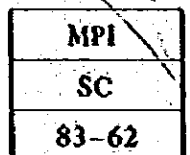
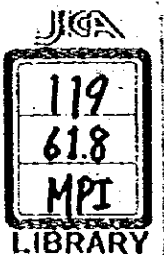


**THE REPORT
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ENVIRONMENTAL EFFECTS
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AND
INTEGRATED STEEL MILL
IN THE REPUBLIC OF SINGAPORE
VOLUME II – AIR QUALITY
(SUMMARY)**

JULY 1983

JAPAN INTERNATIONAL COOPERATION AGENCY



(12, 68.3, 66.8)

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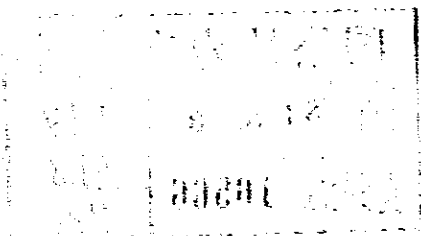
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1. Background of Study

The Government of the Republic of Singapore has requested the Government of Japan to extend its technical assistance to conduct the study on the environmental effects of coal firing power stations and integrated steel mill which will be sited in the new industrial estates under the development plan of the Republic of Singapore.

In response to the request, the preliminary survey team has been sent to Singapore in December 1980 and the team entered into agreement on the scope of work including survey items, survey schedule and so on.

The environmental study has been carried out for air and water quality based on the above scope of work.

This report has been compiled on air quality study.

2. Objective of Study

The objectives of the study are (1) to conduct the field survey on air quality of the total area of the Republic of Singapore, (2) to conduct dispersion simulation of SO_2 based on the data obtained through the field survey together with the collected data related to the present and future emission sources for the purpose of predicting the environmental impact of the coal firing power stations and integrated steel mill which will be operated by 1990.

3. Survey Area

The survey area of this study covers the total area of the Republic of Singapore.

For monitoring the present level of SO_2 concentration and meteorological conditions, seven monitoring stations have been established as shown in Fig. 1.

4. Survey Schedule

The survey schedule of this study is as follows:

- (1) Field survey during June 1981 to July 1982
- (2) Data processing & analysis, and simulation during August 1982 to March 1983

5. Outline of Survey Items and Survey Methods

In order to survey the present environmental conditions of the Republic of Singapore and to obtain the basic data for simulation, the following field survey has been conducted.

The study has been carried out under the close cooperation of JURONG TOWN CORPORATION (JTC), National University of Singapore (NUS) and other Authorities concerned.

The outline of the study is shown in Fig. 2.

(1) SO₂ concentration

The continuous and automatic monitoring of ambient SO₂ concentration has been conducted for 365 days during July 15th 1981 to July 14th 1982, by establishing 7 monitoring stations (MP-1 to MP-7).

(2) Meteorological conditions

Monitoring of wind direction and wind velocity at 7 stations, and temperature, solar & net radiation flux at 1 station has been conducted for 365 days by continuous and automatic instruments. In addition to the above, the vertical distribution of wind direction and velocity has been measured by releasing pilot balloons and tracing by Theodolite for two days at two points during 08:00 to 17:00 hours respectively.

(3) Collection of emission sources data

The emission sources data have been collected by JTC under guidance of Japanese team and based on these data collected and supplied by Singapore side, the assumption of future emission factors have been performed.

