# **Technical cooperation on**

The Development of Basic Schemes for PRTR System in the Kingdom of Thailand

# **Progress Report No. 9**

September 2015

Pollution Control Department, MONRE Department of Industrial Works, MOI Industrial Estate Authority of Thailand, MOI

**Japan International Cooperation Agency** 

## Abbreviation

AIT	Asian Institute of Technology
AQNMB	Air Quality and Noise Management Bureau (PCD)
CMR	Carcinogenicity, Mutagenicity, Reproductive Toxicity
CRJA	Chonburi Rayong Japanese Association
C/P	Counterpart Personnel
DG	Director-General
DDG	Deputy Director-General
DEQP	Department of Environmental Quality Promotion
DOA	Department of Agriculture
DIW	Department of Industrial Works
DIA	Department of Local Administration (Ministry of Interior)
FARTH	Ecological Alert and Remediation for Thailand (NGO)
ECNEO	Enhancement and Conservation of National Environmental Quality Act
FF	Emission Factor
FRTC	Environmental Research and Training Center
ESIE	Eastern Seaboard Industrial Estate (Rayong)
EOLD	Environmental Quality and Laboratory Division (PCD)
FTI	Enderation of Thai Industry
	Gross Domostic Product
GSEL	Good Governance for Sustainable Environment Institute (NGO)
GDD	Groop Partnership Program
HAPe	
	Hazardous All Foliatants
	Institute of Environmental Training
	Industrial Estate Authority of Thailand
IDIS	Integrated Pick Information System (US EDA)
	IT Division (PCD_DIM/)
	Industrial Water and Environmental Technology Bureau (DIW)
	loint Coordination Committee
100	
JPCC	
	Man/Month
	Ministry of Natural Posources and Environment
MONINE	Ministry of Industry
MOT	Ministry of Transport
MOA	Ministry of Anriculture
MOA	Material Safety Data Shoot
NER	National Environmental Reard
NESDA	National Environmental Board
	Office of the Natural Resources and Environmental Policy and Planning
OTD	Office of Treffic and Transport Policy and Planning
	Pollution Control Committee
	Pollution Control Commutee
	Protoct Design Matrix
	Pilutent Belages and Transfer Register
	Policy and Strategy Ruroau/Ministry of Public Health
	Strategie Approach for International Chamical Management
TEI	Theiland Environment Institute (NGO)
	Thei Autometive Industry Association
	Thai Automotive mously Association
	Thei Aniopan's Manulaciule's Association
	Thai Olup Flutection Association
	Indi Faint Manufacturer's Association
	United Nations Environment Program
US EPA	United States Environmental Protection Agency

VOCsVolatile Organic CompoundsWHOWorld Health OrganizationWHSMBWaste and Hazardous Substances Management Bureau (PCD)WQMBWater Quality Management Bureau (PCD)

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1.	List	t of CP and task forces	

- PRTR project CP list
- Risk Communication Promotion Task Force

## 2. Paper/Report prepared

- Pilot project Implementation 6th Progress report
- Report of risk communication meetings
- Report of feedback survey
- Report and presentation materials of 4<sup>th</sup> and 5<sup>th</sup> PRTR seminars

#### 3. Meeting/Visit/workshop memo

## 4. JICA PRTR website and newsletter

#### 1. General

## 1.1. Project Outline

## • Title of the project

The Development of Basic Schemes for PRTR System in Kingdom of Thailand

## Overall Goal

Model of PRTR system for Thailand is established

## • Project Purpose

Capacity of PCD, DIW and IEAT's staff for implementation of PRTR pilot project is strengthened

## • Project period

5 years (March 6<sup>th</sup>, 2011 – March 5<sup>th</sup>, 2016) Extension was proposed and approved in 2014.

## • Implementing agency

Pollution Control Department, Ministry of Natural Resources and Environment Department of Industrial Works, Ministry of Industry Industrial Estate Authority of Thailand, Ministry of Industry

## • Outputs

(Output 6 noted below was approved at Joint Coordination Committee meeting held on July 12, 2013.)

- 1. Basic design of PRTR system in Thailand is established
- 2. Emission reporting scheme of industry is developed
- 3. Capacity of estimation of emission and transfer for point source is strengthened.
- 4. Capacity of emission estimation for non point source is strengthened.
- 5. Importance of use of PRTR data including initial assessment is understood
- 6. Implementation structure of risk communication is developed in the pilot area.

#### • Activities of the Project

(Activity of the project noted below was approved at Joint Coordination Committee meeting held on July 12, 2013.)

