



Asia Pacific Mercury
Monitoring Network

Mercury Central Analytical Lab and Site Liaison Reports

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National Central University, Taiwan



Wet Deposition Sampling and Hg Analysis: QA/QC and Data Summary

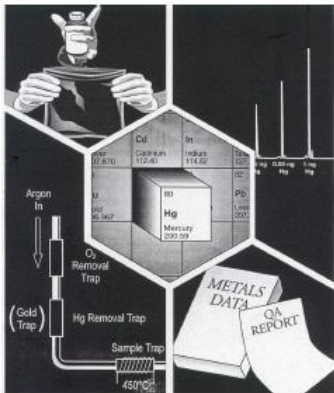
Rainwater Hg Analysis

Total Hg is quantified by dual amalgamation Cold Vapor Atomic Fluorescence Spectrometry (CVAFS) after BrCl oxidation, $\text{NH}_2\text{OH}\cdot\text{HCl}$ neutralization, and SnCl_2 reduction.



Method 1631, Revision E:
Mercury in Water by Oxidation, Purge and
Trap, and Cold Vapor Atomic Fluorescence
Spectrometry

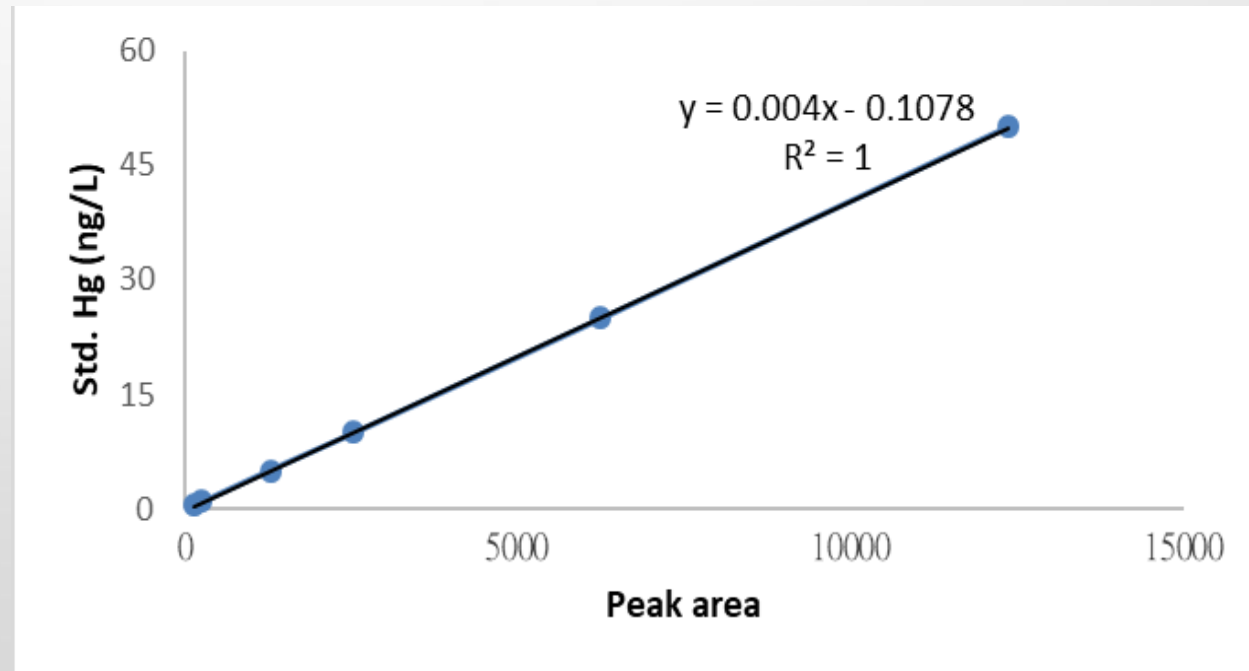
August 2002



Method Detection Limit

0.03 ng/L (in 2023)

Calibration Curve



Blanks

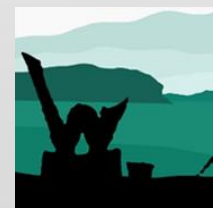
	Number	Mean (ng L ⁻¹)	Min. (ng L ⁻¹)	Max. (ng L ⁻¹)	1631 rev. E
System blank	43	0.04	0.01	0.09	< 0.5
Bottle blank	83	0.12	0.00	0.38	< 0.5

QC

	Number	Mean (%)	Min. (%)	Max. (%)	1631 rev. E
Duplicate analysis	43	0.6	0.0	1.9	$< \pm 20$
Matrix spike/duplicate	43	100.3	97.9	103.2	75 – 125
Quality control sample	60	100.6	97.5	106.5	80 – 120

