European Bank
for Reconstruction and Development

Sub-sectoral Environmental and Social Guidelines: Wine Making

PROCESS DESCRIPTION

The winemaking process starts with selection of the grapes or other produce and ends with bottling/packaging the finished wine. Although most wine is made from grapes, it may also be made from other fruit or non-toxic plant material. The fruit may be supplied from vineyards/farms owned by the winery or may be bought in from other locations.

The process is:

- Crushing and stemming of grapes/apples;
- Addition of sulphur dioxide to discourage bacterial and yeast growth;
- Possible addition of clarifying agents, usually in powder or granular form;
- Processing to produce grape/apple juice;
- Maturation in casks or large tanks;
- Filtration and clarification;
- Addition of preservatives;
- Bottling, possibly in a sterile atmosphere to protect wine from oxidation and corking, and addition of foil or plastic outer cap. Some wines are also packaged in foil bags in boxes (also known as bag-in-box).

KEY ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Water Consumption

Wine production can use a relatively large quantity of water throughout the process; large volumes are used in the cleaning and cooling processes. Much of this water is wasted when much of it can be treated and reused in the process.

Wastewater Management

Wastewater from wine production presents a pollution risk due to:

- Wine making may generate significant volumes of wastewater including waste product and cleaning water. While this effluent is unlikely to contain toxic materials, it will contain high levels of organic matter, which will reduce the oxygen concentration in watercourses;
- High acidity or alkalinity, depending on the type of cleaning detergents used;
- Other contaminants, such as pesticides from the initial washing of fruit and biocides from cleaning;
- The winery may require a permit that sets limits on water quality discharged from an on-site wastewater treatment plant or discharged to a municipal wastewater treatment plant.

Energy Consumption

A number of the stages in the wine making processes are energy intensive. Where equipment is being used for heating and cooling purposes, it will increase the amount of energy (gas, electric, or diesel) used within the processes. Energy usage has a direct correlation to the operating costs of the company.

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 (bottling machines, packaging machines and palletisers) and fork lift trucks, all of which can lead to injury.

Explosion Risk

Wine making includes the use of fermenting vessels designed to operate at high pressures. If this pressure is not correctly regulated, there is a high risk of the vessel exploding and causing severe injury or death.

Slips, Trips and Falls

Liquid substances form a large proportion of the wine making process and therefore there is a high risk of slips, trips and falls where liquid spills have not been cleared up or cleaning is taking place.

Manual Handling and Repetitive Work

Lifting, repetitive work and posture injuries occur as a result of lifting and carrying heavy or awkward shaped items (especially crates and barrels). Repetitive tasks can lead to musculoskeletal injuries, for example, manual tasks within a bottling plant.

Occupational Dermatitis

Within the wine making process hygiene is paramount and this results in a requirement for regular hand washing which can lead to occupational dermatitis (that is health conditions affecting the skin).

OTHER ENVIRONMENTAL, HEALTH AND SAFETY RISK/LIABILITY ISSUES

Handling and Storage of Materials

- Storage facilities may include silos, bulk storage tanks and drums, sacks and bags;
- Pollution risks to watercourses may arise from spillages of additives used in wine production, such as calcium carbonate, potassium bicarbonate; product; cleaning materials; and oils and fuels, and/or untreated discharge of wastewater.

Solid and Hazardous Waste Management

Solid wastes include:

- Grape marc (left over skins and seeds from pressing of fruit);
- Filter cake (perlite and diatomaceous earth used as filtration aids);
- Lees and distillation wine;
- Sludges wastewater treatment plants and tank washings.

If dealt with inappropriately these can lead to significant environmental problems, e.g. greenhouse gas and alcohol emissions; odour; soil and surface water contamination; vermin and potential fire hazards. These wastes can be treated to recover saleable products with the residual wastes used as animal feed or compost.

Hazardous wastes include waste oil and solvents from maintenance and operation of equipment.

