

Atmospheric Mercury Monitoring in Thailand

July 26, 2016

**Air Quality and Noise Management Bureau
Pollution Control Department (PCD)**



กรมควบคุมมลพิษ
POLLUTION CONTROL DEPARTMENT

Atmospheric Mercury Monitoring in Thailand

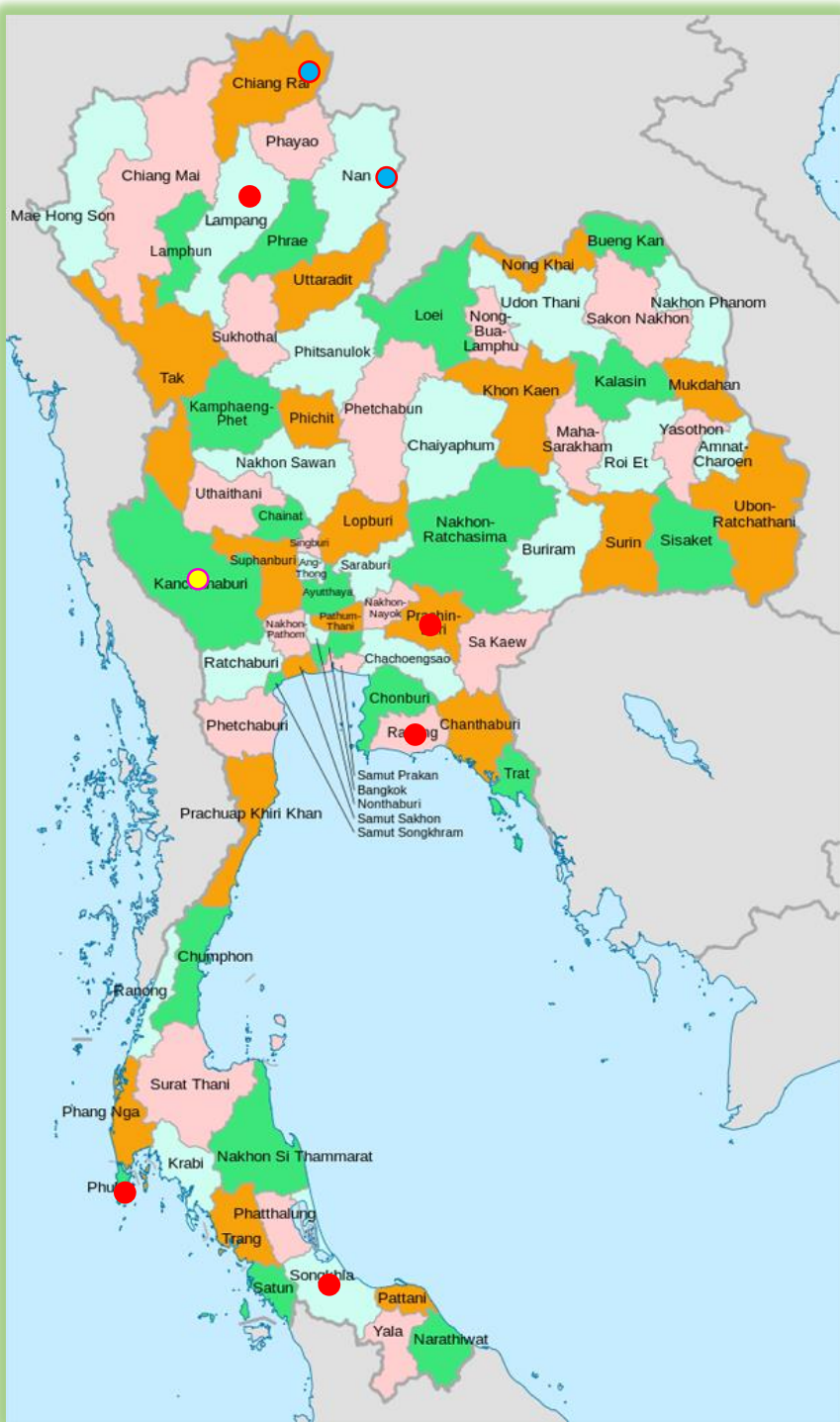
- Initial mercury monitoring plan: Total Gaseous Mercury (TGM) since November 2014
- Instrument: Tekran 2537 (installed in a mobile ambient air monitoring unit)
- Principle: Cold Vapor Atomic Fluorescence (CVAFS)
- Data base: 1-hr average

Objectives

- Establish a baseline of ambient mercury level in Thailand,
- Provide the basis for the long term monitoring (permanent monitoring station),
- Evaluate long term atmospheric mercury trend from which to formulate policy,
- Report atmospheric mercury situation to the public,
- Support further implementation of the Minamata Convention in the future.

