ENVIRONMENTAL IMPACT OF THE SLATE PLANT

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ABSTRACT

The object of the research is slate production enterprises. To study the environmental impact of the projected enterprise, an environmental review of the state of the environment in the area of construction of the slate production was first carried out. In the results, it was noted that according to the degree of pollution of atmospheric air, soil and groundwater, soil and vegetation cover, the area of the object's location belongs to the zone of an admissible ecological situation. Then an ecological analysis of the design solution was carried out, as well as the types, objects and nature of the enterprise's impact on the environment were studied. During the period of operation, the enterprises the main sources of environmental impact are the asbestos packing and filling unit, cement warehouse, receiving pit and pneumatic transport of cement, boiler room, gas burners. The types of impact are mainly determined by the introduction of cement and asbestos dust, carbon monoxide, nitrogen oxides, iron oxide and manganese oxide into the environment. The results of the study noted that the maximum concentrations of these pollutants abroad of the enterprise will be lower than the quotas established for them. It is noted that the implementation of the project will not lead to negative consequences of the natural environment when the environmental measures and recommendations specified in the work are carried out, as well as when the safety regulations and the operation of the enterprise are observed.

Key words: Environment, environmental components, environmental analysis, objects of impact, nature of impact, sources of impact, pollutants, sources of emissions, sources of discharges, production waste, quota, ground-level concentration.

Introduction

Along with the intensification of the use of natural resources, the pollution of the environment with industrial waste has rapidly increased. The massive release of harmful substances and compounds into the atmosphere, hydrosphere and soil-vegetation cover has assumed a dangerous character that can cause irreversible environmental changes.

Therefore, the protection of the environment is the most urgent task of global importance. One of the leading areas of environmental protection work is a detailed study of sources of pollution and assessment of their impact on the environment.

The purpose of this work is to assess the environmental impact of the construction of a slate production in the Urgut district of the Samarkand region.

An ecological overview of the state of the environment in the area of construction of a slate production. The area where the projected slate production plant is located has an agricultural

focus, where such agricultural industries as tobacco growing, grain growing and horticulture are developed.

Among the existing sources of impact, it is necessary to highlight objects of agricultural, transport and irrigation profile. There are no large industrial facilities within a radius of up to 30 km from the construction site.

Sources of agricultural and irrigation trends include extensive arable land and an irrigation network. They are associated with such problems as irrigation erosion, weak chemical pollution by decomposition products of chemical and mineral fertilizers and pesticides.

The state of the atmospheric air, taking into account the listed climate features and existing emission sources, is mainly influenced by transport emissions and high dust content in the air.

When motor vehicles move near roads, the concentrations of nitrogen oxides, benzo (a) pyrene, soot, sulfur dioxide, carbon monoxide, and lead compound increase. The emissions are periodic and do not have a noticeable effect on the state of the atmospheric air.

The state of the atmospheric air in the area of the slate production plant is acceptable.

Geologically, the study area is located on the northern edge of the Zerafshan-Gissar structural-facies zone. In the study area, the soils are mixed and represented by permeable rocks: loams, gravel, pebbles.

Water supply to the area where the facility is located is based on the balance reserves of groundwater in the valley of the Urgutsay River in the Southern foothill field.

In the area where the object is located, dark gray soils are widespread, heavy loamy, non-saline, with varying degrees of satiety, development occurs on proluvial loamy deposits.

In the study area, there is an anthropogenic impact on the soil cover, caused mainly by the agricultural use of the area.

In general, it can be noted that herbaceous and woody vegetation does not show any painful manifestations or oppression.

The study area represents residential buildings and farmland. Therefore, his animal world includes those representatives who live in close proximity to humans.

The assessment of the health status of the population of the study area was carried out on the basis of data from the State Department of Statistics of the Republic of Uzbekistan. In general, the health status of the population is not a cause for concern.

Thus, in the area where the projected enterprise is located, the state of the natural environment can be assessed as acceptable.

