

LAND-RECLAMATION PROBLEMS IN COAL STRIP MINING OF KUZBASS¹

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Abstract: The Kuznetsk coal basin (Kuzbass) is the largest raw material base of the Russian power industry. Being located in the center of Russia, it possess huge coal reserves - about 63.0 billion metric tons (MT), more than 41% of which being suitable for coking. Only 21% of the coal reserves are on the balance-sheets of Kuzbass open (25) and deep (77) mines. The process of developing new coal mines is being continued actively. According to scientific forecasts, the efficiency of coal-getting in Kuzbass will mostly depend upon outstripping development of open cast mining. At the same time there is a deterrent factor of open-cast operations increase -- high land occupation level. In the last ten years the average land occupation level in open has exceeded 12.6 ha/mln MT. Currently, the strippings have destroyed more than 40,000 ha and this figure can be doubled. In this respect searching for solutions securing land occupation reduction is getting more and more important. The carried out investigations showed that the possibilities of land-saving technologies depend upon the respective of raising mine operation intensity and concentration. It concerns the order of working inclined and steeply-deeding seams in such a way that while in one of the deposit sections outstripping open-cast mining is taking place the overburden rock from sections is placed just here. But the problem of land occupation can be solved in a more effective way if the system of stage mine operation deeding is used. The technology essence lies in the fact that mine operation front is located across the strike of the deposit and moves along the strike with new horizons being cut in certain time and space intervals. As a result, the pit bottom of the first stage is formed at an angle providing the possibility of placing the overburden rock in a goaf starting from the first year of the deposit exploitation. Upon achieving the designed pit depth the deposit is exploited with constant parameters of the working zone being transferred along the strike and with the overburden rock being placed in the goaf. In case of revising the low boundary of effective coal seam working the pit is deepened with the next horizontal development. To find out the advantages of this technology, a number of investigations has been carried out and comparative estimation of the main indices has been done. It has been established that the application of stage-deepening technology makes possible to cut the destroyed area by 2.5 - 3.5 times in comparison with longitudinal strip mining systems used nowadays. A gradual regime of overburden operations is provided. The distance of rock transportation is reduced by 3.5 - 4.5 times remaining constant during the whole life period of the stripping. Also it reduces the amount of dust and fumes ejection from the harmful pollution source-transport. Expenses reduction concerning the most expensive technology process - overburden rock transportation results in high economical efficiency of the technology offered and brings down the limit overburden coefficient. It allows open operations to be expanded into the depth and additional reserves of mineral resources to be exploited. The calculations showed that the latter can be increased by 1.5 - 2.0 times. At the same time the effective realization of the solution offered is connected with the problem of the developing mining and transportation equipment of the new generation providing the realization of the conveyor mining technology. The achieved results shows that the new technology of inclined and steeply-dipping seams has both ecological advantages and high economical efficiency and its realization will promote the solution of the land-saving problem in coal strip mining.

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