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## CONSTRUCTION WASTE ACCOUNTING AT TECHNOLOGICAL CYCLE STAGES IN PETROCHEMICAL COMPLEX IN THE CONTEXT OF THE GREEN ECONOMY

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*In this article, the relevance of improving industrial waste accounting of petrochemical complex in the context of the green economy is considered; technological cycle stages of construction waste are identified. The accounting objects at technological cycle stages of construction waste of petrochemical complex are also determined.*

In order to understand the global nature of environmental problems and the relationship between human problems, the economy and the environment, the 1992 Rio Declaration on Environment and Development, a number of principles, were adopted. Thus, Principle 1 of this declaration states that in order to achieve sustainable development, environmental protection must be an integral part of the development process and cannot be considered in isolation from it [1]. Thus, the importance of the environmental protection problem was noted. Since the activities of enterprises in terms of waste generation, have a significant negative impact on the environment, proper handling of them is an integral part of sustainable development.

This issue is especially relevant for the Republic of Belarus, as today there are a number of unresolved interrelated environmental and economic problems in the country, including climate change, degradation of ecological systems, pollution of atmospheric air and surface water bodies, reduction of biological diversity, **emergence and accumulation of waste**. The green economy as a method for addressing environmental degradation problems is made to solve all of them. The national action plan for the development of the green economy in the Republic of Belarus until 2020 provides for a number of activities that contribute to the development of the green economy, which includes competent waste management [2].

For Vitebsk region of the Republic of Belarus, the most relevant issues are the handling of production waste in the **petrochemical industry**. During the activities of petrochemical organizations, various types of industrial waste arise. Despite the fact that the issues of valuation and accounting of waste are reflected in some legal documents and economic literature, there are a number of unexplored issues in this area, which confirms the relevance of the chosen topic. The **purpose** is to identify the stages of technological cycle of industrial waste and accounting objects identification at these stages in order to develop practical recommendations for assessment and accounting of industrial waste in the petrochemical complex. The setting of the goal determined the solution of the **problematic aspects**: classification of waste; separation of technological cycle stages of industrial waste; identification of accounting objects at technological cycle stages of industrial waste (Fig. 1).

1. By origin
  - Waste production;
  - Consumption waste;
2. According to the aggregate state
  - Solid;
  - Liquid;
3. Local emergence
  - Depending on the specific process, where these waste occur: construction, reconstruction, cleaning of reservoirs, etc.
4. Possibility of further using
  - Secondary material resources;
  - Other waste products of production and consumption;
5. On the need for further processing for use
  - Subject to recycling for use;
  - Used without processing;
6. By degree of danger
  - 1st class - extremely dangerous;
  - 2nd class - highly dangerous;
  - 3rd class - moderately dangerous;
  - 4th class - low-risk

Fig. 1. Classification of industrial waste

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The authors have identified 5 main levels of waste classification, which can be used as a basis for developing methodological recommendations for the assessment, documentation, synthetic and analytical accounting of industrial wastes under conditions of using ecological technologies of their processing and utilization taking into account branch peculiarities:

It is important to note that different types of waste will have their own classification characteristics for accounting purposes.

Separating technological cycle stages of industrial waste, the category "technological cycle stages of waste" is introduced into the domestic practice of handling waste with the interstate standard GOST 30773-2001 "Resource Saving. Waste management. Stages of technological cycle" [3]. In general, there are 9 stages of technological cycle of waste, but after studying different economic sources, normative legal acts we have identified the following integrated stages of technological cycle of waste, which have a significant impact on the system of their accounting (Table 1).

Table 1 – Integrated technological cycle stages of industrial waste

The name of the stage	The content of the stage	The definition
Stage 1 "Emergence"	1) Simultaneously with identification; 2) In some cases simultaneously with disinfection	Identification of waste: activities related to the determination of the belonging of a given object to a waste of one or another type, accompanied by the establishment of data on its hazardous, resource, technological and other characteristics. Identification includes classification and coding of waste
Stage 2 "Collection and Accumulation"	In some cases simultaneously with disinfection	Activities on the concentration of waste in places of temporary storage of waste for the purpose of their subsequent disposal
Stage 3 "Waste Preparation for Use"	Includes sorting, packaging, labeling, stratification, etc.	A set of technological operations performed with waste to ensure the subsequent use of waste as a secondary raw material
Stage 4 "Storage"	It is carried out for the purpose of further use for recycling waste and disposal (destruction) for waste that are impossible to use	Waste content in places of temporary storage of waste, at waste storage facilities prior to their transportation to burial sites, disposal of waste and (or) waste disposal facilities
Stage 5 "Use"	1) In own production process; 2) Sale on the side; 3) Gratuitous transfer, etc.	The use of waste products for the production of products, energy, works, services
Stage 6 "Burial (destruction)"	1) Including transportation / transportation of waste; 2) Including certification (if there is transportation / transportation of waste	Waste insulation at waste disposal sites in order to prevent the harmful impact of waste products of their interaction and (or) decomposition on the environment, health of citizens, property owned by the state, property of legal entities and individuals, not providing for the possibility of their further use

At each stage of technological cycle of any kind of waste, two accounting objects will arise: the waste itself and the costs due to the specifics of the technological stage.

Waste at the stages of technological cycle is the final result of the processes occurring at the corresponding stage (at the output). In this case, waste will be recognized as accounting objects only if the criteria for recognizing assets are met.