Monitoring plan (2014 - 2016)

- Temporary sites: monitoring period \approx 2 weeks
- Classify sites:
 - *Industrial site (hot-spot site)*: 5 sites near industrial sources such as coal-fired power plants, waste incineration facilities, oil refinery, gas separation plant; and pulp and paper industry.
 - *Background site (remote site)*: 1 site in rural area
 - “Wachi Ra Long Kon Dam” at Kanchanaburi province.
- Special purposes
 - Monitor during haze episode
 - Baseline of transboundary mercury



Atmospheric Mercury Monitoring 2014 - 2016

Mobile monitoring unit

Mercury analyzer

Flow diagram of automated mercury analyzer

อ้างอิง: คู่มือการใช้งานเครื่อง Ambient Mercury Vapor Analyzer Model 2537x

Remark : ● Hot-spot sites ● Special purpose
 ● Remote site

Monitoring period: 1-2 weeks/site

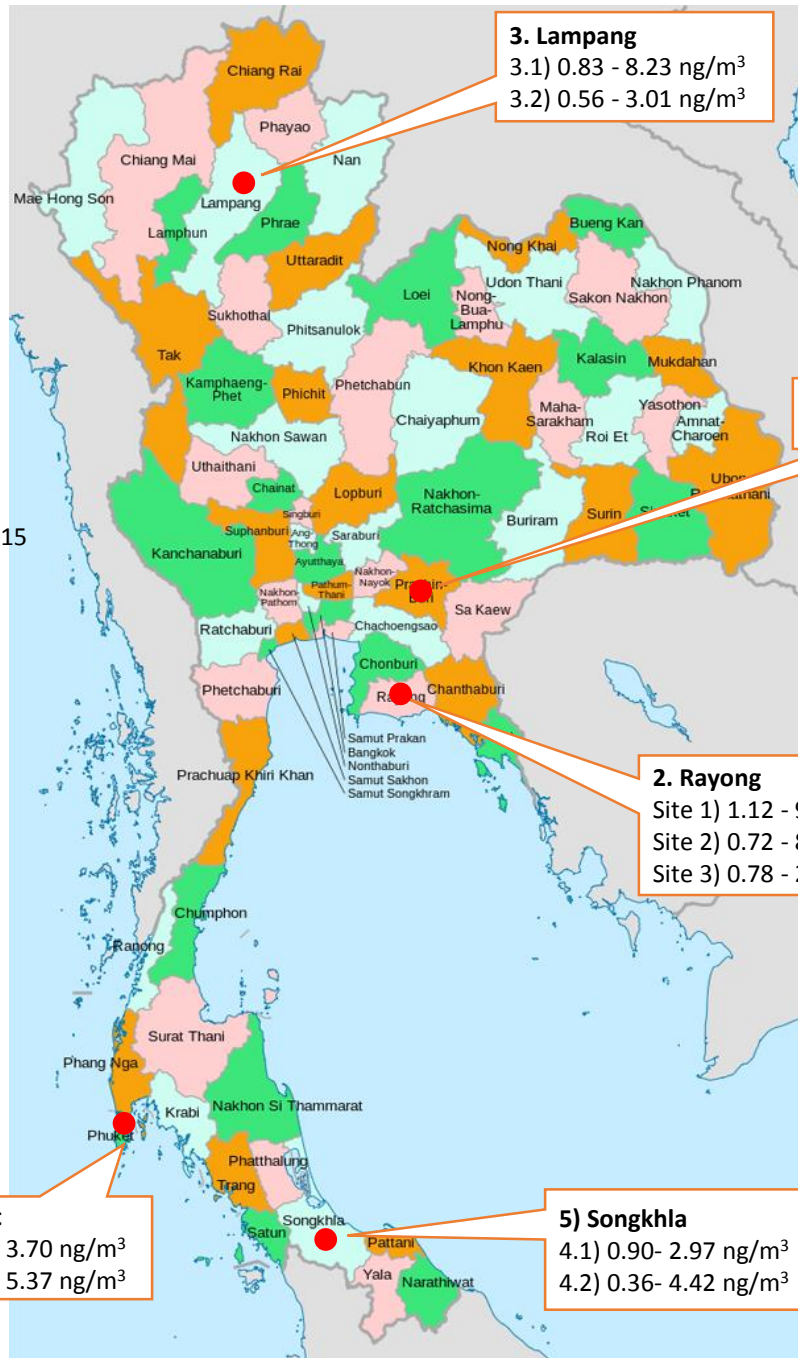
Preliminary Atmospheric Mercury Monitoring Results