Mercury Laboratory Proficiency Testing

- PT name: 2nd Round of Mercury Laboratory Proficiency Testing – Asia and the Pacific
- PT test period: February – June 2023
- Test item: One (1) Dried fish sample
- Target parameter: Total mercury



Project for
Promoting
Minamata
Convention
on Mercury

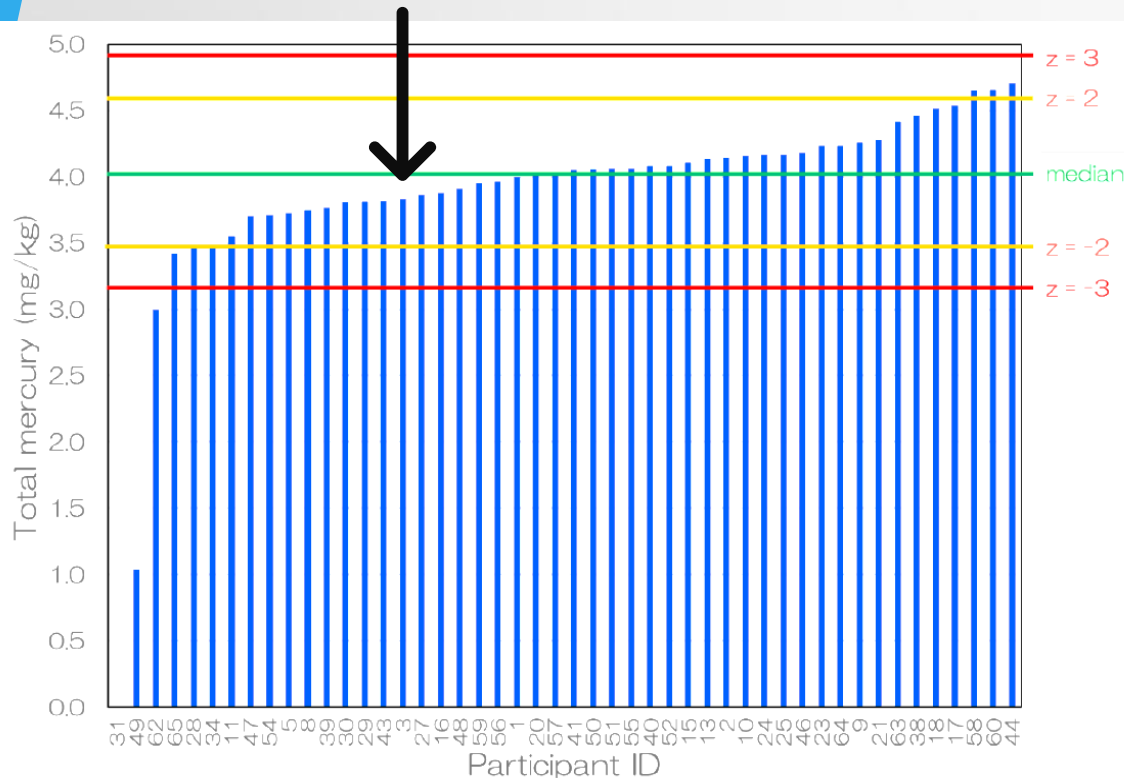


by making the most of Japan's
knowledge and experiences

Reference: <http://www.rrcap.ait.ac.th/Pages/japanmercuryproject.aspx>

2nd PT results

$|z| \leq 2$: Performance is
satisfactory (satisfactory)



