

ILO Toolkit Control Sheet E200 Control of emissions into water systems and groundwater Chemicals that can Cause Harm to the Environment

Scope

This control sheet is part of the ILO Chemical Control Toolkit. It provides general advice on the control of chemical emissions into water. It describes the key points you need to follow to provide adequate control and ensure that environmental exposure is reduced to acceptable levels. Other sheets in this E series provide guidance on emissions into air, and as wastes. Your local authority or environment control authority will have limits for environmental emissions to water. Ask them for details. Some chemicals and products are flammable, corrosive or toxic to humans as well as harming the environment, so exposure of humans via the environment needs control.

Emissions into water and their control

- Substances requiring control include:
 - chemicals that accumulate in groundwater
 - chemicals that damage waste water systems
 - chemicals that run off into rivers or streams and poison wildlife
 - chemicals that poison organisms in sewage treatment works
- The degree of control needed is a matter for local regulation. Emission limits set boundaries for the quantity of pollutant emitted, the concentration emitted, and/or the duration of the emission per day.

Control of chemicals that accumulate in groundwater

- You need to know something about the geology of your site. Chemicals entering aquifers present a long-term risk, and may reappear in drinking water. It is particularly important to prevent any release of chemicals to the soil if your firm is situated above an aquifer, particularly if the rock is porous.
- It is also important to keep industrial chemicals away from soil, if there is any likelihood of leaching into the water compartment of the environment. Means for doing this include:
 - bunding chemical storage areas, with the bund of a sufficient size to contain any foreseeable spillage, including the failure of storage tanks
 - an impermeable barrier (e.g. concrete), with collection of rainwater run-off
 - secure storage of products and wastes
 - stopping vehicle tyres dragging chemical out of the plant, e.g. using a tyre wash.

Control of chemicals that damage waste water systems

- Some chemicals can generate dangerous gases in waste water systems and must not be passed directly to waste water. These need to be collected for special disposal. Waterborne waste can be treated on site through:
 - settling ponds, to remove suspended solids
 - interceptors, to collect oil and immiscible organic fluids from water
 - aeration ponds, to oxidise the liquid waste and precipitate sludge, prior to release into the waste system
 - reed beds, to prepare liquid wastes for release to surface water drainage (streams, etc.)
- Suspended solids, sludge, and intercepted oil and solvent should be disposed separately. Water treatment systems need to be designed by experts for the expected chemicals in the waste water.

Control of chemicals that run off into streams and poison wildlife

- Chemicals entering streams present a short term risk to wildlife and stream organisms. There is also a long term risk if the chemicals collect in the sediment. It is particularly important to prevent any release of chemicals if your firm is situated on a watercourse. Means for doing this include:
 - bunding chemical storage areas, with the bund of a sufficient size to contain any foreseeable spillage, including the failure of storage tanks
 - an impermeable barrier (e.g. concrete), with collection of rainwater run-off
 - secure storage of products and wastes.
- In some cases, such as pesticides warehouses, in case of fire, it is necessary to have a catch pit to prevent water from firefighting from entering the environment.

Control of chemicals that poison organisms in sewage treatment works

- Some chemicals are particularly toxic to organisms in sewage treatment works, for example chlorinated hydrocarbons and metal salts. Unless these can be treated in an on-site treatment plant, such wastes should be collected in drums or tanks, for specialist disposal.

Control of other dilute biodegradable chemical wastes

- Where it is the chemical's concentration that gives rise to environmental risk, it is acceptable to discharge waste solution to the waste water system, so long as the chemical has been diluted enough. For example, soluble sulphates can damage concrete pipes, and need to be well diluted.
- One way of doing this is to schedule the discharge at a time of peak water flow (e.g. around breakfast time). Another is to pipe the waste some distance offshore, and you need to contact your local environment authority for permission.

Typical control systems

- Common processes have range of typical water cleaning devices as follows:

Dust	Water Cleaning Device
Ceramic dust	settling lagoon
Chemical dust	water treatment plant
Food and drugs	water treatment plant
Metal smelting	settling lagoon and water treatment plant
Metal working and plating	interceptors, electrode stripping, precipitation
Solvents and oils	interceptors, water treatment plant

General precautions

- Check the bunds and concrete surfaces from time to time, to make sure these are not damaged
- Monitor the quantities of chemicals on site
- Prepare plans to deal with spills and fires
- Dispose of sludge and waste solvents as special waste
- Do not dump waste except in a specified tip.
- Check with your local environment authority how to classify the collected waste for disposal.
- Make sure the waste is clearly labelled and disposed through an authorised waste contractor
- Don't enter sludge pits or any other confined space without making sure that the air is fit to breathe until it is safe to do so. Check for hazardous or flammable substances and sufficient oxygen (between 19.5% and 22%). Note that entry or the work may give rise to a hazardous situation, e. g. disturbing sludge, welding may deplete oxygen.
- Sludge may be corrosive or poisonous – wear protective equipment and wash it off your skin
- Intercepted organic liquids may require you to use a respirator
- You may need to shower after working with sludge