Location (<i>near industrial sources</i>)	Monitoring period	Total Gaseous Mercury (TGM) 1-hr avg. (ng/m ³)		
		Min.	Avg.	Max.
Industrial sites (hot-spot sites)				
1. Prachin Buri province (<i>sub-bituminous coal-biomass power plant, pulp and paper industry</i>)	18 Nov. - 1 Dec.2014	1.24	2.12	4.42
2. Rayong province Site1 (<i>oil refinery</i>) Site2 (<i>gas separation plant, power plant</i>) Site3 (<i>oil refinery</i>)	2 - 25 Dec. 2014	1.12	3.05	9.26
	17 Dec. 2015 - 4 Jan. 2016	0.72	1.94	8.02
	7 - 28 Jan.2016	0.78	1.53	2.91
3. Lampang province (<i>coal-fired power plant</i>)	14 Jan. - 17 Feb. 2015	0.83	1.55	8.23
	15 Aug. - 13 Sep. 2015	0.56	0.99	3.01
4. Songkhla province (<i>waste incineration facility</i>)	23 Apr. - 1 May 2015	0.90	1.92	2.97
	11 - 23 May 2016	0.36	1.39	4.42
5. Phuket province (<i>waste incineration facility</i>)	4 - 12 May 2015	0.42	1.15	3.70
	26 May - 7 Jun. 2016	0.73	1.87	5.37
Background site (remote site)				
Kanchana Buri province	12 Sep. - 26 Dec. 2015	0.36	0.77	1.14
	29 Mar. - 18Apr. 2016	0.72	1.29	2.20

Preliminary Atmospheric Mercury Monitoring Results (con't)

Location	Monitoring period	Total Gaseous Mercury (TGM) 1-hr avg. (ng/m ³)		
		Min.	Avg.	Max.
Special purpose				
1. Nan province (baseline for transboundary mercury from nearby country)	19 Feb. - 25 Mar. 2015	0.85	1.66	3.39
2. Chiang Rai province (haze days during dry season)				
- Mae Sai district	10 - 17 Mar. 2016	1.15	3.23	10.96
- Chiang Khong district	18 - 24 Mar. 2016	1.03	3.63	6.15

Preliminary atmospheric mercury range (min. - max.) in hot-spot sites (2014 - 2016)



3) Lampang province

3.1) 14 Jan. - 17 Feb. 2015, 3.2) 15 Aug. - 13 Sep. 2015



4) Phuket province

4.1) 4 - 12 May 2015, 4.2) 26 May - 7 Jun. 2016



5) Songkhla province

5.1) 23 Apr. - 1 May 2015, 5.2) 11 - 23 May 2016



1) Prachin Buri province

(18 Nov. - 1 Dec. 2014)



2) Rayong province

site 1) 2 - 25 Dec. 2014
site 2) 17 Dec. 2015 - 4 Jan 2016
site 3) 7-28 Jan. 2016

Challenge ahead

- Monitor in hot-spot area near cement clinker production facilities.
- Establish the permanent monitoring stations in urban, industrial, and background areas.
- Determine the mercury level during haze days in dry season