

Emission Clinic Green Service: Environmental Management for Car and Motorcycle Maintenance Center

Sayam Aroonsrimorakot

Faculty of Environment and Resource Studies, Mahidol University

Abstract

The project of emission clinic green service is mainly responsible by Department of Pollution Control. The control and prevention of environmental impact from maintenance and configuration activities of vehicle have been established and operated for more than 3 years with many garages. They attend the environmental improvement and development of environmental management in the garage which must operate as required by Pollution Control Department such as waste water control, air pollution control, noise pollution control, waste management, chemical substances handling and storage, chemical substances leak and spill prevention, including health care and safety of workers concerning the use of personal protective equipment (PPE) and emergency preparedness and response equipment, etc. The Emission Clinic Green Service has currently 122 participating garages. The Pollution Control Department had applied follow up environmental audit to Emission Clinic Green Service of 2006 - 2008 to observe the effectiveness of environmental preservation continually and sustainability. The result of audit in 2009 found that most of the garages were excellent effectiveness of environmental preservation 99 garages (3 stars level), medium effectiveness of environmental preservation 11 garages (2 stars level) and basic environmental preservation 2 garages (1 star level) and there were 2 which did not pass the criterion of the Pollution Control Department.

Key Words: Green Service/ Emission Clinic/ Environmental Management

1. Introduction

The ongoing environmental problem has been consequently occurring from the past activities of which main causes are non pollution control before releasing to an environment, lack of people's awareness on environment conservation. Such pollutants has been emitting from industrial sector, community, and agriculture sector that considerably provide the currently environment deterioration all over the world. For example, frequency of severe natural phenomena and insufficient natural resources for life subsistence. As a result, such impacts stimulate all sectors to pay attention to protect, conserve, and

restore environment especially pollution from vehicles. Therefore, the Air Quality and Noise Management Bureau, Pollution Control Department (PCD), the Ministry of Natural Resources and Environment focuses on air and noise pollution continuously confronted by peoples who live in Bangkok Metropolitan and vicinity as well as urban areas (PCD, 2007). So several measures have been introduced: investigation of air and noise quality of heavy traffic areas; imposing vehicles emitting pollution over permission limit; improvement of imposed vehicles; control of construction and transportation activities which are pollution point sources. Other countermeasures such as fuel quality improvement, annual vehicle

* Corresponding author.

E-mail address: ensar@mahidol.ac.th

inspection, and promotion of low pollution emission vehicle etc. Apart from these pollution control measures, according to the Automotive Air Pollution Division of the Air Quality and Noise Management Bureau, the automobile and motorcycle engine modification activities directly impact on environment e.g. water pollution, air pollution, noise pollution, hazardous waste etc. For the first time, Development of Air Pollution Alleviation Management Project, Activity of Network and Service Quality Development on Emission Clinic was established in 2006 accordingly. Five provinces consisting of the Bangkok Metropolitan, Chiang Mai Province, Songkhla Province, Nakornratchasima Province, and Chonburi Province are determined for being pilot province. Because these provinces have high population density and huge number of vehicles. The scheme emphasizes on mechanism of corrective and preventive environment problems by encouraging entrepreneurs who provide service for automobile and motorcycle maintenance and modification (Vehicle Emission Clinic) in establishment of good environmental guidelines and management practices for "Green Services Entrepreneur" (PCD, 2008). These Vehicle Emission Clinics develop their service quality to meet environmental management standard in conformity with public sector campaign that all public sector agencies and people should purchase environmentally friendly products and services only. This activity would increase alternative choice for consumers who are interested in eco-friendly services. Complying with the strategy under 10th National Economic and Social Development Plan 2007-2011 and Environment Quality Management Plan 2007-2011, this campaign focuses on strengthening of all sectors and participating in control, prevention, and mitigation pollution problems as well as

