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THE ENVIRONMENTAL POLLUTION SOURCES INVENTORY SYSTEM AS SUPPORT
TO THE AIR POLLUTION CONTROL IN THE SAO PAULO METROPOLITAN AREA

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A B S T R A C T

The paper presents the experience of CETESB - Companhia de Tecnologia de Saneamento Ambiental in the development of an Environmental Pollution Sources Inventory System in the São Paulo Metropolitan Area - SPMA and its application as a support in the establishment of air pollution control strategies.

The information fed to the system comes from the activities development by CETESB in the exercise of its legal attribution of prevention and control of the environmental pollution as established in the Regulation Number 8468 (September 08, 1976) that regulates the Law Number 997 (May 31, 1976).

The methodology of collection, organization and treatment of the information that is constantly added to the system and periodically updated is described.

Data and results obtained from the system are presented such as, for E.G., the identification of the most significant sources and the definition of critical areas related to the air pollution.

The Inventory System implanted in this manner allows to provide technical and administrative information in order to orient the air pollution control actions.

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BIBLIOTECAI. INTRODUCTION

The Environmental Pollution Inventory System constitutes one of the fundamental factors for the establishment of strategies for the control of environmental pollution. This paper presents the experience of CETESB - Companhia de Tecnologia de Saneamento Ambiental in the development of an Environmental Pollution Sources Inventory System in the Sao Paulo Metropolitan Area - SPMA and its application as a support in the establishment of air pollution control strategies.

The Inventory System referred to duely stores and processes the information and data relative to polluting activities and has as main objectives:

- Estimate qualitative and quantitatively the principal pollutants emitted within a determined area.
- Identify the most significant emission sources within a determined area.
- Furnish means for the definition of critical areas of a region which merite priority control action.
- Furnish means for the implantation of an air quality monitoring system for a determined area.
- Orient control actions, establishing priorities for the pollutants emitted in large quantities and/or that present greater damages to the environment.

The Air Pollution Sources Inventory System in the Sao Paulo Metropolitan Area - SPMA received a large volume of information with the implantation by the Sao Paulo State Government through CETESB the so called "Operação Branca" (White Operation) starting from 06 of October of 1975 with a duration foreseen for one year.

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With the objective of imparting more dynamism to the execution of programs and projects in operation at that time, the Inventory was carried out initially in the Sao Paulo Metropolitan Area - SPMA and in the Cubatão municipality. These areas were chosen for the reason that represent the greater concentrations of industries in the Sao Paulo State.

II. SYSTEM INPUT METHODOLOGY

Actually the Inventory System is fed by information generated through the activities by CETESB in the exercise of its legal attribution of prevention and control of the environmental pollution as established in the Regulation Number 8468 (September 08, 1976) that regulates the Law Number 997 (May 31, 1976).

II.1. DATA COLLECTION

The information relative to the air pollution sources of the Sao Paulo Metropolitan Area - SPMA come from various forms of action carried out by specific areas and sent to the Inventory System, as follows:

- PREVENTIVE CONTROL

All potentially polluting activities which intend to install itself in the Sao Paulo State are obliged to apply at CETESB for the Installation Permit on which occasion the viability of its implantation is analyzed and necessary technical requirements are made for the conservation of the environment (Articles 58 to 61 of the Regulation of the Law Number 997).

By this legal procedure (Articles 62 to 66) in the beginning of its activity the industry is obliged to apply for a Operation Permit on which occasion a technical inspection of the installation is made

during the issue of the Installation Permit are checked.

In the process of obtaining these permits a variety of information is collected which are stored in the Inventory System.

- AIR QUALITY DATA

The air quality data obtained in the network of air sampling stations installed in the State of Sao Paulo are forwarded to the Inventory System.

- TECHNICAL DATA ABOUT THE SOURCES AND CHARACTERISTICS OF SAO PAULO METROPOLITAN AREA

The technical data about sources, such as: industrial processing, flowsheets, control methods, etc. and the characteristics of the Sao Paulo Metropolitan Area, such as: zoning, meteorological and topographical data, maps, number and type of automotive vehicles, etc are gathered and added to the Inventory System.

- COMMUNITY STUDIES

In the development of this activity support is provided for corrective control actions, directly working along the neighbouring community to the offending polluting sources through community surveys, information to the population about adopted measures, follow up to the evolution of the problem referred to complaint against air pollution and indirectly through the establishment of objective criteria which permit classification in priorities of the complaints with the objective of attending.