Refrigerants

Wineries 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) or Hydro chlorofluorocarbons (HCFCs), the production of which are being phased out under the Montreal Protocol. Releases of these types of refrigerant gases should be avoided. Ammonia is also becoming a more commonly used alternative refrigerant which has no such restriction. There are however health and safety risks associated with the storage (and release) of large volumes of ammonia which is toxic if inhaled at high concentrations and can cause frostbite when released to the atmosphere.

Packaging

Packaging is widely used for the protection of the quality of the product, marketing and for transport purposes. Typically this is glass, tetrapack/cardboard, plastic, shrink wrap and film. In many cases, the material becomes part of the waste stream. Where possible companies should attempt to recover packaging or should ensure that the packaging used is easy to recycle.

Companies operating within 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 packaging that is being introduced into the waste streams.

Polychlorinated Biphenyls (PCBs) and Asbestos

- PCBs are a group of substances which are good electrical insulators. Typically, PCBs may be present in hydraulic oils or dielectric fluids in electrical switchgear and transformers.
- 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 and furnaces.

Though the presence of PCBs and asbestos are not likely to be a principal issue of concern in relation to the main wine production process, they may be present in factories constructed prior to the 1980s and present both an environmental and health and safety hazard.

Permit Requirements

Large beverage manufacturing plants operating in the European Union may be required to hold an environmental permit under integrated pollution prevention and control regulations. Other smaller facilities and operations outside the EU may still require environmental permits but these permits may be less stringent and cover fewer processes.

Temperature

Refrigeration systems will result in very cold temperatures which can result in contact burns and, in extreme cases, frostbite.

Vats

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

Warehouses

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

Chemical Hazards

Wine making uses carbon dioxides. Inappropriate storage and use of these materials could result in inhalation of harmful/toxic fumes.

KEY SOCIAL, LABOUR AND COMMUNITY RISK/LIABILITY ISSUES

Supply Chain Labour Conditions

Workers on the farms that supply wineries, particularly temporary workers and migrant workers, may face many issues related to their lack of employment security, low pay, poor access to benefits, inadequate childcare, lack of training, and lack of, or low-quality on-farm housing. This may be unlawful, and/or present reputational risks;

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 Hazard Analysis

Critical Control Points (HACCP)[1] and Codex Alimentarius[2].

Harmful Substances

Harmful substances such as ammonia or caustics and other chemicals, if incorrectly used, could release into the surrounding environment and result in inhalation of harmful fumes by the general public.

OTHER SOCIAL, LABOUR AND COMMUNITY RISK/LIABILITY ISSUES

- Transport of raw materials and chemicals to site could result in a road traffic accident which involves the general public;
- Operations may cause noise which is a nuisance to neighbours.

FINANCIAL IMPLICATIONS

- The Company should allocate a portion of its annual budget for environmental management and related environment, health and safety monitoring;
- Water supply and wastewater treatment may constitute a significant proportion of operating costs;
- Environmental improvement targets for wastewater discharges are set as part of a local, regional or national plan to improve the quality of watercourses. These targets may be very costly to achieve, and require significant capital expenditure and operating costs;
- Legislative requirements to recycle used packaging in countries to which product is exported may increase costs of packaging materials;
- Energy costs, particularly for generation of steam and hot water, may be significant;
- Capital expenditure may be required to maintain or improve to health, safety and hygiene standards;
- Fines penalties and third party claims may be incurred where there is non-compliance with environment, health, safety and hygiene regulations.

