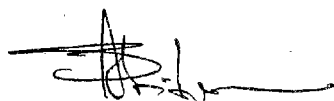


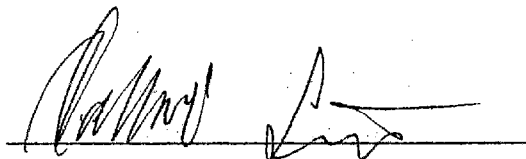
付属資料 3 . M / M(Minutes of Meetings)

MINUTES OF MEETINGS
ON
SCOPE OF WORK
FOR
THE STUDY
ON
THE ACID DEPOSITION CONTROL STRATEGY
IN THE KINGDOM OF THAILAND
AGREED UPON BETWEEN
POLLUTION CONTROL DEPARTMENT, MOSTE
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Bangkok, July 31, 2001



Mr. Sirithan Pairoj-Boriboon
Director General
Pollution Control Department, Ministry
of Science, Technology and Environment
Kingdom of Thailand



Mr. SUZUKI Katsunori
Leader of Preparatory Study Team
Japan International Cooperation Agency
Japan

In response to the official request of the Government of Thailand (hereinafter referred to as "the Government of Thailand"), the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Preparatory Study Team, headed by Mr. SUZUKI Katsunori (hereinafter referred to as "the Team"), to Thailand from July 22 to August 10, 2001 to discuss the Scope of Work (hereinafter referred to as "S/W") for the Study on the Acid Deposition Control Strategy in the Kingdom of Thailand (hereinafter referred to as "the Study").

During its stay in Thailand, the Team carried out field surveys in the study area, and held a series of discussion with Pollution Control Department, Ministry of Science, Technology and Environment (hereinafter referred to as "PCD"), Department of Technical and Economic Cooperation (hereinafter referred to as "DTEC"), and other authorities concerned of the Government of Thailand. The list of those who attended the wrap up meeting on 30 July 2001 is shown in Appendix 1.

The Minutes of Meetings have been prepared for the better understanding of the S/W that would be agreed upon between PCD and the JICA Thailand Office in August 2001.

The main items that were discussed and agreed by both sides are as follows.

I. TITLE OF THE STUDY

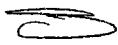
Both the Thai side and the Team agreed that the title of the study would be "the Study on the Acid Deposition Control Strategy in the Kingdom of Thailand" as described in the S/W.

II. STUDY AREA

Both sides agreed that the Study would cover the whole country of Thailand as described in the S/W. In addition, more detailed study would be undertaken for the Bangkok Metropolitan Region (the BMR) by using hybrid approach (with another model).

III. SCOPE OF THE STUDY

Both sides agreed that the Study would be carried out in principle, in the following manner.



1. Steering Committee

The Study will be guided and supervised by the Steering Committee (hereinafter referred to as "the Steering Committee"). The Sub-Committee on Acid Deposition Monitoring Network in Thailand will function as the Steering Committee. The results of the Study will be reported to the Pollution Control Board, and the National Environment Board for their consideration as appropriate.

2. Study Team

JICA will notify number and field of the members of the Study Team (hereinafter referred to as "the Study Team") 1(one) month before the commencement of the Study. Information on local consultants to be hired by the Study Team will be informed later to PCD in due course. Counterpart personnel of the Study in PCD, in principle, are listed in Appendix 2.

3. Base year/target year

The base year of the Study will be 2000, and the target year is tentatively set as 2011.

4. Target substances

Target substances will be sulfur (S) for the whole country, and sulfur (S) and nitrogen oxides (NOx) for the BMR.

5. Future control targets

Regarding future control targets, WHO criteria (hourly, daily and annual) will be considered. Critical load approach used in RAINS-ASIA model will be applied as a reference for possible impact analysis. Consideration for impact analysis will be given to available local soil sensitivity data.

6. Models to be applied

RAINS-ASIA ATMOS module (the original model) will be used as the long-range transport model. Grid model in Airviro system at PCD will be applied in hybrid approach for the BMR. The domain for the long-range transport model will be Southeast Asia, and that for Grid model will be the BMR.

7. Steps to be taken in the Study

The Study Team will, in principle, follow the steps described in Appendix 3.



Modifications will be considered as appropriate in the process of the Study.

8. Training components

In addition to the on-the-job training for the counterpart staff in PCD, presentations on emission inventories and modelling will be undertaken for broader PCD and other agency staff as a part of training at the end of respective activities. During the first four months of modelling activities, intensive training will be undertaken to enable PCD staff having better understanding and handling capability of the models.

