European Bank
for Reconstruction and Development

Sub-sectoral Environmental and Social Guidelines: Drinks Canning

PROCESS DESCRIPTION

This guideline refers to the process of mixing ingredients with water to produce a finished product. It is assumed that ingredients are simply mixed and receive little or no on-site processing. Once mixed, the drink is usually carbonated (gases added) and then canned. The canning procedure is typically fully-automated and comprises the following:

- Pre-formed and printed cans that have no lid are put onto a conveyor;
- The product is poured into the can; and
- The lid is put on and fixed in place.

KEY ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Water Use and Product Contamination

Most canning operations use a large amount of water which is added to a small amount of concentrate and essences, all of which have to be fit for human consumption;

Water treatment is widely used and often relies on high specification technologies. However, care should be taken to ensure that the treatment process itself does not introduce contaminants such as cleaning agents into the water;

Where water is abstracted, it is typical for abstraction or water use permits to detail volumes of water abstraction allowed as over abstraction can impact local communities. Where ever changes take place in product volumes this should be reflected in the permit.

The Company's operations should be designed to internationally recognized food safety standards consistent with the principles and practice of Hazard Analysis Critical Control Points (HACCP)[1] and Codex Alimentarius[2].

Effluent Discharges

One of the main environmental problems associated with drinks canning is the management of effluent arising from tank cleaning operations, cleaning agents, such as sodium hydroxide and detergents and spillages. These effluents have a high organic content that can have a significant impact on the environment if released untreated and may be coloured.

Some drinks canning processes will have their own wastewater treatment plant. Alternatively, some companies will not have a wastewater treatment plant and will discharge to the municipal wastewater treatment plant. It is typical for authorities, in either case, to require treatment of such wastewater before it is discharged from the site. These requirements will be set out in an environmental permit.

Wastewater treatment systems for process water, drainage water and cleaning water are essential in order to reduce the polluting potential of waste effluent to watercourses.

Energy Use and Air Emissions

- Large canning plants may be significant users of energy. In a particular territory, Governments may apply taxes and levies to reduce energy use and associated emissions. Investment in new technology may be required to reduce energy use;

[1] ISO 2005

[2] FAO and WHO (1962–2009).

- Cleaning water may be heated in a boiler prior to use and combustion plant emissions from on-site boilers may generate dust and gaseous emissions. The emissions from the boilers will be dependent on the fuel used (coal, oil or gas). Coal fired boilers may emit high concentrations of gases which are regulated.

Refrigerants

Drinks canning plants will usually have facilities to chill the product at various stages in the process. The refrigerants used may be ozone depleting chemicals, such as Chlorofluorocarbons (CFCs) Hydrochlorofluorocarbons (HCFCs) the production of which, are being phased out internationally under 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. There are health and safety risks associated with the storage (and release) of large volumes of ammonia.

Odours

Concentrates and essences used in the process typically have strong odours. Any release of mixing vessels or accidental releases may result in nuisance odours.

Materials Storage

- *Printing* - Following filling, cans are typically printed with product information, using a solvent based ink. While quantities are small, storage of the ink and disposal of waste ink is an environmental issue and may cause pollution of land/water;

- *Fuels and Oils* - Fuels and oils may be stored at the facility for fuelling and maintenance of a transportation and delivery fleet. These materials should be stored appropriately, with secondary containment to prevent escape to soil, groundwater and surface water;

- *Essences* - Essences can be both corrosive and flammable. Storage adjacent to incompatible materials, or near heat or flame sources is an environmental and safety risk;

- *Cleaning Agents* - Sodium hydroxides and other corrosive materials may be used in cleaning.

Waste Management

- A large amount of can-material, plastic and cardboard is used in the packaging process. Waste packaging can represent a significant proportion of the waste stream. Can-material is 100% recyclable and should be collected and sold for recycling, other packaging materials are also recyclable;

- Potentially hazardous wastes may include sludge from either the cleaning of the CIP facilities or wastewater treatment plants; waste oil and solvents; and waste chemicals from the quality control laboratory.

Explosion/Fire Hazard

Fine dusts emitted during the production process can ignite resulting in explosions or fires. In addition, combustible materials (sugar) and flammable liquids and vapours (essences) can ignite resulting in explosions or fires.

