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THEORETICAL ACCOUNTING FRAMEWORK OF INDUSTRIAL WASTE RECYCLING

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Summary: Nowadays “circular” economy becomes extremely relevant in conditions of ineffective eco-resources’ use and environmental instability. In modern scientific research it’s considered as one of the imperatives of environmental-economic accounting and sustainable development as a whole. Industrial waste recycling, in its’ turn, as a huge component of “circular” economy, makes some challenges to the current accounting system in the Republic of Belarus. The Belarusian enterprises do not reflect any information about waste recycling in their accounting (financial) statements. It causes the lack of information which describes economic and environmental effect of industrial waste recycling in enterprise’s economic activity. That’s why there is no doubt that there is no complex accounting system for industrial waste recycling, which would allow to show the natural resources flow and its influence on the environment. The purpose of this study is to identify the stages of industrial waste recycling, to identify accounting objects at these stages and to make industrial waste classification for accounting purposes. Among the methods used in the study can distinguish synthesis, analysis, comparison, logical generalization, inference by analogy, classification, grouping and so on.

Keywords: circular economy, waste accounting, industrial waste, recycling

JEL Classifications: M410, Q20, Q530

Introduction

Directive 2008/98/EC of the European Parliament and of the Council of November 19, 2008 On Waste and Cancellation of Some Directives introduced the definition of the concept of recycling into the global practice of waste management. According to this Directive, recycling means any recovery operation by which waste is processed into products, materials or substances, both for the original and for other purposes [2].

Nowadays, in national and foreign practice there is no integrated accounting methodology for industrial waste recycling, which would allow to solve the problems posed by “circular” economy. Despite the fact, that the issues of assessment and accounting of industrial waste are reflected in some legal documents and economic literature, many problems have not been resolved in this area, which makes the chosen topic relevant.

The study of the theory and practice of industrial waste handling has shown that the existing methodologies do not take into account various types of waste and their recycling. In this regard, fundamentally new accounting approaches are required for industrial waste recycling.

In order to develop the integrated accounting methodology for industrial waste recycling, it is necessary to clarify the relevant accounting objects throughout the recycling process and develop industrial waste classification for accounting purposes.

Basic Content of the Paper

It is important to note that recycling is the main prerequisite for the waste hierarchy described by Directive 2008/98/EC, which prioritizes the most efficient waste management solutions. Waste hierarchy is used as a priority in legislation and policy in the field of waste prevention and management:

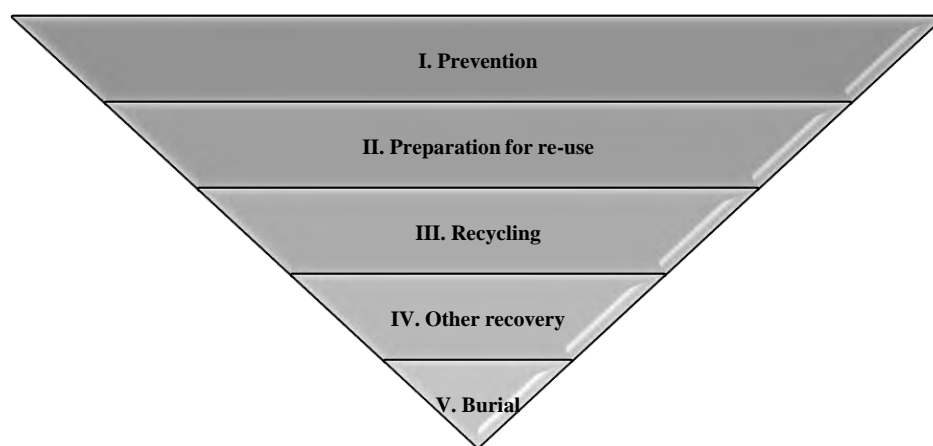


Fig. 1. Waste hierarchy

Source: Directive 2008/98/EC [2]

However, the analysis of current integrated solutions to problems in the field of waste management has shown that the philosophy of “*cradle to grave*” is about to be changed by a new one - “*cradle to cradle*”, which goes beyond the usual tools and approaches to sustainable development, and based on life cycle assessment and recycling. Under these conditions, the traditional waste-centric approach is gradually being replaced by a cycle-centric. Thus, the cycle-forming stage is the transformation of waste into a secondary resource.