Environmental analysis of the design solution. It is envisaged to place the slate production on the territory of the former warehouse [4]. According to the technological regulations [5], chrysolite asbestos, Portland cement, artesian water, brass mesh, cloth, hydrochloric acid and solder are used as starting materials.

The technological process for the production of corrugated asbestos-cement sheets includes the following stages: storage and dosage of asbestos; storage and dosage of cement; fluffing

and moistening of asbestos; hydraulic fluffing of asbestos; preparation of asbestos-cement suspension; stock creation, homogenization and supply of asbestos-cement slurry; roll forming; cutting the roll for workpieces; roughing and calibration of sheets; stacking sheets on hardening conveyor carts; preliminary hardening; moisturizing; final hardening.

As a result of the environmental analysis of the design solution, it was noted that, at the first production site for the production of asbestos-cement slurry, there are 3 sources of emission of cement dust and asbestos into the atmospheric air; the following types of waste are generated: polypropylene asbestos bags, waste oils, cleaning rags; water consumption occurs; there is no wastewater discharge.

At the slate production site, there will be one source of emission of gas combustion products; water is consumed; there is no wastewater discharge. The following types of waste will be generated: pieces of scrap and scrap of hardened slate sheets, asbestos, waste technical cloth, waste nets No. 2 and 24 made of stainless steel, waste conveyor belt, waste oils, cleaning rags, ferrous metal waste (formed when equipment breaks down) and solid household waste (MSW).

The provision of the slate shop with steam is provided from the boiler room. To carry out the repair of technological equipment in the projected workshop, it is planned to place an electric welding post.

Thus, the analysis of the design solution showed that during the operation of the enterprise for the production of slate, the main sources of environmental impact will be: a unit for unpacking and filling of asbestos, an unloading site for a cement warehouse, a receiving pit for cement, a gas burner for heating water, steam boilers and a welding apparatus.

Emissions from these sources pollute the atmospheric air with dust of asbestos, cement, products of fuel combustion (nitrogen oxides, carbon monoxide), iron and manganese oxides. Technological equipment will have a noise and vibration effect on working personnel.

Calculation method. During the operation of the enterprise, 9 types of pollutants will enter the atmospheric air from 17 stationary sources of emissions. The following chemical compounds are present in the emissions from the main production; dust from cement and asbestos, natural gas combustion products (CO, NO, NO2). From sources of auxiliary production - manganese oxides and iron oxide. The quantitative characteristics of the emissions of pollutants from each source were calculated according to the approved methods [6, 10], and also the passport data of the technological equipment were used. The parameters of the sources of pollutant emissions are presented in Table 1.

The calculation of the concentration of pollutants in the atmospheric air during the operation of the projected enterprise was carried out using the VARSA - RADUGA program on an area of 1.5 x 1.5 km with a step of 150 m. The initial data were taken from the parameters of emission sources (Table 1), meteorological characteristics and coefficients that determine the degree of dispersion of chemicals in the atmosphere.

The water supply of the site in question is carried out from the factory water supply network. The water will be used for household, drinking, industrial and fire-fighting needs. The total water consumption will be about 31.6 m3 / day or 10481 m3 / year.

Industrial effluents from slate production are not discharged, but reused. Wastewater from the boiler room and household wastewater is collected in concrete cesspools. The total amount of wastewater will be 4.58 m3 / day or 1586.8 m3 / year.

Estimated water consumption and the amount of generated effluent were calculated according to the current regulatory documents [7-8].

Production wastes can be divided into technological (wet slate scraps, wet asbestos-cement waste), general workshop (conveyor belt waste, waste of polypropylene bags, waste oils) and household (food waste, solid household waste (MSW), fecal waste and waste water) ...

Waste from production and consumption was calculated according to approved methods [9-12], and data on the consumption of raw materials and materials were also used.

Types of exposure. The introduction of chemicals. During the operation of the enterprise, the following pollutants will enter the atmosphere: asbestos dust, cement dust, nitrogen oxides, carbon monoxide, manganese and iron oxides.

