

# Stages of development and determination of the cost of development of regulatory environmental documentation on transport

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**Abstract.** The requirements of modern nature management imply mandatory compliance with environmental legislation aimed primarily at eliminating problems in the field of environmental protection. The primary measure in this direction is the development by economic entities of environmental documentation reflecting the main provisions of environmental activities. Management processes at the level of economic entities involve activities related to environmental protection, which is subject to mandatory documentation through the development of regulatory environmental documentation. Identifying the stages of this type of activity allows you to clearly understand the sequence of work in terms of the development of regulatory environmental documentation and properly organize management processes in this area. In addition, it should be taken into account that often the cost of developing such documentation is unacceptable for enterprises of various fields of activity, therefore, this article discusses the main individual postulates of the formation of such documentation and determining its cost both at the stage of a commercial offer and at the stage of concluding a contract for the development of environmental documentation.

## 1 Introduction

Environmental documentation is currently a prerequisite for the functioning of any business entity and is a list of necessary documents that must be legally present at each enterprise. These documents characterize an economic entity as a source that negatively affects the environment [1, 2], and allow for the control of the company's expenses for environmental purposes. The absence, as well as improperly developed and executed environmental documentation, may entail excessive costs of the working time of an environmental engineer and an economist-accountant, as well as certain financial expenses expressed by fines imposed and, most importantly, may lead to a temporary suspension of the company's activities [3].

The functioning of any economic entity presupposes the existence of an impact both on the health of its employees and on the environmental situation around the enterprise [4]. Therefore, activities related to environmental protection are subject to mandatory

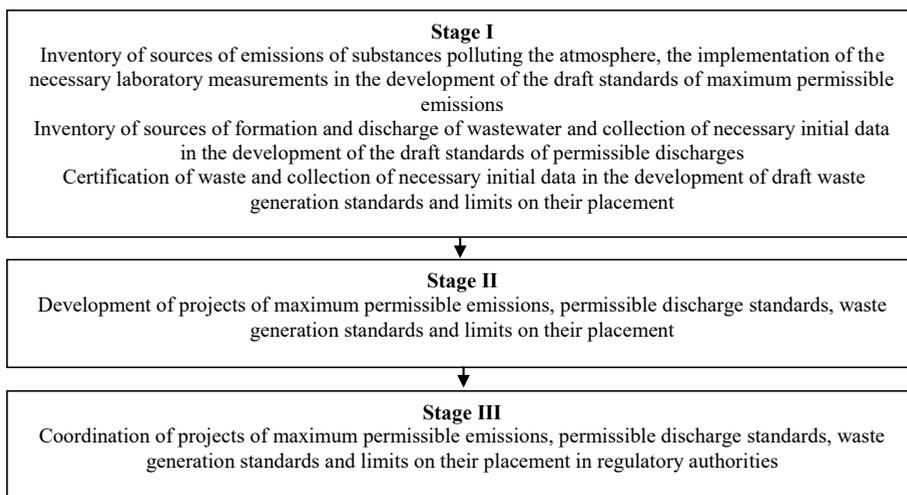
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documentation. Environmental documentation is used in environmental management systems [5], which is integrated into the management processes at the enterprise. In this regard, all organizations compile and maintain environmental documentation, which is a package of documents specially developed on the basis of environmental legislation in force in the Russian Federation. An economic entity that has this documentation is focused on meeting all the requirements regulated by the established regulatory materials [6]. This documentation is the object of environmental consulting and environmental audit. The preparation of environmental documents involves taking into account the scope of the business entity, the direction of its impact on the air and water environment, as well as on the soil. At the same time, its own documentation is provided for each direction of impact, and a package of such documents serves as the basis for obtaining special permits in the environmental sphere by the enterprise. It should be noted that the set of environmental documentation to be developed depends primarily on the conditions of an economic entity's impact on the environment [7], and is also determined by the composition of mandatory documents reflected in regulatory and legal environmental acts of the Russian Federation. Regulatory environmental documentation involves the development of the following main documents: draft standards for maximum permissible emissions; draft standards for permissible discharges; draft standards for waste generation and limits on their placement.

## 2 Methods

The stage-by-stage development of regulatory environmental documentation assumes the implementation of this process in three stages (Fig. 1). The formalization of this type of activity will provide an opportunity to minimize the reputational risks of an economic entity [8].



