Environmental impact assessment of industrial enterprises (on the example of objects of category I,II of environmental impact in the Samarkand region)

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Abstract. As a result, the implementation of measures to protect the atmosphere (the use of innovative technologies in the introduction of dust and gas cleaning equipment, the conversion of cars to gaseous fuel, the renewal of rolling stock, the implementation of the state program to reduce emissions), the stabilization of the environment is observed. It is necessary to carry out technical re-equipment of key sectors of the economy, the introduction of new technologies, as well as the stabilization and reduction of emissions of pollutants into the atmosphere. It is recommended to take additional measures to ensure that the amount of pollutants released into the atmosphere as a result of the operation of the facility does not exceed the permissible level, to install dust-collecting equipment that captures dust with high efficiency (up to 99.5%).

1 Introduction

Environmental impact assessment is a process that can lead to adverse environmental consequences, causing and negatively affecting the intended economic and other activities, taking into account public opinion, the development of measures to reduce and prevent these impacts, as well as the implementation of environmentally oriented management. an event that allows you to make decisions.

Its main goal is to find optimal design solutions in the design process, prevent environmental degradation, ensure the ecological, economic and social balance of economic development, improve people's living conditions, and minimize or compense adverse environmental impacts by the development of effective measures.

Environmental impact assessment is also an important part of sustainable project management, both at the level of the individual enterprise and at the regional level. [1]

The emissions of enterprises of various industries and transport contain a large number of different harmful impurities. Over the past decade, serious practical steps have been taken that would significantly change the attitude of the human community to nature, to the problem of its conservation, in order to ensure the sustainable development of future

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generations. The bank of unresolved environmental problems continued to increase. There are many reasons for this, and not the least of them is the low professionalism of professionals who make decisions in the field of environmental protection, in the field of its protection from industrial waste. This fully applies to the problem of protecting atmospheric air from dust-gaseous emissions. [2]

The impact assessment criteria include the study of the current state of the environment as a result of the operation of the equipment, as well as the identification of the most vulnerable from an environmental point of view. With regard to sources and emission parameters and emissions to the environment, the current state of the area and the layout was reviewed to assess the impact of the projected enterprise on the environment [3].

When assessing the impact of the projected object on the atmospheric air, special attention was paid to the contribution of the object to the formation of the background of urban pollution. In the study, special attention was paid to the study of the object, effects and prediction of changes in the components of the environment as a result of the projected enterprise.

All the above-mentioned environmental issues are considered in the work, taking into account the priority of their solution. Since this type of economic activity involves the impact on such components of the environment as the subsurface, soil and vegetation cover, the main attention is paid to the consideration of these natural complexes [4].

As a result of ecological analysis of design solutions will be identified sources of impact on the terrain, natural resources, soil and vegetation, defined the scope and extent of environmental changes in the project and surrounding areas. The object is characterized from the point of view of the formation of emissions, discharges and waste.

The possibilities of emergency situations are considered, as well as measures to reduce the negative consequences of the proposed production activities are proposed.

2 Methods

The following methods are used to determine the composition and amount of pollutants in the exhaust gas streams:

- theoretical (balance);
- calculation and analytical (experimental);
- reporting-static.

The theoretical method allows to establish the composition and quantity of pollutants on the basis of drawing up thermal and material balances of technological processes taking into account the chemical composition and properties of raw materials, fuel, materials, structural and geometric features of units, technological parameters, processes that ensure maximum performance of units and data on specific emissions of pollutants of the operated equipment. [3]

3 Results and discussion

In the Samarkand region, the following objects belong to the I category of environmental impact (high risk): LLC "Samarkand-NPK" "Samarqandkimyo" plant for the production of mineral fertilizer nitrogen-phosphorus-potassium NPK, cement plants, plants for the production of asbestos slates, objects belonging to the II category of environmental impact (medium risk): Samarkand and Jambay grain processing plants, cotton refineries, oil depots, poultry farms, Samarkand gas supply Company, construction industry enterprises and a number of industrial enterprises.

The location of the Samarkand Gas Supply Company is shown in Fig. 1.