- CORRECTIVE ACTION

This control is applied to firms which were already functioning before the promulgation of Law Number 997 and its Regulation and those which are complained

by the population. In this type of activity are generated important information to inventory purpose and emitted legal documents, such as: inspection citations and infraction citations: warning, penalty, summons and shutdown.

- REGISTER

All potentially polluting activities functioning before the promulgation of Law Number 997 and its Regulations is obliged to register itself at CETESB and to apply for a Operation Permit being for that reason called by publication in the official press (Articles 67 to 69 of the Regulation of the Law Number 997).

II.2. DATA ORGANIZATION

Due to the large volume of information generated by the aforementioned activities a different treatment is given to the data.

The information coming from the activities referred to the preventive control arrive to the Inventory System in form of administrative files that are inventoried, its main data transcribed into a control card and a history of the developed actions is made.

The information coming from the activities referred to the corrective control are channelled to the Inventory System through the following mechanisms:

- community surveys made by sociologists that go to the neighbourhood of the complained air pollution source and interview members of the community affected during which are collected data of: significance of the complaint, extension of the problem and interference level in the community.

- industrial surveys made by engineers that go to the air pollution source and collect the following data: raw materials, manufactured products, industrial process, flowsheets, specific air pollution sources and control equipments, after which is made a technical report from a point of view of air pollution control engineering.
- fiscalization of combustion sources made by technicians which daily go through schedules of combustion equipments fiscalization (Ringelmann Chart Fiscalization - Black Smoke) making readings of the combustion products emitted by the stacks.
- surveys made by engineers attending complaints of the population against air pollution or to check compliance of legal requirements.

Considering that the Inventory System must furnish technical and operational support to the fiscalization and air pollution control actions a method of elaboration of files was adopted for storage of the information:

There are two types of files:

- ADMINISTRATIVE FILES

Containing individually all the information about the administrative process that is being developed against the emission sources; population complaint register, community surveys report, inspection citation, penalties, appeals and contravention dossiers.

- TECHNICAL FILES

Containing individually all the information about emission sources, such as: name, address, raw materials, fuels, process, operations and equipments employed, operation cycle, etc. These files also contain differentiated histories of actions developed by CETESB, as well histories of preventive, corrective and fiscalization which one relating in a

suscinct manner the type of specific action and the technical report. The histories are constantly actualized by information added to the Inventory System coming from each event occurred during the control action.

- CENTRAL OF DOSSIERS

A Central of Dossiers was instituted to distribute for attending according to a established priority sequence the dossiers of complaint, follow and control terms originated by the control actions.

- ACCIDENT INVENTORY

The Accident Inventory contains individually information about potential sources of accidents, pollutants emitted and control measures that can be adopted in case of an emergency.

- TECHNICAL INFORMATION INVENTORY

The Technical Information Inventory contains information about processes, operations, equipments, flowsheets, fuels, control methods, raw material, as well data of zoning, air quality, maps, meteorological and topographical data, etc and allows to orient the engineer in a short space of time as to the attending of a certain air pollution source.

The planning of the Inventory System activities is shown in Figure I.

III. DATA TREATMENT AND APPLICATIONS

The analysis and interpretation of the data permits:

- Estimate the emissions for various atmospheric pollutants emitted in the Sao Paulo Metropolitan Area-SPMA through application of emission factors.

- Identify the most significant sources of air pollution for a given pollutant presenting the emissions in form of an ABC curve.
- Define critical areas of air pollution which merite priority control action.
- Establish priorities sequence for the corrective actions on the air pollution sources.
- Propose the necessary reductions in the emissions of a given pollutant based on the emission estimatives and on the air quality data so as to reach the air quality standards.

Some data and results obtained from the Inventory System referred to the Sao Paulo Metropolitan Area - SPMA are presented in the appendix.

In this way it is demonstrated that the Inventory System planned as described in the present work is a fundamental tool in the strategic planning of air pollution control.

