ANALYSIS OF ENVIRONMENTAL ASPECTS TO OJSC "MINSK TRACTOR FACTORY"

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In this paper, an analysis of environmental performance at the enterprise and the documentation of EMS is conducted. The analysis made it possible to identify a number of environmental aspects that affect the environment, including air, water and wastewater, soil, and also systematize data that include quantitative and qualitative characteristics of the waste.

Keywords: priority environmental aspects, sources of pollutant emissions, water supply, waste management, environmental activities.

OJSC "MTF" is engaged in the development, manufacture and export of wheeled tractors and spare parts for them, organizes their production on a licensed basis, renders services in setting up and carrying out the service. In addition to tractors, the company's products are also special purpose machines for logging, forest care, special vehicles for public utilities, as well as forklifts and machines for work in mines.

The analysis of environmental activities at the enterprise and the documentation of the EMS have revealed a number of environmental aspects that have an impact on the environment, including on atmospheric air, water consumption and wastewater, and soil.

The enterprise has 1794 organized sources of pollutant emissions into the atmosphere, 306 emission sources are equipped with gas treatment plants. Also, the company has 850 mobile emission sources. 73 substances of various hazard classes are emitted into the atmosphere from the territory of the Minsk Tractor Plant. In total, 7921,099 tons of pollutants are emitted in a year.

At OJSC "MTF" there is no emission of pollutants above the limit, and the enterprise throws out 353 tons of greenhouse gases (carbon dioxide) per year. [1]

The source of water supply at OJSC "MTF" for household, drinking, industrial and fire-fighting needs is its own water intake and water supply of the city's centralized water supply system. The water intake consists of 13 wells with a depth of 61–78 m, a capacity of 4,4–36,0 m^3/h, two wells are conserved. The source of industrial water supply of the plant is the Chizhovskoe Reservoir on the Svisloch River (MHPP-3 water intake), as well as the purified water after the sewage treatment plants of the plant's sewage and conditionally pure sewage. The water consumption of the enterprise is 8663 m^3/day, including:

- for domestic and drinking needs – 5192 m3 / day;
- for production needs: drinking quality – 2189 m^3/day, technical quality – 1282 m^3/day. [2]

The production process at OJSC "MTF" is accompanied by waste generation. They are divided according to the types in accordance with the "Classification of waste" and hazard classes. Total waste generated 267609,214 tons/year (excluding waste mercury lamps). The amount of waste that is transferred to outside organizations for use or used in own production is 241449,119 tons/year (90,2 %) to be disposed of – 22918.260 tons/year (8,6 %). Also on the territory of the enterprise 11,207 tons of galvanic waste are stored. [3; 4]

The analysis of environmental aspects identified 16 priority aspects. [5] These include:

- emissions to atmospheric air (nitrogen dioxide, carbon monoxide, solid particles in aggregate (gravel dust), sulfur oxide), (VOC), (carbon monoxide, nitrogen dioxide), (natural gas consumption);
- treatment of waste products to be disposed of (old varnishes, paints hardened, as well as cured residues in barrels, paper and rags contaminated with paintwork materials, lacquers and paints varnish, old varnishes, paints that have not hardened), (wet dust melt for purging exhausts);
- handling of BMP, as well as waste that is to be reused or transferred to third parties (waste molding mixtures), (slags of iron foundries, steel slag, granulated granulated slag, scrap of refractory products produced from cast iron products, scrap of refractory products from injection molding products steel), (waste ceramic molds for investment casting of cast steel products), (waste from disassembly of buildings), (furnace debris (breakdown) of metallurgical processes), (iron containing I dust without harmful impurities FFS);
- discharge of contaminated sewage into the network of urban rainwater (suspended substances, petroleum products, BOD5).

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5. Register of priority environmental aspects.

MODELLING OF NONLINEARITY OF LIGHT COLLECTION IN LARGE-VOLUME SCINTILLATORS

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In the state of progressive extension of information technologies around the world, non-analytic methods of calculation are widely used by means of powerful computer systems. In particular, it is very effective today to use the Monte Carlo method to simulate the transport of ionizing radiations in different materials.

Keywords: Monte Carlo method, scintillation, optical photons.

The systems of radiation portal monitors are an effective way to provide homeland security on potential dangerous objects. Recently, the idea of categorization of isotopes to increase the speed and quality of inspection at customs facilities has been actualized. In RPM the large volume scintillators are usually used to achieve the maximum sensitivity at low exposure rate. This inevitably leads to the problem of nonlinearity of light collection. In other words, the amount of light detected depends on the detector point where the flash occurred. The nonlinearity of the light collection results in a deterioration of detector's resolving power and, consequently, the possibility of correct categorization of isotopes.

GEANT4 is an open-source software toolkit for simulation of the transport of different types of particles through matter [1]. It has traditionally been used in medium and generally high energy physics applications. However, there is on-going development to extend the capabilities of this toolkit beyond this traditional scope [2]. In particular, some effort has been made into applying GEANT4 in the simulation of the optics of scintillation. For example, the simulation may commence with the propagation of a charged particle and end with the registration of the ensuing optical photons on photo sensitive areas, all within the same event loop [3].

In this research capability of GEANT4 to predict the nonlinearity of light collection in large-volume scintillators was investigated.

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AUTOMATING THE MANAGEMENT OF THE PORTAL RADIATION MONITORS SYSTEM

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Modern world is filled with events that disastrously influence nature and society. Some of these events, such as acts of terror at potentially dangerous facilities or illicit trafficking of ionizing radiation sources and nuclear materials, can be prevented by usage of specialized radiation monitoring systems – radiation portal monitors. Automation of management of such systems allows to speed up and increase work quality of various security services.

Keywords: radiation control, automation, software.