#### Activity for output 1

- 1-1. Formulation of basic strategy
- 1-2. Organizational set up inside government and with other stakeholders
- 1-3. Development of project work plan
- 1-4. Development of criteria for target substance selection
- 1-5. Draft target substance list and revision
- 1-6. Draft basic design of PRTR system

- 1-7. Development of PRTR database and Web site
- 1-8. Draft pilot project implementation plan and set up organization
- 1-9. Organizing awareness raising and training workshop for pilot project
- 1-10. Collection of data and disclosure for pilot project
- 1-11. Organizing risk communication meeting for pilot project
- 1-12. Obtaining feedback from stakeholders for pilot project
- 1-13. Final design of PRTR system and prepare action plan
- 1-14. Preparation of final report of output 1

#### Activity for output 2

- 2-1. Collection of available data for preparing point source definition
- 2-2. Development of point source definition (reporting thresholds)
- 2-3. Development of reporting form
- 2-4. identifying reporting procedure from point sources
- 2-5. Listing of candidate point sources and sending reporting form to them
- 2-6. Collecting reports from point sources
- 2-7. Verification of point source data
- 2-8. Compilation of point source data
- 2-9. Revision of point source definition and reporting form
- 2-10. Preparation of final report of output 2

#### Activity for output 3

- 3-1. Establishment of task forces on development of release estimation manuals for specific industries
- 3-2. Development of draft release estimation manuals for specific industries
- 3-3. Conducting model studies for industries for which release estimation manuals are not prepared
- 3-4. Organizing workshop on point source release estimation for governmental officials and relevant agencies
- 3-5. Organizing workshop on point source release estimation for factories/facilities
- 3-6. Organizing consultation for factories/facilities to estimate releases by site visit
- 3-7. Responding to questions (via phone, e-mail) on release estimation from factories/facilities and preparing FAQs
- 3-8. Revision of release estimation manuals for specific industries
- 3-9. Preparation of final report of output 3

#### Activity for output 4

- 4-1. Establishment of basic idea for estimation of emissions from non-point sources (NPS)
- 4-2. Survey of availability of activity data and emission factors (EFs) necessary to estimate
- 4-3. Selection of target categories and target chemicals for NPS and responsible bodies to estimate

- 4-4. Validation of data used for estimation; activity data and EF
- 4-5. Establishment of estimation method in each target category
- 4-6. Preparation for drafts of estimation manuals
- 4-7. Collection such data used for estimation as activity data and EF
- 4-8. Estimation of emission amounts from NPS at pilot project area and Compilation of disclosed data
- 4-9. Collection of information, data necessary for revising estimation manuals and revision of estimation manuals
- 4-10. Implementation of workshop for estimation of emissions from non-point sources for government officials and relevant agencies
- 4-11. Preparation of final report of output 4

#### Activity for output 5

- 5-1. Introduction of domestic and overseas case studies on use of PRTR data including initial assessment of exposure risk to target substances
- 5-2. Utilization and possible development of model or tools for uses of PRTR data e.g. concentration estimating model
- 5-3. Implementation of case studies for use of PRTR data including initial assessment
- 5-4. Training for use of PRTR data including initial assessment for both government and private sectors
- 5-5. Preparation of final report of output 5

#### Activity for output 6

- 6-1. Development of basic strategy for promoting risk communication
- 6-2. Organizational set up inside government and with other stakeholders for promoting risk communication
- 6-3. Awareness raisings for risk communication importance for relevant agencies, relevant local governments and participating companies.
- 6-4. Development of training curriculum for facilitator and pilot project implementation of training course
- 6-5. Review of facilitator training course and follow-up for trainee
- 6-6. Development of the Handbook for risk communication
- 6-7. Planning the registration system of chemical advisor for supporting risk communication.
- 6-8.Development of the implementation plan, and pilot project organization of risk communication meeting with community people of Rayong
- 6-9. Preparation of final report of output 6

#### Project area

Major activities of the project will be at Bangkok and surrounding area where the office of the implementing agencies are located. In addition, activities will be at area selected for pilot project.

Year		2011		2012		2013		2014		2015
Major work	•	Capacity assessment	٠	Capacity assessment	•	Capacity assessment	•	Capacity	•	Capacity_
								assessment		assessment
Output 1	•	Clarification on	•	PRTR design paper	•	Designing the element	•	Compilation of the	•	Implement
		organizational matters,		(draft) will be prepared.		of basic PRTR system.		pilot project data		questionnaire
		policy priority	•	Preparation for pilot	•	Implementation of pilot	•			<u>survey</u>
	•	Designing the element of		project action plan		project			•	Design of PRTR
		<u>basic PRTR system</u>								system for
	•	Basic survey and listing of								nationwide
		target chemical substances								application
	•	Preparation for pilot project								
Output 2	•	Selection of target business	•	Design of PRTR	•	Direct support to	•	Direct support to	•	Design of reporting
		and size		reporting system		industry for PRTR		industry for PRTR		system and format
	•	Review of existing reporting				reporting		reporting		for nationwide
		<u>system</u>			•	Verification,	•	Verification,		PRTR system
	•	Design of PRTR reporting				compilation of		compilation of		
		system.				reported data		reported data		
							•	Disclosure of PRTR		
								data from pilot		
								project		
Output 3	•	Preparation of industry	•	Preparation of industry	•	Continue Preparation	•		•	Revision of manual
		specific emission estimation		specific emission		of industry specific				for point source
		manual from point source		estimation manual from		emission estimation				estimation
				point source. Draft		manual from point				
				manual will be prepared		source. Draft manual				
				in English and then		will be prepared in				
				translated to Thai.		English and then				
						translated to Thai.				
Output 4	•	Selection of target business	•	Advice on emission	•	Implement pilot project	•	Implement pilot	•	Revision of manual
		and activity		factor experiment		Estimate emission		project		for non point
	•	Advice on emission factor	٠	Preparation of emission		from non point source		Estimate emission		source estimation
		<u>experiment</u>		estimation method from		in pilot project area		from non point		

