

Monitoring of Mercury Concentration in Fish in the Vicinity of Natural Gas Production Platform in the Gulf of Thailand

Piamsak Menasveta and Somkiat Piyatiratitivorakul

Department of Marine Science
Faculty of Science
Chulalongkorn University
Bangkok, Thailand.

Natural gas production platform in the Gulf of Thailand.





Table 2. Total mercury in biota of the Gulf of Thailand.

Study period	Location	Kind of biota	Total mercury	Reference
1974	Bang Pra Coast	3 rd trophic level fishes	0.003-0.010	Menasveta (1976)
		4 th trophic level fishes	0.002-0.057	
1976	Chao Phraya Estuary	Fishes and shellfish	0.009-0.205	Menasveta (1978)
1977-1980	Inner Gulf	Fishes and shellfish	0.002-0.206	Sivarak et al. (1981)
1978-1979	River estuaries	Bivalves	0.013-0.120	Menasveta and Cheevaparanapiwat (1982)
1976-1977	Inner Gulf	3 rd trophic level fishes	0.002-0.130	Cheevaparanapiwat and Menasveta (1979)
		4 th trophic level fishes	0.002-0.650	
1979-1981	Inner Gulf	Fishes and shellfish	0.012-0.051	Sidhichaikasem and Chernbamrung (1983)
1980	Estuarine areas			Menasveta and Cheevaparanapiwat (1981)
	-Mae Klong	Mulletts	0.04±0.03	
	-Ta Chin	Mulletts	0.07±0.04	
	-Chao Phraya	Mulletts	0.15±0.06	
1980	Bang Prakong	Mulletts	0.08±0.03	Menasveta and Cheevaparanapiwat (1981)
	Estuarine areas			
	-Mae Klong	Green mussels	0.07±0.04	
	-Ta Chin	Green mussels	0.09±0.03	
	-Chao Phraya	Green mussels	0.21±0.06	
1982-1983	-Bang Prakong	Green mussels	0.09±0.04	Sivarak et al. (1984)
	-Hua Hin	Green mussels	0.04±0.03	
	Inner Gulf	Bivalves	0.001-0.041	
1982-1986	Inner Gulf	Bivalves	0.001-0.153	Boonyachotmongkol et al. (1987)
1990	Sichang Island	Fishes	0.012-0.032	Menasveta (1990)
	Mab Tapud	Fishes	0.013-0.049	
	Off-shore (Erawan)	Fishes	0.055-0.324	
1997	Outer Gulf of Thailand	Demersal Fishes	0.003-0.93	ARRI (1998)

Mean mercury in fish caught at different locations in 1995.

	Erawan	Platong	Funan
Mean Hg ($\mu\text{g/g}$)*	0.28	0.21	0.17
% of Hg Conc. Higher than 0.5 $\mu\text{g/g}$	11.6	7.50	2.33
% of Hg Conc. Higher than 0.2 $\mu\text{g/g}$	46.5	30.0	34.8
% of Hg Conc. Higher than 0.1 $\mu\text{g/g}$	74.4	62.5	55.8

*** $\mu\text{g/g}$ wet weight**

Source: Aquatic Resources Research Institute,
Chulalongkorn University, 1995.

Mean mercury in fish caught at different locations in 1997.

