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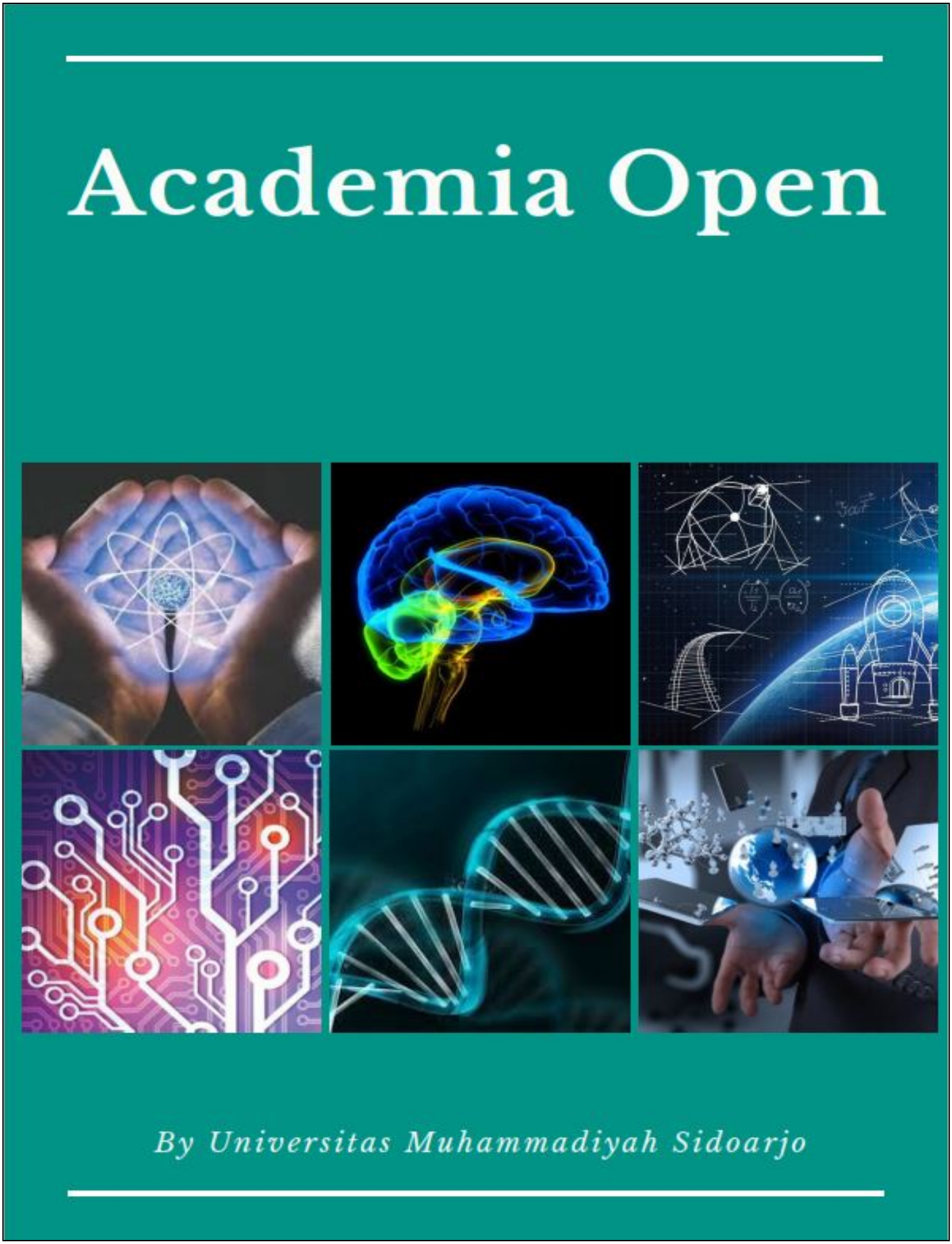

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Prospects for the Regulation of Harmful Substances Produced by the Oil Production Enterprise

Prospek Regulasi Zat Berbahaya yang Dihasilkan oleh Perusahaan Produksi Minyak

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Abstract

This study investigates the identification, quantification, and regulatory aspects of pollutant sources in an oil production joint venture. The research aims to determine the number of sources and quantify the substances released, while analyzing regulatory frameworks addressing harmful emissions. Employing a multifaceted approach, we utilize advanced methods for source identification and quantify emitted substances. Results reveal key sources and their associated emission levels, shedding light on the environmental impact of the joint venture. The implications of our findings extend to refining regulatory strategies for mitigating adverse effects on the environment, making this study crucial for global scientists and policymakers alike.