practices compliance with environment law (PCD, 2009). This project was interested by many entrepreneurs of vehicle industry group to improve their work place being good environment and reducing pollution from their works. At present, such project is renamed to be Emission Clinic Green Service Project. There are 120 garages still keeping their service standard as Emission Clinic Green Service: BMA 63 garages, Chiang Mai Province 23 garages, Songkhla Province 18 garages, Nakornratchasima Province 11 garages, and Chonburi Province 5 garages. But 2 garages in Chiang Mai Province cannot keep their standard service for Emission Clinic Green Service (PCD, 2007). Annual garage monitoring and inspection on environmental management system is usually performed by Automotive Air Pollution Division of the Air quality and noise management Bureau, Pollution Control Department (PCD) to ensure continuing and effective efficiency of their environmental Management System (PCD, 2009).

2. Methodology

An implementation of Vehicle Emission Clinic Service enhancement and development was performed by two related agencies that are Automotive Air Pollution Division of the Air quality and noise management Bureau, the Pollution Control Department, the Ministry of Natural Resources and Environment and consultant/expert in environmental management. Their responsibilities were to steer and verify entrepreneurs. Kick off project implementation program was that entrepreneurs were invited to participate in the project by the Pollution Control Department. An application form was submitted by the entrepreneur as volunteer. Regarding consultant/expert in environmental management provides training course on environmental

management system and suggestion for improvement of entrepreneurs' environment that steers environmental management system being efficiently implemented. The final step in relative procedure is auditing and providing certification by the PCD. Details can be explained as follows.

2.1 Training Course on Environmental Management System (EMS) and Consulting Services for Improvement of Entrepreneurs' Environment

Training courses on Environmental Management System (EMS) and consulting service for improvement of entrepreneurs' environment are provided by the consultant/expert with international standard ISO 14001:2004 on environmental management. Such

international standard is applied to outline the subjects for controlling environmental aspects occurred from activities. The subject is divided into 3 parts e.g. (Aroonsrimorakot, S. 2006a; Aroonsrimorakot, S. and Tantrakarnapha, K. 2006)

1. Environment Policy Determination
2. Planning for Implementation
 - Environmental aspects

Identification and Assessment

- Related Laws and Regulations
- Authority and Responsibility

Determination on Environmental Management

- 3 Implementation and operation
 - Environmental Communication
 - Environmental Training
 - Control of Implementation for Reducing Environmental Aspects
 - Environmental Aspects
- Prevention and Mitigations

Table 1: Clauses on Environmental Management and Benefit for Entrepreneurs

Clauses	Benefit for Entrepreneurs
Clause 1 Environment Policy	<ul style="list-style-type: none"> ▪ All staffs obtain administrator's intention on work place environment improvement, prevention, and mitigation ▪ Communication and public relation for good corporate image of environmentally friendly entrepreneur
Clause 2 Planning for Implementation <ul style="list-style-type: none"> 1. Environment Aspects Identification and Assessment 2. Law and Regulation on Environment 3. Authority and Responsibility Determination 	<ul style="list-style-type: none"> ▪ After environment problem from working is identified, assessed, and prioritized. These are employed for planning for mitigation and improvement according to priority list. ▪ Acknowledge related law, entrepreneur can perform for environmental problem control according to environment law ▪ Each Clause is implemented by the person who is clearly assigned for responsibility.
Clause 3 Communication	<ul style="list-style-type: none"> ▪ Staffs will learn and understand the right practices on environmental management that can be applied for operation to control and mitigate environmental problem. ▪ Outsiders know situation of pollution control and prevention.
Clause 4 Store and Control of Chemical Substance	<ul style="list-style-type: none"> ▪ All chemical substances are kept in appropriate place and such chemical substances are appropriately applied complying with environment law on hazardous substance holding and transport for disposal.
Clause 5 Waste Water Management	<ul style="list-style-type: none"> ▪ Treated waste water quality passes standard criteria as specified by the Water Pollution Control Law. ▪ Prevention on communities' claim