## 1.2. Project work plan for 5 years (Activities indicated by **bold underline** are on-going or completed as of September 2015)

	•	Preparation of emission estimation manual from non-point source	non-point source. Draft method document will be prepared.	(Including mobile source and pesticide).       source in pilot project area         • Preparation of emission estimation manual from non-point source. Revise manual       (Including mobile source and pesticide).	
Output 5			Preparation of case <u>study of PRTR data     utilization</u>	Preparation of case study of PRTR data <u>utilization</u> Application of <u>models and tools</u> for PRTR data <u>utilization</u>	
Output 6	•	Review of current situation and design of human resource development Planning and development of risk communication training course	Organization of training <u>course for risk</u> <u>communication</u>	<u>Support for training of</u> <u>risk communication</u> <u>Support for</u> <u>training of risk</u> <u>communication</u> <u>communication</u>	
Training (study visit)			<u>Training in Japan (study</u> <u>visit)</u>	<u>Training in Japan(study</u> <u>visit</u> )	
Evaluation			Mid-term review	Final evaluation	n
Seminar/Work shop	•	<u>JCC</u> <u>1<sup>st</sup> PRTR seminar</u>	<ul> <li>JCC</li> <li>2<sup>nd</sup> PRTR seminar</li> <li>Seminar for PRTR awareness raising to industry</li> </ul>	<ul> <li>JCC</li> <li>3<sup>rd</sup> PRTR seminar</li> <li>Point source estimation workshop for government officer</li> <li>Point source estimation workshop for industries</li> <li>Non point source estimation workshop</li> <li>Non point source estimation workshop</li> <li>PRTR data utilization &amp; r communicatii workshop</li> </ul>	TR RTR Tisk on
Sub-contract	•	Basic survey for chemical substance PRTR Web site development	Data availability survey for non point source	Direct factory support for         Direct factory support           pilot project         for pilot project           Traffic survey in Rayong         Traffic survey in Rayong	

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1-2. Organizational set up inside government and with other stakeholders											+		Ħ		+							+	+					+					+				H			H	╈		H	-	
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1-11. Organizing risk communication meeting for pilot																																													
1-12. Obtaining feedback from stakeholders for pilot																																								$\square$	Τ		$\square$		
1-13. Final design of PRTR system and prepare action plan																																													
1-13-a Design role of relevant organization in non point source estimation																																													
1-13-b Design role of local government in risk communication																																													
1-13-c Design inclusion of PRTR system in eco industrial town program																																													
1-13-d Prepare action plan to implement PRTR on regular basis																																													
1-14. Preparation of final report of output 1																																													
2. Emission reporting scheme of industry is developed.																																													
2-1. Collection of available data for preparing point source definition																																													
2-2. Development of point source definition (reporting thresholds)																																													
2-3. Development of reporting form																																													
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2-6. Collecting reports from point sources																																											Ц		
2-7. Verification of point source data																																											Ц		
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2-10. Preparation of final report of output 2																																								Ц			Ш		

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3-9. Preparation of final report of output 3																																									
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4-11. Preparation of final report of output 4																	1																								

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<ol> <li>Development of the implementation plan, and pilot organization of risk communication eeting with community people of Rayong</li> </ol>	n																		X		Ŵ	ľ	V	V	X		X	V			X								
10. Preparation of final report of output 6																																							

