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ScienceDirect

Procedia Technology 22 (2016) 425 – 430

Procedia Technology

9th International Conference Interdisciplinarity in Engineering, INTER-ENG 2015, 8-9 October 2015, Tirgu-Mures, Romania

Study on Procedures for Acceptance of Waste in Landfill

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Abstract

This paper intends to conduct a study on the classification of sludges resulted from the treatment plants in a class storage according to the procedures for accepting waste storage. Waste that can be stored on a specific location should be reflected in the environmental authorization of the warehouse.
It is necessary for the waste generators and operators warehouses follow the procedures for accepting waste for storage because it helps to prevent or reduce negative effects on the environment, particularly pollution of surface water, groundwater, soil, air and the any risk to human health, the duration of operation of the deposit and after its expiry.
There were determined heavy metals and anions from mud samples taken from a company that produces car parts to determine what grade of deposits falling.

Peer-review under responsibility of the "Petru Maior" University of Tirgu Mures, Faculty of Engineering

*Keywords:*pollution; water quality; quality indices; industrial wastewaters; water-treatment plant; admissible value; used water.

1. Introduction

Everyday the waste has reached transform landscapes, to pollute the environment, wear or carry pathogenic germs in water, air, soil affecting environmental health of humans and animals.

One important strategy, which marked diversity of waste in today's world is the Integrated Waste Management (MID) with all the stakeholders, namely:

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Peer-review under responsibility of the "Petru Maior" University of Tirgu Mures, Faculty of Engineering
doi:10.1016/j.protcy.2016.01.074

- Industry or commercial chain generating products;
- Potential waste generator unit (producers of services and goods);
- Effective waste generators (operators, population);
- Sanitation agencies that provide collection and transportation of waste;
- Operators of the recycling of waste and their reintegration into the production circuit;
- Economic agents engaged in waste neutralization plant with final processing.

Cherubini et al. [4] states that "ecosystems recycle any kind of waste, and the very concept of waste is no longer adequate. Products from a specific component or department are always a useful resource for other component or compartment." So ecological systems are able to recycle and use resources with maximum efficiency, but human intervention disrupts all processes in natural ecosystems that are significant character.

Production and consumption, resource usage that involves sets of activities resulting in waste. The life cycle of products from resource extraction to production and consumption to waste disposal is shown in Figure 1.

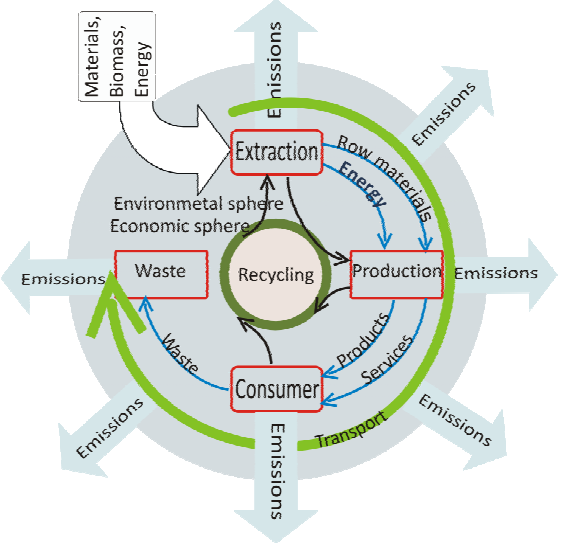

Fig.1 The life cycle from extraction to production, consumption and waste [1]

As it is seen, the waste flow generation is directly related to the production and consumption, which can not be avoided, but the question resources exhausted, environmental degradation, and especially the prosperity of humankind.

The universal strategy is to maximize the amount of waste, namely the natural resource use and recycling to maximize the flow of matter and energy [4].

Prevention and waste minimization involves prevention and minimization at source. For municipal waste, Tonglet et al. [14] states that the effectiveness of this method is closely linked to the behavior and attitudes of men and that this behavior is induced by environmental awareness (pro-environmental behavior). Also to support this method, approach is needed that considers and analyzes the cognitive psychology of people. Tonglet et al. [14] wanted to emphasize that recycling, waste reduction and reuse should be considered separately.

2. Considerations on waste management

The most accepted and promoted minimizing waste management methods waste and recycling. Minimizing take more than a conceptual part, much used nowadays and try to be supported by various instruments: levyng of taxes

"pay as you through", "willingness to pay". Also some other factors, such as human behavior, degree of development of society, attitudes, concepts, education.

Minimizing the waste stream refers to the waste management measures, such as decreasing the degree detoxicate (hazardous waste) and recycling (as EEA) (Fig.2).

