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PREVENTION OF AIR POLLUTION BY FERROUS  
METALLURGICAL ENTERPRISES  
- USSR -

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PREVENTION OF AIR POLLUTION BY FERROUS  
METALLURGICAL ENTERPRISES

- USSR -

[Following is a translation of appendices I and II, and of the Table of Contents, of the monograph Sanitarnaya Okhrana Atmosfernogo Vozdukha ot Vybrosov Predpriyatiy Chernoy Metallurgii (Sanitary Protection Against Air Pollution by Waste Products from Ferrous Metallurgical Enterprises). Complete bibliographic information accompanies each article.]

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APPENDIX I:

MODEL PROGRAM FOR THE INSPECTION OF INDUSTRIAL ENTERPRISES  
TO REVEAL AND ELIMINATE SOURCES OF AIR POLLUTION

[Following is a translation of appendix I of the monograph Sanitarnaya Okhrana Atmosfernoy Vozdukh ot Vybrosov Predpriyatiy Chernoy Metallurgii (Sanitary Protection Against Air Pollution by Waste Products from Ferrous Metallurgical Enterprises), by Professor D. N. Kalyustniy, Kiev, 1961, pages 166-168.]

1. Designation of industry (enterprise).
2. Address.
3. Controlling authority (main community, Sovnarkhos, ministry) local, republican, union.
4. Character of industry.
5. Location of industry in a given region: The sanitary zone and its correspondence to the sanitary planning standards for industrial enterprises (N.S.P. 101-54). The surrounding buildings, facilities, rest areas and athletic fields, etc., requiring uncontaminated air (domiciles, playgrounds, schools, dining halls, clinics, gymnasiums, gardens, parks, etc.), and their distance from the industrial buildings.
6. The sanitary characteristics of the industrial area, its size, design and location of individual plans representing sources of air pollution. The public works and sanitary facilities of the area (road surfacing, plantings, etc.). Industrial sites, their amount and character, elimination (collection, removal, neutralization, utilization), and the influence of these wastes on air pollution. Sewage, its amount and character, means of purification and removal, influence on air pollution.
7. Raw material employed, character and quantity, supply, site and means of storage, characteristics with respect to air pollution.
8. Type of fuel employed (wood, peat, coal, oil, shale, gas) and the amount, sources of supply, means and site of storage, preparatory processing (concentration, drying, crushing). The ash and sulphur content of the fuel. The sanitary characteristics of the fuel with respect to air pollution.

9. The industrial power. The steam-producing capacity of the boilers, the power of the gas generators, the construction and number of furnaces, the suitability of the fuel utilized. The type and amount of waste obtained (slag, ash), the site and means of correction and removal. The amount and composition of the smoke and gases released into the atmosphere, especially sulphur dioxide and airborne ash. The location, number, diameter and height of smoke stacks. Type of ash separators. Coefficient of purification of gases from ash. The condition of gas-purifying apparatus, proper maintenance and the correct utilization. The sanitary characteristics of the power supply with respect to air pollution.

10. Delivery of product items. The nature, site and means of packaging, storing, loading and distribution. The sanitary characteristics with respect to air pollution.

11. The industry as a whole and individual plants pertaining to the technological processes. The sanitary characteristics of the industry and of individual plants with respect to air pollution and the specific contribution of individual plants to the contamination:

(a) Technological processes, working procedures, production aggregates and mechanisms, the location and type of work, inspection and control, listing of especially dangerous processes and their specific contribution to air pollution, the sanitary characteristics of technological processes with respect to air pollution;

(b) The sites of planned and unplanned escape of contaminants into the air, their condition, composition and special relations, causes of unplanned exhausts and the possibility of its elimination, planned exhaust, list of sites of exhaust, number, height and diameter of smoke stacks, exhaust pipes, etc., the sanitary characteristics of contaminants released in each case, the amount and composition of exhaust;

(c) The presence of equipment for purifying, reclaiming and catching the exhaust gases and aerosols; type of equipment, location, condition, efficiency, the presence of proper maintenance and correct utilization, sanitary evaluation of the effectiveness of the equipment and system of gas-purification, the trapping and recovery of dust;

(d) Shipping, the type, range, volume of work, and the air pollution and degree of air pollution which results from it.

