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О. В. Прищепа, Н. А. Удачина
Уральский государственный горный университет
г. Екатеринбург, Россия

Экономическая эффективность рекультивации

В данной статье поднимаются вопросы экономической эффективности рекультивации. Рекультивация – это комплекс работ, направленных на восстановление продуктивности земель, нарушенных в результате любой хозяйственной деятельности человека. В статье рассмотрены экономические аспекты и современные проблемы рекультивационных работ на примере опытно-промышленного карьера хромитовых руд Жижинско-Шаромского массива, расположенного в Свердловской области.

The economic efficiency of reclamation

According to the statistics of the Russian Federation the dynamics of the increase in the area of disturbed lands are noted. Information about the restored or reclaimed areas is also given in the state (national) reports on the status and use of lands in the Russian Federation for the period of 2004–2011 years. For 2001–2007 the speed of reclamation corresponded to the speed of mining or land disturbance in most sectors of the economy. Since 2008 the Federal Real Estate Cadastre Agency has not given any data on restoration of territories [1; 2].

As noted in the reports for 2004–2011 years, reclamation of disturbed lands in most subjects of the Russian Federation is carried out only on lands disturbed in recent years (Figure 1). It is also clarified that the recovery of lands having been disturbed previously is problematic due to the lack of individuals who had their obligations for reclamation of these lands.

In a rapidly changing economic situation, companies are paying little attention or ignoring questions of reclamation. The newly formed legal entities of different forms of ownership due to reorganization, bankruptcy or liquidation are not successors to the former ones and are not responsible

for reclamation of previously disturbed lands. As a result, the problem of land reclamation remains unsolved by liquidated enterprises.

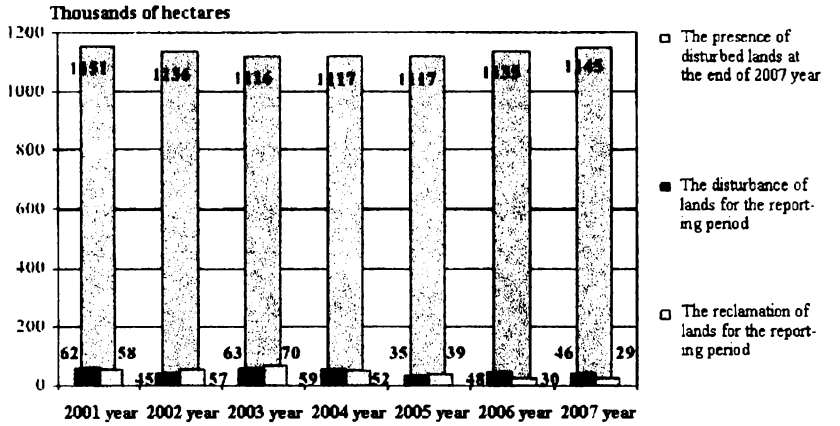

Figure 1. Disturbance and reclamation of lands in the Russian Federation (2001–2007) [1]

Like any measures to protect the environment, reclamation requires large investments. However, businesses do not see the economic feasibility in its carrying out. But there are same economic effects of land reclamation for company. We shall consider the economic effects of reclamation on the example of reclamation of pilot-industrial quarry of "Ore occurrence number 219" of Zhizhinsky-Sharomsky chromite ore deposit of Sverdlovsk region.

In November 2011 the industrial development of chromite ore was started by LLC "OboronGeoGrupp" at Zhizhinsky-Sharomsky field. The investment in to the mine totals $ 6 000 000. The company annually extracted 60 thousand tons of ore out of which it produced 18 thousand tons of concentrate delivered to Pervouralsk company being a part of the JSC "Russian Chrome 1915" holding [3].

Development of "Ore occurrence number 219" is carried by open mining with overburden removal to external dump.

The objects of reclamation include quarry, single tier external dump and the lands occupied by industrial surface structures. Such destinations of reclamation as forestry, environmental and sanitary were recognized expedient for the project [3].

