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Issues Related To Improving The Environmental Condition Of Industrialized Territories, Reducing Environmental Impact And Inventory Processes

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Abstract

This article analyzes the impact of harmful emissions on the environment from a cotton refinery. The results of calculating the amount of dust and gas released during production and measures to ensure work efficiency are also presented. Calculations of technological equipment and efficiency of the dust and gas purification plant. The results of the inventory and regulation of emissions of pollutants entering the atmosphere are considered. The issues of studying dust cleaning equipment, methods for improving the efficiency of the equipment are highlighted. Analyses of harmful substances entering the atmosphere during production were carried out.

Key words: dispersion map, calculation, inventory, waste, pollutants, analysis, situational plan, industrial site, parameters.

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Introduction

One of the most crucial areas of study concerns the contamination of the atmosphere. In the Republic of Uzbekistan, there is widespread establishment of projects aimed at identifying sources of atmospheric air pollutants (inventory) and setting permissible limits for emissions (PLE). The development of such documents is crucial for assessing pollution levels and implementing preventive measures.

A necessary step is the formulation of plans for executing comprehensive efforts to achieve regulated disposal of pollutants emitted by industrial sources.

Preserving the environment surrounding individuals has emerged as one of the most pressing challenges of the 21st century. This stems from the fact that the scientific and technological advancements resulting from various disciplines have enabled the prolonged utilization of natural resources. Consequently, this has fostered the development of societal productive forces and the fulfillment of material and spiritual needs.

However, the rapid pace of scientific and technological progress complicates the interaction between society and nature, altering environmental processes in the biosphere unexpectedly. Often, these changes lead to accelerated contamination of water, atmosphere, soil, and other natural elements by diverse wastes.

The development of environmental regulatory initiatives (such as setting permissible limits for emissions) in production and industrial enterprises plays a vital role in assessing the quality of atmospheric air and determining the sanitary standards for pollutants within it.

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

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

The theoretical method allows us to establish the composition and quantity of pollutants based on the determination of thermal and material balances of technological processes, considering the chemical composition and properties of raw materials, fuel, structural and geometric features of units, technological parameters, processes maximizing the performance of units and data on specific emissions of pollutants of the operated equipment. The Samarkand State Unitary Enterprise for Current Road Use is located in the village of Farhad in Samarkand. The main activity of this enterprise is the production of asphalt-concrete mixtures and reinforced concrete products. The production capacity of the enterprise reaches 200 thousand tons per year of asphalt-concrete mixture, and the plant produces 10 thousand m3/year of reinforced concrete structures. [2]

Analysis and results. This project examines the cotton ginning plant of “BAHT NAVOIY” LLC, located in the industrial zone of the Khatirchi district in the Navoi region. The plant is designed for the primary processing of medium-fiber raw cotton and consists of two batteries. Primary processing involves harvesting, storing, drying, weed cleaning, ginning, bagging, and baling.

The level of atmospheric pollutants generated by pollutant-emitting sources within the enterprise remains within the permissible limits. This ensures that there is no adverse impact on the population or other living organisms.

The annual production capacity of the cotton gin is 9 thousand tons. The enterprise operates for 16 hours per day, totaling 220 days per year. The workforce consists of 216 employees.

The terrain where the enterprise is situated is flat, with a relief impact coefficient of 1. Meteorological data and coefficients specific to the location of the enterprise are presented in the table.

"Baht Navoi" Ministry of Economy of the Republic of Uzbekistan:

* Administration building;
* Cotton raw material receiving point (bunts • ;
* Riot sites
* 2 PCs stationary displacement
• Transmission unit
• Closed warehouses;
• Drying-cleaning department;
• Cleaning department;
* Main building;
• Pressing Department;
* Finished product warehouse;
• Seed warehouse (overpass);
* Workshop;
* Balance sheet.

Cotton raw materials are transferred to 14 cotton bunts after passing the scales through the model TLX-18 6 with a length of 16 M and a width of 0.62 m, RBX 1 through the switchgear (transporters). In the process of transferring cotton raw materials to bunts with the help of transporters, cotton dust is released into the atmosphere unorganized.

Closed product warehouses there are 3, 1 awning. When transferring cotton raw materials from bunts and closed warehouses to production, a transmission unit serves. The product transmitted through the transmission devices comes to the drying unit. The Transshipment is considered to be 1 slider, the transmission is shifted by 2 bunts and has an SS-15-a separator and a Ts-7 fan. In the process of transferring raw materials, cotton dust from the sliding transmission compartment is thrown into the atmosphere unorganized.

