

Implementation of Environmental Measures at JSC “ArcelorMittal Kryvyi Rih”

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Environmental safety of manufacture is a major activity in the development strategy of JSC “Arcelor Mittal Kryvyi Rih”. Compliance with the requirements of environmental legislation and decrease of significance of ecological aspects are the priorities of the enterprise. Stage-by-stage decline in the ecological stress is performed through the redesign and technical re-equipment of enterprise's capital stock, as well as implementation of new capacities with a set of environmental measures instead of environment-damaging manufactures.

Keywords: ECOLOGICAL POLICY OF ENTERPRISE, ENVIRONMENTAL PROGRAM, ENVIRONMENTAL SAFETY OF MANUFACTURE, REDESIGN, ENVIRONMENT-FRIENDLY TECHNOLOGIES, ECOLOGICAL MONITORING, ECOLOGICAL EFFECT

Introduction

OJSC "ArcelorMittal Kryvyi Rih" is a powerful mining and smelting enterprise capable to solve complicated economic and technical problems. This enterprise has a complete metallurgical cycle and combines coke and by-product process, ore-dressing, blast-furnace practice, steelmaking and rolling.

Environmental safety of manufacture is a priority tendency in general strategy of enterprise development at such a powerful infrastructure. Compliance with the requirements of environmental legislation, decline of ecological aspects significance and improvement of ecological indexes are the first-priority problems for the enterprise. Stage-by-stage decrease of ecological stress is carried out by means of redesign and technical re-equipment of enterprise's capital funds, and also implementation of new capacities with a set of environmental actions instead of outdated techniques and environment-damaging manufactures.

Results and Discussion

Accomplishment of “Program of improvement of Dnepropetrovsk region ecological state due to reduction of environmental pollution by enterprises-polluters for 2007-2015”, approved by Decision of Dnepropetrovsk Regional Council

No. 295-13/V from 04.12.2007, is the most important ecological problem of the enterprise. Measures of “Program...” are related to the application of new ecologically safe technologies, re-equipment of gas treatment units, implementation of environmental monitoring computer-aided systems, improvement of aqueous waste quality and recultivation of disturbed soils. They are the most important obligations stated in the enterprise's Ecological policy. Implementation of “Program...” will allow lowering negative environmental impact.

21 measures are considered to be implemented at OJSC "ArcelorMittal Kryvyi Rih".

8 measures have been accomplished during 2007-2008:

Modernized coke furnace batteries No. 3, 4 are implemented with a set of environmental protection measures and removal of coke furnace battery No. 7 from service (Figure 1). The best environmentally friendly technologies of dust catching at all stages of coke industry are implemented:

- screw charging system of coking boxes and hydroinjection system;
- application of coking box doors with a new design and raised gas tightness;
- dust free coke pushing plant;
- localization of all units of overcharging, coal and coke transportation and equipment with new gas treatment station;

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- installation of knockout drums on a quenching tower;

- closing of coke gas final cooling cycle.

Total environmental effect is the prevention of 2005.4 tons of atmospheric emissions per year including 340.5 tons of coke breeze per year (at operation of dust free coke pushing plant).

Construction of tide-gauge stations on a bypass duct. The system with true considering of wastewater quality indexes was developed. Water measuring lips are applied to measure charge and level on hydraulic posts No. 1, 2, 4. Level gauging in overflow edge is accomplished by means of acoustic flowmeter of EKHO-R-02 type with integrator. The automatic monitoring system was developed by Scientific Production Enterprise "Vodomer".



Figure 1. Coke furnace battery No. 4 of coke department No. 1

Landfill construction. Landfill was constructed in the 1st quarter of 2008 to dispose waste of 3rd and 4th classes of hazard not recovered at the enterprise by environmentally safe method. Landfill implementation will allow disposing 325 thousand tons of waste annually within 5 years, the total amount will be 1625 thousand tons.

A number of environmental actions including dust collecting when unloading the wastes, water-proof polyethylene film watertight screen produced by "AGRU" protecting ground waters and soil against pollutants, water supply closed cycle were performed in the landfill. 95.6 thousand tons of waste of 3rd and 4th classes of hazard were disposed in 2008.

Reclamation of demolition waste landfill. Mining-technical and biological recultivation of 1.2 hectares of coke and by-product process land is accomplished.

Implementation of additional treatment of sewage tank. As a result of implementation of

sewage tank additional treatment, it was possible to remove up to 20% of suspended substances and iron from sewage before discharge to river Ingulets.

Modernization of coke gas desulfurization department (with hydrogen sulfide content up to 0.5 g/m³ in coke gas) (Figure 2). Technology of coke gas vacuum-carbonate desulfurization up to 0.5 g/m³ and lower developed by "Haldor Topse" (Denmark) was implemented. It allowed meeting the requirements of Geneva convention "About reduction of sulfur emissions and its transboundary fluxes" (1979). Coke gas desulfurization was 0.44 g/m³ in 2008. Effect – drop in pollutant emissions by 999.42 t/year.



Figure 2. Desulfurization department

BF-8 heavy overhaul of 1st category with implementation of environmental protection measures (Figure 3). Dust exhausting plants of casting yards and stock house equipped with two up-to-date electrofilters produced by company "Alstom Pauer Stavan" were constructed. Dust concentration was decreased from 160 mg/m³ down to 30.0 mg/m³ in dust exhausted air. Effect – decline in pollutant emissions by 777.834 t/year

Dust briquetting plant (**Figure 4**) will allow using briquettes as charge additives in cast-iron production, which will make it possible to lower amount of waste disposed. Effect – processing and recycling of up to 170 thousand tons of dust per year.

Modernization of tailing area and water reuse with topping of flood-breaking dams up to 135 m elevation for maintenance of mining-and-processing integrated works power. Construction of new elevations of flood-breaking dams of tailing ponds is carried out according to technology that allows simultaneous operation and construction of

tailings ponds. The given method of refinement tailings impoundment increases safety of tailing ponds operation. Environmental effect is efficient land use, disposing of waste in ecologically safe way.



Figure 3. Electrofilters of dust exhausting plant of BF-8



Figure 4. Briquetting plant

Conclusions

Total "Program..." performance expenses were 567.278 million UAH, 231.387 million UAH from them were spent in 2008, year plan was 206.522 million UAH (112 %).

Ecological management system, which is one of the most powerful up-to-date ecological tools, developed according to requirements of international standard ISO 14001:2004, was implemented and operates successfully at the enterprise. Ecological policy of OJSC "ArcelorMittal Kryvyi Rih" is conformable to Ecological policy of Company "ArcelorMittal" and

accepted with the purpose of successful environmental activity and to achieve environmental performance.

Working out of all environmental protection measures is based primarily on priority ecological aspects related to enterprise's environmental impact and is directed on achievement of specified ecological purposes and problems, which is a recipe for an optimum combination of ecological interests with social and economic requirements of society. ISO 14001:2004 Certificate of Conformity granted by international commission in Netherlands acknowledges the enterprise's successful operation.

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Внедрение природоохранных мероприятий в ОАО «АрселорМиттал Кривой Рог»

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Экологическая безопасность производства является приоритетным направлением в общей стратегии развития ОАО «АрселорМиттал Кривой Рог». Соблюдение требований природоохранного законодательства, снижение значимости экологических аспектов – первоочередные задачи предприятия. Поэтапное снижение техногенной нагрузки на окружающую среду осуществляется путем реконструкции и технического переоснащения существующих основных фондов предприятия, а также ввода новых производственных мощностей с комплексом природоохранных мероприятий, взамен экологически опасных производств.