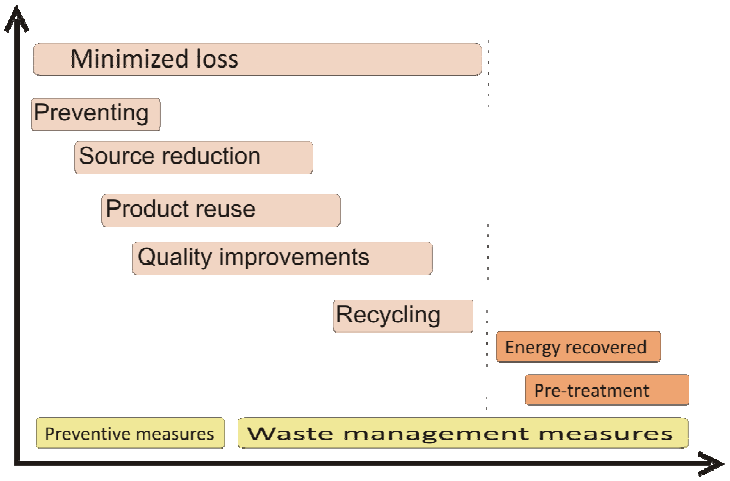

Fig.2 Reduce the amount of waste [15]

The recovery of waste through recycling involves "processing" a waste already formed. Recovery measures to be taken should facilitate increasing the life of the waste in the economic cycle or the reintroduction of this circuit [12].

By the '70s, waste management was based on one method, namely the storage, which consisted of the collection and proper disposal of waste [7]. Landfills can be divided into two main classes: deposits involving energy recovery (biogas recovery), and deposits without energy recovery [12]. Numerous studies have been conducted in order to assess the disadvantages and risks posed by landfills and methodology approach is the LCA (Life cicle Assesment is life cycle analysis) [8], [6], [4]; [9]; [10]. LCA is n significant model that allows evaluating the potential impact, total, each method of stat management [3]. Cleary [5] states that "LCA is a popular tool used to evaluate the environmental benefits of management systems of municipal solid waste (MSW)".

Adopting a particular waste management system must take into account both economic and environmental effects for the entire product life cycle.

A study based on this principle Salhofer and Beigl (2004) [2] concludes that recycling due to environmental benefits is considered to be the most advantageous and the additional costs are justified.

2.1. Acceptance of the waste for storage

The acceptance of waste at a specific class of storage based on lists of accepted waste defined by nature and origin, waste characteristics determined by standard analytical methods, except for household waste.

Waste that can be stored on a given site should be included in the environmental permit of the deposit. The warehouse operator must ensure that all necessary measures so that the waste they take to comply with the storage conditions of integrated environmental authorization. It is prohibited to mix waste in order to meet the acceptance criteria for a certain class of storage.

Waste disposal on deposits of hazardous waste and non-hazardous waste is allowed only if animals undergo further treated technically feasible and contributing to the objectives set in HG no. 349/2005 with amendments by Law no. 426/2001 [11]. The purpose of storage is to prevent or reduce negative effects on the environment, particularly pollution of surface water, groundwater, soil, air, including the greenhouse effect, and any health risks, the duration of exploitation of the deposit, as and after its expiry.

2.2. General procedures for testing and acceptance of waste

General characterization and testing procedures for accepting waste for storage, according to H.G. no. 349/2005 with amendments by Law no. 426/2001, they are the three hierarchical levels:

- Level 1 - General characterization conducted with standardized methods of analysis for determining the composition of the waste and physico-chemical testing leaching behavior and / or waste characteristics variation on short and long term;
- Level 2 - Testing the correct classification of waste in a repository, which is achieved by regular checks carried out by simple analysis, standardized methods for characterizing the behavior to determine if waste remains compliance with the permit conditions and / or specific criteria reference. The tests focus on key variables will (various indicators) and behavior identified by the general characterization;
- Level 3 - On-site verification by a quick check to confirm that the waste stored is the same as that which has been subjected to testing Level 2 and is described in the accompanying documents. It may consist of a visual inspection of a load of waste before and after unloading at the warehouse.

To appear on a list of reference, waste is characterized at level 1 and must satisfy the relevant criteria that will be established for each type of deposit.To remain on a specific list of the warehouse, a waste tested at level 2 at regular intervals, quarterly or annually and must satisfy the relevant criteria for each type of deposit. All shipments of waste that enters a deposit subject to Level 3 verification. Levels 1 and 2 are made in so far as is possible.

If the test can not be performed, test procedures are not available or there are other legal provisions prevailing, some waste may be exempted permanently temporarily from testing at Level 1.

Information provided by the tests carried out can be supplemented with information from waste producers, research laboratories and literature. Mandatorily the warehouse operator who issued the written confirmation of their waste reception accepted each load delivered to the warehouse, according to H.G. no. 1061/2008 on hazardous and non- hazardous waste transport in Romania. The national list of waste accepted in each class of landfill with the classification and codification of Government Decision no. 856/2002 for approving the list of waste management and waste, including hazardous waste.