Statement of restored areas:

№	OBJECT OF RECLAMATION	AREA, HA	DIRECTION OF RECLAMATION
THE DISTURBED LANDS			
1	Quarry, including:	6,41	Dry preservation to the level of the 1st bench on the area 3.85 ha
2	mined-out space		
3	flattened slope and bench of 1st tier	4,00	Forestry reclamation without applying a layer of potentially rich rocks
4	Single tier external dump of overburden with the height from 10 to 24 m	16,24	Forestry reclamation with applying a layer of loose sediments capacity to 0,25 m
THE LANDS OCCUPIED BY INDUSTRIAL SURFACE STRUCTURES			
5	Industrial site of quarry	0,19	Sanitary direction of reclamation
6	Ore stockpile	0,43	
7	Stockpile of soil and potentially rich rocks	0,92	
8	Area of purification plants	0,03	
9	Technological roads	0,47	
10	Cross object lands	11,74	–

Among the economic effects (results) of land reclamation of pilot-industrial quarry of Zhizhinsky-Sharomsky field may be distinguished the following [4]:

1.*Economic effects*:

• *Prevention of economic damage caused* by the deterioration and destruction of soil and land as a result of anthropogenic (man-made) loads.

Within 5–7 years after reclamation the area of land allotment will be presented by young forest plantations. Without conducting of reclamation works it will be exposed to wind and water erosion and, as a consequence, the amount of economic damage from soil and land degradation will be 9 million rubles [5].

• *Increase the gross national product* by increasing the volume of production (services, implementation of works), which becomes possible thanks to the creation of productive land area.

Before the development of "Ore occurrence number 219" the land allotment (36.43 hectares) belonged to GUSO "Nevyansky forestry" and was covered with forest. The forest was cut down to develop the field and if after mining the area will be reclamated it would return about 87 % of forest land to the balance of GUSO "Nevyansky forestry".

2. *Commercial effects* are due to *reduced costs of the enterprise as a result of environmental improvements*:

- Reducing the amount of the land tax at the expense reducing the amount of land allotment by 5 hectares using mined-out space of quarry for internal dump with capacity up to 1200 th. m^3 during further development of the ore occurrences [6].
- Reducing payments for emissions of pollutants in to the atmosphere by 11544 rubles a year, reducing the number of sources of fugitive emissions – dumps [3].
- Reducing payments for location of production wastes.

Formation of internal dump with the capacity of 1200 th. m^3 will not be considered as hazard waste placement that will save up to 1 248 000 rubles for the entire period of dumping.

The company also will not pay 2 016 768 rubles for location of non-hazardous waste if external dump be reclamated.

- Reducing payments for discharges of pollutants by reducing the actual concentration of pollutants in surface waters and other run-offs from the reclamated dump.

All the above mentioned economic effects are based on improvement of ecological and social conditions in Nevyansky district.

Economic efficiency estimation of reclamation. Approaches to estimation economic efficiency of land reclamation are identified depending on the purposes of its implementation [4]:

1) Replenishment of the national (regional) Land Trust (*maximization of net economic effect*).

2) Improvement of financial performance of enterprise (*maximization of net commercial effect*).

3) Meeting the requirements of organization and conducting of mining works (*minimizing commercial costs*).

LLC "OboronGeoGrupp" performs reclamation, fulfilling the requirements of the organization and conducting mining works in order to minimize commercial costs. Rationalization and optimization reclamation works based on the uniform use of land allotment, complex optimization of fixed assets (equipment), time shortening for recovery works up to 1 year at the expense of technological cycles mechanization. Costs of reclamation are included in to the cost unit of extracted mineral.

The estimate and budget for reclamation equals to 12,2 million rubles, which totals 6,8 % of all capital investments in comparison with typical 10–20 %.

The total economic effects of reclamation "Ore occurrence number 219" may be expressed in 12,3 million rubles that covers the costs of reclamation works by 100,8 %.

Economic efficiency of Zhizhinsky-Sharomsky field reclamation totals 0,8 %, being achieved by minimizing commercial costs at the account of solution of ecological and social problems on this territory.

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