The authors considered the features of identification of accounting objects on the allocated integrated stages of industrial waste technological cycle in the context of the following **types of industrial waste** that are presented below.

In the interest of this study the authors considered only construction waste at technological cycle stages in petrochemical complex.

Construction waste - wastes generated during the implementation of economic activities by legal entities and individual entrepreneurs for the erection, reconstruction, overhaul and maintenance, restoration, improvement, installation, dismantling, demolition and demolition of buildings and structures, industrial

facilities, roads, engineering and other communications, including the implementation of organizational and technical measures, special, installation and commissioning works [4] (Fig. 2).

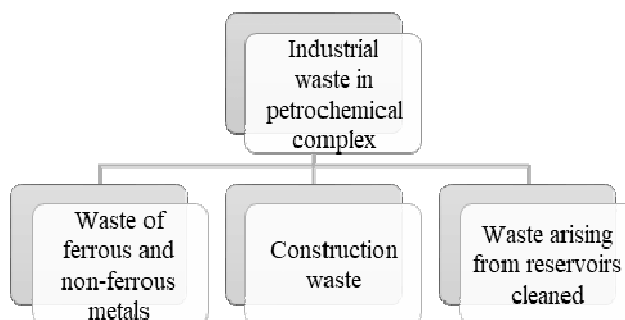


Fig. 2. Types of industrial waste for accounting purposes

There several types of construction waste that are formed in petrochemical complex:

- Wood waste;
- Wastes from pulp, paper, cardboard;
- Waste of mineral origin (excluding metal waste);
- Other wastes of mineral origin, including waste products for refining;
- Waste plastic, rubber-containing waste.

For each type of construction waste, specific features of the passage of the specified stages of the technological cycle of construction waste can be identified.

The features of identification of waste and costs as objects of accounting at the stages of technological cycle of construction waste are presented in the table 2.

Table 2 – Accounting objects of construction waste (waste, costs) in the context of integrated stages of technological cycle

Stages	Accounting objects	
	Waste	Costs
1	2	3
<b>Construction waste for burial (destruction/ disposal)</b>		
Emergence of waste	Paper, cardboard, oil product, fiberglass contaminated, waste glass "Triplex", Sand contaminated with inorganic substances, waste of mineral wool contaminated etc.	Costs for repair and construction works, costs for processing sawn timber, cutting and cleaning of the territory costs, etc.
Collection and accumulation		Costs for collection and accumulation
Burial (destruction/disposal)		Costs for land filling on landfills
<b>Construction waste for further using (with changes in material form)</b>		
Emergence of waste	Asphaltic concrete from disassembly of asphalt coverings, remains of bitumen and asphalt-concrete mixture, fight brick ceramic, waste of concrete, etc	Costs for repair and construction works, etc.
Collection and accumulation		Costs for collection and accumulation
Waste preparation for using		Costs of preparing the waste for use (sorting, drying, packing, marking)
Storage		Costs of collection and temporary storage

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1	2	3
Using	New sort of secondary resource	Costs of use
<b>Construction waste for further using (without changes in material form)</b>		
Emergence of waste	Wood waste construction, sawdust and shavings in the manufacture of carpentry and milled products, lump waste from production of carpentry and milled parts, etc.	Costs for repair and construction works, etc.
Collection and accumulation		Costs for collection and accumulation
Storage		Costs of collection and temporary storage
Using		Costs of use

So as a conclusion we may say that construction waste also has its own peculiarities at the stages of technological cycle. Not every type of construction waste passes through all the enlarged stages of technological cycle. This is because construction waste can be both suitable and not suitable for future use.

For example, construction waste to be buried passes through stage 1, stage 2 and stage 6. Either construction waste can undergo further processing for use, but in Stage 3, in addition to new types of waste, construction waste that is subject to disposal may arise. Therefore, such waste will go through Stage 1, Stage 2, Stage 3 and Stage 6. It is important to note, however, that such waste is not valued for accounting purposes.

Construction waste, subject to further use, can pass through the following stages of the technological process:

1. Construction waste to be prepared for use: phase 1, 2, 3, 4, 5. It is important to note that construction waste that is subject to further processing (stage 3) can change the material-material form, which will also be reflected in the accounts of accounting.

2. Construction waste not to be prepared for use: phase 1, 2, 4, 5.

As it was noted earlier, as a result of waste transfer of technological cycle stages, there are two accounting objects: the waste itself and the costs that arise at each stage of their formation.

Thus, considering the features of waste technological cycle of construction waste, considering the objects of accounting at these stages, it is possible to develop methodological recommendations on assessment, documentation, synthetic and analytical accounting of industrial waste in conditions of application of ecological technologies for their utilization and processing taking into account industry specific features.

## REFERENCES

1. Rio de Janeiro Declaration on Environment and Development adopted by the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992
2. Decree of the Council of Ministers of the Republic of Belarus on December 21, 2016 No. 1061 National plan of actions for the development of the "green" economy in the Republic of Belarus until 2020
3. Interstate Standard GOST 30773-2001 "Resource Saving. Waste management. Stages of technological cycle" adopted by the Interstate Council for Standardization, Metrology and Certification (Protocol No. 19 of May 24, 2001).
4. Technical practice code 17.11-10-2014 (02120)