3. Material and Methods

Testing and collection of samples for general characterization and compliance verification is done by independent institutions and competent persons. Methods used for sampling and analysis are indicated in Section 3 of Order no. 95/2005 establishing acceptance criteria and preliminary procedures for the acceptance of waste storage and the national list of waste accepted in each class of landfill.

The standards are the latest variants recognized ISO / CEN standards or they replace. As long as the CEN standard is not available as formal EN, they can use both national and international standards and procedures that provide the same quality and comparability of data science.The objective of this study is to determine the parameters usual samples of mud taken (from the treatment plant to a company that manufactures auto parts) as well as investigation into the waste-specific processes disposal analyzes necessary for acceptance procedure Sludge storage. As a basic method in the study (to determine the content of heavy metal samples) using optical spectroscopy method by inductively coupled plasma optical emission.

Materials: mud samples, spatula, bowl, aqua regia, mineralizing, flasks, distilled water filter. Determinations are made to the original substance.

4. Results and discussion

The results obtained from analyzes performed of the sludge tested show that it contains a heavy metal chlorides, nitrates, sulfates, fluorides and phosphates which employs him in landfill acceptance criteria (Table 1).

Table 1 Limit values and determined from samples of mud

Analysis on content:	U.M.	Limit values in according with SR EN 12457-2	Results
Arsen	mg/kg	<1	<1
Barium	mg/kg	2,56	2,56
Cadmium	mg/kg	<0,5	0,0107
Crome	mg/kg	<0,5	0.01775
Copper	mg/kg	<2	0.095
Molybdenum	mg/kg	<1	0,131
Nickel	mg/kg	<2	0.1258
Plumbum	mg/kg	<2	0.05377
Zinc	mg/kg	<50	3,42
Chlorides	mg/kg	1500	1188
Nitrates	mg/kg	1400	178
Sulphates	mg/kg	2000	190
Fluorides	mg/kg	150	<125
Phosphates	mg/kg	200	<125

Determination of dry matter and moisture content was obtained by following procedure of calculation calculated in according with SR EN 12457-2 standard for levigating [13].

- Dry matter content (DR):

  $DR = 100 \times M_D/M_W \ [\%]$; $DR = 87,86\ \%$;

  in which: M_D-table dry test fraction [kg];

  M_W-table test faction not dried [kg].
- Degree of humidity (MC):

  $MC = 100 \times (M_W - M_D) / M_D \ [\%]$; $MC = 12,14\ \%$;
- PH of the aqueous extract / leaching from leaching ratio L/S=10:1 is 7.77.

A comparison of the values obtained outcomes acceptable limits according to EN 12457-2 standard for leaching SR is shown in Figure 3.

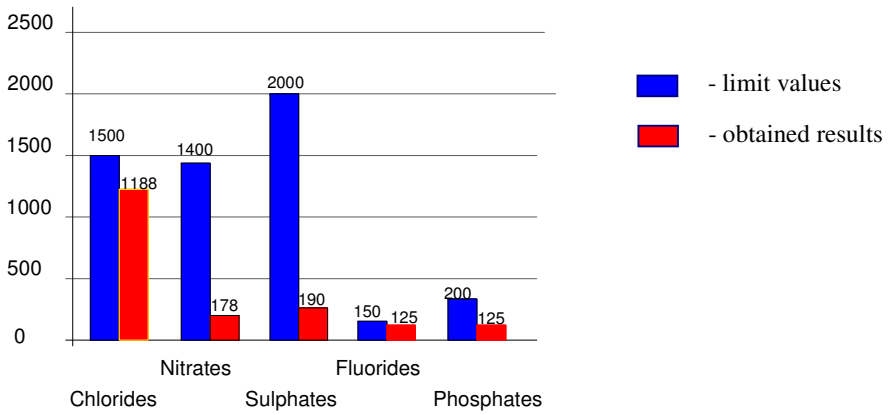

Fig.3 Comparison between the results for the limit values

After interpreting the results The anion is found not to have exceeded the limit samples of sludge as such sludge samples which were collected meet the acceptance criteria for storage.

5. Conclusions

The acceptance of waste at a certain class of storage based on lists of accepted waste defined by nature and origin, waste characteristics determined by standard analytical methods, except household waste. Waste that can be stored on a given site should be included in the environmental permit of the deposit.

There is waste which is sufficient only for a visual inspection, but waste in the study was needed laboratory analysis. These analyzes were done to see what class of deposit falls.

The analyzes were determined heavy metals and anions present in the sample slurry method and found to have not exceeded the legal limit provided so that the sludge deposits fall within the class for non-hazardous waste.

Acknowledgements

This paper has come to life with the support of the staff of the laboratory within the company WESSLING.RO. We are grateful for their help in making the determinations. It is based on upon work supported by the Aided Design and Manufacturing Advanced Technologies Research Center.

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