Slips, Trips and Falls

Liquid substances form a large proportion of the drinks canning processes and therefore there is a high risk of slips, trips and falls where liquid has not been cleared up.

Manual Handling and Repetitive Work

Lifting, repetitive work and posture injuries occur because of lifting and carrying heavy or awkward shaped items such as barrels and crates.

Collision Risk

In a busy manufacturing environment it is common to have injuries where people are struck by moving or falling objects, such as, crates, boxes, equipment, conveyors (canning machines, packaging machines and palletisers) and fork lift trucks, all of which can lead to injury.

OTHER ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Temperature

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.

Vats

Vats for mixing raw materials provide hazards in the form of working at height which could result in falls and drowning (immersion).

Working at Height

Storage warehouses will entail moving equipment and possibly working at height.

Noise

High noise that can lead to hearing deficiencies can be experienced in the bottling plant.

Machinery

All equipment should have safety guarding and workers should be issued with appropriate personal protective equipment to protect against unavoidable sharp items and edges.

Hazardous Substances

Hazardous substances are used in the cleaning and disinfecting of process areas. Inappropriate use and storage could result in chemical contact burns to employees, 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. They should be prepared to respond appropriately if releases do occur;

Polychlorinated Biphenyls (PCBs) and Asbestos

- PCBs are a group of substances which are good electrical insulators. Typically, PCBs may be present as constituents of hydraulic oils or dielectric fluids in electrical

switchgear, transformers and fluorescent light starters;

- Asbestos has been used on a large scale for many years as a fire proofing and insulation material and may be encountered in a wide range of forms including asbestos cement boards, as fire retardant gaskets in pipework and as fire retardant insulation around boilers

Particular attention should be given to buildings constructed before the 1980s.

Permitting

Food processing operations within the EU with production capacity greater than 300 tonnes of finished product per day will be subject to national regulations under the Integrated Pollution Prevention and Control Directive (2008/1/EC), which requires the use of the best available techniques and a programme of continuous environmental improvement. 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.

KEY SOCIAL, LABOUR AND COMMUNITY RISK/LIABILITY ISSUES

Hygiene

- Contamination of product could result in ill health in the general public and may result in product recall. Hygiene standards within process areas must be maintained to a high level to prevent product contamination. In accordance with international best practice, the Company's operations should be designed to internationally recognized food safety standards consistent with the principles and practice of HACCP[3] and Codex Alimentarius[4].

- Factory hygiene standards should prevent the spread of diseases such as salmonella, Escherichia coli (E. coli) and Legionnaires' disease beyond the factory boundaries, for example to the local surrounding community and/or consumers;

Fires & Explosions

- Measures should be in place to prevent explosions and fires resulting from drinks canning processes. Essences, which can be both corrosive and flammable, should not be stored near heat/flame sources;

OTHER SOCIAL, LABOUR AND COMMUNITY RISK/LIABILITY ISSUES

- Delivery vehicles may cause traffic congestion or excessive noise.

- Odour from process operations can cause a local nuisance.

- The noise generated by equipment and trucks delivering raw materials can be a nuisance if the site is located close to where people live and work.

FINANCIAL IMPLICATIONS

- Capex investment in new plant and equipment may be required to comply with new health, safety, environmental and hygiene legislation/standards;

[3] ISO 2005

[4] FAO and WHO (1962–2009).

- Where large quantities of energy are used then this can result in high operating costs to the business;
- Explosions and fires could result in harm to employees and machinery, resulting in compensations claims and costly replacement of plant and infrastructure;
- Injuries may lead to increased payroll costs to replace skilled workers and lost production time;
- A drinks recall caused by contamination of the product may lead to financial loss and damage to the organisations reputation and loss of market share;
- Fines, penalties and third party claims may be incurred for non-compliance with environment, health and safety regulations.