## 1.3. Input and Plan for 2013 - 2015

							3rd \	/ear											4	hth Y	ear					ľľ		-	-	-	-	5th	Year						
Name of Expert							20	13												201	4					1						20	)15						
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① Leader / PRTR System / Chemical Management	Plan		3!	5	30		42				60		40		35		30			60		3(	)	5	2		4	45		35			35		35		40		
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2 Sub-Leader / Point Source Reporting / Point	Plan		21	8		64				28					42				42			36										30							-
(Mr. Takahashi)	Actual		21	8		61							31		56			35													31								
③ Non-point Source Estimation 1 (Mr.	Plan			30					51			5	4			60					60			30								5						—	
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Social Consideration / Risk Communication 1	Plan			28		28		28						Γ						6						I										Ħ			
(Mr. Tezuka)	Actual		5/19(2	21)6/8	8/4	(35)9/7	7 9/22	(28)10	0/19												1	1/24(6)11/2	9			I													
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(Mr. Hashimoto) (at Rayong)	Actual																	8/13(1	1) 9/4 1) 9/1	(2)9/5 10/ 10(3)9/1 0/1	13(5)1 1 7 1	1/11(10) 1/20	/1(3)3	2/2	0 0 3/12 19:														
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Communication 3 (Mr. Hashimoto) (at Bangkok)	Actual																8/4	,8,14,15,1	8/2	2,3,17-	10,20,22(3) 10,20,22(3)	1/7,21,2 12/1	12.18(2) 1/2	6(1)	3/2,9-1 18, 3	1.6. 41	-3,7-8(5), 10(2) <b>#</b> #									$\square$			
Training																																							Π
Study tour to Japan									]																	•													
Local consultant																																							
Traffics survey in Rayong										1	1	1 : :																											
Estimation support to factories																																							-
Others					JCC					CP me	eting					CP r	meeting																$\square$	J	<u>č</u>	$\uparrow$			Π
JCC or CP meeting					স্থ					$\Sigma$	\$					$\mathbf{x}$	-												م_م	-				2	£				
Seminar Review/Evaluation					3rd F	RTR se	minar							+														ł	4th & 5	th PRI	`R semi	inar	++	Fin	nal evalu	lation			

\* Period covered by this progress report is indicated by the rectangular box in dotted line.

Input of the JICA side is as follows.

- For the period of this progress report
  - > Expert assignment was shown in following table.

Expert	Assignment period
Munehiro Fukuda	4/1 - 4/9/2015
	5/24 - 7/4/2015
	7/27 - 8/22/2015
Makoto Takahashi	7/27 – 8/26/2015
Yoshiharu Shirane	8/20 – 9/8/2015
Shinya Hashimoto	(2/26 - 2/27/2015)
	(3/2/2015)
	(3/9 – 3/11/2015)
	(3/12- 3/13/2015)
	(3/16 – 3/18/2015)
	(3/19 – 3/20/2015)
	(3/31/2015)
	4/1 – 4/3/2015
	4/7 – 4/8/2015
	4/9 – 4/10/2015

Note: ( ) assignment period of previous period by missed from progress No.8

- > Organization of PRTR data disclosure and risk communication meeting
- > Organization of 4<sup>th</sup> and 5<sup>th</sup> PRTR seminar (under Thai budget)
- Implementation of questionnaire survey
- > Revise non point source manual
- Plan for next six months
  - Continue the expert assignment. Approx. 3M/M is expected in (October 2015 March 2016).
  - > JICA terminal evaluation
  - Joint Coordination Committee
  - > Revise point source estimation manuals
  - Complete final design of PRTR system
  - ➢ Final PRTR seminar

## 2. Summary of progress (overall)

2.1.Summary sheet

Summary	Total of five risk communication meetings to explain PRTR data were
	implemented by early April.
	Questionnaire form was designed to obtain feedback from the
	stakeholders. Two seminars, at Bangkok and Rayong were organized to
	report the PRTR pilot activities and to obtain feedback using the
	questionnaire. In addition, the questionnaire forms were sent to the industrial
	facilities who made PRTR report under pilot.
	Over 240 replies were collected and analyzed to find the direction of
	PRTR system revision.
Major	• 4 <sup>th</sup> Risk communication meeting was organized at Map Ta Phut IEAT on
Activity	March 25 <sup>7h,</sup> ,2015
	• 5 <sup>th</sup> Risk communication meeting was organized at Pluak Daeng
	municipality on April 3 <sup>nd</sup> , 2015
	• 4 <sup>th</sup> PRTR seminar was organized at Bangkok on June 11 <sup>th</sup> , 2015.
	• Final Task force meeting of risk communication promotion was held on
	June 24 <sup>th</sup> , 2015
	• 5 <sup>th</sup> PRTR seminar was organized at Rayong on June 25 <sup>th</sup> , 2015
	Questionnaire survey was implemented for feedback.
Major	<ul> <li>Report of risk communication meetings</li> </ul>
Paper/report	<ul> <li>Report of feedback questionnaire survey</li> </ul>
prepared	<ul> <li>Progress Report No.9 and Pilot Progress Report No.6</li> </ul>
Plan	<ul> <li>JICA terminal evaluation</li> </ul>
	Joint Coordination Committee
	<ul> <li>PRTR final design and implementation plan</li> </ul>
	Final PRTR seminar
	<ul> <li>Final report (summary report for each output)</li> </ul>

#### 2.2. Organization structure

Diagrams in pages 19 and 20 show organizational structure of the project and the relationship with various stakeholders as of September 2015. There is no major change.