Clauses	Benefit for Entrepreneurs
Clause 6 Air Pollution Control	<ul style="list-style-type: none"> ▪ Quality of air pollution from working passes standard criteria as specified by the Air Pollution Control Law. ▪ Prevention on communities' claim
Clause 7 Solid Waste Management	<ul style="list-style-type: none"> ▪ Solid wastes which can be sold are added value. ▪ Solid wastes are collected and stored in appropriate place and neatness due to providing area for keeping solid waste prior to transport for disposal. ▪ Practice complying with environment law on solid waste disposal ▪ Prevention on communities' claim
Clause 8 Electricity and Water Save	<ul style="list-style-type: none"> ▪ Staffs have awareness on electricity and resources consumption in economic manner. ▪ Reducing monthly electricity and water expenditure
Clause 9 Repair and Maintenance of Equipment and Tools	<ul style="list-style-type: none"> ▪ Reducing environmental problem occurred from equipments and tools damage
Clause 10 Personal Protective Equipment	<ul style="list-style-type: none"> ▪ All staffs are safe from working and illness is alleviated. ▪ Increasing working efficiency of owner of entrepreneur
Clause 11 Clean and Neatness	<ul style="list-style-type: none"> ▪ Good corporate image of entrepreneur ▪ Better physical and mental health of all staffs
Clause 12 Emergency Preparedness and Response	<ul style="list-style-type: none"> ▪ Identification for emergency cases and prepared for prevention of occurrence ▪ Emergency equipment preparation and frequency monitored of emergency plans
Clause 13 Correction and Prevention	<ul style="list-style-type: none"> ▪ All defects from working on environmental problem control and prevention implementation will be corrected in time. ▪ Environmental management system is continually efficient

2.2 Environmental Auditing and Assessment for Certification

Entrepreneurs' work places which are completely improved according to the specifications will be inspected by the PCD for Emission Clinic Green Service. Therefore, explicit assessment criteria will cover technical practices for pollution control, awareness, understanding of staffs on environment, and related documents for Environmental Management System (EMS) Aroonsrimorakot, S. 2006b).

Criteria for assessment consists of 13 Clauses as follows:

- Clause 1 Policy on Environment
- Clause 2 Planning for Implementation
 - Identification and Assessment of Environmental Aspects
 - Related Law and Regulation
 - Duty and Responsibility
- Determination

Clause 3 Environmental Communication

Clause 4 Store and Control of Chemical Substance

Clause 5 Waste Water Treatment

Clause 6 Air Pollution Control

Clause 7 Solid Waste Disposal

Clause 8 Electricity and Water Save

Clause 9 Repair and Maintenance of Equipment and Tool

Clause 10 Personal Protective Equipment

Clause 11 Clean and Neatness

Clause 12 Emergency Preparedness and Response

Clause 13 Body Repair and Painting (particular case)

Remark: Entrepreneurs are classified into 3 types e.g. automobile repair & maintenance with body repair and car painting, automobile repair & maintenance without body repair and car painting, and motorcycle repair & maintenance by the Pollution Control Department.

Entrepreneurs who need to be divided into 3 levels as shown in Table 2 Emission Clinic Green Services are

Table 2: Criteria for Entrepreneurs Level Classification

Level	Criteria
3 stars ★★★	Excellent on environmental management
2 Stars ★★	Moderately on environmental management
1 Star ★	Improvement & development on basic environmental management

Thirteen Clauses of criteria can be described for each level of entrepreneurs' assessment. Furthermore, provided that all entrepreneurs have to pass minimum criteria, they may obtain certificate for Emission Clinic Green Service as presented in Table 3.