IMPROVEMENTS

Environmental Improvements

- Good housekeeping should be maintained at all times in the drinks canning process. The adoption of good cleaning and working practises as a routine will reduce odour emissions and improve hygiene standards;
- Segregate and collect waste materials to enable reuse and sale for recycling;
- Regular, rigorous hygiene monitoring programmes should be in place;
- Regular inspection should be carried out of all bulk containment facilities and effluent holding tanks to ensure integrity of storage. Install (or upgrade) equipment to treat wastewater;
- Install grids to reduce solid materials into the wastewater drainage system;
- Improve the integrity of drainage systems through sealing or removing abandoned drains to avoid undetected leaks;
- Reduction in water volume used through the use of high-pressure hoses and re-use and recirculation of water and use of re-circulated chilled water systems where practicable;
- Control can washers so that they are not operating when the conveyor is stopped;
- Install overfill alarms and shut off mechanisms on the production line to reduce the risk of overflow;
- Reuse rinse water as the first cycle cleaning water;
- Consider changing to non-CFC coolants and/or sealing of leakages in the refrigeration system;
- Reduction in refrigeration losses from cooling plants through use of insulation;
- Separate cooling water from process water;
- Use reusable plastic crates instead of cardboard boxes.
- 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; the training should include the reasons for its use and the dangers of not using it. PPE should be inspected regularly and maintained or replaced as necessary;

- Train workers in correct use of machinery and safety devices;
- Provision of segregated worker welfare areas;
- 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. Floor cleaning should be scheduled for a time when work is not in progress or has finished;
- Ensure correct clean up programmes for liquids: restrict access to areas being cleaned down or where spillages have occurred;
- Install mechanical lifting aids where possible and rotate work tasks to reduce repetitive activities and redesign of manual processes to avoid heavy lifting/repetitive activities;
- To reduce the risk of noise exposure isolate noisy equipment and rotate tasks to minimise time spent in a noisy area and provide PPE when appropriate.

Social, Labour and Community Improvements

- Implement a food safety programme to improve food hygiene standards in accordance with HACCP prerequisites and the Codex Alimentarius;
- Implement a Customer complaints mechanism;
- Implement a system of food labelling to enable food traceability and recall and to inform the consumer of correct storage and cooking requirements.

GUIDE TO INITIAL DUE DILIGENCE SITE VISITS

During the initial site visit, the issues will vary according to the size of operation, the type of drink being canned and the type and level of environment, health and safety management already introduced. While visiting the site it is important to discuss and review the following:

Environment, Health and Safety

- Confirm organisational responsibilities and systems for environment, health and safety;
- Check the condition of the wastewater treatment plant and location of discharge points for wastewater from the facility. 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. Higher environmental risks will be associated with facilities discharging to water courses;

- Check the condition of storage facilities for chemicals;
- Note any odours that might cause a nuisance;
- 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;
- 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 PPE?
- Check for automatic safeguards on machinery to prevent accidental injury;
- Check safety signage around the site:
    - Does it convey the health and safety risks?
    - Are fire exits clearly marked?
    - Are there separate 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 clear 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;
- Have the premises been inspected recently (within the past 2 years) by the regulatory authorities for health, hygiene and environment? What were their findings?
- 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, contamination of product, 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 improvements?
- Check the conditions and duration of validity for all permits.

Social, Labour and Community

- 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;

- Check that wages and working hours are consistent with the average for the sector and national standards;
- 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?
- Consider installing product traceability systems that facilitate tracing and recall of products once released for sale.
- 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 company have in place?

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 and safety 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;
- Emergency plans for environment, health and safety accidents;
- Management review/demonstrated involvement in environment, health and safety management.

REFERENCES AND ADDITIONAL SOURCES

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 (2005), Integrated Pollution Prevention and Control: Reference Document on Best Available Techniques in the Food, Drink and Milk Industries, December 2005, http://eippcb.jrc.es/pub/english.cgi/0/733169

FAO and WHO (Food and Agriculture Organization and World Health Organization).1962–2009. Codex Alimentarius. Geneva: FAO and WHO. http://www.codexalimentarius.net/web/index_en.jsp

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 Health and Safety Executive, Food manufacture – Beer, spirit and soft drink manufacture: http://www.hse.gov.uk/food/drink.htm

United Kingdom Health and Safety Executive, Priorities for health and safety in the soft drinks industry. Food Sheet No 19.

United Kingdom Health and Safety Executive, Safeguarding flat belt conveyors in the food and drink industries, Food Information Sheet No 25.