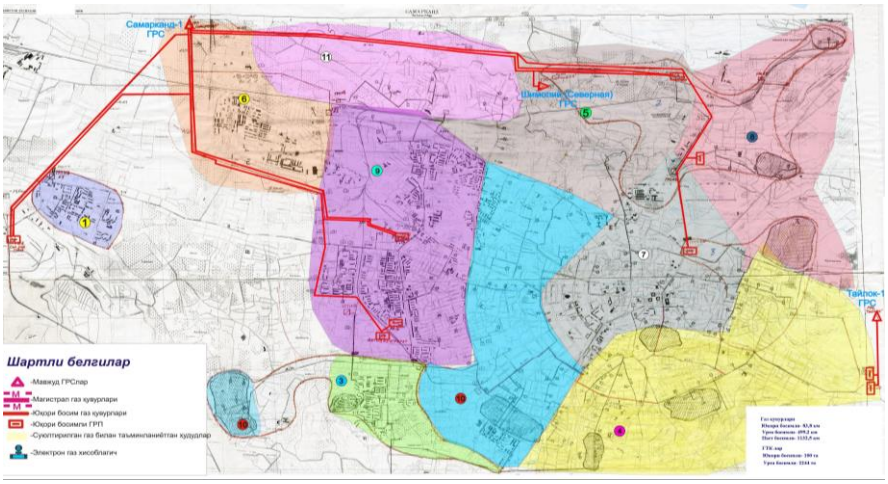

Fig. 1. Diagram of the location of the Samarkand gas supply company

The following departments belong to the enterprise "Samarkand International Airport": Airport terminal, administrative building, air traffic control, airfield service, airfield service is intended for the operational maintenance of the airfield. A detachment of paramilitary protection, the Service of fuels and lubricants (POL). The fuel and lubricants warehouse includes a warehouse of aviation fuel (of kerosene 1000 m^3 8 pcs., 75 m^3 12 pcs. aviation gasoline 75 m^3 7 pcs.) refueling point (SMI), comprising a fuel depot for the vehicles (of gasoline 25 m^3 5 PCs, extraction petrol 75 m^3 1 PCs, 1 PCs 25 m^3 to 25 m^3 of diesel fuel 2 PCs., for the SSS 28 m^3 1 PC, MMO 8 m^3 1 PCs.) and filling Ostrovok under a canopy for refueling vehicles. Aviation fuel is delivered to the warehouse via the railway from the Bukhara Oil Refinery. Gasoline, diesel fuel delivered to the warehouse to the vehicles of LLC "Marokandneftebaza". For refueling cars with gasoline and diesel fuel, fuel pumps are installed on the filling island – 5 pcs. Formed waste oil sludge from tank cleaning, the filtrate from the filtration of fuel oil contaminated sand. Department of Operation of Ground Structures (OENS), service of search and emergency flight support (SPASOP), service of special transport (SST), Service of sanitary maintenance (SRT), service of electric lighting support of flights(ESTOP), checkpoint, pass office and Apron-technical team (PTB). [5]

At the moment, the surveyed industrial and construction companies will be able to create a database on ventilation networks, dust collection equipment and give recommendations on reducing dust emissions by analyzing atmospheric dust. As part of this study, the laboratory of microclimate and environmental protection of Samarkand State Institute of Architecture and Construction analyzes pollutants in the atmosphere based on long-term data on water, soil and atmospheric air. For the first time, a comprehensive analysis of dust and other pollutants emitted into the environment by industrial and industrial enterprises is carried out.

As a result of the conducted studies, 66 sources of emission of pollutants into the atmosphere were identified, of which 46 were organized sources. From these sources, 37.1216 tons/year are emitted during the year; tons/year of pollutants of 13 names: wood dust – 0.505 tons/year, 1.36 %; paint aerosol – 0.66 tons/year, 1.78 %; solvent vapors – 0.06 tons/year, 0.162 %; sulfuric acid vapors – 0.0052 tons/year, 0.014 %; hydrocarbons – 0.02046 tons/year, 0.055 %; aromatic hydrocarbons – 0.1337 tons/year, 0.36 %; vapors gasoline and kerosene – 35.3835 tons/year, 95.318 %; dust is abrasive metal – 0.159 t/year, 0.428 %; dust metal and 0.172 t/year, 0.463 %; welding fumes – 0.00294 t/year, 0.008 %;

manganese oxide – 0.0004 t/year, 0.00011 %; spray oil – 0.0096 t/year, 0.0259 %; nitrogen oxides – 0.0098 t/year, 0.026 %.

Emissions of solid ingredients is 0.83934 t/year (2.26%), and gaseous 36.28226 t/year (97.74%). The calculation and analysis of the fields of surface concentrations of pollutants in the atmosphere is carried out.