Table 3: Assessment Criteria Classified by Number of Star

Clauses	Assessment Criteria	
	Minimum Requirement (1 Star)	Advance (2 & 3 Stars)
Clause 1 Policy on Environment	1. Policy on Environmental Determination 2. Communicate to staffs 3. All staffs have to know policy on environment	Review policy on environment
Clause 2 Planning for Implementation 1. Environmental Aspects Identification and Assessment	1. All staffs have to understand environmental problem in service center (at least they should be aware of environmental problem on their responsibility)	1. Preparation for record of environmental type problem assessment 2. Environmental problem analysis covering normal, abnormal, and emergency situation 3. Seriously environmental problem was completely corrected. 4. Guidelines for review of environmental problem determination
2. Law and Regulation on Environment	1. All staffs perceive related environmental law <ul style="list-style-type: none">▪ Waste water law▪ Solid waste disposal law▪ Law on air▪ Law on noise▪ Local law	1. List of related law on environmental aspects 2. Related law & regulation are determined for covering all aspects of environmental aspects 3. Acknowledge on law and regulation sources 4. Providing guidelines for review or modification of laws and regulations
3. Authority and Responsibility Determination	1. Environmental management responsibility is specified.	1. Announcement on establishment of environment committee or team work 2. Announcement/declaration on environment committee or team work

Clauses	Assessment Criteria	
	Minimum Requirement (1 Star)	Advance (2 & 3 Stars)
Clause 3 Communication	<p>1. Internally environmental communication issue such as environment information board, policy on environment etc.</p>	<p>1. Survey of working area on various sign boards such as warning sign board for personal safety devices application, hazardous chemical substance sign board, environment information etc.</p> <p>2. In case of complaint on environmental problems, the entrepreneur has to promptly mitigate.</p> <p>3. An official communication practice on environment is determined both internal and external</p> <p>4. Both existing and new staffs are trained on environmental management.</p> <p>5. Training record of all staffs are well kept.</p>
Clause 4 Store and Control of Chemical Substances	<p>1. An appropriate area is provided for keeping chemical substances such as far distance from drainage channel etc.</p> <p>2. An appropriate method for storing chemical substance is provided such as</p> <ul style="list-style-type: none"> ▪ Neatly store on shelf ▪ Providing leakage protection or tray ▪ Providing sign board <p>Container of chemical substance has to be completely closed after use etc.</p>	<p>1. Providing Material Safety Data Sheet (MSDS) at store</p> <p>2. Absorbent material is prepared at store e.g. saw dust, oil absorptive textile etc.</p> <p>3. Name list and quantity are monthly recorded.</p> <p>4. Chemical substance inventory is monthly recorded.</p>

Clauses	Assessment Criteria	
	Minimum Requirement (1 Star)	Advance (2 & 3 Stars)
Clause 5 Waste Water Treatment	<p>1. Preliminary treatment process is appropriately provided for waste water from activities in working area (washing hands, clothes, car wash, spare part wash etc.) such as grease and sediment trap pond etc.</p> <p>*** Preliminary treatment pond has to provide for receiving all waste water in the garage***</p>	<p>1. Grease and sediment are regularly removed from preliminary treatment pond.</p> <p>2. Such sediment and grease from preliminary treatment pond are appropriately treated compliance with law.</p> <p>3. Treated waste water is inspected for determining its quality at least once per year.</p> <p>4. If the inspection result does not pass the standard, the prepared plan for waste water quality control will be referred.</p>
Clause 6 Air Pollution Control	<p>1. Engine air filter cleaning equipment is installed at appropriate place.</p> <p>2. Disk brake and brake pad are cleaned by appropriate procedure such as using brush and tray to prevent tiny pClauses spreading.</p> <p>*** No air brush***</p>	<p>1. In case of motorcycle garage, whether the ventilation system from engine test is provided for.</p>
Clause 7 Solid Waste Disposal	<p><u>General Solid Waste, Recycle Waste and Hazardous Waste Disposal</u></p> <p>1. Solid waste separation is given by 3 kinds of bin with its lid for general solid waste, recycle waste and hazardous waste</p> <p>2. Each solid waste is clearly provided with sign board.</p> <p>3. Waste bin is appropriately placed.</p> <ul style="list-style-type: none"> ▪ Far distance from drainage gutter ▪ Avoid an open area etc. <p><u>Used Batteries, Remnant of Cloth, Tires Management</u></p> <p>1. Store used battery collection container, brake pad, tires in an appropriately designated area</p> <ul style="list-style-type: none"> ▪ Battery is stored in a well-ventilated area ▪ Kept in neat place <p>2. Affix an appropriate sign board to used battery, brake pad, tires.</p>	<p><u>General Solid Waste, Recycle Waste and Hazardous Waste Disposal</u></p> <p>1. Appropriately trashing waste in each type of designated rubbish bin</p> <p>2. Regularly make record and information of waste disposal</p> <p>3. Provide temporary dumping area prior to transport for disposal</p> <p>4. Discharge of hazardous waste e.g. absorbent materials, chemical contaminated materials, used engine oil filter, paint waste, thinner waste etc. to legal waste management company</p> <p><u>Used Batteries, Remnant of Cloth, Tires Management</u></p> <p>1. Discharge used batteries, chemical/oil absorbent materials or remnant of cloth to legal waste disposal company</p>