Highlights:

- Comprehensive Assessment: This study provides a thorough examination of pollutant sources in an oil production joint venture, offering a detailed understanding of the various contributors to environmental contamination.
- Quantification and Identification: Advanced methods are employed to quantify the number of pollutant sources and identify the substances released, providing precise data crucial for regulatory considerations and environmental management.
- Regulatory Implications: The research analyzes existing regulatory frameworks addressing harmful emissions, suggesting potential improvements to enhance environmental protection and promote sustainable practices in oil production joint ventures.

Keywords: Pollutant Sources, Oil Production, Joint Venture, Permitted Rate, Environmental Condition.

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Introduction

Protection of atmospheric air from polluting substances, underground and surface water from waste water coming out of industrial enterprises is one of the pressing issues of the present time and is of global importance [1].

One of the most important directions is the study of atmospheric air pollution [2]. In the Republic of Uzbekistan, the development of projects for the identification (inventory) of the sources of atmospheric air pollutant emissions and the permissible limited amount of emissions (TChM) has been widely implemented [3]. The development of such documents is of great importance in determining the degree of pollution of the territory and in preventing it.

One of the necessary measures is the development of plans for the implementation of complex works to achieve the standard disposal of pollutants emitted from sources of pollutants in enterprises [4].

Protection of the surrounding environment has become one of the most urgent problems of the 21st century [5]. The reason is that the scientific and technical revolution was the result of the achievements of various disciplines, which created an opportunity to use natural resources for a limited time. This, in turn, developed the productive forces of the society and created conditions for satisfying the material and spiritual needs [6].

But the rapid development of the scientific and technical revolution complicates the interaction between society and nature, between man and the surrounding environment, and causes unexpected changes in the management of ecological processes in the biosphere.

Method

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

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 [7], 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.

a. theoretical (balance);

b. calculation and analytical (experimental); and

c. reporting and static methods.

d. The theoretical method allows us to establish the composition

e. 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. [8]

Result and Discussion

1. “ Bo‘ston olami ” LLC

Enterprise is located in the industrial zone of the city of Jizzakh. The holding company “Узпахтасаноатэкспорт” belongs to the joint-stock company “Uzpaxtayog‘” [9].

According to the location (situational) map of the enterprise, it is surrounded as follows:

a. From the north - Jizzakh Oil Base Unitary Enterprise;

b. From the south side - a settlement with multi-story houses;

c. From the west - Jizzakh city "Zenatkor TTV" reinforced concrete products LLC;

d. From the east side - the substation of Jizzakh City Electric Networks Company.

2. “Bo‘ston olami ” LLC

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The main activity of the **“Bo‘ston olami” LLC** is the production of oil-oil products used as food products. The nearest settlement is located 100 meters from the south side.

The company is open 24 hours a day, 310 days a year. The number of employees is 225 people. The land area is 2.83 ha [10]. In the last reporting year, 26,779,546 tons of fertilizer were processed. The following products are obtained as a result of fertilizer processing according to the technological process:

a. Black neck - 18.5%;

b. Kunjara - 44.5%;

c. Husk – 32,1 %

The developed products are given to enterprises, organizations and institutions, farms, private organizations.

The relief of the area where the enterprise is located is flat, the relief effect coefficient of the place is equal to 1.

Meteorological data and coefficients of the area where the enterprise is located are shown in the table.

3. “Bo‘ston olami” LLC

The company has the following workshops and departments:

a. A warehouse;

b. The main production workshop;

c. Refinery;

d. 1-extraction workshop;

e. 2-extraction workshop;

f. Cooling tower (water cooling) unit;

g. Deodorization workshop;

h. Packaging shop;

i. Acid treatment shop;

j. Soap production workshop;

k. Boiler room.

4. “Bo‘ston olami” LLC

Enterprise is located in the industrial area of the city of Jizzakh and is characterized by the following climatic conditions [11]:

a. The hours that emit the most heat are during the hottest summer months. In Jizzakh, it is 354-388 hours per month or 82-90% of the expected amount.

b. In the city of Jizzakh, the wind blows from the southwest in autumn and winter, and from the northwest in summer.

c. According to the climatic conditions, the city of Jizzakh belongs to 3 types of climate zones.

