

Landfills and Water Matters – Key Issues and Some Examples

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Landfills and Water Matters

Why should we be concerned ?

- Waste disposal sites, especially old un-lined landfills, represent very real threats to water quality.
- Both surface water and groundwater may be at risk.
- All landfills generate leachate which must be collected and treated before disposal.
- Illegal landfill sites, especially unauthorised sites containing many thousands of tonnes of waste create serious risks of contamination.

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Defining a Landfill ...

A biologically and chemically active site, releasing a wide variety of pathogenic micro-organisms, together with organic and inorganic contaminants, many of them toxic, to air and water for more than 30 years.

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Leachate may be defined as any liquid percolating through the deposited waste and emitted from or contained within a landfill.

Leachate picks up suspended and soluble materials that originate from or are products of the degradation of the waste.

If leachate is allowed to migrate from the site it may pose a severe threat to the surrounding environment and in particular to groundwater and surface water.

... EPA Landfill Monitoring Manual

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Leachate may escape sub-surface to contaminate groundwater, it may break out from the sides of an elevated landfill and may contaminate surface waters ...



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Leachate may escape mixed with silt-laden surface water run-off ...



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The two landfills shown in the previous slides are both licensed by the EPA.

The Landfill Directive requires that surface water, if present, must be monitored at representative points. The surface water environment on and off a landfill site may include:

- • streams, rivers, canals and ditches,
- • lakes, reservoirs and lagoons,
- • wetlands,
- • estuaries, and
- • coastal waters.

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Landfill sites must be selected, designed, managed and monitored using BAT to comply with:

- The Waste Management Act, 1996,
- The Council Directive on the landfill of waste (99/31/EC),
- The Council Directive concerning integrated pollution prevention and control (96/61/EC),
- The Directive on the protection of groundwater against pollution caused by certain dangerous substances (80/68/EEC), and,
- The Water Framework Directive (2000/60/EC).

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The Water Framework Directive key aims are:

- *to expand protection to all waters: inland and coastal surface waters and groundwater;*
- *to achieve "good status" for all waters by 2015;*
- *to base water management on river basins;*
- *to combine emission limit values with environmental quality standards;*
- *to ensure that water prices provide adequate incentives for water users to use water resources efficiently; and,*
- *to involve citizens more closely.*

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It is also a key aim of the Water Framework Directive that water policy must be integrated into other EU policy areas, in particular agriculture, energy, transport, research, external relations and regional development.

Management of our wastes must also comply with the spirit and aims of the WFD.

Therefore, minimise waste, reduce its toxic content, and ...

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- **Consider waste as an out-dated concept;**
- **Design for repair, re-use, re-use and yet more re-use;**
- **Recycle after re-using;**
- **Follow the examples provided by nature;**
- **We can achieve 98 % recycling, i.e., near-zero waste;**
- **We can, and must, achieve Zero Waste in less than 20 years;**
- **Fiscal measures, economic instruments and the necessary and correct infrastructure must be provided to achieve this target as a matter of urgency.**

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The 2007 Programme for Government includes

- an objective to reduce reliance on landfill to as low as 10%, and
- commits Government to ensuring that “*the landfills currently provided for under regional waste management plans should be the last to be constructed for a generation*”.

But will that be enough ... ?

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“Never in the history of mankind have we done so much, in so little time, to destroy the wonderful ecosystem that sustains us. Our biggest challenge in this new century is to take an idea that seems abstract -- sustainable development -- and turn it into a daily reality”

Kofi Annan, Secretary General, UN; speaking at the United Nations Environment Programme, 8th International High-level Seminar on Sustainable Consumption and Production; Monterrey, Mexico ~ November 15-16, 2004.

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- Since 1950 we have added more people to the world population than during the entire preceding 4 million years, since our ancestors first stood upright.
- In 50 years the world's per capita availability of water dropped from 17,000 cubic metres to 7,000 cubic metres.
- In the EU, between 1970 and 1985 we increased our water withdrawal rate by 35%.
- To stabilise atmospheric carbon dioxide concentration at a level that will prevent dangerous interference in the climate system, the 2500 scientists on the IPCC advise an **80% reduction**.
- Kyoto target by 2012: **8% reduction** in greenhouse gas emissions

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Increase in waste generation per capita in industrial countries in the last 20 years: 300%

Percentage of products discarded after a single use: 80%

Volume of the solid waste stream that consists of packaging: 50%.

The Concept of Sustainability

“Improving the quality of human life while living within the carrying capacity of the Earth’s supporting eco-systems”.

From: “Caring for the Earth: a Strategy for Sustainable Living”, IUCN/UNEP/WWF (1991)

or

“Sustainable Development is about raising our quality of life by establishing symbiotic relations within and between our diverse human cultures and between those cultures and the biosphere”

The Concept of Sustainability

Sustainable Development does **NOT** mean:

- Sustainable Growth
- Business as usual
- Improved energy saving and better use of natural resources and less waste and some more recycling ...

Basic Principles

- **Our modern industrial society should be, and can be, compatible with a healthy planet**
- **“Waste” is an artificial, socially imposed deficiency of our imagination; it is not an intrinsic property of goods, articles or materials**
- **Energy is embodied in products and materials to serve particular functions**
- **Recycling the material components is good, but not adequate; functionality must be conserved as much as possible by re-use**

Some Practical Points

- ✓ **Re-use and recycling save energy.**
- ✓ **Manufacturing goods from recycled materials requires less energy than producing goods from virgin materials.**
- ✓ **Waste prevention is even more effective at saving energy.**
- ✓ **When people re-use things or when products are made with less material, less energy is needed to extract, transport, and process raw materials and to manufacture products.**

Conclusions

- **Even with the most careful management and licensing, landfills are a threat to water resources;**
- **We need to reduce dramatically the proportion and actual quantities of biodegradable wastes being landfilled;**
- **Government and society need to consider waste going to landfill as a failure to manage natural resources and raw materials**
- **Some landfilling is unavoidable for the near future, but we should aim for near-total recycling and zero waste.**

The World of Yesterday



LANDFILL
CIRCA 1999

LANDFILL

CIRCA 1999

A hole in the ground where valuable resources were needlessly buried.

This practice was ended in the early 2000's with the introduction of ZERO WASTE.

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