The comparative analysis of payments for negative environmental impact in Russia and Kazakhstan

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Abstract. The article represents the calculation of the payment for negative environmental impact caused by the development of the uranium ores deposits in the Republic of Kazakhstan. To compare the deposits in Kazakhstan and the Russian Federation, the event is simulated as if the object were located in the territory of the Russian Federation. The comparison of the results serves as an evidence to substantiate the experts' claim that the financial mechanism of land management in Russia should be reformed.

1. Introduction

Charges for the negative environmental impact is a way to compensate the damage to the environment [1] caused by the companies and other enterprises through contamination and waste disposal [2]. The scientists state that current charges perform neither compensation [3, 4] nor regulatory functions [5]. Even with the penal sanctions being accounted, the payment of companies make up hundreds and tenths of a percent within the expenses and income respectively [6]. It is still more profitable for Russian companies to pay the charges for the damage to the environment than to carry out environmental actions [7]. The absence of economic incentives to motivate companies to perform environmental actions and insignificance of charges increase the level of environmental pollution [8, 9, 10].

2. Materials and Methods

The authors of the article analyze the payments for the negative environmental impact made by an exploration company in Kazakhstan in 2015. The company is Volkovgeology, which explores Irkol deposit in Kazakhstan. The calculation was made for all possible sources of contamination when constructing a well for in situ leaching of uranium, which makes a considerable negative impact on the environment. Special attention has been paid to the process waste management system as the wastes of this particular type are produced in great amounts. The same calculation has been made in compliance with the laws and regulations of the Russian Federation.

3. Results and Discussion

The major sources of negative environmental impact are the mobile drill rig BPU-1200 M equipped with the drill ZIF-1200 MR, the bulldozer T-165-2, trailers, the mobile power plant AKSA AJD-200

with the capacity of 160 kW, the excavator EK-18, the water tank truck KRAZ-6322, the maintenance crew vehicle GAZ-66, the repair vehicle on the basis of ZIL-131.

All moving machines (plants and vehicles) firm and shave the soil, which causes dust. The vehicles and the power plant emit exhaust gases. Constructing pits, clarifiers, and sumps add even more dust [11]. Potential air pollutants, wastewater releases, and wastes caused by the construction works are represented in table 1.

Table 1. Air pollutants, wastewater releases, and wastes caused by the construction works.

Activities	Air pollutants	Waste water releases	Wastes
Pre-drilling activities (construction of access roads, site, three sumps)	Dust caused by moving vehicles and excavating works, exhaust gases	No	Barren rocks at the site, domestic garbage
Wellbore enlargement with the implementation of clay-based drilling mud. The access to the orebody.	Dust caused by moving vehicles, exhaust gases	No	Cuttings (resulted from drilling both barren rocks and orebody), domestic garbage
Well completion: implementation of water-based mud, 3-phase airlift pumping until complete clarification of the mud	Dust caused by moving vehicles, exhaust gases	No	Cuttings
Geological, hydrogeological, and radioecological surveys, including topographical survey	Dust caused by moving vehicles, exhaust gases	No	Domestic garbage
Mining	Dust caused by moving vehicles and excavating works, exhaust gases	No	Domestic garbage

Well construction undoubtedly has a negative environmental impact on:

- air (due to the vehicles and special machines);
- soil and cover crop (due to the pits, clarifiers, and annular seal failure);
- surface and ground waters (mud losses, fuel and lubricant storage, formation fluid seeps);
- subsurface resources;
- flora, fauna, and human beings.

The implemented waste management system makes it possible to minimize the negative environmental impact. Non-radioactive process wastes are split into two groups: one group is further recovered and recycled while the other one is buried. Radioactive and highly radioactive substances are sent to be buried at the special burial site for radioactive wastes. Broken rock debris and cuttings are put into wide ditches and covered with the humus layers, which were put aside and generated while digging the ditches. There is radiation safety and ecological control service which is in charge of environmental monitoring, i.e. accounting, keeping, transferring, and transporting all wastes including radioactive ones [12, 5].

In the process of works, about 22.2 ha of soil will be disturbed. Therefore, during the performance period mine reclamation will be provided: backfilling, further covering of sumps, pits, and clarifiers with the soil layer, afterward furrow firming and irrigation. The experience of similar activities performed in the bordering region shows that the vegetation on such saline soils is restored within three years. As a result, by the end of the performance period a certain part of the lands will be reclaimed [8].

Moreover, actual mining will take place in the territory when drilling is completed. Therefore, the question on compensation for agricultural losses caused by different land-disturbing activities should be solved only after actual mining is over, reclamation activities are performed, and the land is transferred to the government.

If the rate of pollution exceeds the regulated limits, the charge for emissions is calculated in compliance with the Code of the Republic of Kazakhstan for Taxes and Other Obligatory Payments to the State Budget. The calculation of the charge for harmful emissions given below is done in accordance with tariffs approved by the Solution of the Maslikhat of Kyzylorda region № 121, dated 26.12.2008 (tables 2, 3, 6).

Table 2. The calculation of payment for air pollution in the Republic of Kazakhstan.

№	Pollutants	Tariff per 1 ton (minimum calculation index) 2015 – 1982 tenge	Tariff, tenge (2015)	Emissions, ton per year	Amount of tax, tenge
1	Nitrous oxides	20	39 640	3.554	140 881
2	Sulphur oxides	20	39 640	1.115	44 199
3	Carbon oxides	0.32	634	3.043	1 930
4	Hydrogen sulphide	124	245 768	0.000003	1
5	Hydrocarbons	0.32	634	0.856	543
6	Formaldehyde	332	658 024	0.036	23 689
7	Inorganic dust	10	19 820	3.052	60 491
8	Carbon soot	24	47 568	0.142	6 755
9	Iron oxides	30	59 460	0.0123	731
10	Benzo(a)pyrene	996.6 per 1 kg	1408195.8	0.0000004	1
	Total per year				**279 219**

Table 3. The calculation of payment for pollution caused by vehicles and mobile machines within the regulated limits.