The drying manufactory has its-1.8 drying generator 1; drying Drum 2 SB-10 2 of which 1 works.

In the cleaning manufactory, 1-CC cleaning equipment is 10 PCs, 1-RX cleaning equipment is 1 PC, vzp-1200 cyclone is 2 PCs, and Ts-6 dust capture equipment is 5 PCs.

The main building has 5 DP-130 sawn-off mechanisms 2, 5 LP lintering mechanisms 9, Noria 2, es-14 elevator 2, first-gear TS-6 cyclones 5, second-gear vzp-1200 cyclones 5 for a total of 10 groups of dust capture equipment. In sliding, pressing manufactory, the MMs sorting equipment is 2, the press is 2, and TS-6 cyclones are 4.

The enterprise has a workshop. The workshop has 3 PNS devices that emit teeth into the Saw, 1 piercing device, and 1 lathe device. From these devices, metal dust is released into the atmosphere. In addition to these, there is 1 sliding Electropwelling device. In electroplating work, an electrode is used, and the annual consumption of the electrode is 280 kg. In the process of operation of the device, Solder dust and manganese oxide are released into the atmosphere.

List of pollutants.

Table 1.

№	**Source**	**Pollutant designation**	**Throw, t / y**	**The amount of the throw in the percentage account**
1	From 1 to 13	Cotton dust	54, 9642	88,16
2	14	Inorganic dust	0,81	1,30
3	15	Metal image dust	0,0054	0,01
4	15	Metal dust	0,0621	0,10
5	16	Iron oxides	0,001	0,00
6	16	Manganese oxides	0,0001	0,00
7	4, 18, 19	Carbon oxides	4,332	6,95
8	4, 18, 19	Nitrogen oxides	1,902	3,05
9	4, 18, 19	Sulfur oxides	0,2691	0,43
10	17	carbohydrates	0,00002 5	0,00
			62,3459 25	**100**

The enterprise features an atmospheric pollutant-releasing shaft or chimney. This source is organized, with a height of N = 9.4 meters and a transverse cross-section of 0.4*1.2 meters in the shape of four corners.

Within the drying section, there are 2 SB-10 drying drums. The source operates for 6960 hours annually, utilizing natural gas for drying purposes. The yearly consumption of natural gas totals 108.26 thousand cubic meters.

During natural gas combustion in the drying compartment, carbon monoxide, nitrous oxide, and Benz(a)pyrene are emitted into the atmosphere.

According to Appendix 1.13 of the "Directive on Accounting for Sources Emitting Pollutants into the Atmosphere and Normalizing Pollutants in Enterprises within the Territory of the Republic of Uzbekistan," registered with the Ministry of Justice of the Republic of Uzbekistan under No. 1533 on January 3, 2006, the amounts of carbon monoxide and nitrous oxide primarily released into the atmosphere were calculated as follows:

The actual consumption of natural gas is 320,000 cubic meters per year or 0.0128 G/second. The density of natural gas is 0.723 kilograms per cubic meter. The volumetric weight is equal to 9.25 grams per second.

The formula for determining carbon monoxide emissions into the atmosphere is as follows:

P_{SO} = 0.001 * SSO * V * (1 - q4 / 100)

Where:

- S_{SO} represents the release of carbon monoxide (in kilograms per ton, kilograms per thousand cubic meters, or grams per second) during fuel combustion, determined by the following expression:

S_{SO} = q3 * R * Qir

Here, q3 represents the heat loss due to chemical incomplete combustion of fuel (in percentage),

R is the coefficient accounting for heat loss due to chemical incomplete combustion of carbon monoxide generated in fuel combustion (R = 1 for solid fuel, R = 0.5 for gas, R = 0.65 for fuel),

and Qir represents the lowest heat required for natural fuel combustion (in megajoules per kilogram or megajoules per cubic meter).

Additionally, Q4 represents the heat loss due to mechanical incomplete combustion of fuel (in percentage).