#### 2.3 Major Issues and problem

#### 2.3.1 Outcome of risk communication meetings

During the period of late February – early April, 2015, risk communication meetings were organized five times at various location within Rayong province. Detail of the meeting was elaborated both in pilot progress report and risk communication meeting report in ANNEX.

At each meeting, simple questionnaire was distributed and collected to evaluate the outcome of the risk communication meetings. Two most critical questions asked are as follows.

Q1. Do you think PRTR data is useful for you to understand the chemicals in environment?

Q2. Do you think PRTR meeting is useful to consider the possible action to reduce chemicals?

1<sup>st</sup> question is to find if the participants understand well about PRTR system, PRTR data in relation to their life. Thus this is fundamental question to observe if PRTR can be accepted in society as useful system.

2<sup>nd</sup> question is to find if the risk communication meeting was well organized to promote understanding of PRTR data and constructive discussion among the participants. This is an indicator if PRTR could have positive/constructive impact on society rather than generate fear of chemicals and chaotic behavior.

Participants were requested to answer the above questions not by simple Yes or No, but by selecting the 5 scale from 5 (very good), 4 (good), 3(moderate), 2 (less than moderate), to 1 (bad). Result of reply was compiled in the below table.

	Very Good 5	%	Good 4	%	Moderate 3	%	Less than moderate 2	%	Bad 1	%	Average
27-Feb											
Q1	6	18.2	18	54.5	8	24.2	0	0.0	1	3.0	3.85
Q2	4	12.1	19	57.6	8	24.2	2	6.1	0	0	3.76
13-Mar											
Q1	2	7.7	22	84.6	1	3.8	1	3.8	0	0	3.96
Q2	1	3.8	20	76.9	4	15.4	1	3.8	0	0	3.81
20-Mar											
Q1	14	7.4	62	33.0	100	53.2	11	5.9	1	0.5	3.41
Q2	16	8.5	73	38.8	84	44.7	14	7.4	1	0.5	3.47
27-Mar											
Q1	10	27.8	21	58.3	4	11.1	0	0	1	2.8	4.08
Q2	9	25.0	20	55.6	6	16.7	0	0	1	2.8	4.00
3-Apr											
Q1	16	28.6	33	58.9	7	12.5	0	0.0	1	1.8	4.18
Q2	14	25.0	31	55.4	10	17.9	1	1.8	0	0	4.04

As observed in the table, reply from the participants were improved to higher scale except for the meeting on March 20<sup>th</sup>. The meeting on March 20<sup>th</sup> was for over 350 health volunteers and different from other meetings (with average participant around 50), and also time for the meeting was shorter than others.

In the last two meetings, average of the participants answer went higher than 4.00. It

demonstrated the good success of the risk communication meetings and endorsed the acceptance of PRTR system in society.

2.3.2 Result of feedback survey

About participation

Stakeholders were separated in 3 groups that consist of government, private sector and citizen/public group. Government group include government office and state enterprise officer that join in seminar, Private sector group include business operator/factory from seminar and direct mail sending and citizen/public group include general public, public health, academic organization, NGO/CSO, media/journal and other that join in seminar.

Group	number	%	agency	number	%
Government	77	31.95%	Government office	71	29.46%
			State enterprise officer	6	2.49%
			Private sector	120	49.79%
Private sector	120	49.79%	- seminar 50 - direct mail 70		
			General public Public health and	8	3.32%
			hospital	10	4.15%
Citizen/Public	44	18.26%	Academic organization	16	6.64%
			NGO/CSO	7	2.90%
			Media/journal	1	0.41%
			Other	2	0.83%
Total	241	100%		241	100%

Summary of stakeholders

## Questionnaire feedback survey results

The questionnaire survey of PRTR pilot implementation consisted of 11 main questions area as follow

- 1) Objective of PRTR system
- 2) Target substance
- 3) Point source definition
- 4) Non-point source coverage
- 5) Estimation method and work
- 6) Reporting system
- 7) Data disclosure
- 8) Risk communication meeting
- 9) Audit & review
- 10) Implementation mechanism
- 11) Outputs (Evaluation of the project)

First question regarding objectives of PRTR system got varied responses from each stakeholder. Four choices were provided to prioritize them as follows.

- To collect scientific emission/transfer data for policy making.
- To ensure the people's right to know.
- To promote voluntary reduction effort by industry.
- To provide common information platform for constructive dialogue among the stakeholders.

First three choices are the common objectives usually defined in PRTR system elsewhere, while the last choice was prepared to meet the situation of the area like Map Ta Phut. Result is shown below.

	Government	Private sector	Citizen/ Public
To collect scientific emission/transfer data for policy making.	1	3	2
To ensure the people's right to know.	3	4	4
To promote voluntary reduction effort by industry.	4	2	1
To provide common information platform for constructive dialogue among the stakeholders.	2	1	3

As expected, Government likes to collect the data for policy making. Private sectors place highest importance in the last choice demonstrating the need of platform for better relation with communities. In turn, this can be basic incentive for private sector to continue PRTR. Interestingly, Citizen group considers voluntary reduction as highest priority while right to know choice as lowest.