Isolation of industrial waste recycling stages is important not only for organizing the correct waste management process, but also for identifying accounting objects at these stages, since each of the stages has its own specifics. Within the framework of the studied approaches to the definition of recycling stages, as well as taking into account the practice of waste management in the Republic of Belarus, the following recycling stages of industrial wastes can be distinguished, which have a significant impact on their accounting system:

Stage	Description
I. Appearance	1) Waste generation in technological and operational processes, as well as from facilities during the period of their liquidation. 2) Identification: determining the affiliation of a given facility to waste of a particular type, accompanied by the establishment of data on its hazardous, resource, technological and other characteristics. Also includes waste classification and coding. 3) Sorting waste [3].
II. Collection and/or accumulation	Activities are carried out on the concentration of waste in places of temporary storage of waste for the accumulation of up to 1 transport unit for the purpose of their subsequent disposal.
III. Disposal Preparation	The set of technological operations performed to ensure the subsequent use of waste as secondary raw materials [3].
IV. Storage	The content of waste in places of temporary storage of waste, at waste storage facilities prior to their transportation to disposal facilities, waste disposal and (or) to waste disposal facilities [3].
V. Disposal	The use of waste for the production of products, energy, work and services [4].
VI. Burial (destruction)	Isolation of non-returnable waste at waste disposal sites in order to prevent the harmful effects of waste, their interaction products and (or) decomposition on the environment, the health of citizens, property owned by the state, property of legal entities and individuals, which does not provide for their further use. At this stage, it is possible to transport / transport waste (including certification).

Fig. 2. Recycling waste stages

Source: Own development on the basis of Directive 2008/98/EC [2], GOST 30773-2001[3], Law № 271-3 [4]

For the purpose of integrated approach to the study of accounting for industrial waste recycling, it is necessary to clarify the accounting objects arising at recycling stages.

According to the National Action Plan for the Development of Green Economy in the Republic of Belarus, the development of green economy is based on several principles, among which environmental and social values are included in economic accounting system [5]. In this regard, there is a need to create a complex data in the field of reflecting the connection between the economy, its impact on the environment and the consumption of ecosystem resources, which poses certain challenges to the current accounting system.

The lack of comprehensive information on waste generated, waste to be removed, as well as operations carried out to protect, restore or manage the environment in the balance sheet of enterprises not only distorts information on the resource, economic and technological potential of enterprises, but also does not ensure integration of the accounting system accounting with a system of national accounts.

The need to reflect accounting objects at all industrial waste recycling stages in order to take into account the resource potential, impact on the environment, and further integrate this information into the national accounts system, allows us to conclude that it is expedient to create a more integrated system accounting in the field of waste recycling. In the interests of accounting research on recycling, we consider it expedient to propose a new accounting object “industrial waste”.

The lack of interpretation in the regulatory legal acts of the Republic of Belarus and foreign countries, as well as in the special economic literature, determined the need to identify the characteristic features of the definition “industrial waste” as an accounting object.

Based on the studied principles of environmental and economic accounting of waste, approaches to the preparation of financial statements according to GRI standards, the requirements of the international system of national accounts the author proposes to assign the following characteristics of the studied category “industrial waste” as an accounting object:

1) economic resources, completely or partially lost their consumer properties; 2) formed during the production activities of the organization, but not the goal of the production process; 3) subject / not subject to disposal in the original or transformed (processed) form; 4) subject to valuation; 5) affecting the environment.

Industrial waste that meets the criteria for recognizing an asset will be included in the accounting facilities for industrial waste recycling. Thus, according to International Financial Reporting Standards, assets are resources controlled by a company, resulting from past events that are expected to generate economic benefits [6].

Next step is to define the objects of accounting at industrial waste recycling stages. Accounting objects at industrial waste recycling stages are presented below.

Table 1. Accounting objects at industrial waste recycling stages

I. Appearance	Costs for the purpose of work performed
	Industrial waste to be disposed
II. Collection and/or accumulation	Collection and / or accumulation costs
	Industrial waste to be disposed
III. Disposal Preparation	Expenses for preparation for use
	Industrial waste to be recycled
IV. Storage	Temporary storage costs
	Recycled industrial waste
	Industrial waste that does not require recycling
V. Disposal	Usage costs
	Recycled industrial waste
	Industrial waste that does not require recycling
VI. Burial (destruction)	Burial (destruction) costs

Source: own development

The most important prerequisite for building an accounting system is a scientifically based classification, which confirms the feasibility of developing the classification of industrial waste.

There are many approaches for classification of waste both at the legislative level and in the special environmental literature. However, none of the existing classifications is applicable for determining the composition of industrial waste as accounting objects. This is due to the fact that the existing

classifications are based on the signs that indicate their origin, physical components, such as the state of aggregation, the degree and class of their danger to the environment and the status of the waste. Thus, the classification of waste according to the Commission's Notification of Technical Guidelines for European Union Waste Classification is based on the following classification criteria:

1. The origin and process of waste generation (indicating the industrial activity and the production process during which the waste was formed);
2. The potential composition of the resulting waste;
3. Hazard degree of waste (absolutely hazardous, absolutely non-hazardous) [1].

