

Consideration of the ecological factor during the cadastral assessment of the land of industrial enterprises

Nikolai Vladimirovich Volovich¹, Maxim Alekseevich Skatov²

¹Financial University under the Government of the Russian Federation, Moscow, Russian Federation

²Self-regulatory organization "Union" Federation of Specialists Appraisers ", Moscow, Russian Federation

Abstract. In 2022, a new state cadastral assessment took place in the Russian Federation, which does not determine the details of including a sanitary protection zone and assessing its cost to adjust the total cost of plots. The purpose of this study is to justify a return to the normative establishment of tax rates, taking into account changes in the state policy of regulating land and property relations. The purpose of the study was achieved by performing two tasks: analysing the share of the area of the sanitary protection zone, which should be taken into account when assessing the main land use of the enterprise, and determining the cost of this part of the sanitary protection zone. To solve the problems, standards and theoretical works are analysed, as well as the actual practice of using sanitary protection zones with regulatory requirements is compared. The result of the study is the possibility to use aggregated methods to calculate additional adjustments for industrial sites and territories with a sanitary protection zone, using the norms of green spaces and the costs of creation. These results can serve as a basis for the development of effective measures and regulations in the field of taxation of land and property relations.

Keywords: Cadastral value, sanitary protection zones, land plot assessment, property tax.

1 Introduction

Russia has established itself among the countries with an alarming ecological situation. The country has faced serious environmental problems. Only 15% of the urban population breathes clean air, and significant concentrations of pollutants exceeding the norms by 5-10 times are registered in 125 cities in Russia. Industrial facilities are the main source of atmospheric pollution, with a total of 27,600 enterprises and 1.183 million emission sources. It is important to note that 22% of emissions occur without purification, while 78% undergo treatment. The environmental condition in the regions of Russia has a negative impact on the social situation and limits economic development. Some of the most polluted cities include Norilsk, Cherepovets, Novokuznetsk, and Lipetsk, where pollutant concentrations exceed the permissible limits by 10 times.

Currently, the entire regulatory system of the complex of land and property relations cannot undergo radical changes towards accounting for the environmental and climate consequences of industrial activities. On the one hand, the administrative mechanism aimed at maintaining high

rates of investment in infrastructure, industrial and agricultural production, and housing construction is being refined. State land control is being strengthened, primarily in the use of agricultural lands, as well as control over compliance with urban planning and environmental requirements. At the same time, when developing territories, emphasis is placed on comprehensive development, including job creation.

On the other hand, the system of economic regulatory measures is being improved. Direct state financing in the construction and housing and utilities sector is increasing significantly. Measures for indirect regulation of the market of land plots and other real estate objects are being developed, primarily through the system of financing market turnover. In this regard, the factor of social responsibility of the borrowing companies and the environmental condition of their facilities is of fundamental importance. At the same time, the government annually increases the rates in accordance with the resolution of the Russian government dated September 13, 2016, No. 913 "On rates of payment for negative impact on the environment and additional coefficients." For 2023, these payments were increased by 6%, which is higher than the forecasted income growth for industrial enterprises.

Systemic changes should also occur in the measures of mandatory payments for the use of all land plots:

1. Property taxes for individuals and organizations.
2. Rent for plots owned by the state.
3. Mandatory payments when purchasing plots and other real estate objects owned by the state.

In 2022, for the first time, a new state cadastral valuation (hereinafter referred to as GKO) of land plots was simultaneously conducted in all subjects of the Russian Federation by regional budgetary institutions for cadastral valuation (hereinafter referred to as GBUKO). Despite the obvious difficulties associated with the market situation, this allows for a more complete realization of the potential of the new information base for conducting a unified policy in the field of land and property relations.

To some extent, the methodological instructions on GKO provide the possibility of taking into account environmental factors in the cadastral (tax) valuation of industrial plots. In particular, paragraph 11 establishes that the determination of cadastral value is carried out without taking into account encumbrances (restrictions) of real estate, except for land rights restrictions arising in accordance with land legislation in connection with the establishment of zones with special conditions for land use (hereinafter referred to as ZOUIT).

According to the legislation, such zones include sanitary protection zones of enterprises and facilities (hereinafter referred to as SPZ), which are intended for:

- Ensuring the reduction of the impact level to the required hygienic standards for all influencing factors beyond its boundaries.
- Creating a sanitary protection barrier between the enterprise's territory (group of enterprises) and the residential area.
- Organizing additional green areas that provide screening, assimilation, and filtration of atmospheric pollutants, as well as improving microclimate comfort.