PCD requested to explore a possibility of the counterpart training in Japan, in addition to the training in Thailand for the purpose of the smooth transfer of technology during the Study. The Team agreed to convey this request to JICA H.Q. for consideration.

9. Seminars

Two national seminars (Initial and Intermediate) and one international seminar (Final) will be undertaken during the Study. The expenses for the national seminars, e.g. meeting room, expenses for photocopying and refreshments will be, in principle, borne by PCD. The expenses for the International Seminar will be shared by both sides.

10. Cooperation with international organizations and bilateral aid agencies

For smooth implementation of the Study, PCD will coordinate with other donors to achieve maximum cooperation from them as well as to avoid any duplicated works. In this connection, particular attention should be paid to the Swedish project on "Study of acidification in Thailand" with ERTC, for which PCD will make necessary coordination.

IV. UNDERTAKING OF GOVERNMENT OF THAILAND

1. The Team requested the Thai side to take necessary procedures to permit the Study Team to take available aerial photographs and satellite images out of Thailand, when it was considered necessary for the Study. However, the Thai side notified that they would provide requested information to the Study Team as far as possible according to laws and regulations of Thailand.

2. The Thai side agreed that office space and office equipment would be provided for the use of the Study Team. As for necessary equipment, the Thai side requested the Team to provide some equipment, to which the Team agreed to convey this request to JICA H.Q.



3. The Thai side requested the Team to provide, in principle, transportation at JICA's own expense due to the budgetary constraints in the Thai side. The Team agreed to convey this request to JICA H.Q. for the positive consideration. However, it was also agreed that transportation vehicles for field visits and other necessary purposes would be provided from the Thai side, as much as possible.

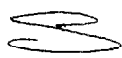
V. OTHERS

1. It was agreed that Sections VII and VIII of the S/W would be further elaborated by DTEC and JICA Thailand Office in consultation with PCD.

2. Both sides agreed that the Study would be undertaken by collecting and analyzing existing data and information, and that measurements would not be undertaken specifically for the Study.

3. Both sides agreed that the results of the Study would be open to the public in order to achieve maximum use of the Study results.

4. The Thai side agreed with the Team on the necessity of the establishment of a web site at PCD with the assistance from Japanese consultant showing the progress of the Study on the Internet to provide the public with more information on the technical cooperation between the two governments. It was mutually agreed that the contents of the web site would be discussed in future.



APPENDIX 1

List of attendees to the Wrap-up Meeting on 30 July 2001

(Thai side)

Pollution Control Department

Dr. Supat Wangwongwatana	Director, Air Quality and Noise Management Division
Mr. Phunsak Theramongkol	Environmental Officer, AQNMD
Mr. Aunnop Rungmaksathum	Environmental Officer, AQNMD
Mr. Nawarat Mitrjit	Environmental Officer, AQNMD
Mr. Panya Warapetcharayut	Environmental Officer, AQNMD
Ms. Wassana Toruksa	Environmental Officer, AQNMD

Department of Technical and Economic Cooperation

Ms. Hataichanok Siriwardhanakul	Japan Sub-division
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Meteorological Department

Mr. Sarayut Rachupimol	Chief, Atmospheric Turbidity, Solar Radiation & Ozone Observations
Ms. Sumridh Sudhibrabha	Meteorologist, ATSROO

Department of Industrial Works

Mr. Nopparit Sirirudeeporn	Head of Air Pollution Division
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Environmental Research and Training Centre

Ms. Hathairatana Garivait	Environmental Officer
Ms. Teeranuth Mongkolsopanrat	Environmental Officer

(Japanese Side)

Preparatory Study Team

Mr. SUZUKI Katsunori	Leader
Dr. MATSUDA Kazuhide	Member
Mr. ENDO Hiroaki	Member
Mr. YUKAWA Akira	Member
Mr. SASAKA Tsuyoshi	Member

JICA Thailand Office

Ms. HAYASHI Keiko	Assistant of Resident Representative
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APPENDIX 2