Pattern analysis of the ground level concentrations of pollutants in the atmosphere show that constitute the fields of near-surface concentrations of wood dust in the territory, on the border of the production company, or 0.19 MPC, metal abrasive dust that are in the territory, on the border of production enterprise of 0.14 MPC, metal dust that are in the territory, on the border of production enterprise of 0.27 MPC, welding fumes, which are in the territory, on the border of production enterprise of 0.13 MPC, oxides of manganese, that are in areas on the border production company 0,012 MPC, nitrogen oxides, which are in the territory, on the border of the production company to 0.127 MPC, a pair of kerosene and gasoline, which are in the territory, on the border of the production company to 0.488 MPC, the hydrocarbons that make up the territory and on the border of production company 0,168 MPC, aerosol oils that are in the territory, on the border of the production company 0.024 MPC, colorful aerosol that are in the territory, on the border of the production company MPC 0.045, solvent vapors that are in the territory, on the border of the production company 0.042 MPC, aromatic hydrocarbons, which are in the territory, on the border of the production company 0.052 MPC, sulfuric acid, that are in the territory, on the border of the production company 0.0009 Mac and all the ingredients do not exceed the quotas.

The Samarkand Gas Supply Company has 14 district and city branches. As a result of the inventory of sources of emissions of harmful substances into the atmosphere, 8732 sources were identified, of which 8641 were organized sources, and 91 were unorganized sources. From these sources, 16,136.080714 tons/year, 9% are emitted during the year. Including by ingredient: methane-16,133.2337 t / year, 99.982 %; hydrogen sulfide-0.433838 t / year-0.0027 %; mercaptan-0.875966 t / year, 0.0054 %; carbon monoxide-1.0042 t/ year, 0.0062 %; nitrogen oxides-0.33756 t/ year, 0.0021 %; welding aerosol, -0.0063 t / year, 0.00004 %; manganese oxides 0.00088 t / year, 0.000005 %; metal dust 0.1754 t / year, 0.0011 %; hydrocarbons-0.01287 t/ year, 0.00008 %

The joint venture limited Liability Company "Samarkand-NPK ""Nitrogen-phosphorus-potash" (NPK-Mineral fertilizers) includes the following workshops and departments:

Main building for the production of nitrogen-phosphorus-potash (NPK-mineral fertilizers); product warehouse, finished product warehouse, compressor station, boiler room, product packaging department, loading and unloading shop, water supply network (node), water pumping station, industrial and fire-fighting reserve reservoir, household and drinking reservoir, city building, wet cleaning installation, settling tank, storage tank, transformer substation, motor transport shop.

Produced 1 ton of mineral fertilizer NPK is 750 kg of nitrophos, 230 kg of potassium and 50 kg of bentonite. According to the results of calculations and analysis, NPK fertilizer dust, carbon monoxide, nitrogen oxide, benzapyrene and ammonia are released into the atmosphere.

Pattern analysis of the ground level concentrations of pollutants in the atmosphere show that constitute the fields of surface dust concentrations of NPK in the working area of the enterprise 0.92 MPC, for the border of the territory of the enterprise 0.78 PDK, carbon monoxide in the working area of the enterprise 0.63 MPC, for the border of the enterprise of 0.56 MPC, nitric oxide in the working area of the enterprise 0.71 MPC, for the border of the territory of the enterprise, 0.59 MPC, benzopyrene in the working area of the company 0.052 MPC, for the border of the territory of the enterprise 0.034 MAC.

The company has identified 11 sources of emissions of emitted pollutants into the atmosphere, all sources are organized. Emissions of pollutants into the atmosphere from

these sources amount to 14.103351 tons / year. Analyses show that the volume of emissions of pollutants into the atmosphere does not exceed the permissible norm (MPC). Diagram of the location of the company JSC "Samarkandkimyo" is shown in fig. 2.

Fig.2. The schema location for the production of mineral fertilizer nitrogen-phosphorus-potassium (NPK) JSC “Samarkandkimyo”

Production of asbestos-containing slate. The preparation of corrugated asbestos-cement sheets is carried out in the following stages. Storage and standardization of asbestos; hydraulic softening of asbestos; humidification and improvement; preparation of suspension asbestos-cement mixture; preparation of reserve, delivery of asbestos-cement mixture; transform; from form to list; undulating formation and calibration of the list; loading on a conveyor cart for distribution and solidification of the sheet; primary fastening; wetting, final curing.