According to Sanitary and epidemiological rules and regulations 2.2.1/2.1.1.1200-03, the criterion for determining the size of SPZ is not exceeding the maximum allowable concentrations of pollutants for atmospheric air in residential areas at its external border and beyond, as well as the maximum permissible levels of physical impact on atmospheric air. At the same time, the SPZ itself is not provided to the enterprise for which it is established, except for those plots within the SPZ where the enterprise's facilities are located, particularly the main industrial site. This is due to the fact that this zone does not restrict the placement of various industries and facilities, except as specifically stipulated by legislation. Thus, residential development, including individual houses, landscape and recreational areas, rest areas, resort territories, sanatoriums, holiday homes, horticultural associations and cottage construction

areas, collective or individual dachas and garden plots, as well as other territories with regulated indicators of habitat quality, are not allowed to be located in the SPZ. Similarly, sports facilities, playgrounds, educational and childcare institutions, medical and preventive and recreational facilities for public use are not allowed. However, for other types of use, primarily defined by the territorial planning zoning, there are no restrictions on providing plots for construction. "Plots of sanitary protection zones of enterprises are not included in the enterprise's territory and can be provided for the placement of objects whose construction is allowed in the territory of these zones."

However, a sanitary protection zone can only fulfill its function if the requirements for its improvement are met, which limits the use of the main part of the SPZ territory to the necessity of using it only for landscaping purposes. Such a limitation significantly expands the actual land use of the enterprise, whose activities necessitated the establishment of the SPZ, beyond the plots that are directly provided to and formalized for it. Therefore, when assessing the value of land plots provided to such an enterprise, it is necessary to take into account the obligation to form a sanitary protection zone in accordance with the requirements of paragraph 22 of the federal appraisal standard "Real Estate Appraisal" (FSO 7) by making an adjustment for zoning. In fact, this adjustment will represent the costs of forming and using the SPZ (hereinafter referred to as the adjustment for the necessity of forming the SPZ).

Calculating additional adjustments for plots of industrial enterprises and facilities, the use of which requires the formation of a sanitary protection zone as a ZOUIT, is possible within the framework of aggregate methods of calculating the adjustment value through norms for the area of landscaped territories of the sanitary protection zone and norms for cost expenditures for acquisition and landscaping.

2 Materials and Methods

The goal of this article is to justify the need to return to the normative establishment of tax rates for industrial enterprises' plots and properties due to the change in the state policy regarding the regulation of land and property relations in the Russian Federation.

The research hypothesis is formulated as follows: it is necessary to establish normative indicators for the areas that are subject to greening in the sanitary protection zone and for the acquisition and greening of these plots for industrial enterprises and properties.

The implementation of the goal and testing of the hypothesis can be achieved by carrying out two tasks:

- 1) Examine what part of the sanitary protection zone area should be taken into account when assessing the main land use of such enterprises;
- 2) Examine the determination of the cost of this part of the sanitary protection zone and make the corresponding adjustments to the overall value of the enterprise's land plots.

The theoretical framework for the research includes articles on cadastral valuation of real estate and cadastral value by V.M. Kruglyakova [1], A.A. Bakulina [2], S.A. Mamontov and I.V. Zinchenko [3], S. V. Gribovskiy [4], G. N. Barsukova, N. M. Radchevskiy, N. R. Saifetdinova [5], E. Bykova, M. Heldak, & J. Sishchuk [6], K. R. Ihlanfeldt [7], J. Michael, R. Palmquist [8], S.A., Sladkopevtsev, A.P. Sizov, and A.Y Antsiferov [9], P. Munro-Faure [10]. Concerning the research on determining cadastral value, the works of N.V. Volovich [11], E. N. Bykova and V.V. Butina [12], E. N. Bykova and K.E. Senkovskaya [13], and separately E. N. Bykova [14] should be noted.

3 Results

The solution to the first problem can be justified by an approved (or previously calculated)

project of a sanitary protection zone. The project of the sanitary protection zone (SPZ) should determine both the size and boundaries of the SPZ, as well as measures to protect the population from the impact of emissions of harmful chemical pollutants into the atmosphere and physical effects. It should also include the functional zoning of the SPZ territory and its land use regime. The size of the SPZ directly depends on the hazard class of the facility. The higher the class, the wider the buffer zone:

- Class 1 (extremely hazardous) - 1000 meters;
- Class 2 (highly hazardous) - 500 meters;
- Class 3 (moderately hazardous) - 300 meters;
- Class 4 (slightly hazardous) - 100 meters;
- Class 5 (practically non-hazardous) - 50 meters.