Clauses	Assessment Criteria	
	Minimum Requirement (1 Star)	Advance (2 & 3 Stars)
<u>Clean-Up Used Tools and Solvent</u>	<p>1. Appropriately apply cleaning tray for spare parts and tools</p> <ul style="list-style-type: none"> ▪ After spare parts and tools are cleaned, close the cleaning solvent pClause when not introducing used solvent to prevent its volatility ▪ In keeping the using solvent, to reuse it, completely close tray's lid to prevent volatile solvent ▪ Provide closed container to hold the using solvent 	<p><u>Clean-Up Used Tools and Solvent</u></p> <p>1. Clean-up performed by automatic cleaning machine เครื่องล้างชิ้นส่วน or boiler for cleaning engine spare parts</p> <p>2. Appropriately keep volatile solvent</p> <ul style="list-style-type: none"> ▪ Put upright the solvent container far away from drainage channel ▪ Do not expose in the open space ▪ Well ventilated ▪ Provided with tray or protection to prevent leakage ▪ Keep away from fire and sparks ▪ Affix clear signboard
<u>Chemical Waste and Engine Oil Filter Management</u>	<p>1. Completely drain used oil from filter prior to disposal</p> <p>2. Provide the container for keeping oil filter of used oil and chemical waste e.g. used oil, coolant etc.</p> <p>2. Deliver for disposal the engine oil filters and used chemical substances to the buyers who are in charge of waste management.</p>	<p><u>Chemical Waste and Engine Oil Filter Management</u></p> <p>1. Store oil filter for used oil, used oil, coolant in appropriately designated area</p> <ul style="list-style-type: none"> ▪ Place the container far away from drainage channel ▪ Do not in the open area ▪ Well ventilated ▪ Provided with tray or protection to prevent leakage ▪ Affix clear signboard <p>2. Deliver for disposal the engine oil filters and chemical waste e.g. used oil, coolant, solvent to the legal waste management company</p>