Result of major design parameter for 2) to 10) are as follows.

	Agree/Yes			
Topics	Government	Private	Citizen/	All
		sector	Public	
Target substance	<b></b>		<b>67 7</b> (	<b>00 7</b> 0/
Do you agree with the current criteria of target	98.7%	99.2%	97.7%	98.7%
substance selection?				
Do you suggest to add/remove substance(s)?	93.5%	91.7%	97.7%	93.4%
Point source definition				
Do you agree with method of the current	83.1%	91.6%	88.4%	88.3%
definition of point source?				
Do you agree with industry category under	90.9%	92.5%	72.1%	88.3%
DIW code that covered in point source?				
Do you agree with industry size criteria?	96.1%	94.1%	90.5%	94.1%
(Type 3: over 50 employee or over 50HP)				
Do you agree with the amount of chemical	90.9%	87.5%	86.1%	88.3%
handled criteria? (1 ton/year)				
Do you agree with the amount of chemical	75.3%	80.7%	78.6%	78.6%
handled criteria (1 ton/year) for every source?				
Do you agree with industry category under	85.3%	88.2%	93.0%	88.2%
DIW code (7 industry sectors) for PRTR pilot				
project?				
Non-point source coverage				
Do you agree with the non-point source to be	76.1%	80.8%	80.7%	80.0%
covered by PRTR pilot project?				
Do you agree with the target substance to be	85.9%	93.9%	100%	92.2%
covered by the non-point source in PRTR pilot				
project?				
Estimation method and work				
Do you agree with estimation manual	78.6%	78.1%	75.0%	78.0%
prepared by PCD, DIW or IEAT?				
Reporting system				
Do you agree with reporting format in PRTR	91.0%	91.2%	88.9%	90.9%
pilot project?				
Do you agree with reporting flow in PRTR pilot	89.6%	94.7%	96.3%	93.2%
project?				

All stakeholders agreed on most of current PRTR design principle and criteria, regardless of their background, except for suggestion to add/remove target substances. For data disclosure and risk communication, replies were obtained by 5 scale from 5 (very good), 4 (good), 3(moderate), 2 (less than moderate), to 1 (bad). Results are shown in next table.

	Satisfaction (Average)			
Topics	Covernment	Private	Citizen/	A 11
	Government	sector	Public	All
1) Data disclosure				
Is Data book well organized?	3.77	3.36	3.77	3.54
Is Data book easy to understand?	3.49	3.35	3.55	3.42
Does Data book contain necessary information?	4.10	3.67	4.27	3.89
2) Risk communication meeting				
Was risk communication meeting well	4.00	2.45	4.00	0.70
organized?	4.06	3.45	4.00	3.72
Was risk communication meeting helpful to	4.00	2.50	4.00	2.05
understand PRTR data?	4.09	3.58	4.29	3.85
Does risk communication meeting contain	4.00	2.70	4.00	4.00
necessary discussion?	4.29	3.79	4.33	4.02
		Agree/	Yes	
Topics	Covernment	Private	Citizen/	A 11
	Government	sector	Public	All
3) Audit & review				
In the current plan, point sources will be audited				
to confirm the appropriateness of the estimation	97.4%	99.2%	100%	98.7%
and reporting. Do you agree with this plan?				
In the current plan, all PRTR system will be				
reviewed periodically to update substance list,				
point and non-point source, estimation method	100.0%	98.3%	97.7%	98.7%
and data disclosure. Do you agree with this				
plan?				
4) Implementation mechanism				
Should PRTR be regulated by law?	90.91%	69.75%	95.35%	81.17%
Which agency shall take lead in PRTR?	1. PCD	1. PCD	1.PCD	1. PCD
1. Pollution Control Department (PCD)	2. DIW	2. DIW	2.IEAT	2. DIW
2. Department of Industrial works (DIW)	3. All agency	3. All	3.All	3. All
3. Industrial Estate Authority of Thailand (IEAT)				
4. Others				
What is the important capacity of the leading	1.Authority	1.chemical	1. Authority	Authority
agency?		management		
Authority as regulator	2.pollution	2.coordination	2. coordination	2. coordination
Experience/capacity of interagency	management			
coordination.	3. coordination	3. Authority	3.chemical	3.chemical
Experience/knowledge of chemical			management	management
management				
Experience/knowledge of pollution management				
at local level				
Others				

What should be the role of local authority?	1. Education	1.Education	1. Education	1. Education
	2. Risk com.	2. Estimation	2.Risk com.	2. Risk com.
Awareness raising/education	3.Report collection	3. Risk com.	3.all choices	3.Estimation
Report collection				
Non-point source estimation				
Risk communication				
Others				