In real practice, the use of pollutants from the facility beyond the perimeter of the sanitary protection zone, only for hazard classes 1-3, is significantly restricted because it has a significant negative impact on the environment. Norms have been established regarding the minimum area of green spaces in the SPZ, depending on the zone's width. For a zone width up to 1000 meters, the minimum area of protective greenery in the SPZ should be 50%, and for a width up to 3000 meters, it should be 40%.

For hazardous facilities of the 1st class, such as metallurgical plants, the regulations set the calculated width of the SPZ at 1000 meters. Therefore, the area of greenery should be approximately half of the SPZ territory, even in the absence of an approved SPZ project by the evaluator. However, in the new edition of SanPiN 2.2.1/2.1.1.1200-03, there is no concept of a "normative percentage of SPZ greenery." According to current legislation, the design of SPZs does not require the inclusion of materials for their greening and improvement. This is because, in most cases, the territory where the SPZ is located is not owned by the industrial enterprise and is not registered for their use. This is due to the fact that in densely built urban areas, it is practically impossible to provide the required percentage of greenery within the SPZ boundaries, as there are often objects within the SPZ that prevent the planting of the necessary number of trees and shrubs to effectively reduce noise levels or harmful emissions in the air.

Nevertheless, it is possible to use the mandatory green space standards of the SPZ as a correction to the price of the main contaminated site of the enterprise, in accordance with SP 82.13330.2015 "Territory Improvement." This would allow calculating the size of the SPZ area for adjusting the cost of the main contaminated site of the enterprise, even in the absence of a corresponding greening project.

To solve the second problem, it is necessary to consider the costs of forming and greening this part of the SPZ. The minimum cost of a plot for greening involves the expenses for acquiring and greening the land, whether it is agricultural or forestry land, depending on the location of the enterprise. This corresponds to the normative requirements. "Land plots of facilities and their groups should be located in non-agricultural areas or areas unsuitable for agriculture. In the absence of such land, plots on agricultural lands of lower quality may be selected. Placement of facilities on state forest lands should primarily be on areas not covered by forests or occupied by shrubs and low-value plants." The mandatory list of elements for landscaping the green areas of the SPZ includes elements of connecting the green area with adjacent territories (curbstones, retaining walls, etc.) and elements of protection for plantings and green areas.

During the Soviet period, due to the allocation of state funds for these activities, cost calculations for the corresponding expenses were included in land development projects. Currently, for the purposes of state cadastral valuation, approximate indicators can be used for the respective territories, particularly state estimate norms (further referred to as NCS). They are intended for investment planning, assessing the effectiveness of capital investment funds, and preparing technical and economic indicators in design tasks for greening projects, the construction of which is financed with federal budget funds. The norms were developed based

on resource-technological models, which are based on typical norms for providing objects with green zones. The indicators include all cost items stipulated by the current regulatory documents in the field of pricing for carrying out the main, auxiliary, and related stages of work for greening the territories of various objects under normal (standard) conditions, not complicated by external factors. The NCS, as of 2014 prices for the base region (Moscow region), for calculating the greening area of the SPZ per 1 hectare, amounted to up to 39,080.10 thousand rubles (excluding VAT). These amounts exceed the cost of creating parks according to the same NCS in major cities of the region.

Thus, the study has revealed that the calculation of additional adjustments for industrial sites and facilities, the use of which requires the formation of a sanitary protection zone as an environmental protection zone, is possible within the framework of approximate methods by using norms for the area to be greened in the SPZ and norms for cost expenses for acquisition and greening. This demonstrates the need to return to normative establishment of tax rates for industrial sites and facilities. This conclusion supports the hypothesis put forward.

4 Discussion

Research on incorporating the environmental factor into the cadastral value of land plots for industrial facilities is an important and relevant topic. Scientific publications discuss methods and approaches to consider the environmental factor in the assessment of cadastral value. This includes the development of methodologies, models, and indicators, as well as the analysis of legislation and regulatory requirements. Empirical studies on specific industrial facilities analyze the impact of the environmental factor on land value, including pollution, public health, and environmental infrastructure.