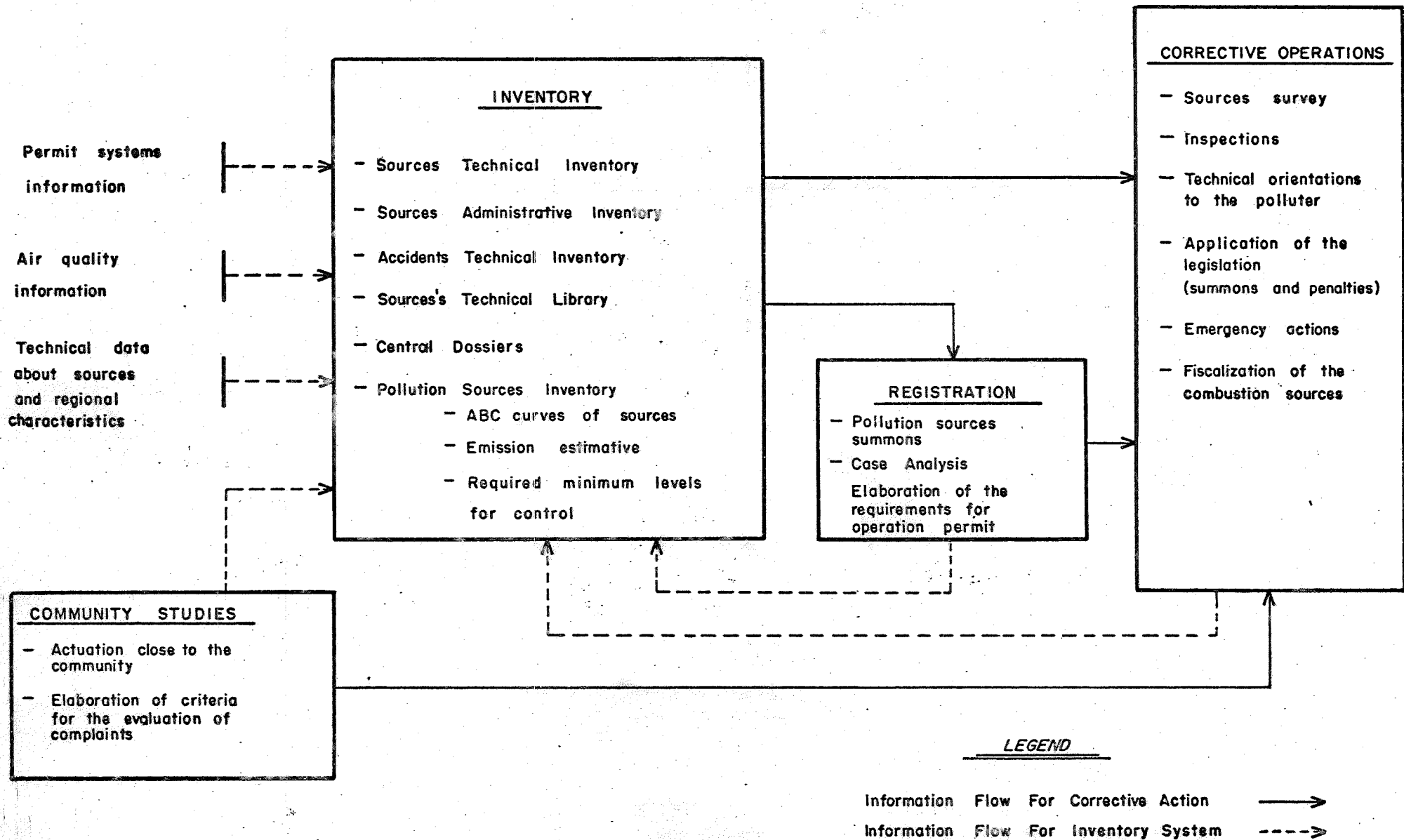
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V. A P P E N D I X

Figure 1 — PLANNING OF THE INVENTORY SYSTEM ACTIVITIES



PARTICULATE EMISSION IN THE SPMA BY PROCESSES, INDUSTRIAL
OPERATION AND COMBUSTION - 1978

	A	B	C	TOTALS
Nr OF INDUSTRIES	69	193	1.813	2.075
%	3,32	9,30	87,38	100
EMISSION (TONS/DAY)	384,44	31,80	10,56	426,80
%	90,07	7,45	2,48	100