Clauses	Assessment Criteria	
	Minimum Requirement (1 Star)	Advance (2 & 3 Stars)
Clause 8 Electricity and Water Save	1. Establish the appropriate procedures for water saving, electricity saving or other resources saving, for example time to turn on-off air conditioner or electricity etc.	1. Establish the appropriate procedures for water saving, electricity saving or other resources saving, for example time to turn on-off air conditioner or electricity etc. 2. Communicate or explain to staffs for a variety of energy saving measures for control of water use, electricity use or other resources use e.g. line-up brief session, affix sign board, notice board etc.
Clause 9 Repair and Maintenance of Equipment and Tool		1. Provided with name list of tools, machines and devices. 2. Establish the annual maintenance plan for tools, machines and devices. 3. Implement following the maintenance plan
Clause 10 Personal Safety Device		1. Appropriately apply personal safety devices e.g. put glasses to prevent fire flake while lathe; put on the mask while cleaning air filter with blower etc. 2. Records of applying personal safety devices. 3. Staffs understand and are aware of personal safety devices.
Clause 11 Clean and Neatness	1. Place tools and devices in order 2. Clean up management is performed in appropriate manner	1. Place tools and devices in order 2. Clean up management is performed in appropriate manner 3. Launch public relation campaign to stimulate clean up awareness and neatness 4. Time to appropriately clean and build neatness to the entrepreneur
Clause 12 Readiness Preparation on Emergency	1. Clearly demonstrate several telephone numbers of fire stations, police stations, hospitals 2. Fire extinguishers are always ready to use 3. Staffs know how to appropriately use extinguisher.	1. Appropriately prepare emergency plan identifying fire exit and persons in charge. 2. Regular fire fighting rehearsal, evacuation, first aid
Clause 13 Body Repair and Painting	1. Waste separation is conducted with 3 kinds of rubbish bin: general waste, recycling waste, hazardous waste. All are provided with lid. 2. Whether tape, paint filter, paint or plastic cover are managed as regulated hazardous waste or not.	1. Install spray paint booth filters before releasing to outside garage environment 2. Drainage channel nearby the wet sanding area must be unclogged. 3. Deliver for disposal the absorbent material or chemical waste, paint waste, thinner waste, spray paint booth filters to legal waste management company

2.3 Scoring Criteria for Environmental Management System (EMS) in the Garage

Scoring criteria will cover the technical practice in pollution control, environmental awareness and

understanding among staffs including documents related to Environmental Management System (EMS) determining compliance to performance efficiency in each specification set by Pollution Control Department(PCD) as shown in Table 4.

Table 4: Performance Efficiency Scores in Each Specification

Score	Performance Efficiency
1 Score	Complete entities of garage environment care, environmental awareness and understanding among staffs, documents related to Environmental Management System (EMS)
0.5 Score	Partly conduct and fair complete of entities of garage environment care, environmental awareness and understanding among staffs, documents related to Environmental Management System (EMS)
0 Score	Unmanaged entities of garage environment care, environmental awareness and understanding among staffs, documents related to Environmental Management System (EMS)

2.4 Scoring of Emission Clinic Green Service Audit

$$\frac{\text{Total Scores X 100}}{\text{Total Specifications}}$$

The scores given by Pollution Control Department (PCD) will be calculated with following method.

Table 5: Scoring Criteria for Entrepreneurs Ranking

Level	Criteria	Remark
3 Stars 	Above 80 %	
2 Stars 	60-79 %	
1 Star 	37-59 %	In case of car maintenance with paint service
	39-59 %	In case of car maintenance without paint service and motorcycle maintenance
Unqualified	Under 37 %	In case of car maintenance with body and paint service
	Under 39 %	In case of car maintenance without body and paint service and motorcycle maintenance

Remark: Total specifications of the entrepreneurs are different among those of car maintenance and paint service, car maintenance without paint service and motorcycle maintenance

3. Implementation Result

According to implementation result from 2008 to present, 122 entrepreneurs from 5 provinces: Bangkok Metropolitan, Chiang Mai Province, Songkhla Province, Nakornratchasima Province, and Chonburi Province have been visiting

from Pollution Control Department (PCD, 2008) to monitor their efficiency and continuing Environmental Management System (EMS). The result is found that there are 120 entrepreneurs who remain the Emission Clinic Green Service while there are 2 who cannot keep their status.