In this study, the necessity of returning to the normative establishment of tax rates is justified due to changes in state policies in the regulation of land and property relations. Additionally, the possibility of using aggregated methods for calculating additional adjustments for industrial sites is considered. The research has revealed that calculating additional adjustments for industrial sites and objects requiring the formation of sanitary protection zones is possible using aggregated calculation methods based on norms for green space area in the sanitary protection zone and cost expenditures for acquisition and landscaping. This underscores the need to return to the normative establishment of tax rates for industrial sites and objects, which is of significant importance in determining the land value of industrial facilities. E.V. Maryin [15], in a previous study, also asserts the need for improvement in the taxation system regarding land property, aligning with the results of this study.

However, in addition to the obtained results, the authors have identified potential avenues for further research within this subject matter. Future studies could focus on a more detailed examination of landscaping and improvement issues within sanitary protection zone projects, as well as analyzing the effectiveness of regulatory requirements and their alignment with the actual conditions of landscaping implementation.

5 Conclusion

The work on normative regulation of accounting for environmental requirements, including in the case of sanitary protection zones (SPZ) for land plots, requires constant attention. Unfortunately, more recent normative and calculation standards (after 2014) do not provide information on the cost of landscaping SPZs, and calculating the market value of such work requires high qualifications and responsibility from appraisers. A similar situation has arisen in another closely related regulatory sphere. Since 2003, the government has abandoned the use of norms for the cost of developing new land in exchange for expropriated agricultural lands for

non-agricultural purposes, and these indicators are no longer calculated. It was expected that using market value as a basis would provide illogical indicators that would replace the existing system of financial regulation of restrictions on the expansion of built-up areas of agricultural and forestry lands, which has been in place since the Soviet Union era. However, at present, lobbyists from the business sector and the performers of SPZ work have the opportunity to manipulate approaches to accounting for environmental factors. Nevertheless, the mere initiation of a discussion on how to evaluate artificial recreational and natural areas speaks to the importance of this issue, the resolution of which cannot be solely political or commercial.

References

1. V.M. Kruglyakova, Val. Issues, **3**, 17-25 (2020)
2. A.A. Bakulina, *Methodological Foundations for Assessing the Value of Property Objects Taking into Account their Encumbrances* (FGBOU V O "Financial University under the Government of the Russian Federation", Moscow, 2016)
3. S.A. Mamontova, I.V. Zinchenko, Moscow Econ. J. (4), 59-66 (2021). DOI: 10.24412/2413-046X-2021-10252
4. S.V. Gribovsky, Property Relations in the Rus. **2**(125), 1-10 (2012)
5. G.N. Barsukova, N. Radchevskiy, N.R. Saifetdinova, Intern. J. of Econ. and Fin. Issues, **6**(4), 1981-1997 (2016)
6. E. Bykova, M. Heldak, J. Sishchuk, Sustainability, **12**, 1-26 (2020). DOI: 10.3390/su12197904
7. K.R. Ihlanfeldt, J. of Urban Econ. **61**(3), 420-435 (2007). DOI: 10.1016/j.jue.2006.09.003
8. J. Michael, R. Palmquist, Vermont J. of Environ. Law, **11**(3), 437-464 (2010). DOI: 10.2307/vermjenvilaw.11.3.437
9. S.A. Sladkoptev, A.P. Sizov, A.Y. Antsiferov, Geodesy and Aerial Photo. **63**(2), 211-216 (2019). DOI: 10.30533/0536-101X-2019-63-2-211-216
10. P. Munro-Faure, *Sustainable Development and Land Administration Infrastructure Reforms: The Role of Markets and Land Valuation Systems – Agenda for Change?* (Cadastre and Land Management, International Federation of Surveyors, United Kingdom, 1999)
11. N.V. Volovich, Property Relations in the Rus. **11**(134), 11-30 (2012)
12. E.N. Bykova, V.V. Butina, Engineering Herald of Don, **2** (2014)
13. E.N. Bykova, K.E. Senkovskaya, Property Relations in the Rus. **11**, 8-19 (2016)
14. E.N. Bykova, J. of Mining Institute, **247**, 154-170 (2021). DOI: 10.31897/PMI.2021.1.16
15. E.V. Maryin, Contentus, (4), 89-94 (2020). DOI: 10.24411/2658-6932-2020-00031