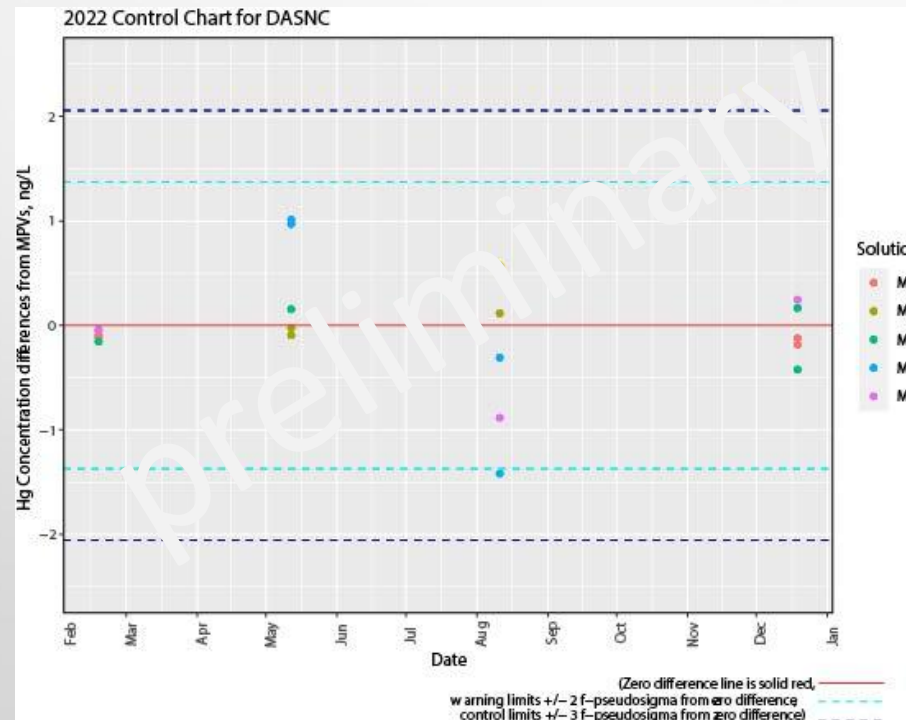
Participant ID: 3

(Center for Environmental Monitoring and Technology,
Department of Atmospheric Sciences, National Central
University)

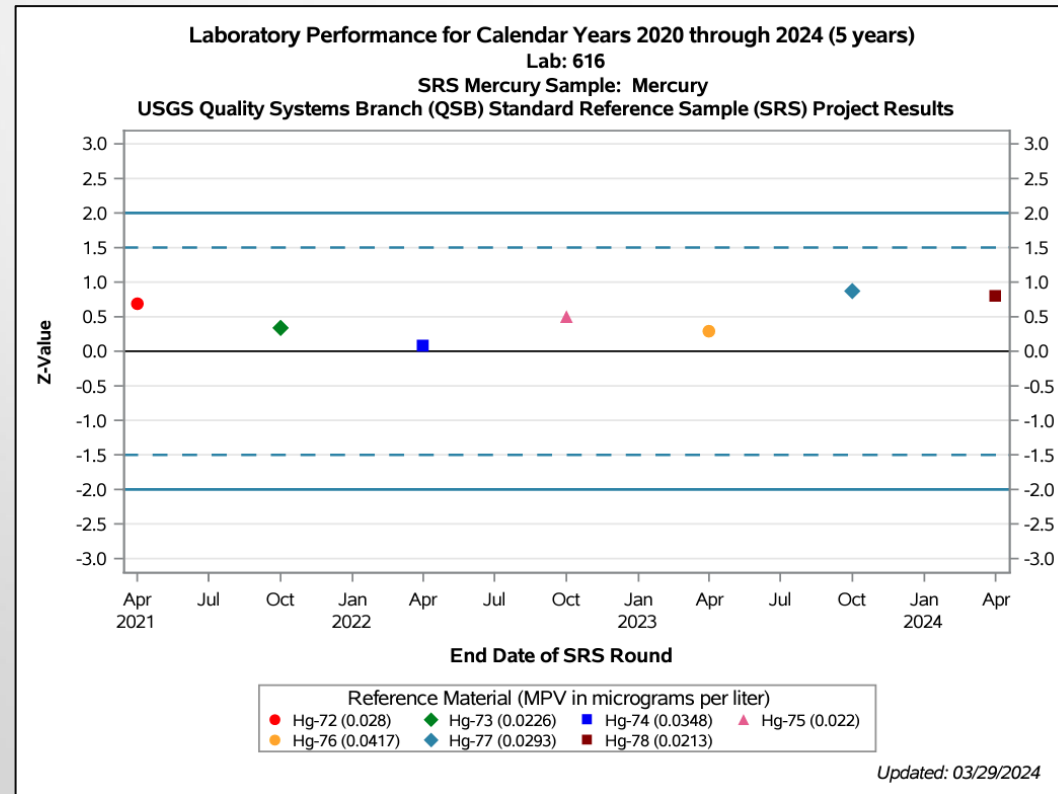


- Specimen: Sediment
- Target parameter: Total mercury
- Test item distribution: August – September 2024
- Deadline for reporting results: 15 January 2025
- Feedback on the result: April 2025

USGS Interlaboratory Comparison Program - Mercury Deposition Network



USGS Standard Reference Sample Program



Samples Received and Analyzed

QA sample (Reagent blank, bottle blank, etc)

Year	2021	2022	2023	Sum
Number	57	72	93	238

Data Summary

QA sample (2023)

Type	Total Hg Concentration (ng L ⁻¹)
Reagent blank (DI water)	0.8 – OL
Reagent blank (0.5% HCl)	28.8 – OL
PETG bottle blank	<MDL – 38.0
Field blank	4.4 – 97.4
Travel blank	<MDL – 1.0
Duplicated	RPD >20%

MDL :Method detection limit, 0.03 ng L⁻¹

OL : Overload (Typically THg > 130 ng L⁻¹)