№	Fuel	Tariff per 1 ton (minimum calculation index) 2015 – 1982 tenge	Tariff, tenge (2015)	Fuel consumption, ton per year	Amount of tax, tenge
1	Petrol	0.66	1308.12	92.64	121184.24
2	Diesel fuel	0.9	1783.8	259.63	463127.99
	Total				**584312.23**

The comparative analysis of payments for the negative environmental impact on Irkol deposit was made on the basis of current tariff rates in the RF. The calculation was made as per rate of exchange 1 ruble = 0.28 tenge (dated 10.04.2015). Current tariff rates in the RF are approved by the Government Resolution № 344 (dated 12.06.2003) and N 410 (dated 01.07.2005). Both inflation and ecological situation factors are taken into account. The results are represented in tables 4, 5.

Table 4. The comparative calculation of payments for pollution caused by stationary sources in compliance with the laws and regulations of the RF.

№	Pollutants	Tariff in Kazakhstan, rubles per ton (2015)	Tariff in Russia, rubles per ton (2015), with all factors taken into account	Amount of pollution, ton per year	Amount of tax in Kazakhstan, rubles	Amount of tax in compliance with the RF legislation, rubles
1	Nitrous oxides	11218.24	205.21	3.554	39869.75	729.32
2	Sulphur oxides	11218.24	123.48	1.115	12508.45	137.68
3	Carbon oxides	179.42	3.528	3.043	546.2	10.74
4	Hydrogen sulphide	69553.8	123.48	0.000003	0.28	0.0004
5	Hydrocarbons	179.42	29.4	0.856	153.67	25.17
6	Formaldehyde	186222.77	4016.04	0.036	6755	144.58
7	Inorganic dust	5609.12	241.08	3.052	17119.3	735.78
8	Carbon soot	13461.89	470.4	0.142	1911.69	66.8
9	Iron oxides	16827	305.76	0.0123	206.88	3.76
10	Benzo(a)pyrene	394294.824	12052829.88	0.0000004	0.28	4.8
	Total per year				**79019.81**	**1858.63**

Table 5. A comparative calculation of payments for air pollution emissions caused by mobile sources in the Republic of Kazakhstan and the Russian Federation.

№	Fuel	Tariff in Kazakhstan, rubles (2015)	Tariff in Russia, rubles (2015)	Fuel consumption, ton per year	Amount of tax in Kazakhstan, rubles	Amount of tax in Russia, rubles
1	Petrol	300	7.6	92.64	121184.24	704.064
2	Diesel fuel	504.82	14.7	259.63	463127.99	3816.561
	Total				**584312.23**	**4520.62**

If the same deposit were located in the territory of the Russian Federation, the total amount of payment for air pollution emissions in the Republic of Kazakhstan would be 42.5 times as much as that in the Russian Federation. While the tariff for benzo(a)pyrene emissions in Russia is 30 times as much as that in Kazakhstan, the tariffs for all other pollutants are significantly lower. For example, the tariff for hydrogen sulphide emission in Kazakhstan is 563 times as much as that in Russia. The results of the comparative analysis of payments for air pollution emissions caused by mobile sources are even more impressive: the total payment in Kazakhstan is 129 times as much as that in Russia.

However, the payments for waste disposal in Kazakhstan and Russia are commensurable: the payment in Russia is 38% more than that in Kazakhstan. The total payment for the negative environmental impact in Kazakhstan over 2015 will be 263571.73 rubles. If the deposit were located in the territory of Russia, the payment would be 32108.55 rubles. The total amount of payment in Russia would be an 8th of that in Kazakhstan (table 6).

Table 6. A comparative calculation of payments for the negative environmental impact caused by wastes disposal.

№	Waste	Tariff per 1 ton (minimum calculation index) 2015 1982 tenge	Tariff, tenge, 2015	Amount of wastes, ton per year	Amount of tax, tenge	Amount of tax in Kazakhstan, rubles	Amount of payment in Russia, rubles
1	Ferrous and non-ferrous metal junk	2	3964	4	15856	4487.3	5842.4
2	MSW (municipal solid wastes)	0.19	376.58	3.6	1355.688	383.66	5258.16
3	Cuttings from barren rocks	0.004	7.928	5785	45863.48	12979.51	13606.32
5	Oily rags	2	3964	0.7	2774.8	785.28	1022.42
	Total				**65849.968**	**18635.74**	**25729.3**

The comparison of payments for the negative environmental impact has allowed us to identify two different approaches to economic regulation of environmental protection. In the Republic of Kazakhstan, the regional authorities are in charge of approving the tariffs, with the minimum calculation indexes being specified in the tax laws of the republic. In Russia, the tariffs are approved by the Government of the RF, with the regional differences in the amount of the tax being determined by the ecological situation factor. In Russia, the payments for the air pollution emissions are lower than those in Kazakhstan, while the payments for wastes disposal in general are higher. The wastes in Russia are differentiated in accordance with the classes of hazard.

4. Conclusion

The analysis of the systems of payments proves that the charges in Russia do not encourage the companies to reduce the negative environmental impact, as the charges are low enough and incommensurable with the costs for environmental constructions.

Currently, it is necessary to reform the system of charges for the negative environmental impact, with the average fifty-fold increase in the rate of the tariff for air pollution emissions.

While reforming the system of charges, the experience of the Republic of Kazakhstan should be taken into account and the subjects of the RF might be vested with the power to set the tariffs for the negative environmental impact.

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