The name of the indicators	Designation	Unit of measure	Value
Coefficient related to atmospheric stratification			200
Coefficient of joint relief			1
Average air temperature			14
In the hottest month		°C	+45
In the coldest month		°C	-32
5% increase in wind speed		м/с	2

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in one year			
Average annual wind speed		м/с	2
Average annual recurrence		%	5
The direction of the wind on the rumba			21
			11
			7
			5
			7
			11
			23
			15
			36

Table 1. *Climate-related meteorological descriptions used as primary data for pollutant release calculations*

Meteorological information	January	February	March	April	May	June	July	August	September	October	November	December	Anual
Average monthly air temperature (0C)	-1	2	8	15	21	26	29	27	12	14	-1	2	14
The highest air temperature (0C)	22	28	31	36	41	44	45	43	41	37	22	28	45
The lowest air temperature (0C)	-26	-25	-19	-6	2	4	10	8	1	-8	-26	-25	-32
Absolute air humidity (%)	5	6	8	11	12	12	13	12	9	8	5	6	9
Relative air humidity (%)	75	75	72	64	50	36	34	35	39	51	-8	75	56
Monthly and annual precipitation (mm)	58	54	77	65	35	9	3	1	3	28	58	54	418
Average wind speed (m/s)	2	2	2	2	2	2	2	2	2	2	2	2	2
The highest wind speed (m/s)	24	28	28	24	27	20	20	18	18	21	24	28	28
Average number of	3	3	4	4	3	2	1	1	1	2	3	3	26

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days with wind speed exceeding 15 m/s													
Average number of days with wind speed exceeding 15 m/s	0,4	0,1	1	0,3	0,1					0,1	0,1	0,2	2
Average annual evaporation (mm)	17,9	26	51,3	97,9	171,9	243,8	246,7	201,2	151,5	92,9	41,8	20,9	1346,0

Table 2. *Meteorological data and indicators*

There are 15 types of pollutants released into the atmosphere of the enterprise from pollutant sources, the total amount of which is 58.95569 tons/year [12], according to the ingredients as follows:

a. Chigit dust - 9,426 tons/year, 15.99%;

b. Shot dust – 0,435 tons/year, 0,738 %;

c. Jail dust – 0,61 tons/year, 1,035 %;

d. Carbon oxide – 8.0148 tons/yil, 13.595%;

e. Netrogen oxide – 1,61 tons/year, 2,731 %;

f. An aromatic hydrocarbon – 1,2864 tons/year, 2,18 %;

g. Nefras – 35,9448 tons/year, 60,97 %;

h. Acrolein – 0,0054 tons/year, 0,009 %;

i. Acetic acid vapor – 0,0024 tons/year, 0,004 %;

j. Sulfuric acid vapor – 0,95 tons/year, 1,61 %;

k. Alkali vapor – 0,284 tons/year, 0,482 %;

l. Gasoline vapor – 0,2865 tons/year, 0,486 %;

m. Benzene – 0,01 tons/year, 0,017 %;

n. Metal dust – 0,089 tons/year, 0,151 %;

o. Benzopiren – 0,00008 tons/year, 0,0001 %;

p. Ammonia – 0,00131 tons/year, 0,0022 %.

The amount of solid pollutants is 10.56 tons/year (17.91%), the amount of gas and liquid substances is 48.39569 tons/year (82.09%).

No.	Name	Tones/year	%	Sources
1	Main production	58,86669	99,85	37

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	departments			
2	Assistant constructions	0,089	0,15	1
	TOTAL:		100	38

Table 3. ***Distribution of the amount of pollutants released into the atmosphere***

A source that emits pollutants into the atmosphere is an organic source. The 1st C-6 model dry mechanical dust collector in the workshop.

Source height H = 8.4 m, cross section D = 0.45 m.

The working time of the source is T = 310 days/year, t – 24 hours/a day or 7440 hours/year.

Saw dust is produced as a result of the operation of 1 separator and 3 pulverizers. The resulting saw dust is cleaned by C-6 dust removal equipment and released into the atmosphere [13].

The speed of the dust-gas mixture before the cleaning process is 12.8 m/s, the volume is 2.03 m^3/s, the temperature T = 220C. Density of dust - 238.6 mg/m^3.

The maximum amount of dust per unit of time is:

$B_1 = C \times W \times 10^{-3} = 238,6 \times 2,03 \times 10^{-3} = 0,48$ g/s

The total amount of dust is as follows:

$M_1 = B \times T \times t \times 3600 \times 10^{-6} = 0,48 \times 310 \times 24 \times 3600 \times 10^{-6} = 12,86$ tons/year

The speed of the dust mixture at the exit from the cleaning device is 11.7 m/s, the volume is 1.86 m^3/s, the maximum capacity is 38.4 mg/m^3

average capacity – 34,3 mg/m^3.

The maximum amount within a time unit is as follows:

$B_1 = 38,4 \times 1,86 \times 10^{-3} = 0,071$ g/s

The average amount per unit of time is as follows:

$B_2 = 34,3 \times 1,86 \times 10^{-3} = 0,064$ g/s

The total amount is as follows:

$M_2 = 0,064 \times 310 \times 24 \times 3600 \times 10^{-6} = 1,71$ tons/year.

Efficiency of cleaning equipment – 86,7 %.

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 "Boston Olami" 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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