

## PROPOSALS FOR THE PROTECTION OF LAND FROM THE NEGATIVE IMPACT OF TECHNOGENIC MINERAL FORMATIONS

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The article considers the processes affecting the cadastral value of land plots, as a result of which occurs land contamination around technogenic mineral formations. The scale of the problem is shown on the example of the Tula region, where large volumes of waste rocks in the form of waste heaps remained on the surface as a legacy from the development of the Moscow Region coal basin. The article gives an assessment of the ways to reduce this pollution, reduce environmental risks, eliminates accumulated harm from the point of view of their environmental efficiency and economic feasibility, which will further increase the cadastral value of land plots located in the zone of influence of technogenic mineral formations. The article proposes a method for the conservation and isolation of man-made mineral formations, which ensures a more effective reduction of the negative impact on the surrounding lands, including the lands of settlements and agricultural lands.

**Keywords:** cadastral value, land pollution, land protection, technogenic mineral formation, reclamation, elimination, conservation, land plot

### REFERENCES

1. Popp, E. A. (2016). Cadastral valuation of real property units: techniques for taking into account ecological state of territory. In *Sbornik materialov Interexpo GEO-Sibir'-2016: Mezhdunarodnoy nauchnoy konferentsii: T. 2. Ekonomicheskoe razvitie Sibiri i Dal'nego Vostoka. Ekonomika prirodopol'zovaniia, zemleustroistvo, lesoustroistvo, upravlenii e nedvizhimost'iu [Proceedings of Interexpo GEO-Siberia-2016: International Scientific Conference: Vol. 2. Economic Development of Siberia and the Far East. Environmental Economics, Land Management, Forestry Management and Property Management]* (pp. 204–209). Novosibirsk: SSUGT Publ. [in Russian].
2. Tatarenko, V. I., & Popp, E. A. (2014). The need to consider the impact of environmental component on the cadastral value of the property in the residential areas. *Izvestiya vuzov. Geodeziya i aerofotos'emka [Izvestiya vuzov. Geodesy and Aerophotosurveying]*, S/4, 165–170 [in Russian].
3. Trubina L. K. (2018). Some aspects of taking into account the environmental component in the appraisal of real estate objects. In *Sbornik materialov Nacional'noj nauchno-prakticheskoy konferentsii: T. 1. Regulirovanie zemel'no-imushchestvennykh otnoshenij v Rossii: pravovoe i geoprostranstvennoe obespechenie, ocenka nedvizhimosti, jekologija, tehnologicheskie reshenija [Proceedings of National Scientific and Practical Conference: Vol. 1. Regulation of Land and Property Relations in Russia: Legal and Geospatial Support, Real Estate Valuation, Ecology, Technological Solutions]* (pp. 149–152). Novosibirsk: SSUGT Publ. [in Russian].
4. Sizov, A. P., & Khabarov, D. A. (2017). Forecasting the value of agricultural land in the Krasnodar Territory, taking into account the environmental situation. *Modeli i tehnologii prirodoobustrojstva (regional'nyj aspekt) [Models and Technologies of Environmental Management (Regional Aspect)]*, 4, 96–103 [in Russian].
5. Timakova, M. S. (2013). Historical and geographical features and modern problems of the development of the Moscow region coal basin (on the example of the territory of the Tula region). *Izvestija Tul'skogo gosudarstvennogo universiteta. Nauki o Zemle [Bulletin of the Tula State University. Earth Sciences]*, 2, 136–146 [in Russian].