12. Proposed alterations: Expansion, reconstruction, consolidation, changes in design, housing, remodeling. Expected positive or negative effect from a particular alteration with respect to air pollution. The assignment of measures to combat air pollution, those currently in progress and those designated for the current year, the following year and the succeeding five years.

13. Sanitary evaluation of the industry with respect to air pollution based on an inspection and analysis of all data. Break-down on the contaminants into various types (smoke, gases, soot, dust, airborne ash, steam, unpleasant odors, etc.). Conditions enhancing or curtailing the dispersion. The damage caused by air pollution. Complaints of the population, institutions, other industrial enterprises. Objective criteria of air pollution, the effect on domestic animals and vegetation. The data of laboratory investigations of air pollution.

14. Suggested means for combating air pollution. Planning a technological process, hermitization of apparatus, recovery of solutes, improved utilization of existing gas-purifying and dust-trapping apparatus, construction of new smoke, dust and gas traps, a special plan for firing boilers, etc., relocation of an industry from a particular territory, eliminating an industry when required to meet a sanitary specification; the establishment of required interval zones; abandoning an industry without expansion and reconstruction prior to amortization or after a definite period of time.

The order of working out and bringing to life the suggested sanitary measures to combat the organized discharge of contaminants into the atmosphere. Further measures (sanitary and technical planning in the industrial sphere, decontaminating an area, removal and neutralization of industrial wastes, sewage, etc.). Setting up protective planted areas.

15. Supplementary reports.

16. The names and responsibilities of individuals performing inspections.

("Instructions for the Organization of Sanitary Control of the Purity of the Air of Inhabited Regions". Medgiz, 1952).



APPENDIX II:

SANITARY CLASSIFICATION OF INDUSTRIES AND PROTECTIVE ZONES

[Following is a translation of appendix II of the monograph Sanitarnaya Okhrana Atmosfernogo Vozdukha ot Vybrosov Predpriyatiy Cherno Metallurgii (Sanitary Protection Against Air Pollution by Waste Products from Ferrous Metallurgical Enterprises), by Professor D. N. Kalyuzhniy, Kiev, 1961, pages 168-171.]

Chemical Industry

Class I.

Protective Zone of 1,000 Meters in Width

The production of aromatic substances (benzene, Toluene, Zylene, Naphtol, Phenol, Cresol, Anthracene, Phenanthrene, Aeridine, Carbozole).

Industries engaged in the processing of coal tar.

Class II.

Protective Zone of 500 Meters in Width

Amonia production.

Production and processing of natural resins and their residues (coal tar, pitch, etc.)

Metallurgical Machine, Metal-Processing Industries

Class I.

Protective Zone of 1,000 Meters in Width

Magnesium production (by the chloride method).

Secondary processing of non-ferrous metals in amounts greater than 3,000 tons per year.

The combustion of coke.

The smelting of pig iron in blast furnaces with a volume greater than 1500 cubic meters.

The smelting of non-ferrous metals (including lead, tin, copper, nickel) directly from the ore or concentrates.

The production of aluminum by electrolysis of molten aluminum salts (alumina).

## Class II

### Protective Zone of 500 Meters in Width

Industries engaged in agglomeration of ores of ferris and non-ferrous metals and pyrite cinders.

Magneium production (by all processes except chloride).

Production of non-ferrous metals in amounts greater than 2,000 tons per year.

Secondary processing of non-ferrous metals in amounts of 1,000 to 3,000 tons per year.

Smelting of pig iron in blast furnaces with a volume of 500 to 1500 cubic meters.

Steel production by the open-hearth and converter methods in amounts greater than one million tons per year.