**Fig. 1.** Stages of development of regulatory environmental documentation.

The first stage in the development of the maximum permissible emissions project involves an inventory of the sources of emissions of substances polluting the atmosphere, as well as the implementation of the necessary laboratory measurements, which is implemented through a study of the production process with a parallel study of technological regulations, material balance, specifications, characteristics of equipment, vehicles, cartographic material, schemes of existing utilities [9], which makes it possible to determine the number

of sources of pollutants, sources of atmospheric pollution with the establishment of qualitative and quantitative characteristics, as well as territorial reference to buildings and structures; the identified information is marked on the map-diagram of the economic entity with a reflection of its boundaries, as well as the location of the sources under study and the simultaneous collection of necessary references for the development of the project. In the case of the development of the draft standards of permissible discharges, at the first stage, an inventory of the sources of formation and discharge of wastewater is carried out with the simultaneous collection of the necessary initial data, which involves registering the modification of wastewater discharge from the area where the economic entity is located, fixing the fact of the presence or absence of storm sewers, the existence of treatment facilities, wastewater disposal options. In the areas of sanitary protected sources for drinking water, protected areas of water bodies [10], additional laboratory studies are carried out in an accredited laboratory for a qualitative chemical analysis of the level of contamination of wastewater samples, water protection restrictions are established in the region of the organization's location. The development of a draft waste generation standards and limits on their placement at the first stage involves the certification of waste based on the results of the analysis and study of the production processes of an economic entity with a study of the production technology, the technological equipment used, which is reflected in a brief description of the production process of the enterprise, the compilation or use of an existing map-layout of the economic entity, which reflects all the necessary information for project execution.

The second stage is focused directly on the development of projects of maximum permissible emissions, permissible discharge standards, waste generation standards and limits on their placement. At this stage, when developing the project of maximum permissible emissions, the following parameters are calculated: the parameters of sources polluting the atmosphere, and the duration of emissions of pollutants, surface concentrations of these pollutants, emissions/emissions are taken into account; the average saturation of pollutants entering the atmosphere is estimated; the maximum of one-time and gross emissions of pollutants is established; dispersion is assessed at the border of the sanitary protection zone; the design of the project is carried out; if the actual emission indicators exceed the normative ones, measures to reduce emissions of pollutants into the atmosphere are determined to achieve the established standards [10]. In the process of developing the draft standards of permissible discharges: it is supposed to determine the volume of wastewater of an economic entity and establish the amount of pollutants and microorganisms that are permissible for discharge; calculation of standards of permissible discharges; development of an environmental control plan; project development; if the actual values of wastewater discharge indicators exceed the prepared ones, a set of measures for the discharge of substances polluting water bodies is being developed, aimed at reducing the negative impact of wastewater on the water body, as well as at achieving the developed values of permissible discharge standards. The formation of a draft waste generation standards and limits on their placement involves the formation of a scheme for the operational movement of waste; characteristics regarding the places of their temporary storage/accumulation, determination of time intervals for waste removal, characteristics of the installation and technology of waste processing and disposal; creation of an information base on waste disposal facilities, collection of data on organizational measures to monitor the state of the environment at the facilities of an economic entity where waste is disposed of, on measures to influence emergency situations, information is collected on measures to reduce the impact of waste generated at the enterprise on the environment; proposals are being formed on the limits of waste disposal

The third stage involves the approval of projects in regulatory authorities. At this stage, the following is being carried out: coordination of projects of maximum permissible

emissions, permissible discharge standards, waste generation standards and limits for their placement with state bodies authorized for this type of work to approve the standards obtained, permits are obtained for the release of substances polluting the atmosphere within the limits of established standards, for the right to use a water body and permits for discharge, the standards for waste generation and the volume of products produced, works performed, services rendered, the amount of waste generated each year are approved; the amount of waste that can be further used and/or neutralized; the amount of waste intended for placement at certain waste disposal facilities.

The development of these projects is accompanied by significant cost costs, which can be estimated using the Methodology for determining the cost standards for the development of regulatory environmental documentation for the purpose of application by branches of JSC "Russian Railways" to establish the optimal cost of project work.

The standard time standards for the development of environmental documentation are designed to determine the complexity of work, to normalize the work of developers and are recommended for use in the relevant services of JSC "Russian Railways". When developing time standards, normative and methodological materials on labor rationing, professional standards for scientific and design work and information technologies, as well as standard time standards for the development of regulatory documentation were used.