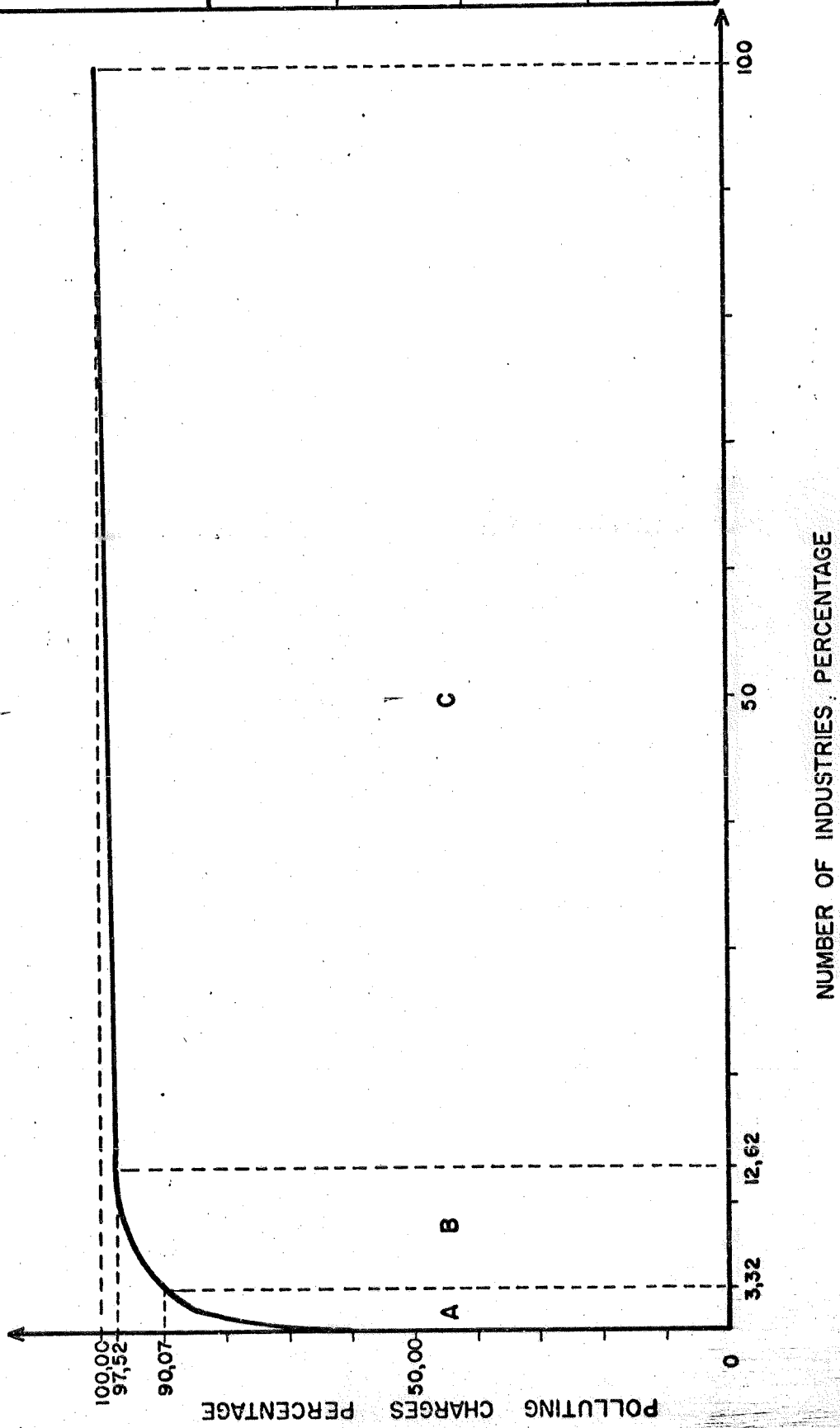


TABLE - EMISSION DISTRIBUTION BY SOURCE AND POLLUTANT IN THE SAO PAULO METROPOLITAN AREA (SPMA) - 1978

SOURCE \ POLLUTANT	PARTICULATE		SOx		CO		NOx		HC	
	MT/DAY	%	MT/DAY	%	MT/DAY	%	MT/DAY	%	MT/DAY	%
Industrial process and operations	399	74	18	3	86	2	-	-	127	17
Combustion of fuels in stationary source	28	5	541	83	19	-	62	20	9	1
Motor vehicles diesel	10	2	57	9	163	4	111	34	27	4
Motor vehicles gasoline	23	4	31	5	4268	91	142	44	504	69
Burning of solid waste	32	6	1	-	120	3	7	2	39	5
Others (*)	51	9	-	-	-	-	-	-	27	4
TOTAL	543	100	648	100	4656	100	322	100	733	100

(*)Others sources include: volatile material trading and fugitive dust sources (traffic on unpaved ways, civil construction and paving works.)