Counterpart staff in PCD for the Study

Project Coordinator

Dr. Supat Wangwongwatana

Director, AQNMD

Assistant Project Coordinator

Ms. Kanjana Suaysorn

Administrative Officer, AQNMD

Monitoring

Mr. Phunsak Theramongkol

Acting Chief of Air Quality Monitoring
1&2 Sub-division, AQNMD

Mr. Nawarat Mitrit

Environmental Officer, AQNMD

Ms. Wassana Toruksa

Environmental Officer, AQNMD

Emission inventories

Ms. Rungsima Maleevat

Environmental Officer, AQNMD

Mr. Panya Warapetcharayut

Environmental Officer, AQNMD

Mr. Aunnop Rungraksathum

Environmental Officer, AQNMD

Modeling

Mr. Sakda Jandetchanawong

Acting Chief of Data Analysis and
Processing Sub-division, AQNMD

Mr. Aunnop Rungraksathum

Environmental Officer, AQNMD

Ms. Vanisa Surapipith

Control strategy

Dr. Supat Wangwongwatana

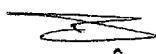
Director, AQNMD

Mr. Seksan Sangdow

Acting Chief of Industrial Air Pollution
Sub-division, AQNMD

Mr. Janejob Suksod

Acting Chief of Automotive Air Pollution
Sub-division, AQNMD



APPENDIX 3

Steps to be taken for the Study

1. Initial Seminar

The Japanese Consultant will prepare the inception report. Japanese and local consultants will dispatch resource persons for the Seminar. The Pollution Control Department (PCD) will develop the outline, program etc., of the Seminar, arrange logistic issues including the dates and the venue of the Seminar, and prepare necessary financial resources for the Seminar.

- Preparation of the Inception Report
- Development of the outline, program etc. of the Seminar
- Arrangements of logistic issues
- Preparation of necessary financial resources

2. Data collection

The Japanese and local consultants will collect data and information except the following ones, which will be collected and provided to the Japanese consultant by PCD. For data and information from the government agencies, PCD will coordinate/make necessary arrangements.

- National administration on acid deposition control;
- Acid deposition monitoring data in the country (in 2000) (not limited to EANET data);
- Air quality data in the country (in 2000);
- Meteorological data in the country (in 2000); and
- Socio-economic conditions to be obtained from the government agencies.

3. Development/elaboration of emission inventories for the Base Year (2000)

Target substances will be sulfur (S) for the whole country and sulfur(S) and nitrogen oxides (NOx) for the Bangkok Metropolitan Region (the BMR). For the BMR, emissions in 2000 will be estimated from 1997 emissions by projection (adjustment) of those in "the Air Emission Sources Database in BMR", which was produced by PCD. Based on the request from PCD, the Team agreed to convey this request to JICA H.Q. for the presentation by a Japanese resource person on Japanese experience in developing emission inventories for VOC at the Seminar.

The Japanese and local consultants will do the work, and PCD will make necessary arrangements if they need help, such as a letter from PCD coupled with questionnaires or interviews for factories.

- Review and elaboration of emission inventories for stationary sources

Identification/selection of large point sources from those prescribed in Section 46 & 80 of ECNEQ (about 60-80 % coverage of the total sulfur emission from stationary sources: 40 to a few hundreds plants including lignite thermal power plants, oil refinery plants and sulfuric acid factories)

Collection of EIA information and emission monitoring data, including geographical locations, emission rates, fuel consumption etc., on the large point sources from OEPP with assistance of PCD

Estimation of emissions of specific pollutants (S for the whole country; S and NO_x for the BMR)

Gridding

- Review and elaboration of emission inventories for mobile sources

Collection of information on national data

Registered vehicles by type

Vehicular fuel consumption by type

Calculation of automotive emissions in the whole country

Review of emission factors

Selection of 5 major roads from BKK to N, NE, S, E, and W regions

Collection of information on major roads

Allocation of automotive emissions to major roads

Estimation of emissions from other small roads by province

Estimation of emissions from other sources (5 major railways from BKK to the regions etc.)

Gridding

- Review and elaboration of emission inventories for area sources

Collection of information on fuel consumption and population density by province

Review of emission factors

Estimation of emissions by airports, harbors, etc.

Estimation of emissions by residential, commercial and industrial sources

Gridding



4. Development of future scenarios in the target year (2011)

The Japanese Consultant will do the work in consultation with PCD. PCD will make necessary coordination with relevant agencies. A Steering Committee session will be held to review the outcome of the study up to the results of model validations and consider future scenarios.

- Review of the Ninth National Development Plan
- Review of other future plans by sector, e.g., energy, transportation and major industries)
- Selection of major indicators
- Estimation of major indicators in 2011

5. Development/elaboration of emission inventories for the Target Year (2011)

The same steps as the Base Year will be taken. The emission inventories before gridding will be completed by the end of model validations.