	Erawan	Platong	Funan
Mean Hg ($\mu\text{g/g}$)*	0.24	0.28	0.13

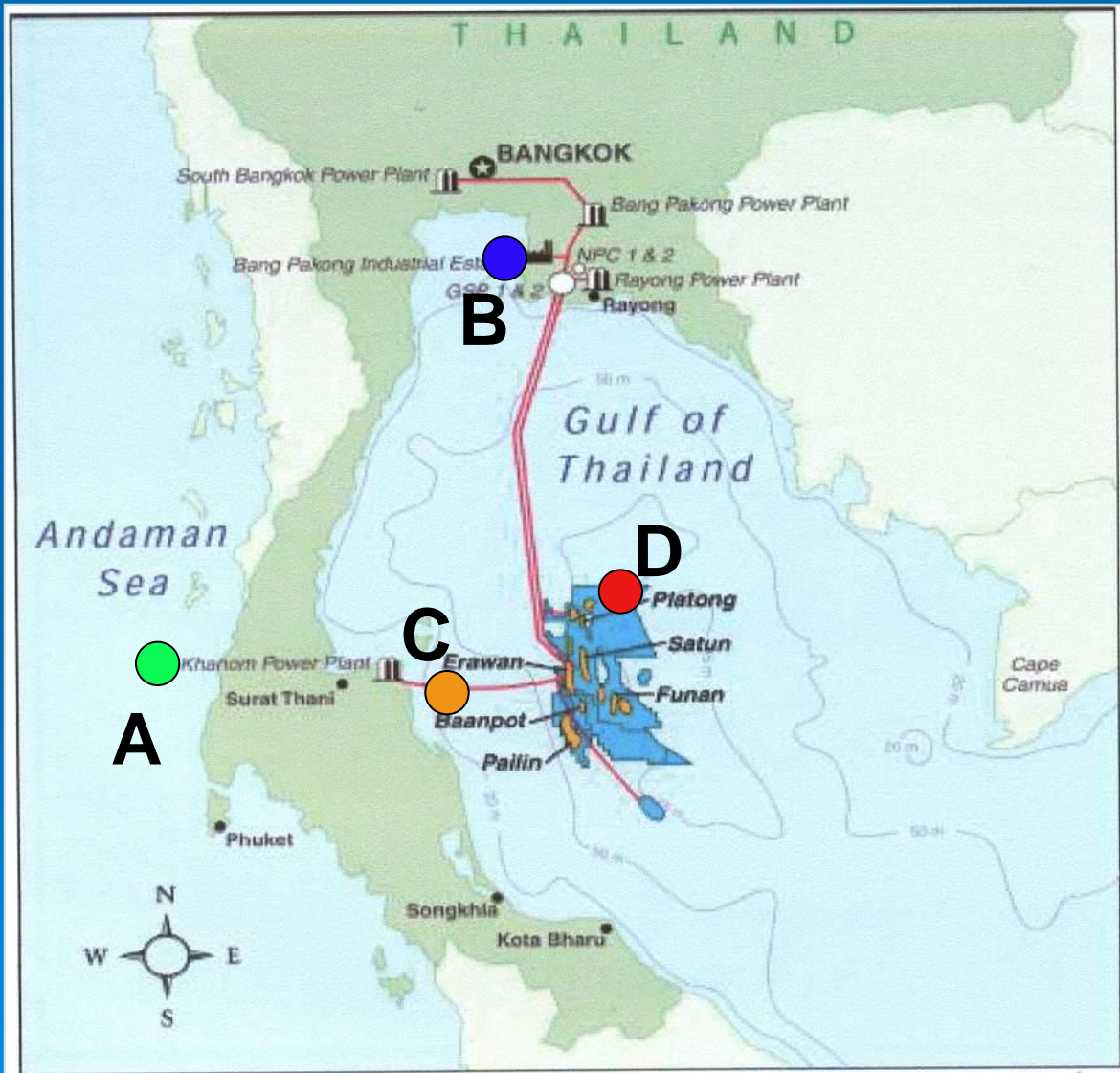
* $\mu\text{g/g}$ wet weight

Source : Tetra Tech (1997)

Rachycentron canadus



Natural gas production platform in the Gulf of Thailand.



