Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 02, May, 2025
Website: usajournals.org

WASTE GENERATION DURING THE PRODUCTION ACTIVITIES OF THE KARAGANDA METALLURGICAL PLANT AND ENVIRONMENTAL PROTECTION MEASURES

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Abstract:
The Karaganda Metallurgical Plant is located in Temirtau, Karaganda region, located in the central part of Kazakhstan. The region is a highly elevated territory with absolute elevations of 400-1000 m, geomorphologically quite heterogeneous. The relief is characterized by the presence of shallow depressions, dry watercourse beds, river valleys, hollows with groundwater outlet, drainless depressions, steppe saucers and lake basins.
The climate of the region is sharply continental and extremely arid. The average annual temperature increased to +3.8 °C. The depth of soil freezing is determined by the amount of snow cover, soil composition and other factors and averages 1.8 m. The maximum average annual precipitation is 332 mm. The average annual wind speed is 3.2 m/s.
The territory contains an aquifer complex of Middle Jurassic deposits of the Kumyskuduk formation. Mineralization of water for the first from the surface of the aquifer to 1 g/l.
Stratigraphically, deposits of the Devonian, Carboniferous, Jurassic, Neogene, and Quaternary systems are distinguished within the territory of the region.
The region is exposed to heavy winds in different seasons of the year, and snowstorms and snowstorms often occur in winter. Due to heavy rains and snowmelt in spring, the territory of the region is prone to floods. In summer, the territory is at risk of extreme heat and drought.
Karaganda Metallurgical Plant is the largest steelmaking enterprise of Kazakh Stan, which is part of the multinational metallurgical group ArcelorMittal.

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The plant produces flat and long products, as well as sinter, iron ore and coal concentrate, coke, cast iron, steel, spar strip, electro-welded pipes and related products of blast furnace and coke production.

The company is certified for compliance with the quality management system based on MS ISO 9001, environmental management ISO 14001 and occupational safety OHSAS 18001.

During the production activities of a metallurgical combine, solid waste is generated at almost all stages of metallurgical production. In addition to solid waste, liquid waste containing acids, alkalis, oil emulsions, and solid particles is also generated.

As a result of the company's production activities, 91 types of production and consumption waste are generated, 80% of which are processed in production, transferred to third-party organizations for recycling or disposal, and 20% are sent to landfills.

According to the negative impact on the environment, waste is divided into five hazard classes:

– Class I – extremely hazardous waste;
– Class II – highly hazardous waste;
– Class III – moderately hazardous waste;
– Class IV – low-hazard waste;
– Class V – practically non-hazardous waste.

The main sources of scrap and waste generation at a metallurgical enterprise are: rolling production (30%); foundry production (9%), steelmaking (5%), blast furnace production (1%).

The formation of production waste is due to the quality of the raw materials and fuels used – low iron content in the ore (52-54%), high ash content of coking and power coals (up to 45%).

The management of industrial and consumer waste at ArcelorMittal Temirtau JSC is carried out in accordance with the requirements of environmental legislation on the basis of draft waste disposal standards and a waste management program. The waste to be disposed of is sent to landfills belonging to the Karaganda Metallurgical Plant. The company has at its disposal 10 storage dumps from the tunnels, 7 of which are active and 3 are inactive.

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The disposal of waste in landfills has a negative effect on the quality of soils and groundwater. It is necessary to regularly monitor the condition of the soil cover in waste storage areas, near reservoirs, as well as in residential areas located near the enterprise.

To improve the environmental situation, constant geo-ecological monitoring of the territory is necessary. In addition, it is recommended to modernize the waste management system, introduce separate collection of solid waste, and new technologies for recycling solid waste. The introduction of separate collection of solid waste by fractions will make it possible to obtain recyclables for further use in the production process.

Also, to reduce soil pollution, it is necessary to consider the possibility of recycling ash and slag waste. Increasing the ash and sludge accumulator will also reduce soil pollution.

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