Asbestos dust will be released into the environment from the asbestos unpacking and filling unit (source No. 12) in the amount of 0.0029 t / year.

Sources of cement dust emission are the unloading area of the cement warehouse (source No. 13) and the receiving pit of the bucket elevator (source No. 14). From these sources, 0.1546 t / year of cement dust will be released into the atmosphere.

Table 1 Parameters of sources of emissions of pollutants into the atmosphere from slate production

Production name No. of workshop, site, etc.	Sources of emission of pollutants	Quantity	Working hours per year	Name of emission source	East numb er on the map	Height ist. ejection, m	Pipe diameter or plane width	Gas-air mixture parameters			Pollutant name	Emissions of pollutants		
	Name							Volu me, m3 / s	Speed, m / s	Temp.-ra grad. celcius		g / s	mg/ m3	t/year
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Existing:														
Etc. workshop No. 1.	Receiving hopper	2	8200	Not limited	1	2	0,564	0,5000	2,00	34	asbestos dust	0,0002	0,40	0,0058
a) Unit for unpacking and loading of asbestos	Bunker	1	8200	Not limited	2	2	0,564	0,5000	2,00	34	cement dust	0,0052	10,50	0,1549
b) Main cement warehouse	Bunker	1	-	Not limited	3	2	0,564	0,5000	2,00	34	cement dust	-	-	-
c) Reserve warehouse of cement	Pneumatic transport Elevator	1	4200	Pipe	4	40	0,4	0,27	2,12	34	cement dust	0,0022	8,20	0,0331
d) Transportation of cement e) Water heating	Gas-burner	2	2060	Pipe	5	14	0,175	0,14	5,82	200	nitrogen dioxide	0,0198	141,59	0,1470
											Nitric oxide	0,0050	35,40	0,0368
											carbon monoxide	0,0697	497,74	0,5168
	Boiler E-1 / 9-1G	2	8232	pipe	6	32	0,4	0,25	1,99	170	nitrogen dioxide	0,0370	148,16	1,0988
											Nitric oxide	0,0093	37,04	0,2747
											carbon monoxide	0,1254	501,73	3,717

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Heating system	Boiler D-721	1	3600	pipe	7	7	0,2	0,14	4,46	250	nitrogen dioxide	0,0198	141,714	0,2569
											Nitric oxide	0,0050	35,429	0,0642
											carbon monoxide	0,0697	497,744	0,9031
Vehicle service area	Tank with diesel fuel 8 m3 Filling station	2	8760	Unlimited unlimited	8	2	0,564	0,5	2,00	34	hydrocarbons	0,0002		0,0072
		1	98		9	2	0,564	0,5	2,00	34	hydrocarbons	0,0205		0,0072
Welding station No. 1	Electric welding machine	1	1040	unlimited	10	2	0,564	0,5	2	34	iron oxide	0,0013		0,00977
												0,00014		0,00107
Repair and mechanical department	Lathe	1 1	1200	unlimited	11	2	0,564	0,5	2	34	manganese oxide	0,0009		0,00778
Projected														
Etc. workshop No. 2.	Receiving hopper	1	8200	unlimited.	12	2	0,564	5000	2,00	34	asbestos dust	0,0001	0,20	0,0029
a) Unit for unpacking and loading of asbestos	Bunker	1	8200	Unlimited	13	2	0,564	5000	2,00	34	cement dust	0,0026	2,25	0,0773
b) Cement warehouse No. 2	Elevator receiving pit	1	2100	unlimited	14	2	0,564	5000	2,00	34	cement dust	0,0102	20,4	0,0773
c) Transportation of cement d) Water heating	Gas-burner	1	1030	Unlimited	15	14	0,175	0,14	5,82	200	nitrogen dioxide	0,0198	141,71	0,0735
											Nitric oxide	0,0050	35,43	0,0184
											carbon monoxide	0,0697	497,744	0,2584
Boiler room No. 2. Steam boiler	Boiler E-1 / 9-1G	3	8232	unlimited	16	32	0,4	0,25	1,99	170	nitrogen dioxide	0,0241	141,647	0,7135
											Nitric oxide	0,0061	35,765	0,1784
											carbon monoxide	0,0836	491,888	2,47813
	Electric welding machine	1	1040	unlimited	17	2	0,564	0,5	2	34	iron oxide	0,0013		0,00489
											manganese oxide	0,00014		0,00053