According to the Law of the Republic of Belarus "On Waste Management" No. 271-3, waste classification is based on the following features:

1. Origin of waste (production waste and consumption waste);
2. Aggregative state (solid and liquid wastes);
3. The possibility of their use (secondary material resources and other waste production and consumption).

Based on the study of approaches to the classification of waste in the Republic of Belarus and foreign countries, as well as based on the assumption that the classification of waste for accounting purposes should be based on signs that characterize the practical significance and nature of the use of waste in the economic activities of companies, let's consider the classification of industrial waste as objects of accounting:

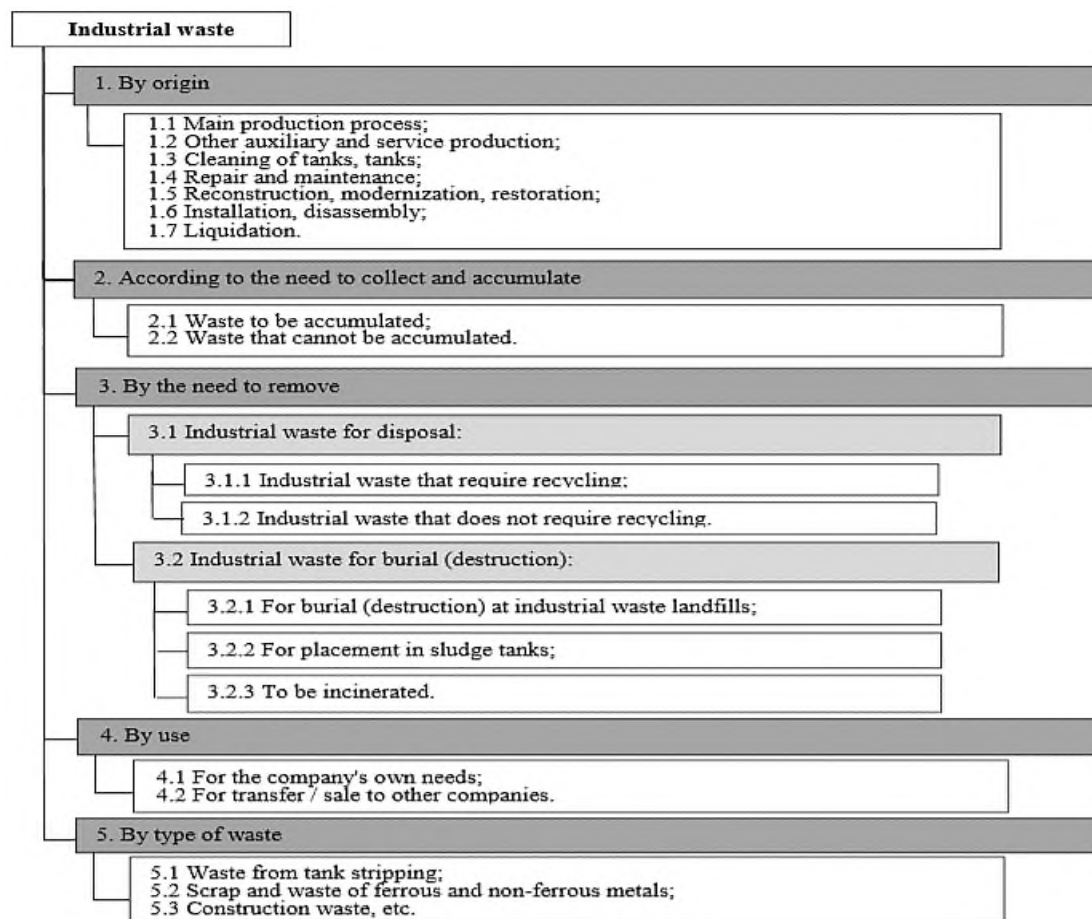


Fig. 3. Industrial waste classification for accounting purposes

Source: Own development

Conclusions

The study made it possible to substantiate and develop the theoretical framework for the accounting of industrial waste recycling:

1. The stages of recycling industrial waste for the development of an integrated accounting system are highlighted, which include:
 - I. Appearance;
 - II. Collection and / or accumulation;
 - III. Disposal preparation;
 - IV. Storage;
 - V. Disposal;
 - VI. Burial (destruction).
2. Identified objects of accounting at the stages of recycling industrial waste. It has revealed that the objects of accounting at these stages will be industrial waste.
3. The developed classification of industrial wastes will allow building an integrated system of analytical accounting of industrial wastes, linking the goals and methods of accounting for industrial wastes at recycling stages, justifying the identification of accounting objects at industrial recycling stages, and will also contribute to the further development of accounting methods and analysis of industrial recycling waste.

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