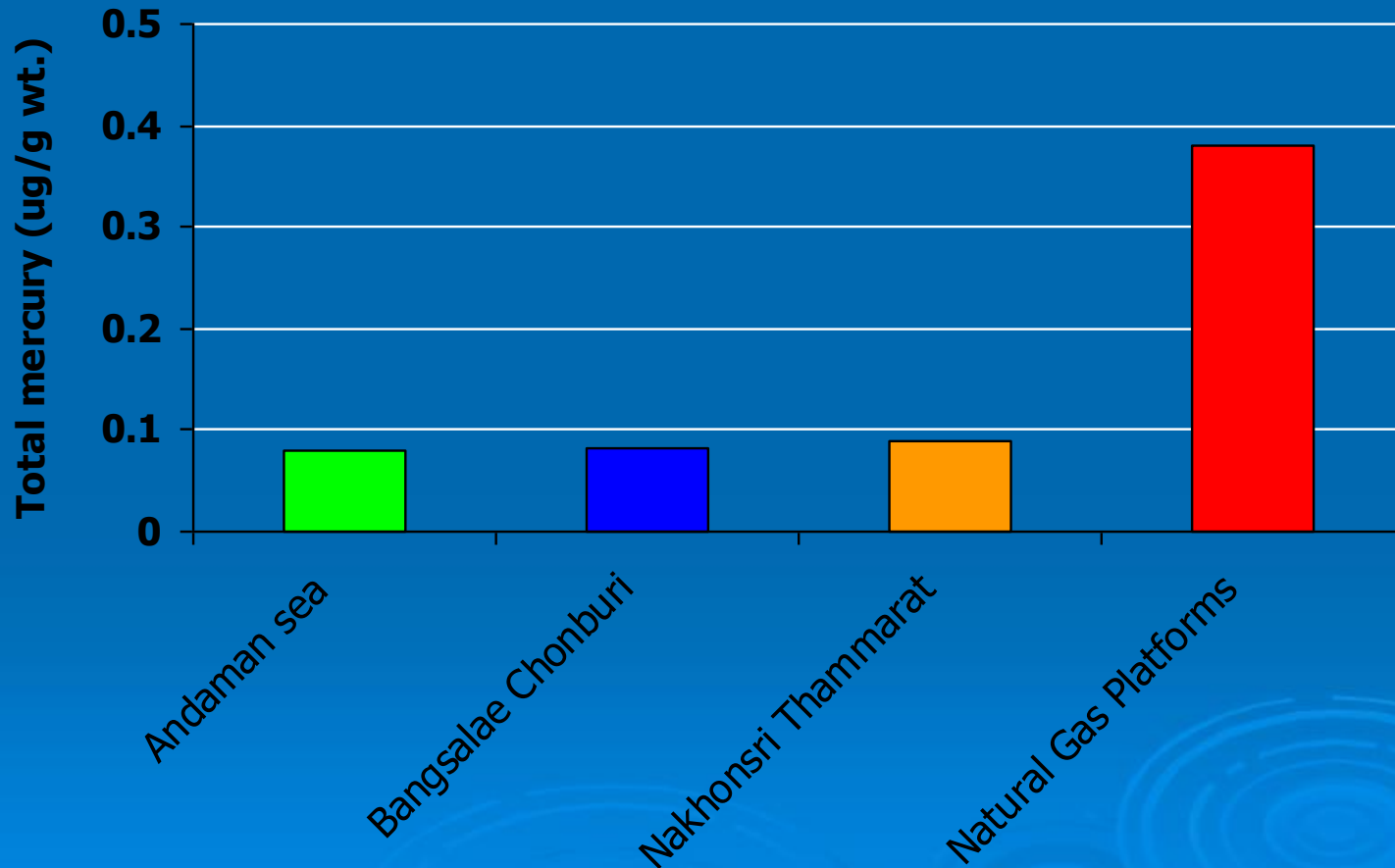
A = Andaman Sea

**B = Bangsalae
Chonburi
Coastal Sea**

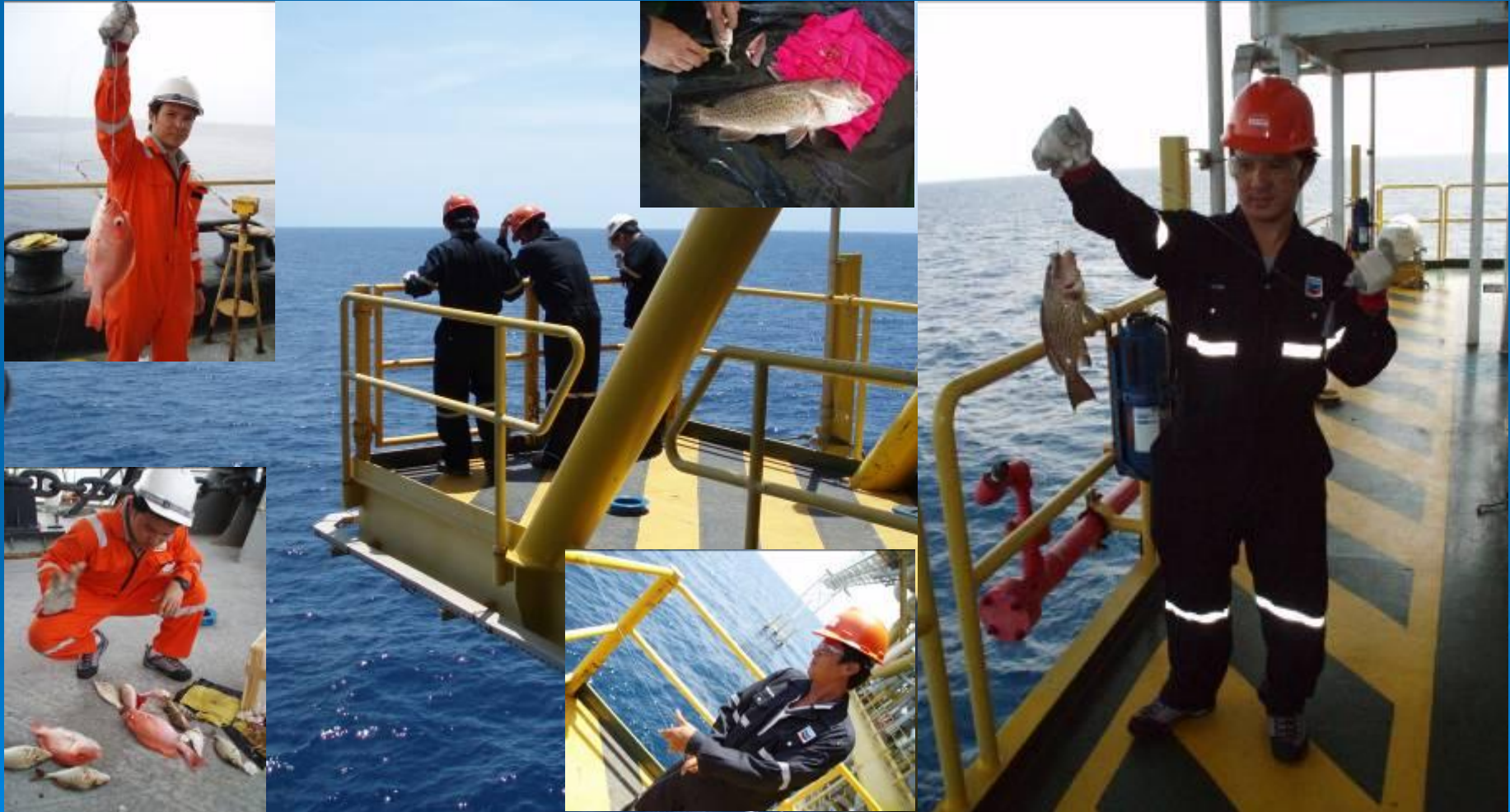
**C = Nakhonsri-
thammarat
Coastal Sea**