The gas combustion products (nitrogen oxides and carbon monoxide) in the amount of 0.34985 t / year will be supplied to the atmosphere from the gas burner used to heat water in the recuperator (source No. 15).

From the sources of the auxiliary production of the boiler house (source No. 16) and the welding station (source No. 17) 3.3753 t / year of pollutants will enter the atmosphere.

During the operation of the projected enterprise, pollutants of 9 types in the amount of 11.125 tons / year will enter the atmosphere from 17 stationary sources of emissions.

For each pollutant in emissions, quotas were established according to the instruction [1], taking into account the hazard class of the substance. Regulatory data are shown in Table 2.

Due to the small amount of emissions into the atmosphere, the deposition of harmful substances will not affect the soil and plants.

Chemicals are not expected to be introduced into surface and ground waters. industrial wastewater will be returned to circulation, and domestic wastewater will be discharged into concrete cesspools.

It follows from the above that the construction of an enterprise for the production of slate will introduce into the environment, mainly into the atmospheric air, a small amount of chemicals that will not affect the ecological situation of the area.

table 2. List of pollutants emitted into the atmosphere

Pollutant name	ПДКмр, мг/м^3	Hazard Class	Established quota
Asbestos dust	0,06	1	0,2
Cement dust	0,3	3	0,33
Carbon monoxide	5	4	0,5
Nitrogen dioxide	0,085	2	0,25
Nitric oxide	0,6	3	0,33
Iron oxide	0,2	3	0,33
Manganese oxides	0,005	2	0,25

Analysis of the impact of noise. On the territory of the enterprise, the main sources of noise and vibration will be the equipment of the slate sheet production line.

The project provides for noise protection measures. The measures provided for by the project ensure compliance with the requirements of the current regulatory documents for the level of noise and vibration on the territory of the enterprise.

Removal of natural resources. The water supply of the area under consideration is carried out from the factory water supply network, which does not have a significant negative impact on water resources.

Objects and nature of the impact. During the operation period of the slate production plant, the following objects will be exposed:

- atmospheric air due to the introduction of chemicals (asbestos dust, cement, nitrogen oxides, carbon monoxide, iron oxide, manganese oxide);
- soil and vegetation under the influence of harmful impurities coming from the atmosphere;
- groundwater due to withdrawal for household, drinking, industrial and fire-fighting needs;
- plant personnel exposed to industrial emissions.

During the construction of the enterprise, the impact on the natural environment will practically not be affected. The enterprises will be created on the basis of the existing communications of the warehouse.

During the operation of the enterprise, the impact on the environment will be exerted by asbestos and cement dust, nitrogen oxides, carbon monoxide, iron oxide, manganese oxide. The concentration of these pollutants in the air outside the enterprise will not exceed the established quotas and, therefore, will not have a negative impact on the environment.

The impact of harmful substances emitted during the operation of the enterprise will be constant and insignificant in strength. The degree of exposure to harmful impurities such as cement dust can be significantly increased in emergency situations. In these cases, the impact will be short-lived. The nature of the impact of cement dust can be divided into physical and chemical. Physical impact occurs due to the accumulation of dust on the leaves of plants in the form of a hard crust. Thus, it disrupts photosynthesis and metabolism of nutrients in plant cells, causing the leaves to turn yellow. The chemical effect is due to the presence of water-soluble salts in the dust, their composition, quantity and toxicity. For example, soluble compounds of calcium, sodium, magnesium, in case of rain and dew, cause leaf burns.