IMPROVEMENTS

Environmental, Health and Safety Improvements

- Mandatory environment, health and safety training for all employees and contractors;
- Pre-treatment of water is likely to be necessary, including sterilisation, filtration and softening;
- Wastewater treatment systems for process water, drainage water and cleaning water are essential in order to

[1] ISO 2005

[2] FAO and WHO (1962–2009).

minimise the risk of polluting watercourses;

- Hard standing for vehicles, should be designed to present or contain oil or fuel leaks;
- List all hazardous materials held on site and prepare procedures for their handling, storage, shipment and treatment in the event of spillage;
- Secondary containment of tanks (bunds, for example) to prevent spills reaching the wider environment;
- Regular inspection of secondary containment facilities and fitting of alarms, where not regularly inspected;
- Protect watercourses from possible leakage from raw material or product storage facilities, tanks for storage of sludge and wastewater;
- Sludges should be disposed of to appropriately authorised waste facilities or licensed for spreading on agricultural land;
- Hazardous wastes must be removed by licensed contractors;
- Recycle cooling water used, for example, in fermentation equipment.
- Separation of people from moving equipment:
    - Ensure that the process layout reduces opportunities for process activities to cross paths;
    - Installation of safeguards on moving parts of conveyor belts and packaging machinery to reduce risk of entrapment of employees;
    - Install walkways to separate people from vehicle movements to reduce risk of collision;
- Maintain walking areas to ensure they are clean and dry and prevent spillage;
- Ensure correct clean up programmes are in place 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;
- To reduce the risk of noise exposure, isolate noisy equipment, 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 access to areas of extreme temperature:
    - Restrict times for people being in very cold or very hot areas;
    - Provide personal protective equipment to reduce risk of frost bite or contact burns;

- Restrict access to working at height or around the top of vats. Ensure correct fall arrest systems are in place, such as, (guarding and harnesses);
- Upgrade storage arrangements to ensure leaks do not occur;
- Personal protective equipment can be used by organisations to protect employees and visitors from identified Health and Safety hazard. Failing to use correct personal protective equipment can result in injury or illness. Provide personal protective equipment to maintain hygiene standards and train personnel in the correct selection, maintenance and use of personal protective equipment;
- Ensure that tanks are correctly maintained and operated to reduce the risk of explosion as a result of a build up in pressure.

GUIDE TO INITIAL DUE DILIGENCE SITE VISITS

During the site visit, it is important to discuss and review the following:

- Confirm organisational responsibilities and systems for environment, health and safety;
- Identify total monthly/annual water quantity consumption, source of the water supply, potential impacts to adjacent users etc..
- Condition and efficiency of wastewater treatment plant and location of discharge points;
- Find out whether drainage systems lead to wastewater treatment systems or discharge directly to surface waters;
- Note the extent of treatment systems for the different types of wastewater, including process water, surface water runoff and cleaning water;
- Water discharge criteria (e.g. national or EU standards);
- Check the screening methods to prevent contamination of raw materials and finished product;
- Are there systems for the good storage of raw materials and chemicals?
- What is the standard of "house-keeping" on site? Do areas look clean and tidy? Look for localised spills, leaking pipes etc;
- Has the facility been recently inspected by authorities responsible for environment, health, safety and hygiene? What was the outcome of those visits?
- Check the age and condition of buildings and equipment;
- 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;
- Note if areas of the factory appear to be noisy;
- Check whether people are wearing personal protective equipment;
- Check the signage around the site, does it convey what health and safety risks might exist in areas?
- Is fire fighting and first aid equipment available?
- 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 incidents (within the last 3 years) 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 as well as asset management and maintenance?
- If investment or refinancing will lead to restructuring of the organisation what will be the potential impacts on health and safety at the operation and wider community? Have these been considered and assessed by the company?
- If the company plans to invest in new technology, what will be the impacts and benefits for human resources?

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?

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

ACTION PLANS

Where relevant, select appropriate improvements from the list above to include in the action plan. As a minimum, each operation should be required to have the following in place:

- Operational procedures to manage environmental, health and safety risks (e.g. Environmental Management System (EMS));
- 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 response plans for environment, health and safety accidents;
- Management review/demonstrated involvement in environment, health and safety management.

REFERENCES AND ADDITIONAL SOURCES

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