6. Sokolov, E. M., Kachurin, N. M., & Melekhova, N. I. (2010). Reclamation of waste dumps of mines near Moscow. *Izvestija Tul'skogo gosudarstvennogo universiteta. Nauki o Zemle [Bulletin of the Tula State University. Earth Sciences]*, 1, 102–105 [in Russian].
7. Kalaeva, S. Z., Bogdanov, S. M., Lukin, N. O., Oger, A. A. (2016). Waste heaps of coal mines in Russia. *Izvestija Tul'skogo gosudarstvennogo universiteta. Nauki o Zemle [Bulletin of the Tula State University. Earth Sciences]*, 1, 3–23 [in Russian].
8. Kachurin, N. M., Vorobev, S. A., Shkuratckiy, D. N., & Bogdanov, S. M. (2015). Environmental Danger of Worked and Liquidated Coal Mines Open Areas. *5th International Symposium Mining and Environmental Protection, 10–13 June 2015* (pp. 141–149). Vrdnik. Serbia.
9. Kachurin, N. M., Solomatin, A. P., Rybak, L. L., & Rybak, V. L. (2012). Problems of the Environmental Safety of Deposits Development in Underground Coal Mining. *Izvestija Tul'skogo gosudarstvennogo universiteta. Nauki o Zemle [Bulletin of the Tula State University. Earth Sciences]*, 2, 17–31 [in Russian].
10. Basova, I. A., Ionina, M. A., & Glukhova, E. N. (2010). Geocological state of soil cover in mining regions. *Izvestija Tul'skogo gosudarstvennogo universiteta. Nauki o Zemle [Bulletin of the Tula State University. Earth Sciences]*, 1, 16–20 [in Russian].
11. Zubova, L. G., Zubov, A. R., Zubov, A. A., Kharlamova, A. V., Vorobiev, S. G., Makarishina, Yu. I., & Bunyachenko, V. V. (2015). *Terrikony [Waste heaps]*. Lugansk: "Noulidzh" Publ., 712 p. [in Russian].
12. Komonov, S. V., & Komonova, E. N. (2008). *Vetrovaja jerozija i pylepodavlenie [Wind erosion and dust suppression]*. Krasnoyarsk: SFU Publ., 192 p. [in Russian].
13. Zaslavsky, M. N. (1979). *Jerozija pochv [Soil erosion]* (pp. 228–241). Moscow: Mysl' Publ. [in Russian].
14. Stupin, A. B., & Arevadze, I. Yu. (2008). Assessment of geodynamic condition, forecasting and management of geocological safety of waste heaps. *Bulletin of Sumy State University*, 2, 106–109 [in Ukrainian].
15. Possokhov, E. V. (1969). *Formirovanie himicheskogo sostava podzemnyh vod (osnovnye faktory) [Formation of the chemical composition of groundwater (main factors)]*. Leningrad: GI Publ., 335 p. [in Russian].
16. Gaidai, M. F., & Vaisman, Ya. I. (2015). Evaluation of the negative impact of waste heaps on the ecological situation in coal-mining regions and ways to reduce it. *Jekologicheskie sistemy i pribory [Ecological Systems and Devices]*, 12, 11–21 [in Russian].
17. Tichanek, F., & Tichanek, R. (2014). Contribution to the solution of thermally active reclamation of coal waste heaps. *14th International Multidisciplinary Scientific GeoConference SGEM Proceedings* (pp. 777–791).
18. Federal Law of November 25, 2001 No. 136–FZ. The Land Code of the Russian Federation. Retrieved from ConsultantPlus online database [in Russian].
19. *Technological schemes for reclamation of waste heaps and flat waste dumps of mines and processing plants / VNIIOsugol [Tehnologicheskie shemy rekul'tivacii terrikonov i ploskih porodnyh otvalov shaht i obogatitel'nyh fabrik / VNIIOsugol']*. (1981). Perm: VC Statupravlenija Publ., 158 p. [in Russian].
20. Shevchenko, E. N., Kiselev, N. N., Filatov, V. F., & Dubrova, N. A. (2014). Project of technology of burial of waste heaps. *Scientific Works of UkrNDMI NAS of Ukraine*, 14, 143–149 [in Ukrainian].
21. Makarov, A. B. (2000). Technogenic deposits of mineral raw materials. *Sorosovskij obrazovatel'nyj zhurnal [Sorosovsky Educational Journal]*, 8, 76–80 [in Russian].
22. Batalin, B. S., Belozerova, T. A., & Gaidai, M. F. (2014). Building ceramics from mounds of Kizelovsky coal basin. *Steklo i keramika [Glass and Ceramics]*, 3, 8–10 [in Russian].
23. Weissman, J. I., & Gaidai, M. F. (2016). Development of technology for conservation of waste heaps in order to reduce their negative impact on the environment and preserve resource potential. *Vestnik Permskogo nacional'nogo issledovatel'skogo politehnicheskogo universiteta. Geologija. Neftegazovoe i gornoe delo [Bulletin of the Perm National Research Polytechnic University. Geology. Oil and Gas and Mining]*, 15(19), 175–174 [in Russian].
24. Kovalev, R. A., Golovin, K. A., & Prokhorov, D. O. (2017). Method of conservation and isolation of industrial dumps. Patent of the Russian Federation No. 2636174.
25. Shmatko, S. I. (2010). On measures for the integrated development of the coal industry of the Russian Federation and its legislative support. *Gornaja promyshlennost' [Mining Industry]*, 6, 14–20 [in Russian].
26. Kudryashova, S. Ya. (2013). Ecological factors of land resources economic estimation. In *Sbornik materialov Interekspo GEO-Sibir'-2013: Mezhdunarodnoy nauchnoy konferentsii: T. 2. Ekonomicheskoe razvitie Sibiri i Dal'nego Vostoka. Ekonomika prirodnopol'zovaniia, zemleustroistvo, lesoustroistvo, upravlenii*

*e nedvizhimost'iu [Proceedings of Interexpo GEO-Siberia-2013: International Scientific Conference: Vol. 2. Economic Development of Siberia and the Far East. Environmental Economics, Land Management, Forestry Management and Property Management] (pp. 27–31). Novosibirsk: SSGA Publ. [in Russian].*

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