	Agree/Yes			
Topics	Government	Private	Citizen/	ΔII
	oovernment	sector	Public	
Who should lead the role in local scene?	1. PONRE	1. PONRE	1. PONRE	1. PONRE
In what area?	2. PIO	2. PIO	2. PIO	2. PIO
Municipality	3.Municipality	3.Munici	3.Munici	3.Munici
Provincial Office of Natural Resources and		-pality	-pality	-pality
Environment (PONRE)				
Provincial Industry Office (PIO)				
Regional Environmental Office (REO)				
Provincial Office of Public Health (POPH)				
Provincial Office of Education (POEd)				
Others please				
What agency should lead the role in non-point	1.Other	1.Other	1.Other	1.Other
source estimation such as agriculture,	2.PCD	2.PCD	2.PCD	2.PCD
household and mobile source?	3.IEAT	3.DIW	3.DIW	3.DIW
Pollution Control Department (PCD)				
Department of Industrial works (DIW)				
Industrial Estate Authority of Thailand (IEAT)				
Other that have data of the source				
If PRTR is regulated by law, Should have PRTR	06 19/	00.99/	00.7%	02 59/
pilot project expansion in other areas or not. 96.1%		90.0%	90.7%	92.3%

(In computing the % of "Agree/Yes", only "Yes" and "No" answers were used. "No comment" answers were removed from computation. )

Most stakeholders agree with basic design and criteria of the pilot PRTR such as criteria of target substance selection, definition of point source, chemical handled criteria, non-point source coverage and reporting system and satisfy with the data disclosure, risk communication meeting that was implemented in the pilot project in moderate to good level.

For implementation mechanism stakeholders agree with PRTR should be regulated by law (although there was obvious difference between government/private/citizen group. While citizen group, over 95% replies consider that PRTR should be regulated by law, less than 70% of private sectors consider the same

way), PCD should take lead in PRTR, Authority as regulator is the important capacity of the leading agency, Local authority should be promote awareness raising/education, Provincial Office of Natural Resources and Environment should lead the role in local scene, Agency that have data of the source lead the role in non-point source estimation and PRTR pilot project should have expansion in other areas.

Based on result, there is no critical and immediate need for major design change of PRTR.

For 11) output, evaluation of the project is as follows.

Objective and Outputs	Satisfaction (Average)			
	Covernment	Private	Citizen/	A 11
	Government	sector	Public	All
Project objective:				
PRTR pilot project operated by PCD, DIW and	2 70	2 5 1	2.69	2 50
IEAT's staff can achieve the objective of PRTR	3.70	5.51	3.00	3.59
system				
Output 1				
Basic design of PRTR system in Thailand is	4.01	3.63	4.03	3.81
established				
Output 2				
Emission reporting scheme of industry is	3.67	3.39	3.70	3.54
developed				
Output 3				
Capacity of estimation of emission and transfer	3.68	3.40	3.68	3.54
for point source is strengthened				
Output 4				
Capacity of emission estimation for non-point	3.50	3.09	3.73	3.33
source is strengthened				
Output 5				
Importance of use of PRTR data including initial	3.68	3.42	3.76	3.57
assessment is understood				
Output 6				
Implementation structure of risk communication	3.56	3.21	3.65	3.40
is developed in the pilot area				

For outputs the stakeholders think that JICA PRTR project through pilot in Rayong achieve the capacity development of PCD, DIW and IEAT's staff in moderate to good level and satisfy with outputs in moderate to good level. Based on result, there is no critical and immediate need for major design change of PRTR.

#### 2.3.3 Sustainability of PRTR

#### • Legal aspect

PCD is in the process of revising the Enhancement and Conversation of the National Environment Quality Act B.E. 2535 (1992), to include PRTR as a measure for pollution control and provide PCD authority to implement it. As of September 2015, revision is final stage before the submission to political stage. It is highly recommended this revision become formal before the end of this project.

IEAT is also in the process of defining the performance indicator of Eco Industrial Town program. Implementation of PRTR is suggested for the indicator.

#### • Organizational/Implementation aspect

In order not to lose the momentum of the pilot PRTR, reporting and estimation work in Rayong province should continue for next year. For this purpose, adequate allocation of manpower and budget is essential. If the allocation can not be provided for the fiscal year starting October 2015, it should be secured, at latest for the next fiscal year.

Involvement of other agencies is also necessary for non point source estimation and risk communication. Such institutional set up should be drafted and be submitted for approval at PRTR subcommittee as soon as possible. Then it should have the cabinet resolution.