### **3 Results**

The analysis of the representativeness of the methodology for developing and estimating the cost of developing environmental documentation was carried out on the basis of an analysis of the cost of rendering services to JSC "Russian Railways" for the development of regulatory environmental documentation for railway landfills, taking into account the following decision-making sequence: "commercial offer – determination of the initial (maximum price) – calculation of the bidder for participation in the tender - the cost of the contract for paid provision services". On the one hand, such a sequence must necessarily lead to a change in the cost in the direction of its reduction, which is economically beneficial for JSC "Russian Railways", but, on the other hand, this process is characterized by the presence of an absolute error as the difference between the standard value determined by the developed Methodology and the cost of tender documentation or concluded contracts and relative error, which is characterized by the ratio of the absolute error to the average value of the analyzed indicator, expressed as a percentage.

The initial data for the analysis were the cost indicators of the relevant projects for the development of environmental documentation for the landfills of JSC "Russian Railways" and the cost standards. A comparative analysis of the cost standard for the development of regulatory environmental documentation, calculated in accordance with the Methodology, and the cost of open quotation documentation, showed the possibility of supporting the business process of preparing and conducting a tender for the conclusion of a contract for the provision of services for the development of regulatory environmental documentation while focusing on the cost standard.

In most regions, the cost of developing regulatory environmental documentation based on tender documentation is higher than the cost standard obtained on the basis of calculations according to the Methodology. This situation is explained by the fact that the cost of the tender documentation is formed on the basis of the analysis of commercial proposals by using the comparative method. It can be assumed that the cost of developing regulatory environmental documentation in commercial proposals is overstated in order to increase the profitability of organizations applying for projects. Calculations carried out on the basis of the developed At the same time in some regions there is a greater regulatory cost of developing projects according to the Methodology than according to the materials of the

tender documentation. At the same time, comparing the number of sites, sources and substances/waste in these regions with other regions, it can be noted that with a larger number of these parameters, these projects have a lower cost. Calculations of the standard cost of development of regulatory environmental documentation carried out according to the developed Methodology show the proportionality of the standard cost of project development to the number of sites, sources and substances/waste. In addition, in the developed Methodology, payroll costs are calculated on the basis of the average monthly nominal accrued wages of employees of organizations in the relevant region, whereas the nominal salary of a potential developer may be much less than this value or the applicant is located in a region with a lower level of nominal wages.

## **4 Discussion**

The draft standards of maximum permissible emissions into the atmosphere are necessary for economic entities that have stationary sources of emissions. At the same time, the maximum permissible emission is understood as the normative value of the maximum permissible release of a harmful (polluting) substance into the air of the atmosphere. The specified standard is approved for a stationary source polluting atmospheric air, and takes into account technical emission standards, as well as background air pollution of the atmosphere, taking into account that the source does not exceed atmospheric air quality standards (hygienic and environmental), critically permissible loads on environmental systems and other environmental standards [11].

The work on establishing standards for emissions of pollutants into the atmospheric air is based on the results of an inventory of emissions of harmful (polluting) substances into the atmospheric air and sources of these emissions for operating enterprises, as well as on data from project documentation for new and/or reconstructed enterprises being put into operation. On the basis of inventory data, sources of emissions are identified, and a register of pollutants is formed, which should be taken into account, as well as normalized on the principles of existing regulatory documents by the state [11].

The cost of developing the draft standards for maximum permissible emissions into the atmosphere depends on the number of objects for which the project should be carried out, the complexity of calculations, which ultimately determines the number of hours spent by an environmental engineer on the project.

Preparation of draft standards for permissible discharges of substances and microorganisms into water bodies for water users is necessary for any economic entity that, by the nature of its activity, as well as the features of the applied technological process, diverts technological waters by means of their discharge in the form of effluents into some water body. The standards of permissible discharges of substances and microorganisms themselves determine the standards that are determined in relation to economic entities on the basis of data on the mass of chemical and other substances, as well as microorganisms allowed to enter the environment from any sources in the approved regime, and taking into account technological standards, compliance with which ensures compliance with environmental quality standards. Rationing of maximum permissible discharges is necessary due to the fact that, in essence, each water body is to a certain extent a source of drinking, domestic or technical water supply. At the same time, the norms of the maximum permissible concentration of harmful substances are established for water bodies. Draft standards for permissible discharges of substances and microorganisms into water bodies for water users should be developed both for all pollutants, the source of which is an economic entity, and for the object as a whole.

The development of draft standards for permissible discharges of substances and microorganisms into water bodies for water users involves the preliminary formation of a

project map. The content of the work at this stage involves the analysis of the application for the development of the project, the analysis of advanced achievements of domestic and foreign practice, the definition of basic requirements, the selection and study of source materials, the definition of the stages of project development, stages of work, the selection and justification of the method of project implementation, coordination with the head; coordination of the project map with the responsible executor.