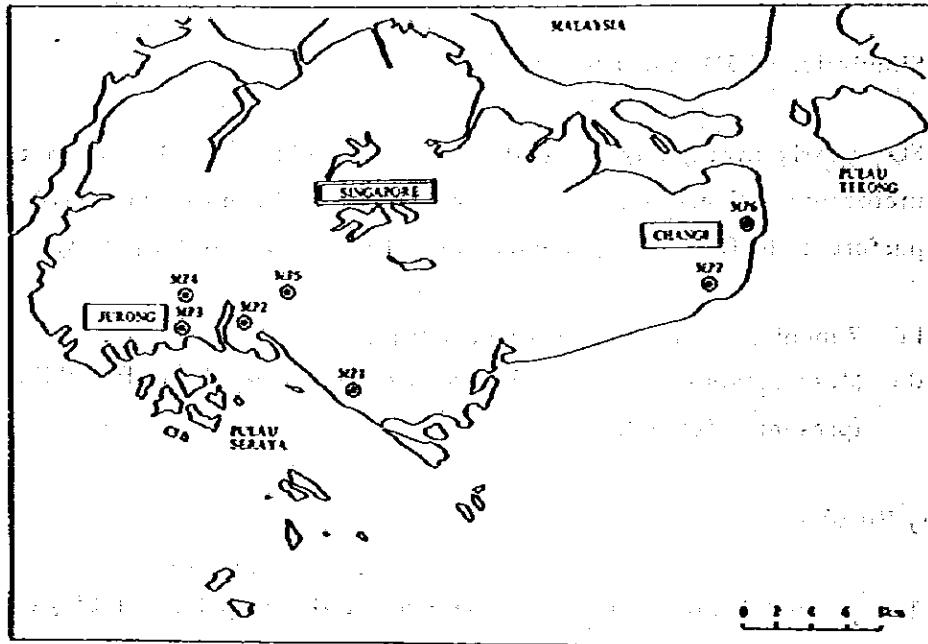
(4) Simulation of SO₂ diffusion

SO₂ yearly average concentration has been obtained. Based on the monitored meteorological and emission sources data, simulation of SO₂ diffusion has been performed by Gaussian plume puff model for the following points.

- (a) 7 monitoring stations (present & future)
- (b) Mesh points (1 km x 1 km) covering total area of the Republic of Singapore (present & future).

6. Survey Results

- (1) The present level of SO₂ concentration in the Republic of Singapore is in the category of acceptable level.
- (2) The future level after operation of new plants in 1990 is predicted as about one and a half times higher than that of the present but it is still in the acceptable level, compared with air quality standards of other countries including USA, West Germany and other Asian countries.



MP-1: National University of Singapore (NUS)

MP-2: JTC Town Hall

MP-3: JTC Soil Investigation Unit (SIU)

