Waste Acceptance Criteria, critical parameters, frequency, cost-efficiency

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Contents

- Logic behind the WAC
- Transposition into national regulations
- Dutch considerations and solutions
- Conclusions and recommendations
Landfill Directive considerations

- (6): ‘landfill should be adequately … managed to prevent or reduce potential adverse effects to the environment and risks to human health’

- (7): ‘.. it must be possible to monitor landfill sites with respect to the substances …., whereas such substances should .. react only in foreseeable ways’

- (20): ‘.. in order to prevent threats to the environment, it is necessary to introduce a uniform waste acceptance procedure.’

Waste Acceptance Criteria

- Council Decision of 19 December 2002 established criteria and procedures for the acceptance of waste at landfills.
- ‘Composition, leachability, long-term behaviour and general properties of a waste must be known as precisely as possible...’
- Leaching limit values were introduced with regard to groundwater protection: source – path – threatened object.
- It is essentially a risk assessment method.
- Backward modelling from a point of compliance.

Establishment of WAC

Landfill

Drinking water well

Different scenarios, same problem

Landfill
Road base
Mining

Drinking water well
Industrially contaminated soil
Roof runoff
Agriculture

Coastal protection
Construction
Drinking water pipes
Sewer
WAC fulfilling ambitions?

- Acceptance criteria relate to individual wastes
- No reference (yet) to how wastes interact: no guarantee that wastes only react in foreseeable ways
- The long-term behaviour of waste strongly depends on other wastes: no guidance (yet) to determine waste behaviour
- Landfill Directive and Council Decision on acceptance criteria do not (yet) completely fulfil the ambitions set out in the regulations
Transposition of WAC

- It is a very complicated piece of regulation
- It leaves a lot of room for interpretation
- It is insufficiently detailed and specified to result in national regulations that are verifiable, workable or enforceable
- Decisions have to be made at national level in order to obtain enforceable regulation
Dutch considerations

- Important: goal is to protect soil and groundwater, NOT to know everything of every batch of waste landfilled

- Comparable acceptance procedures exist since 1995

- All operational landfills have high protection standards

- Chosen for the most simple and pragmatic interpretation
To test or not to test?

- Dutch estimate: maximum 15% of wastes will be tested
Cost efficiency

- Limit the number of samples
- Limit the types of waste to be tested
- Only granular wastes: >80% >40 mm → no test methods available
- Exclude wastes for which information is available
- Positive list of stable, non-reactive hazardous wastes
Basic characterisation

- Independent sampling by certified organisation
- One basic characterisation for each batch (up to 4,000 tonne)
- 50 subsamples compiled into 1 sample for testing = good
- No distinction between waste regularly generated and waste not regularly generated → less mistakes
- Analysis of all parameters for which limit values exist

Evaluation

- Comparison of test results with leaching limit values
  - If parameters comply: landfill of batch is allowed
- Assess variation of 5 basic characterisations
  - If all averages comply with all limit values, then the waste can be landfilled without further basic characterisation
- If the process changes: new basic characterisation
Identification of critical parameters

- Chance of exceeding limit value is > 5%: critical parameter
- Critical parameters have to be analysed in the compliance test
- If the compliance tests indicate the parameter is no longer critical, the necessity to analyse stops
- The regular compliance tests (1 out of 10 loads) can however result in new critical parameters
## Compliance testing: frequency

<table>
<thead>
<tr>
<th>% of units that exceed</th>
<th>Sampling frequency</th>
<th>Number of loads to be evaluated together</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5%</td>
<td>No testing</td>
<td>n.a.</td>
</tr>
<tr>
<td>5% &lt; x &lt; 10%</td>
<td>1 of 10 loads</td>
<td>100</td>
</tr>
<tr>
<td>10% &lt; x &lt; 30%</td>
<td>1 of 6 loads</td>
<td>60</td>
</tr>
<tr>
<td>30% &lt; x &lt; 50%</td>
<td>1 of 2 loads</td>
<td>20</td>
</tr>
<tr>
<td>&gt; 50%</td>
<td>Every load</td>
<td>10</td>
</tr>
</tbody>
</table>
Compliance testing: sampling

- Sampling procedures have to be simple!
- The basis for sampling is a truckload: 5 samples per load
- A compiled sample consists of 50 subsamples (= 10 truckloads) or all subsamples compiled within 365 days
- Which 10 truckloads need sampling depends on the critical parameter frequency and on the number of loads in 365 days
Compliance testing: sampling

- First truckload after basic characterisation / compliance sample
- Next sample: depends on the critical parameter frequency
- Landfill operator records selection method and selected loads
- Maximum is every truck load and minimum is every tenth truck load or 50 samples every 4,000 tonnes (ships, storage)
Compliance testing: analysis

- At least one compliance test per type of waste per 365 days
- Clustering → several contracts
- After 10 sampled truck loads or 365 days after the first sample a compiled sample is sent to the laboratory
Compliance testing: clustering

- Comparable wastes may be clustered by the landfill operator
- This is judged on nature, origin and basic characterisation
- Same critical parameters with comparable chance of exceeding limits
- Limits the number and costs of compliance tests
- Practical advantage because of uniform procedures on the landfill: less mistakes

Compliance testing: evaluation

- Test results become available after disposal of 10 to 100 loads
- Some disposal of non-compliant batches: inherent to the system
- This is acceptable on the bulk of the waste in the landfill
- Therefore: no immediate action with occasional non-compliance
- Only increase the sample frequency
- When average of last 5 tests exceeds limits: do not landfill

Conclusions and recommendations

- If your government has only translated WAC → problem
- Look for solutions close to everyday landfill practice
- Avoid too detailed or stringent regulations: a harmless mistake is (on paper!) immediately an environmental crime
- Avoid most comprehensive testing of everything: too expensive
- But: we do need more knowledge, so we have to start testing
Thank you very much for your attention