The values of Q3s and Q4s are derived from the provided table:

Acceptable coefficient indicators for carbon monoxide determination

Table 2

Boiler and furnace model	**Type of fuel**	**α**	**q_3**	**q_4**
Bed rack shaft furnace	Wood, crushed waste, sawdust	1,4	2	2
Quick-firing kilns	Wood, sawdust	1,3	1	4/2
Solid fuel chamber furnace	Coal, brown coal	1,2 1,2 1,2	0,5 0,5 0,5	5/3 3/1,5 3/1,5
Chamber furnace	Mazut	1,1 1,1 1,1	0,5 0,5 0,5	0,5 0,5 0,5

Carbon monoxide can also be determined by the following expression:

P_{SO} = 0.001*SSO *V*KSO (1-q4 / 100), where

K_{SO} is the coefficient accounting for the amount of carbon monoxide released in fuel combustion per unit of fuel, (kg/Gdj).

The greatest amount of pollutants thrown into the atmosphere within a unit of time is as follows:

Carbon monoxide– 0,001 * 9,25 * 0,5 * 0,5 * 52,0442 * 0,995 = 0,12 g / Sec

Nitrous oxide thrown into the atmosphere was calculated through the following formula:

P_{NO2} = 0.001* V * Qir * KNO2 (1-β), where

V-natural fuel consumption (t / yr, thousand m3 / yr, g / s, l / s;

Qir is the lowest heat required for natural fuel combustion (mDj / kg, mDj/m3;

K_{NO2}-1 Gdj coefficient, which takes into account the amount of nitric oxide spent on obtaining heat, kg/Gdj.

β is a coefficient that takes into account the decrease in the throw of nitrous oxide based on the technical decision taken.

The amount of nitrous oxide within the unit of time was calculated as follows:

Nitric oxide– 0,001 * 9,25 * 52,0442 * 0,05 * (1 – 0) = 0,024 g / Sec.

The gross annual amount of floating substances:

Carbon monoxide– 0,12 * 6960 * 3600 * 10-6 = 3,01 t/yr.

Nitric oxide– 0,024 * 6960 * 3600 * 10-6 = 0,60 t/yr.

The speed of the gas mixture at the exit from the source was equal to W = 5.4 m / s

And the volume of the gas-dust mixture is equal to :

V = W * r = 5,4 * 0,4*1,2 = 2.59 M3 / s.

The Benz (a)pyrene quantity was determined by the following formula:

Qb = SB Vv t n/106

Here, SB-Benz(a)pyrene capacity mkg/m3, 1.13.6 was taken from the table – SB = 0.95, VV-volume of gas flow:

Vv = Vt 273 R/(273+T) 7453

Vt = S * W0 = 0,4 * 1,2 * 5,4 = 2.59 m3 / s, T = 90 0S

Vv = 2,59 * 273 * 736,6/(273+90) * 745,3 = 1,87 m3 / s.

Qb = 0,95 * 1,87 * 86400 * 1/106 = 0,153 G / milk

V = 0.153 / 28800 = 0.000005 G / Sec

The annual amount of benzopyrene is equal to:

P = 0,000005 * 6960 * 3600 * 10-6 = 0,000125 t/Year

The amount of cotton dust exiting the shaft is S = 48.6 mg/m3, with a velocity of 5.4 m/s. Then the volume of cotton dust thrown into the atmosphere was equal to V = W * R = 5,4 * 0,4 * 1,2 = 2.59 M3 / s.

The amount of cotton dust thrown into the atmosphere within a unit of time is equal to:

V = S * V/1000 = 48,6 * 2,59/1000= 0,126 g / s.

The annual amount of dust was equal to:

M = V * T * 3600/1000000 = 0,126* 6960 * 3600/1000000 = 3,16 t/yr..

Conclusion. According to the results of the calculation analysis, it was determined that the amount of ingredients coming from the company's sources will not exceed the permitted capacity PDK under the current working conditions and in the future.

A sanitary protection zone has been defined for the enterprise, and it was determined that the discharges into the atmosphere do not exceed the permissible capacity (PDK) even in the sanitary protection zone. This does not lead to pollution of the natural environment at a higher than normal level. It does not have a negative effect on the health of humans and other living organisms.

In the joint enterprise " BAHT NAVOIY " LLC, sources 2 are equipped with air pollutant dust treatment equipment (ChTU), sources 3 and 4 are equipped with Ts-6 dust treatment equipment, the data of dust treatment equipment is presented in the table in the appendix. According to the results of the calculation analysis, it was determined that the amount of ingredients coming from the company's sources will not exceed the permitted capacity under the current working conditions and in the future.

A sanitary protection zone has been established for the enterprise, and it was determined that emissions released into the atmosphere do not exceed the permitted capacity (PDK) even in the sanitary protection zone.

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