIAL IMPLCATIONS

- Product recall can have a significant impact, e.g. compensation claims, loss of reputation, loss of contracts and in terms of export markets. Significant upgrades in hygiene standards may be required at the production facility in order to reduce the risk of contamination during processing and to satisfy national and international food hygiene standards. A system of product traceability is required to facilitate product recall. This may be a mandatory requirement in some countries;
- Many countries are signatories to the Kyoto Protocol and have adopted targets for the reduction of CO₂ emissions. Where Governments have set up carbon emission reduction programmes industrial processes have been required to reduce their CO₂ emissions through the setting of targets. This can result in a need for substantial investment in new/clean technologies to achieve the emission targets. These targets may be reflected in environmental permits;
- Replacement of refrigerant gas or equipment may be required to meet international standards;
- Capital investment may be required to meet new environment, health, safety and hygiene legislation;
- Where large quantities of energy are used this can result in high operating costs to the business;
- Income may be generated through sale of by-products, for example for use in animal feed or in the soap industry;

- Injuries may lead to increased payroll costs to replace skilled workers and lost production time;
- Fines, penalties and third party claims may be incurred for non-compliance with environment, health and safety and labour regulations.

IMPROVEMENTS

Environmental Improvements

- Implement procedures to prevent mixing of high and low-risk materials as mixed materials must be treated as high-risk in energy intensive processes;
- Implement procedures to ensure solid waste is removed from transport equipment and surface areas before rinsing and washing, e.g. using scrapers, brooms and vacuum cleaners;
- Ensure organic waste is collected and stored separately from other waste to enable recycling;
- Solid wastes should be stored in adequate containers and segregated where possible to encourage recycling. Solid wastes will need to be disposed of regularly to avoid odour, litter, fly and rodent problems;
- Regular inspection of all bulk containment facilities on site to prevent leakage should be carried out;
- Install steam scalding equipment to minimise water usage;
- Ensure dipping of birds in scalding tanks does not cause overflow and that hot water dripping from birds is captured and returned to scalding tanks;



- Install covers and insulation on scalding tanks to save energy;
- Consider use of insulated sterilisers to sterilise knives and equipment;
- Install insulation in refrigeration areas; consider automatic door closures and alarms to prevent chill room doors being left open;
- Recover evaporative energy from the rendering process;
- Install vacuum pump based transportation system for organic materials instead of water based systems;
- Adopt tank and equipment cleaning-in-place procedures to reduce chemical, water and energy consumption;
- Stop water supply automatically when equipment is not in use during breaks or production stops;
- Storage of processed and unprocessed meat and waste in an enclosed store with ventilation to suitable arrestment equipment;
- Animal matter should be processed as soon as possible to reduce offensive smell and noise problems;
- Good housekeeping should be maintained at all times in all areas. The adoption of good cleaning and working practises as a routine will reduce odour emissions and improve hygiene standards:
 - Clean live bird handling areas daily to remove faecal matter and dead birds
 - Fat interceptors should be installed on all drains and should be inspected and cleaned regularly;
 - Minimise storage of raw carcasses, by-products and waste;
 - Regular, rigorous hygiene monitoring programmes should be in place;
- Discharges of animal wastes to the wastewater treatment plant should be minimised;
- Upgrade exhaust stack heights from rendering and smoking processes to minimise air pollution and nuisance to the local community;
- Consider the use of wet scrubbers to remove odours such as ammonia;
- Installation (or upgrade) of effluent treatment plant especially if production is planned to increase;
- Reduction in water volume used through the re-use and recirculation of water and use of re-circulated chilled water systems where practicable;
- Effluent holding tanks and treatment facilities should be checked regularly;
- Controls to maximise the efficiency of cooling plants;
- Thaw frozen meat in air;
- Separate cooling water from process water;
- Eliminate wet transportation of waste and by-products;



- Recover and process blood and other material into useful by-products;
- Send waste organic material to a rendering plant;

Health and Safety Improvements

- Provision of personal protective equipment (PPE) that is fit for the task to prevent injury and maintain hygiene standards. Staff should be trained in the correct selection, use and maintenance of PPE;
- Train workers in correct use of machinery and safety devices and best practices in hygiene management;
- Provision of segregated worker welfare areas;
- Installation of safeguards on machinery;
- Redesign manual processes to avoid heavy lifting/repetitive activities;
- Install mechanical lifting aids where possible and rotate work tasks to reduce repetitive activities and exposure to biological hazards;
- Separation of people from moving equipment;
 - Ensure that the process layout reduces opportunities for process activities to cross paths;
 - Install correct guarding to reduce risk of entrapment of employees;
 - Install walkways to separate people from vehicle movements to reduce risk of collision;
- Walking and working surfaces should be kept clean and dry and workers provided with anti-slip footwear. Restrict access to areas being cleaned or where spillages have occurred. Floor cleaning should be scheduled for a time when work is not in progress or has finished for the day and the floor should be dried as much as possible;
- Reduce the risk of noise exposure by isolating noisy equipment and rotate tasks to minimise time spent in a noisy area over an eight hour period and provide personal protective equipment where people have to enter noisy areas;
- Restrict times for people being in very cold or very hot areas;
- Ensure all electrical equipment in wet areas is safe and regularly maintained;
- Redesign processes where practicable to remove dust and aerosol generating activities; or provide adequate ventilation of enclosed and semi-enclosed areas;
- Conduct health screening of new staff and regular testing of existing staff for salmonella and other diseases;
- Consider use of antiviral drugs and vaccination programs to minimise risk of influenza in the workforce.

