Workshop on good practices and experience in sludge management

EU Legal Framework

6th June 2018, Warsaw
A Picture Tells a Thousand Words

Sludge Treatment Processes

Digestion
- Aerobic digestion
- Anaerobic digestion: Mesophilic, Thermophilic

Composting:
- Sludge only
- Co-composting

Wet oxidation

Incineration (with energy recovery)
- Raw sludge
- Digested sludge
- Co-incineration (waste)

Ash

Lime stabilisation

Dewatering (20-35% DS)
- Dewatered sludge cake/solids
- Dried sludge

Thermal drying
- Digested sludge drying
- Raw sludge drying

Biogas, Syngas or usable heat produced

Potential for power production

Chemical conversion:
- Pyrolysis
- Gasification
- Wet oxidation

Key:
- Liquid/thickened sludge
- Dewatered sludge cake/solids
- Dried sludge
- Ash or residue
- Biogas, Syngas or usable heat produced
- Potential for power production
- Process under development

Products

Uses

Agriculture:
- Food crops
- Commercial crops (energy & material)

Land reclamation:
- Landfill capping
- Landscaping

Forestry
- Plantations

Fuel:
- Cement kilns
- Heat/power plants

Landfill
- Co-disposal
- Mono-disposal

Raw material:
- Construction
- Brick manufacture etc

Note: The following treatment–use routes are used but are not best practice:
- Use of raw or limed sludge in agriculture
- Disposal of dewatered or dried sludge to landfill
Water Legislation

**UWWTD**
- Directive 91/271/EEC concerning urban waste water treatment

**Water Framework Directive**
- Directive 2000/60/EC establishing a framework for Community action in the field of water policy (WFD)

**EQS Directive**
- Directive 2008/105/EC on environmental quality standards in the field of water policy….

**Groundwater Directive**
- Directive 2006/118/EC on the protection of groundwater against pollution and deterioration

**Nitrates Directive**
- Directive 1991/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources
Waste

**Sludge Directive**
- Directive 86/278/EEC on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture

**Waste Framework Directive**
- Directive 2008/98/EC on waste

**End of Waste Criteria**
- .... Article 6

**Landfill Directive**
- Directive 1999/31/EC on the landfill of waste
  - Council Decision 2003/33/EC: waste acceptance criteria
Other

**IED ex. IPPC**
- Directive 2010/75/EU on industrial emissions

**Product Related**
- Decision 2015/2099/EU establishing the ecological criteria for the award of the EU Ecolabel for growing media, soil improvers and mulch
- Regulation (EC) No 1881/2006 setting maximum levels for certain contaminants in foodstuffs

**Environmental Protection**
- Environmental Impact Assessment (Project / Strategic)
- Nature Protection (Habitats …)
General Implications

- Regulated
- Monitoring, Reporting
- Waste Hierarchy
  - Re-used whenever appropriate
- Prevent adverse impacts on health
- Minimize adverse effects on environment

1. Prevention
   - Ecodesign, information and awareness
2. Reuse
   - Remanufacturing, refurbishing
3. Recycling
   - Mechanical and feedstock recycling
4. Recovery
   - Energy recovery, reclamation and regeneration
5. Disposal
   - Incineration, landfill, biological treatments

06/06/2018
Sewage Sludge Workshop - Warsaw
Direct Use on Land (1)

**Sewage Sludge, Use in Agriculture (1986/278/EEC)**

- 7 Heavy Metals in soil (but Chromium limit never set)
- Monitoring and Procedural constraints

<table>
<thead>
<tr>
<th>Soil mg/kg DM</th>
<th>Sludge mg/kg DM</th>
<th>10-year load kg/ha/y</th>
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<td>1 – 3</td>
<td>20 – 40</td>
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<tr>
<td>Cu</td>
<td>50 – 140</td>
<td>1 000 – 1 750</td>
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<tr>
<td>Hg</td>
<td>1 – 1.5</td>
<td>16 – 25</td>
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<tr>
<td>Ni</td>
<td>30 – 75</td>
<td>300 – 400</td>
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<tr>
<td>Pb</td>
<td>50 – 300</td>
<td>750 – 1 200</td>
</tr>
<tr>
<td>Zn</td>
<td>150 - 300</td>
<td>2 500 – 4 000</td>
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</table>

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**Direct Use on Land (2)**

**Member State / Other Approaches**
- Sludge (mg/kg Dry Matter)

<table>
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<tr>
<th></th>
<th>86/278</th>
<th>Germany</th>
<th>Helcom</th>
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<tbody>
<tr>
<td>Cd</td>
<td>20 – 40</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
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<tr>
<td>Hg</td>
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<tr>
<td>Ni</td>
<td>300 – 400</td>
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<tr>
<td>Pb</td>
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<tr>
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<td>2 500</td>
<td>2 500</td>
</tr>
<tr>
<td>Cr</td>
<td>900</td>
<td></td>
<td>300</td>
</tr>
<tr>
<td>Salmonella</td>
<td>Not in 50g</td>
<td></td>
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<tr>
<td>PCB</td>
<td>0.2</td>
<td>0.1</td>
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</tbody>
</table>

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Direct Use on Land (3)

Nitrates Directive (91/676/EEC)

• Reduction in water pollution (eutrophication)
• Vulnerable Zones
• Code of Good Agricultural Practice
• Places limits on fertilizer (mineral and organic):
  • Mass of nitrogen application to land
    • 170 kg/ha
  • Mode of application
    • Integration into soil mass
  • Timing of application
    • Banned when frozen, waterlogged …
Agricultural Production Standards

• Regulation (EC) No 1881/2006:
  • establishes restrictions to contaminants in foods by the establishment of good agricultural, fishery and production practices:
  • in case of spreading on agricultural terrains the requirements and practices should be complied with

• Regulation (EC) No 834/2007
  • establishes conditions to sustainable biological production;
  • sludge from UWWTPs cannot be applied on terrains for biological production as it is result of a non-biological process
Preparation for Use on Land

Product: Compost / Soil Improver

• End of Waste Criteria
  • EU level: not yet established (“biosolids” consultation), but:
  • Decision 2015/2099/EU: defines criteria for awarding of an eco label
to growing media and soil improvers: eco label cannot be awarded for
such products if they contain sludge

• End Product Controls
  • End of Waste Criteria – national specification
  • Product Specification

• Process / Facility Controls
  • Authorization
  • Emission Controls
Energy Recovery

**On site**
- Anaerobic Digestion
- Process Controls
  - Emissions
- Digested sludge disposal

**Off site**
- Emissions controls at facility
  - Industrial Emissions Directive
  - BATNEEC
- Ash / Residue Disposal

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Landfill of Waste

- Pressure to reduce landfill use in general
- Specific requirements to reduce proportion of biodegradable waste
- Acceptance Criteria
  - Moisture content
  - Carbon content
  - Biodegradability
  - “Hazard”
- General requirements of landfill operation
  - Stability of waste mass
  - “Nuisance”- odour...
“Other”

Recovery of Nutrients (P)
- From the sludge
- From the ash

Use in Other Products
- Lightweight Expanded Clay Aggregate (LECA)
- Other construction materials
Environmental Assessment

Other Assessments
- water, IPPC and CO₂ legislation

Appropriate Assessment
(for plans and projects)

Policies
- No assessments required

Plans & Programmes
- Covered by the SEA Directive (2001/42)

Projects
- Covered by the EIA Directive (2011/92/EU)
Thank-you for your attention

Questions and Discussion
For info or further questions on this seminar and the activities of the JASPERS Networking Platform, please contact the JASPERS Networking and Competence Centre at the following email:

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