The technology adopted by the design decision with a low asbestos content in the raw material provides a significant reduction in asbestos dust emissions into the atmosphere and, accordingly, the degree of the enterprise's impact on the environment. At low concentrations of asbestos fibers in the air, the body is able to cope with them and no serious consequences should be expected.

To organize an enterprise for the production of slate, the withdrawal of agricultural land from circulation is not required, since the enterprise is created on the existing territories of the warehouse.

Wastewater discharge into surface watercourses and terrain is not predicted.

Technological waste products - wet slate trimmings - are ground and returned to production, asbestos-cement waste from the settling tanks is partially returned to production, and some is stored in the settling tank.

Thus, the organization of slate production in the Urgut district of the Samarkand region will have an insignificant impact on the environment and will not increase the environmental stress in the area. By observing building codes and operating rules of the enterprise, the degree of environmental risk can be minimized.

Results of a study of the environmental impact of slate production facilities. Assessment of possible changes in the environment in the area of the location of the enterprise for the production of slate after its implementation.

Atmospheric air. The operation of the projected enterprise does not worsen the existing state of atmospheric air in the adjacent territory and does not create air pollution above the permissible standards, i.e., the state of atmospheric air will remain acceptable. The concentration of pollutants abroad of the enterprise will be:

- cement dust - 0.03 MPC at an established quota of 0.33 MPC;
- asbestos dust –0.03 MPC at an established quota of 0.20 MPC;
- carbon monoxide –0.03 MPC at an established quota of 0.50 MPC;
- nitric oxide –0.02 MPC at an established quota of 0.33 MPC;
- nitrogen dioxide (before the event) –0.42 MPC with a set quota of 0.25 MPC;
- nitrogen dioxide (after the event) –0.21 MPC at the established quota of 0.25 MPC;
- iron oxide –0.03 MPC at an established quota of 0.33 MPC;
- manganese oxide –0.11 MPC at an established quota of 0.25 MPC;
- metal dust –0.03 MPC at an established quota of 0.33 MPC;
- hydrocarbons –0.05 MPC at an established quota of 0.50 MPC;

Surface and groundwater. The water supply of the projected enterprise is carried out from the existing water supply networks of the plant, there is no discharge of wastewater into surface water courses. Therefore, this enterprise belongs to the category of industries that do not have a significant negative impact on water resources and water quality of surface sources.

Soil and vegetation cover. During the operation of the enterprise, the soil, soil and vegetation will be exposed to the impact of the deposition of harmful substances from the atmosphere.

However, the surface concentration of pollutants is below permissible levels and the impact on these objects will remain at the same level. Soil contamination by industrial waste will not be carried out, provided that the waste is temporarily stored in a special landfill before disposal. The condition of the vegetation will also remain unchanged, as small amounts of pollutants do not significantly affect the vegetation.

Conclusion

An assessment of the environmental impact of the construction of an enterprise for the production of slate in the Urgut district of the Samarkand region showed that according to the degree of pollution of the atmospheric air, soil and groundwater, the soil and vegetation cover, the area of the object's location belongs to the zone of an admissible ecological situation.

During the operation of the enterprise, the main sources of environmental impact are the asbestos packing and filling unit, a cement warehouse, a receiving pit and pneumatic conveying of cement, a boiler room, and gas burners. The types of impact are mainly determined by the introduction of cement and asbestos dust, carbon monoxide, nitrogen oxides, iron oxide, manganese oxide, metal dust into the environment. The maximum concentrations of these pollutants abroad of the enterprise will be lower than the established quotas for them.

Water supply of the projected enterprise is carried out from the existing water supply networks. Wastewater from the enterprise will not have a negative impact on the environment. The production effluents of the enterprise are involved in the recycling water supply and are reused. Industrial waste is partially returned to production, some of which will be temporarily stored in a settling tank.

Thus, the implementation of the project for the construction of an enterprise for the production of slate in the Urgut district of the Samarkand region will not lead to negative consequences of the natural environment when the environmental measures and recommendations specified in the work are carried out, as well as when the safety rules and operation of the enterprise are observed.

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