Production involving the grinding of basic slag.

The production of iron castings in amounts greater than 20,000 tons per year.

Antimony production by the pyrometallurgical method.

The production of zinc, copper, nickel, cobalt by means of electrolysis of water solutions.

The production of ferrous alloys.

## Class III.

### Protective Zone of 300 Meters in Width

Test stations for aircraft engines with sound-extinguishing devices which muffle sounds beyond the protective zone to 70 decibels.

Metal concentration without heat.

Battery production (mass production).

Secondary processing of metals in amounts of up to 1000 tons per year.

Production of pig iron in blast furnaces with the volume not exceeding 500 cubic meters.

Steel production by open-hearth and converter methods in amounts of less than one million tons per year.

Production of iron castings in amounts of 5,000 to 20,000 tons per year.

Production of non-ferrous metals in amounts of 100 to 2000 tons per year.

The production of cable, both lead lined or with rubber insulation.

#### Class IV.

##### Protective Zone of 100 Meters in Width

The production of plain cable.

The production of boilers.

The production of machines and instruments of the electrical industry (dynamos, transformers, projectors, etc.) involving small foundries and other shops using heat.

Metal-processing industries employing ores, steel (up to 10,000 tons per year) and non-ferrous castings (up to 100 tons per year).

The production of instruments employing mercury (mercury rectifiers, thermometers, lamps, etc.).

The production of steel in electric furnaces.

The production of antimony by means of electrolysis.

#### Class V.

##### Protective Zone of 50 Meters in Width

Metal processing plants employing heat processes without casting.

Battery production (light industries).

The production of instruments for the electrical industry (electric lights, flashlights, etc.) without casting.

The production of resistant alloys and infusible metals without plants for chemical treatment of ores.

The Extraction of Ores and Non-Metallurgical Minerals

Class II.

Protective Zone of 500 Meters in Width

The extraction of iron ores by open blasting.

The extraction of lead ores, manganese and arsenic.

Class III.

Protective Zone of 300 Meters in Width

The extraction of dolomites, magnesites, asbestos, and asphalts.

The open extraction of ores of metals and metalloids with the exception of lead, arsenic and manganese.

Class Iv.

Protective Zone of 100 Meters in Width

The extraction of ores of metals and metalloids by shaft mining with the exception of lead, arsenic and manganese.

Community Sanitary Installations

Controlled functioning dumps for sewage and liquid household refuse or organic origin and solid waste. Plowing fields and sanitation fields.<sup>1</sup>

Filtration fields when the amount of sewage exceeds 5000 cubic meters per day.

Class II.

Protective Zone of 500 Meters in Width

Central stations for utilizing and burning garbage.

Filtration field for a daily quantity of sewage of 500 cubic meters and less.

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1. When the existing regulations allow for working the plots.

Filled dumps for solid refuse.

Burial mounds.

Class III.

Protective Zone of 300 Meters in Width

Compost fields and lots.

Plots of land used to neutralize solid wastes and for their utilization in agriculture (seed beds, hothouses).

Irrigation fields. Biological filters, aero filters, sedimentation tanks and sludge fields.

Transport yards for the removal of sewage and garbage.

Overflow stations.

Cemeteries.

Storage yards for utilizable waste.

Biothermal chambers.

1. The distance operating the aforementioned installations from sanatoria, resthomes, pioneer camps, beaches and similar installations should be increased by 50 to 100% depending upon local conditions and the requirements of the State sanitation inspection agencies.

2. The sanitary intervals from purifying installations of small sewer systems are determined according to special norms and technical conditions.

3. The sanitary intervals from reserve filtration fields situated in association with irrigation fields must be determined in accordance with regulations 273 and 275 depending on the amount of sewage to be purified in the reserve filtration fields.

4. The sanitary protective zones for thermoelectric stations and industrial furnaces with a fuel consumption of 3 tons per year and greater are shown in the Table of Appendix III.

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