

Athens 2015 International Landfill Mining Conference

Reliable rehabilitation of uncontrolled dump sites

- *Kimon Hadjibiros, 24 September 2015*

- World: open uncontrolled dumping of municipal waste
- Greece, last 70 years: Thousands of uncontrolled dump sites
- Greece, last 20 years: many projects of rehabilitation

A generally accepted principle

- In waste management regulations: aftercare (or post-closure care) has to be carried out until landfills or dumpsites no longer pose a threat to human health and the environment

Landfill aftercare activities should include

- Water sampling and analysis of discharged rainwater, collecting and treating leachate, groundwater and surface water monitoring
- Measurements and visual inspections of settlement, slope stability and erosion evaluation, quality of vegetation, groundwater levels, visual inspections, gas measurements and analyses
- Cleansing and maintenance of leachate drainage, piezometers, monitoring drainage water
- Maintenance and operation of landfill gas extraction, utilisation and treatment systems, wastewater treatment plant and/or discharge systems, vegetation and cover repairs, safety, accessibility and other maintenance

Environmental reliability

- No toxic substances in the environment
- No pollution of underground water
- No greenhouse gases in the atmosphere
- No erosion
- Natural landscape, vegetation
- Monitoring of qualitative, quantitative parameters
- Reliable maintenance of technical infrastructure
- For 30 years at least

Basic requirements for closing an open dumpsite

- Providing final soil cover, vegetation layer, drainage control system, leachate and gas management systems, monitoring systems and site security (aftercare programme)
- Re-gradation of site slopes, capping of landfill with impermeable cover, placement of leachate collection and treatment systems, installation of landfill gas collection and flaring system, aesthetic landscaping of the closed dumpsite
- Three major design elements: slope stability, drainage and gas controls

Usual rehabilitation projects in Greece

- Are compatible with these criteria?
- Probably only with criterion 5
- Often the dump cover is poor or sporadic and a walk over of the dump area provides visual information on the type of waste
- Low cost projects
- The biodegradable components (food and yard waste) generally undergo anaerobic degradation in a closed dumpsite

Toxic liquids and greenhouse gases

- Leachate: water (due to rainfall, surface drainage, groundwater, etc.) percolates through solid waste undergoing decomposition
- Contains dissolved and suspended materials that may pass through the underlying soil and contaminate underground as well as surface water
- The decomposition of the waste brings about the generation of gases, mainly methane (about 50-65%, 21 times the global warming potential of carbon dioxide)
- About 5-15% of the methane released to the Earth atmosphere is related to waste dumping and waste landfilled

For many years..

- Gas surveys are necessary at most dumps
- This should be completed at least three to four times per year
- Ground water monitoring is necessary at all abandoned dumps
- The long-term effects of settlement, gas emissions and leachate production require aftercare measures for a closed dumpsite long after (30 years) ceasing operations

Informal scavengers/waste pickers at the disposal site

- A potential threat
- They could be formally hired in a Materials Recovery Facility since they are efficient in waste segregation

Mining

- Landfill mining: process of excavating existing or closed solid waste landfills or dumpsites and sorting excavated materials for recycling, processing or other disposition
- Operations to free new landfilling space
- Producing recyclable materials
- Extracting polluting substances
- Dumpsite mining has been used throughout the world since 52 years as a tool for sustainable landfill siting

Landfill and dumpsite mining

- Rehabilitation: a set of activities for re-establishing the productivity and business value of rehabilitated land
- Advanced environmental policy
- Sustainable development
- Material flow
- Cyclic industrial economy
- Reduced integrated cost (avoid environmental cost, costs of landfill closure and post closure care and monitoring)