Community Health and Safety Improvements

- Product traceability systems that facilitate tracing of products once released for sale;
- Review processes and conduct regular maintenance to ensure that the cooling chain is unbroken for sensitive products;



- Ensure adequate veterinary inspection is carried out at appropriate points in the production process;
- Establish laboratory facilities to undertake on-site testing of swabs, products and processes.
- Observe food hygiene standards at the facility and the results of previous food hygiene inspections, e.g. separate welfare areas for workers.
- Are staff wearing Personal Protective Equipment?

GUIDE TO INITIAL DUE DILLIGENCE SITE VISITS

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

- Check the condition and efficiency of the wastewater treatment plant and location of discharge points. Note the colour and appearance of adjacent watercourses;
- Note whether the wastewater treatment plant discharges to a local watercourse or the municipal wastewater treatment works;
- Check the condition of storage facilities for chemicals;
- The source of raw materials and screening for contamination, in particular, which contamination parameters are analysed (e.g. pesticides, bacteria, herbicides, radioactivity, heavy metals, industrial pollutants);
- What is the standard of “housekeeping” on site? Do areas look clean and tidy? Look for build up of fat and oil on floors and surfaces, evidence of any recent spills or releases of raw materials/product. Look for evidence that the walking and working surfaces are kept clean and dry;
- Does the organisation have food traceability systems?;
- Check signage around the site:
 - Does it convey the health and safety risks?
 - Are fire exits clearly marked?
 - Are there demarcated routes for pedestrians and vehicles painted on floor?
- Is fire fighting and first aid equipment available?
- Check the age and condition of equipment, look for signs of wear and tear, degradation, leaks and breaks;
- 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 skips are covered to prevent waste escaping, for example, check that waste containers have lids or are stored in an area with a roof;
- Identify what animal wastes are sent off the site for disposal and where they are sent;



- Review measures of controlling the odour coming out from the plant;
- Check for automatic safeguards on machinery to prevent accidental injury;
- Check that wages and working hours are consistent with the average for the sector and national standards;
- Does the organisation have insurance in place to cover the recall of contaminated products? Have there been any recent product recall incidents? What other insurances does the organisation have? Have any claims been made against these policies?
- Have the premises been inspected recently (within the past 2 years) by the regulatory authorities for health, hygiene and environment? What were their findings?
- Have there been any recent (within last three years) incidents on site such as fatalities, fires/explosions, spills? Are there insurances in place to cover such incidents?
- 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 and Labour improvements?
- Check the conditions and duration of validity for all permits.
- 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.

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 and hygiene risks;
- Monitoring programmes;
- Improvement objectives, targets and project plans;
- Training for personnel;
- Regular inspections, checks and audits with records to demonstrate achievement of the required level of performance against legal requirements and improvement action;



European Bank
for Reconstruction and Development

Sub-sectoral Environmental and Social Guidelines: Poultry Processing

- Emergency plans for environment, health and safety accidents and hygiene incidents;

Management review/demonstrated involvement in environment, health and safety management.

Sub-sectoral Environmental and Social Guidelines

POULTRY PROCESSING

REFERENCES AND ADDITIONAL SOURCES

AVEC: Association of Poultry Processors and Poultry Import and Export Trade in the EU,
<http://www.avec-poultry.eu>.

European Bank for Reconstruction and Development (EBRD), Environmental and Social Policy May 2008. Performance Requirement 2: Labour and Working Conditions, .
<http://www.ebrd.com/enviro/tools/index.htm>.

European Union (1993), Council Directive 93/119/EC of 22 December 1993 on the protection of animals at the time of slaughter or killing, http://europa.eu/eur-lex/en/consleg/pdf/1993/en_1993L0119_do_001.pdf

European Union (1994), European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31994L0062:EN:HTML>.

European Union (2005), Integrated Pollution Prevention and Control: Reference Document on Best Available Techniques in the Food, Drink and Milk Industries, December 2005.

European Union (2008), Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (Codified version) Text with EEA relevance, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:024:0008:01:EN:HTML>.

Food and Agriculture Organisation (FAO) (1991), Guidelines for slaughtering, meat cutting and further processing, Animal Production and Health Paper, Food and Agriculture Organization of the United Nations.

International Finance Corporation (IFC) (2007), Environmental, Health and Safety Guidelines for Poultry Processing, International Finance Corporation, April 30 2007.

International Organisation for Standardisation (ISO) www.iso.org
ISO22000:2005: Food Safety Management System – Requirements for any organisation in the food chain. Geneva ISO; and
ISO14001:2004: Environmental Management Systems – Requirements with Guidance for use. Geneva: ISO.

United Kingdom Department for Food and Rural Affairs (Defra), Eggs and Poultry,. Available at <http://www.defra.gov.uk/foodrin/poultry/default.htm> (Accessed 10/11/08).

United Kingdom HSE (1997), Priorities for health and safety in the poultry processing industry, Food Sheet No 11, Health and Safety Executive.

United Nations Environment Programme (UNEP) (2000), Cleaner Production Assessment in Meat Processing, COWI Consulting Engineers and Planners, United Nations Environment Programme Division of Technology, Industry, and Economics, Denmark Miljøstyrelsen.