The cost of developing draft standards for permissible discharges of substances and microorganisms into water bodies for water users depends on the number of wastewater releases, information on monitoring the quality of discharged wastewater, information on the quality of natural water of a water body to determine background concentrations of substances, hydrological characteristics of a water body at the point of discharge.

Waste generation standards are used to establish the expected values of certain types of waste generated based on the estimated production volumes. The draft waste generation standards and limits on their placement are required to determine the total amount and types of waste generated at the level of an economic entity, their accounting, justification of their admissibility, as well as the possibility of their accumulation on the territory. According to the current legislation, enterprises whose activities are related to waste management are required to develop this project and approve a limit on their placement. Almost all economic entities that accumulate, use, receive, and dispose of production and consumption waste fall under this requirement [12].

The cost of developing a draft waste generation standards and limits on their placement depends on the amount of waste generated in the business entity, the amount of waste of the 5th class, the availability of updated passports of hazardous waste from hazard class 1 to 4, the number of production sites of the enterprise (if there are several sites and they are located in different municipalities, then not one project, but separately for each site).

Using the method of analogies, you can create a list of time standards for the development of individual sections of projects. It is convenient to compare the documents of the project sections by complexity and complexity with the documents defined by the Enlarged norms of time for the development of technological documentation and Standard norms of time for the development of design documentation.

When forming environmental documentation, first of all, it is necessary to rely on a sound methodology for determining the cost standards for the development of regulatory environmental documentation. This methodology for determining the cost standards for the development of regulatory environmental documentation is being developed to assess the cost standards associated with the development of draft standards for maximum permissible emissions into the atmosphere (draft standards for maximum permissible emissions into the atmosphere), standards for permissible discharges of substances and microorganisms into water bodies for water users (draft standards for permissible discharges of substances and microorganisms into water bodies for water users), waste generation standards and limits on their placement (draft waste generation standards and limits on their placement). It establishes a methodology for calculating the cost of work on the development of these projects.

The methodology can be used when performing financial and economic justification of the cost of project development with the involvement of third-party organizations on a contractual basis for their development, capable of professionally executing projects.

## **5 Conclusions**

Thus, the reviewed drafts of regulatory environmental documentation reflect the impact of the company's production on the environment, provide materials on how to ensure the implementation of management processes for the protection of natural resources outside the

organization, compliance with legislation and established norms. Therefore, each economic entity acting as a nature user must have appropriate environmental documentation and submit reports to regulatory authorities. In the absence of environmental documentation, as well as if it was developed incorrectly, the burden on the organization increases. In addition, the availability of environmental documentation allows you to organize competent management control in this area, as well as to take into account the correctness of the expenditure of funds of an economic entity for environmental activities.

Identifying the stages of this type of activity allows you to clearly understand the sequence of work in terms of the development of regulatory environmental documentation, properly organize management processes in this area so that an economic entity can have a complete and competently compiled package of necessary documents in the field of environmental management.

As a result, certain general conclusions can be drawn, as shown in Figure 2:



**Fig. 2.** Alternative conclusions on determining the cost of developing regulatory environmental documentation.

Thus, the application of the methodological approach according to the developed Methodology will ensure the uniformity of calculations and the possibility of an objective assessment of the value presented in the quotation documentation and commercial offers. Based on the regulatory cost of the development of regulatory environmental documentation, it is possible to adjust the initial (maximum) price of contracts when bidding for the purchase of goods, works, services for the needs of JSC "Russian Railways".

In general, the analysis of the calculations shows the effectiveness in most cases of the developed Methodology, the effect of which is the possibility of increasing financial results and obtaining additional economic effect for the structural divisions of JSC "Russian Railways".

Currently, the actual cost indicators for the development of regulatory environmental documentation are accepted as true values, but this requires certain clarifications, since the qualification of a specialist performing the calculation of the cost of regulatory environmental documentation plays an important role in determining them, which is expressed in his competence to take into account the entire complex of all works and their specifics, as well as factors affecting the cost development of regulatory environmental documentation. In addition, there may be a formal approach to determining the cost of developing regulatory environmental documentation, the absence of "ideal" methods of calculation and measurement in the continuous variability of the indicator due to certain instability of procurement processes.

The absence of a unified methodological approach to determining the cost of developing regulatory environmental documentation when forming contracts leads to distortion of the calculation results. The application of the developed Methodology will make it possible to eliminate these shortcomings and apply a common approach to calculations at the landfill of all railways and the unification of calculations of the cost standard for the development of regulatory environmental documentation for railway landfills.

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