## Organization structure of the project and relation with stakeholders



## 3. Progress of each output

3.1 Outpu	t 1 Design of PRTR system
Summary	Two risk communication meetings were organized at the end of March and
	at early April.
	After completion of risk communication meetings, feedback survey by
	organizing seminar and direct mailing of questionnaire was implemented and
	241 replies were obtained. The result was analyzed to consider revision of
	current PRTR design.
	(Overall indicator of the progress)
	Out of 14 activities listed under OUTPUT 1 in the plan, 12 activities
	completed, 1 on-going, 1 yet to be done.
Activity	• PRTR data explanation and risk communication meetings were held on
	March. 27 <sup>th</sup> and April 3 <sup>rd</sup> , 2015.
	• 4 <sup>th</sup> PRTR seminar was organized at Bangkok on June 11 <sup>th</sup> , 2015.
	• 5 <sup>th</sup> PRTR seminar was organized at Rayong on June 25 <sup>th</sup> , 2015
	<ul> <li>Questionnaire survey was implemented for feedback.</li> </ul>
Paper/report	Feedback survey report
prepared	<ul> <li>Pilot project progress report No.6</li> </ul>
	Progess report No.9
Issues	<ul> <li>Measure to secure sustainability of pilot PRTR need to be clarified.</li> </ul>
Plan	<ul> <li>Final design of PRTR system and prepare implementation plan</li> </ul>

3.2 Output	2 Reporting system from Industry
Summary	Priority issues for revision of the point source definition were identified
	based on comments from the feedback survey.
	(Overall indicator of the progress)
	Out of 10 activity list under OUTPUT 2 in the plan, 9 activities completed, 1
	yet to be done.
Activity	• Priority issues for revision of the point source definition were identified
	based on comments from the feed-back survey.
Paper/report	<ul> <li>Revision of the point source definition</li> </ul>
prepared	
Issues	
Plan	Prepare the summary report.

3.3 Output	3 Estimation from Point Source
Summary	Examples of release estimation to be attached to 3 release estimation manuals were prepared based on comments from the feed-back survey
	(Overall indicator of the progress)
	Out of 9 activity list under OUTPUT 3 in the plan, 7 activities completed, 1
	on-going, 1 yet to be done.
Activity	• Examples of release estimation to be attached to 3 release estimation

	manuals (Refining, Chemical/petrochemical, and Automotive) were
	prepared. (To be translated into Thai)
Paper/report	<ul> <li>Examples of release estimation (English version)</li> </ul>
prepared	
Issues	
Plan	Translate examples of release estimation into Thai
	Prepare the summary report.

3.4 Output	4 Estimation from Non Point Source
Summary	The theme of output 4 "Capacity of emission estimation for non-point source
	is strengthened" has been almost completed
	(Overall indicator of the progress) Out of 11 activity list under OUTPUT 4 in the plan, 10 activities completed and the final one (summary report) is passing review
Activity	• Collection of information to revise estimation methods at the feedback
	survey
	<ul> <li>Implementation of NPS workshop for future estimation</li> </ul>
	<ul> <li>Drafting the summary report</li> </ul>
Paper/report	<ul> <li>Presentation file at WS (The Estimation of Emissions from NPS)</li> </ul>
prepared	<ul> <li>Future NPS estimation of emissions</li> </ul>
	<ul> <li>Drafted summary report</li> </ul>
Issues	A few data and methodologies not yet to be approved at PRTR
	subcommittee.
Plan	Finalize summary report

3.5 Output	5 Utilization of PRTR data
Summary	No specific activity
	(Overall indicator of the progress)
	Out of 5 activity list under OUTPUT 5 in the plan, 4 activities completed, 1
	yet to be done.
Activity	None
Paper/report	None
prepared	
Issues	No specific issue.
Plan	Prepare summary report

3.6 Output 6	Risk Communication
Summary	All the risk communication meetings were completed with success.
	Final task force meeting of risk communication promotion was organized to report the outcome of risk communication. Two seminars were organized to report PRTR data to stakeholders.

	(Overall indicator of the progress) Out of 9 activity list under OUTPUT 6 in the plan, 8 activities completed, 1 yet to be done.
Activity	<ul> <li>Risk communication meetings were implemented on March 27<sup>th</sup> and April 3<sup>rd</sup>, 2015.</li> <li>Task force meeting for risk communication promotion was organized on March 26<sup>th</sup>, 2015.</li> <li>Data was uploaded to PCD web site.</li> <li>Two seminar were organized to explain PRTR data on June 11<sup>th</sup> and June 25<sup>th</sup>, 2015</li> </ul>
Paper/report prepared	Report of risk communication meeting
Issues	Responsible party for facilitator training and chemical adviser registration shall be identified and finalized.
Plan	Prepare summary report

## ANNEX

## 1. List of CP and task forces

- PRTR project CP list
- Risk Communication Promotion Task Force

## 2. Paper/Report prepared

- Pilot project Implementation 6th Progress report
- Report of risk communication meetings
- Report of feedback survey
- Report and presentation materials of 4<sup>th</sup> and 5<sup>th</sup> PRTR seminars

## 3. Meeting/Visit/workshop memo

#### 4. JICA PRTR website and newsletter