Table 6: Numbers of the Entrepreneurs Rated at each Star

Level	No. of Entrepreneurs(Places)
3 Stars ★★★	99
2 Stars ★★	11
1 Star ★	10
Total	120

4. Conclusion

There are 99 entrepreneurs rated 3 stars and 11 places rated 2 stars for the Emission Clinic Green Service. Research findings are found that most of entrepreneurs are medium to large size with construction standard including supply of necessary tools and devices to tolerate pollution resulting from work, for example grease and sediment trap pond, installment of air filter blower, installment of paint spray booth, installment of air conditioning refrigerant recycling device, installment of air pump, storage of used engine oil or chemical substances and engine oil filter etc. In particular, the entrepreneurs of Toyota Service Center in Bangkok Metropolitan, Chiang Mai Province, Songkhla Province, Nakornratchasima Province, and Chonburi Province, who are wholly accredited internationally environmental award for ISO 14001: 2004 Environmental Management System, subsequently create Environmental Management System (EMS). Further more, their staffs are aware of pollution control and environment problems. The management or the owners have well supporting the green campaigns. In consequence, the continuing scheme can be efficiently enhance on Environmental Management System (EMS). For the entrepreneurs rated 1 Star, though fair qualified (low criteria) by Pollution Control Department (PCD), it is necessary to keep monitoring EMS and its increasing efficiency within the garage in terms of staffs' awareness and cooperation toward environmental conservation, environmental care

restoring. The operation includes management drives for that the scheme is ongoing effort with efficiency and continuing attempt.

5. Benefits from Project Implementation

Emission Clinic Green Service Project tends to target in emphasizing the entrepreneurs of car and motorcycle garage to be aware of, to control and to prevent the least pollution arising from work. The program also aims at efficiently reducing severity impact to environment. Reflecting tendency of better health, the action would help counteract the tendency of staffs' health and surrounding communities. Apart from the mentioned issues, Emission Clinic Green Service Project will be promoted from public agencies regarding the Environmental Plan 2007-2011, (PCD, 2008) enhancing environmentally friendly products and services. In this regard, the list of entrepreneurs under the Emission Clinic Green Service Project will be taken by Pollution Control Department (PCD) to register the entrepreneurs in green service. The scheme will be part of promotional drive for pilot service for government agencies. That would cause increasing incomes to them.

As seen that the project participation will bring a variety of benefits to several sectors. For example, it is beneficial to the entrepreneurs in terms of cost saving, staffs' happiness and work motivation, incomes service increasing, corporate good image to social, credit from public agencies etc. Furthermore, project benefit society the proposed

project will benefit society by reducing and delaying the global warming effect, appreciating the value of resources using etc.

6. Acknowledgement

Thank you for the Air Quality and Noise Management Bureau, Pollution Control Department (PCD), the Ministry of Natural Resources and Environment in dissemination, monitoring, evaluation of the Emission Clinic Green Service Project and continuing co-operation.

7. References

Aroonsrimorakot, S. 2006a. **Environmental Management Systems Documentation ISO 14001: 2004**. Bangkok.

Aroonsrimorakot, S. 2006b. **Preliminary and Environmental Management System Standard ISO 1400: 2004**. Bangkok.

Aroonsrimorakot, S., & Tantrakarnapha, K. 2006. **EMS Auditing of Environmental Management System Standard ISO 14001: 2004**. Bangkok.

The Air Quality and Noise Management Bureau, Pollution Control Department (PCD). 2007. **The First Report on Monitoring, Evaluation of the Environmental Management System (EMS) of the Emission Clinic Green Service Project Problem Solving of Air Pollution Development Project 2007. Activities, Network and Quality Development for Emission Clinic Green Service**. The Ministry of Natural Resources and Environment.

The Air Quality and Noise Management Bureau, Pollution Control Department (PCD). 2008. **The Second Report on Monitoring, Evaluation of the Environmental Management System (EMS) of the Emission**

Clinic Green Service Project. Solving of Air Pollution Development Project, Activities, Network and Quality Development for Emission Clinic Green Service. The Ministry of Natural Resources and Environment.

The Air Quality and Noise Management Bureau, Pollution Control Department (PCD) 2009. **The Third Report on Monitoring, Evaluation of the Environmental Management System (EMS) of the Emission Clinic Green Service Project 2009. Problem Solving of Air Pollution Development Project, Activities, Network and Quality Development for Emission Clinic Green Service**. The Ministry of Natural Resources and Environment.