MP-4: Boon Lay Apartment

MP-5: Bukit Timah Fire Station

MP-6: Changi Airport

MP-7: Bedok Police Station

Fig. 1 Location of Monitoring Stations

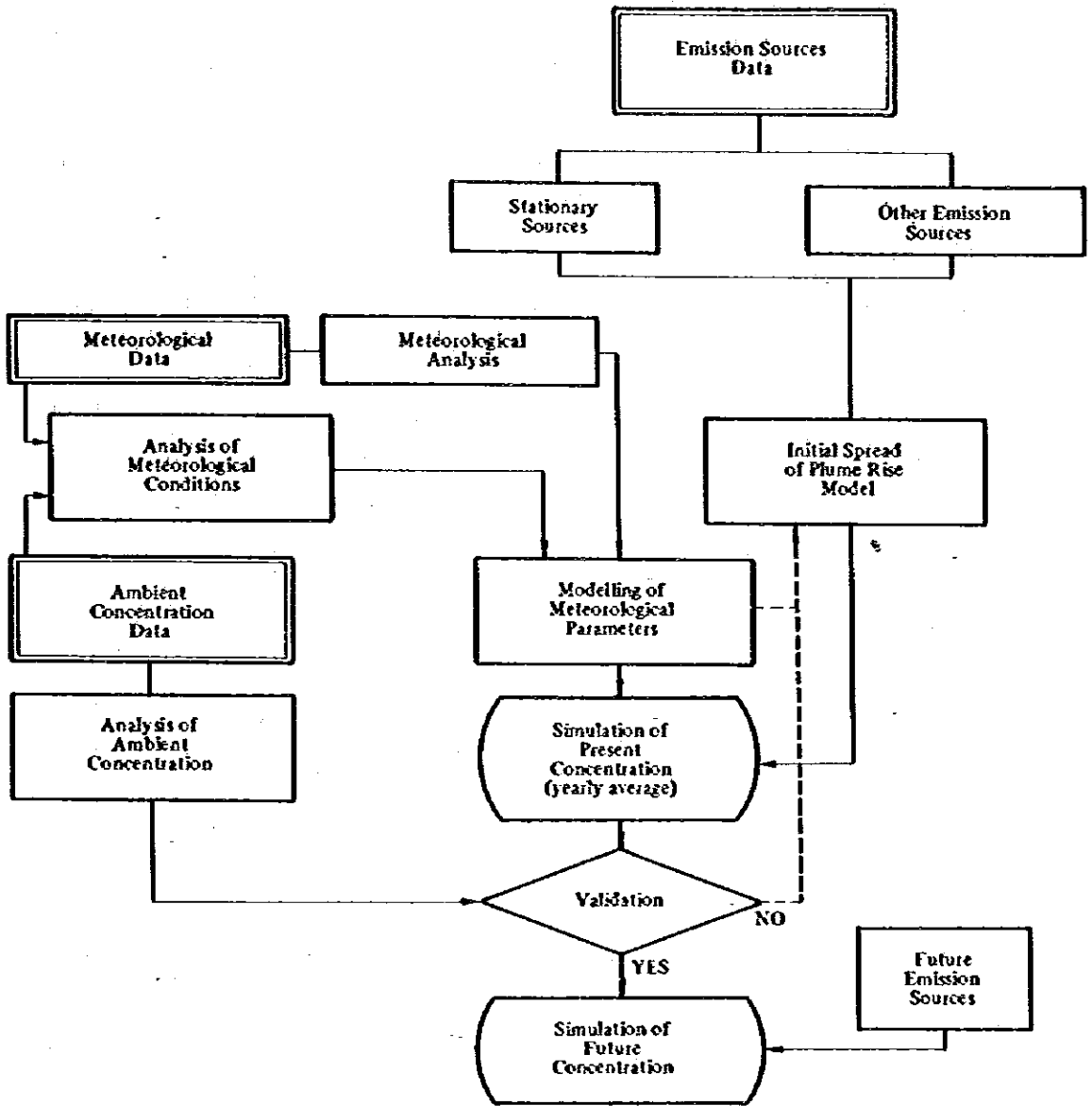


Fig. 2 Outline of Study

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that this is essential for ensuring transparency and accountability in the organization's operations.

2. The second part of the document outlines the various methods and tools used to collect and analyze data. It highlights the need for consistent and reliable data collection processes to support informed decision-making.

3. The third part of the document focuses on the role of technology in modern data management. It discusses how advanced software solutions can streamline data collection, storage, and analysis, thereby improving efficiency and accuracy.

4. The fourth part of the document addresses the challenges associated with data security and privacy. It provides guidance on implementing robust security measures to protect sensitive information from unauthorized access and breaches.

5. The fifth part of the document explores the importance of data governance and compliance. It discusses the need for clear policies and procedures to ensure that data is used in a responsible and lawful manner.

6. The sixth part of the document discusses the role of data in driving innovation and growth. It highlights how data-driven insights can identify new opportunities and inform strategic initiatives.

7. The seventh part of the document provides a summary of the key findings and recommendations. It emphasizes the need for a holistic approach to data management that integrates all aspects of the organization's operations.

8. The eighth part of the document includes a list of references and resources for further reading. It provides a comprehensive overview of the current state of data management research and practice.

9. The ninth part of the document contains a glossary of key terms and definitions. This is intended to ensure that all readers have a clear understanding of the terminology used throughout the document.

10. The tenth part of the document includes a list of appendices and supplementary materials. These materials provide additional details and data to support the main text of the document.

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