6. Application of a long-range transport model

The work will be done at PCD by Japanese and local consultants in cooperation with PCD staff. Necessary equipment and offices for modelling works will be provided by PCD.

- Review of RAINS-ASIA ATMOS module (the original model) and Grid model of the Airviro system at PCD
- Construction/installation of systems at PCD
- Training to understand and operate the models
- Development of input data sets, such as meteorological data and emission data on the base year
- Simulations by using emission data on the base year
- Model validations in comparison with the monitoring data in 2000
- Analysis of contribution by Thailand and other countries
- Analysis of contributions by grids in the country
- Simulations by using emission data in the target year
- Training for better understanding of the models

7. Intermediate Seminar

Intermediate Seminar will be held to present the simulation results and potential project to control substances that cause acid deposition, and receive comments for the results. The procedures will be same as the Initial Seminar.

8. Development of acid deposition control strategy in consultation with PCD and other relevant agencies

Acid deposition strategy is to be presented for improvement of institutional structures in both central and regional governments and strengthening their capability in environmental technologies especially in the following fields:

- environmental management;
- minimization of emissions particularly from stationary and vehicular emission sources;
- improved combustion technologies;
- introduction of cleaner technologies
- improvement of fuel quality
- installation of flue gas treatment
- enhancement of community partnership etc.

In view of effective execution of the Study, counterparts in PCD are requested to provide information on national development policies, practical proposals and comments on proposals from the Japanese side during discussions for developing the control strategy, taking into account the on-going sectoral action plans and budgetary allocations.

- Review of technical options to be potentially applied to the country
- List up of potential control measures in various environmental fields covering actions by central government, provincial and local governments, private sector and individuals.
- Development/selection of potential projects
- Selection of target priority projects, considering urgency and cost effectiveness, based on the simulation results
- Scheduling of target priority projects classified in two or three phases until 2011
- Development of basic design and detailed contents of the projects
- Conclusions and recommendations