During the production of asbestos slate, the following substances are released into the atmosphere: cement dust, asbestos dust, carbon monoxide, nitrogen oxides, nitrogen dioxide, sulfur oxides, dry substances, hydrocarbons, welding dust (iron II oxide), manganese oxide, benzapyrene. (SanPiN "Hygienic standards. List of maximum permissible concentrations (MPC) of pollutants in the atmospheric air of populated areas on the territory of the Republic of Uzbekistan " Tashkent 2005)

According to the results of the inventory, the company has 21 sources of pollutants in the atmospheric air, of which 10 are organized emissions, and the remaining 11 are unorganized sources. The layout of the enterprise production of asbestos-containing slate is shown in Figure No. 3.

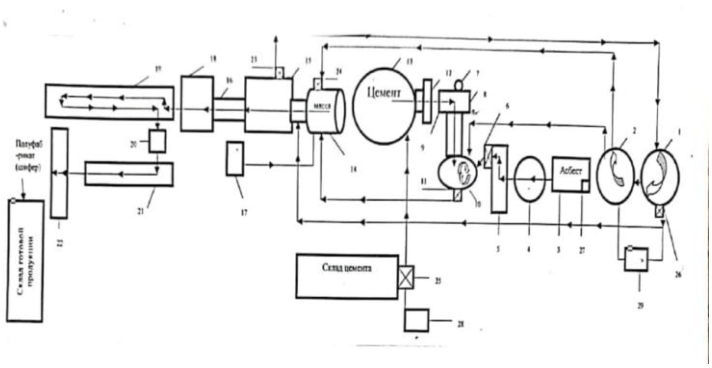

Fig. 3. Layout of the line production of asbestos-containing slate

From the sources of atmospheric air pollution, 11 types of pollutants are released at the enterprise, the total amount of 37,768.277 tons / year.

The largest share of cement dust released from air pollution sources in the working area is 1.078 MPC, outside the plant 0.912 MPC, the largest share of asbestos dust in the atmosphere is 0.648 MPC, outside the plant 0.422 MPC, carbon dioxide 0.92 MPC, outside the plant 0.394 MPC, the largest share of nitrogen oxide in the atmosphere - 0.400 MPC, 0.226 MPC outside the enterprise, the largest share of nitrogen oxides in the atmosphere - 0.848 MPC, outside the plant 0.712 MPC, the highest proportion of sulfur oxides in the atmosphere – 0.539 MPC, outside plant 0.417 MPC, the largest proportion of ash in the atmosphere – 0.685 MPC, the largest share of hydrocarbons in the atmosphere – 0.042 MPC, outside plant 0.019 MPC, the largest share of benzapyrene in the atmosphere – 0.030 MPC, outside plant 0.026 MPC, the maximum percentage of welding dust in the atmosphere is 0.124 MPC, outside plant 0.018 MPC, the largest share of the manganese oxide in the atmosphere is 0.104 MPC, outside plant 0.014 MAC. In addition to cement dust, the proportion of pollutants released in the atmosphere does not exceed the MPC, so no additional environmental protection measures are required.

4 Conclusions and suggestions.

The Government of Uzbekistan recommended to pay special attention to the protection of atmospheric air (the use of innovative technologies in the introduction of dust-collecting equipment, the implementation of measures to reduce emissions, the principle of stabilization of the environmental situation in the field of atmospheric air protection in general). It is necessary to achieve stabilization and reduction of emissions.

It was established, that the maximum rate of cement dust emissions from the sources in the working zone within the territory of the enterprise after the event implementation is 0.76 MPC, outside the enterprise - 0.58 MPC. The percentage of the polluting cement dust in the atmosphere in the work zone within the territory of the enterprise after the event is within the norm [6].

However, influence of production and industrial enterprises on the environment is negative even if the ecological condition of production and industrial enterprises is considered to be satisfactory. Smoke and dust, nitrogen and carbon monoxide generated at them even after passing through treatment facilities can not be considered completely safe [7]. Therefore, it is desirable to introduce a two-stage cleaning process to improve the efficiency of dust-collecting equipment. At industrial enterprises the dust is cleaned up to 85% and released into the atmosphere. When using gas-cleaning equipment with the recommended absorbent movable additional materials it is possible to achieve a reduction of pollutants in the atmosphere by removing nitrogen oxides, carbon monoxide and other gaseous substances by 92-95%.

We also believe that it is necessary to introduce an HSE management system for enterprises, which will more effectively address both the reduction of the impact on individual components of the environment, and reduce risks in the activities of the enterprise, and in general the sustainable development of enterprises and the region. For this purpose it is necessary to develop HSE management training courses both for training new specialists in educational institutions and for professional development of working specialists at enterprises. [8]

The research was conducted in conjunction Management of Ecology and environmental region.

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