**D = Natural Gas
Platforms**

Mercury concentration ($\mu\text{g/g wt.}$)
in cobia (*Rachycentron canadus*) caught in different areas
of the Gulf of Thailand and Andaman Sea.



Collection of fish for total mercury analysis.



Common name and species of fish caught for total mercury analysis.

- Areolated grouper, *Epinephelus areolatus* (Forsk.)
- Red spot emperor, *Lethrinus lentjan* (Lacepede)
- Painted sweetlip, *Diagramma pictum* (Thunberg)
- Rosy red snapper, *Lutjanus malabaricus* (Bloch&Scheider)
- Brownstripe snapper, *Lutjanus lutjanus* (Bloch)

Areolated grouper, *Epinephelus areolatus* (Forsk.)



Red spot emperor, *Lethrinus lentjan* (Lacepede)



Painted sweetlip, *Diagramma pictum* (Thunberg)



Source: www.fishbase.org

Rosy red snapper, *Lutjanus malabaricus* (Bloch&Scheider)



Source: www.fishbase.org

Brownstripe snapper, *Lutjanus lutjanus* (Bloch)



Mercury concentrations in fish muscle ($\mu\text{g/g}$ wet weight) at Erawan production platform.

Year	No. fish	No. fish with Hg >0.5 $\mu\text{g/g}$	% fish with Hg >0.5 $\mu\text{g/g}$	Range $\mu\text{g/g}$ Hg	Mean \pm SD $\mu\text{g/g}$ Hg
1993	24	10	41.67	0.036-3.080	0.557 \pm 0.624
1995	45	5	11.11	0.011-1.113	0.276 \pm 0.252
1997	58	5	8.62	0.002-0.628	0.196 \pm 0.159
1998	45	7	15.56	0.032-1.189	0.298 \pm 0.253
1999	37	5	13.51	0.018-0.814	0.220 \pm 0.197
2000	41	2	4.88	0.045-0.892	0.207 \pm 0.171
2007	19	1	5.26	0.050-0.819	0.213 \pm 0.185
2008	19	6	31.58	0.005-0.840	0.225 \pm 0.217

Mercury concentrations in fish muscle ($\mu\text{g/g}$ wet weight) collected from Pranburi fish market.

Year	No. fish	No. fish with Hg>0.5 $\mu\text{g/g}$	% fish with Hg>0.5 $\mu\text{g/g}$	Range $\mu\text{g/g}$ Hg	Mean \pm SD $\mu\text{g/g}$ Hg
1995	19	1	5.28	0.020-0.958	0.148 \pm 0.208
1997	22	0	0	0.013-0.211	0.068 \pm 0.051
1998	30	1	3.33	0.034-0.933	0.153 \pm 0.172
1999	19	0	0	0.007-0.419	0.140 \pm 0.116
2000	43	0	0	0.018-0.499	0.169 \pm 0.118
2007	5	0	0	0.050-0.195	0.115 \pm 0.054
2008	10	0	0	0.010-0.270	0.086 \pm 0.077

Conclusion

Monitoring results during 1993-2008 found a gradual decrease of mercury concentration in fish near to the baseline level of $0.2 \mu\text{g/g}$. The percentages of fish having mercury concentration exceeded the safety limit of $0.5 \mu\text{g/g}$ were also decreasing.