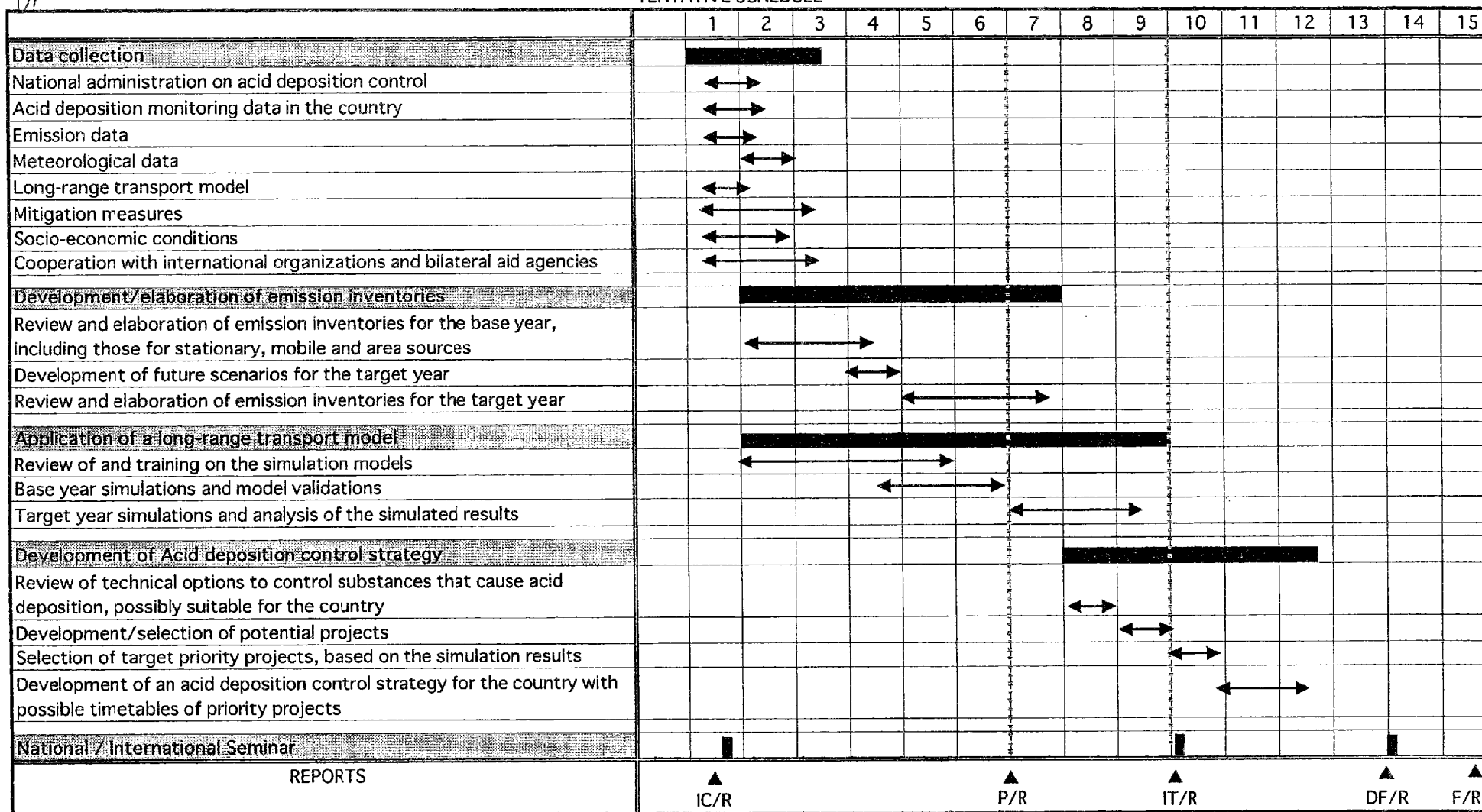


9. International Seminar

Final, International Seminar will be undertaken. The financial resources required for the seminar will be shared by PCD and the Japanese side.

10. Preparation of Final Report

TENTATIVE SCHEDULE



付属資料 4 . 主要面談者リスト

4. 主要面談者リスト

主要面談者リスト

タイ側

PCD (Pollution Control Department)

Dr. Jarupong Boon-Long	Deputy Director General
Air Quality and Noise Management Division	
Dr. Supat Wangwongwatana	Director
Mr. Phunsak Theramongkol	Environmental Officer 6 (Monitoring Sub-Division)
Mr. Nawarat Mitritj	Environmental Officer 5 (Monitoring Sub-Division)
Ms. Wassana Toruksa	Environmental Officer 4 (Monitoring Sub-Division)
Ms. Kanjana Suaysom	Environmental Officer
Ms. RungsimaMaleevat	Environmental Officer 4 (Industrial Air Pollution S.D.)
Mr. Sakda Jandetchanawong	Environmental Officer 6 (Data Analysis and Processing S.D.)
Mr. Aunnop Rungraksathum	Environmental Officer (Data Analysis and Processing S.D.)
Mr. Panya Warapetcharaynt	Environmental Officer 6 (Automotive Air Pollution S.D.)
Ms. Benjawan Pentrakulchai	Environmental Officer (Automotive Air Pollution S.D.)

DTEC (Department of Technical and Economic Cooperation)

Mr. Banchong Amornchewin	Chief of Japan S.D. (Bureau of External Cooperation)
Ms. Hataichanok Siritwadhanakul	Program Officer (Japan Sub-Division)
Ms. Tanyaporn Lertlaksana	Program Officer (Japan Sub-Division)

ERTC (Environmental Research and Training Center), DEQP, MOSTE

Ms. Pornthip Puncharoen	Director
Ms. Phaka Sukasem	Chief of Air and Noise Section
Ms. Hathairatana Garivait	Environmental Officer
Ms. Teeranuth Mongholsoponrat	Environmental Officer (Air and Noise Section)

TMD (Thailand Meteorological Department)

Mr. Tawiesith Damrak	Deputy Director General
Mr. Sarayut Rachupimol	Chief of Air Turbidity, Solar Radiation & Atmospheric Ozone Observation Sub-Division
Ms. Sumridh Sudhibrabha	Meteorologist

DIW (Department of Industrial Works)

Mr. Nopparit Sirirudeeporn	Head of Air Pollution Division
Ms. Poyuw Kummook	Scientist (Air Pollution Division)

King Mongkut's University of Technology Thonburi (School of Energy & Materials)

Dr. Pojanie Khummongkol
Ms. Jarlthat Milindalehha

Assoc. Prof. and Chairperson (Env. Technology Division)
Ph.D Course Student

ESCAP (Economic and Social Commission for Asia and the Pacific), United Nations

Mr. Masakazu Ichimura

Expert on Environmental Policies

JICA タイ事務所

高島 宏明
林 敬子

次長
担当所員