Trace Metal Analysis Reagent

- Hydrochloric acid

Hydrochloric Acid, 36.5–38.0%
BAKER INSTRA-ANALYZED® Reagent
For Trace Metal Analysis

avantor™



Test	Specification	Result
Trace Impurities – Germanium (Ge)	≤ 3.0 ppb	< 2.0
Trace Impurities – Gold (Au)	≤ 4.0 ppb	0.2
Heavy Metals (as Pb)	≤ 100 ppb	< 50
Trace Impurities – Iron (Fe)	≤ 15.0 ppb	1.0
Trace Impurities – Lead (Pb)	≤ 1.0 ppb	< 0.5
Trace Impurities – Lithium (Li)	≤ 1.0 ppb	< 0.2
Trace Impurities – Magnesium (Mg)	≤ 10.0 ppb	< 1.0
Trace Impurities – Manganese (Mn)	≤ 1.0 ppb	< 0.4
Trace Impurities – Mercury (Hg)	≤ 0.5 ppb	< 0.1

ACS – Extractable Organic Substances	≤ 5 ppm	3
ACS – Free Chlorine (as Cl ₂)	≤ 0.5 ppm	< 0.5
Phosphate (PO ₄)	≤ 0.05 ppm	< 0.03
Sulfate (SO ₄)	≤ 0.5 ppm	< 0.3
Sulfite (SO ₃)	≤ 0.8 ppm	0.3
Ammonium (NH ₄)	≤ 3 ppm	< 1
Trace Impurities – Arsenic (As)	≤ 0.010 ppm	< 0.002
Trace Impurities – Aluminum (Al)	≤ 10.0 ppb	< 5.0
Arsenic and Antimony (as As)	≤ 5 ppb	< 3
Trace Impurities – Barium (Ba)	≤ 1.0 ppb	< 0.2
Trace Impurities – Beryllium (Be)	≤ 1.0 ppb	< 0.2
Trace Impurities – Bismuth (Bi)	≤ 10.0 ppb	1.2
Trace Impurities – Boron (B)	≤ 20.0 ppb	< 5.0
Trace Impurities – Cadmium (Cd)	≤ 1.0 ppb	< 0.3

ThermoFisher SCIENTIFIC

Certificate of Analysis

ThermoFisher Scientific Quality System has been tested to conform to Quality Management System Standard ISO9001:2015 by SAH Global Certificate Number QMS000000

This is to certify that only the lot number listed below was tested and found to comply with the specifications of the product listed. Certificate has been supplied for that product. ThermoFisher Scientific represents the quality of the product, including the material of manufacture and fitness for a particular purpose. Products are for research use only and not for clinical use. For the responsibility of the product, ThermoFisher Scientific is not responsible for the product. The following information is for the user's reference only.

Catalogue Number:	H1190/PB17	Quality Test / Release Date:	04-MAY-23
Lot Number:	2355542	Expiry Phase:	Use within 3 years of packing date
Product of:	France		

Description: Hydrochloric acid 1.18 ~37%

Grade: PrimaPlus Application: Trace metal analysis

Appearance: Clear colourless Mobile liquid

Result Name	Test Value	Units	Specification
Aluminum (Al)	<0.05	ppm	<= 0.05
Antimony (Sb)	<0.005	ppm	<= 0.005
Arsenic (As)	<0.005	ppm	<= 0.005
Boron (B)	<0.05	ppm	<= 0.05
Barium (Ba)	<0.005	ppm	<= 0.005
Beryllium (Be)	<0.005	ppm	<= 0.005
Bismuth (Bi)	<0.005	ppm	<= 0.005
Boron (B)	<0.005	ppm	<= 0.005
Cadmium (Cd)	<0.002	ppm	<= 0.002
Calcium (Ca)	<0.05	ppm	<= 0.1
Chromium (Cr)	<0.005	ppm	<= 0.005
Cobalt (Co)	<0.002	ppm	<= 0.002
Copper (Cu)	<0.005	ppm	<= 0.005
Free chlorine (ppm)	<1	ppm	<= 1
Fluorine (F)	<0.005	ppm	<= 0.005
Germanium (Ge)	<0.005	ppm	<= 0.005
Indium (In)	<0.005	ppm	<= 0.005
Iron (Fe)	<0.05	ppm	<= 0.1
Lead (Pb)	<0.002	ppm	<= 0.002
Lithium (Li)	<0.002	ppm	<= 0.002
Magnesium (Mg)	<0.01	ppm	<= 0.01
Manganese (Mn)	<0.002	ppm	<= 0.002
Mercury (Hg)	<0.005	ppm	<= 0.005
Molybdenum (Mo)	<0.002	ppm	<= 0.002
Nickel (Ni)	<0.002	ppm	<= 0.002
Phosphorus (P)	<0.05	ppm	<= 0.05
Residue after ignition	<0.001	%	<= 0.001

Result Name	Test Value	Units	Specification
Indium (In)	<0.005	ppm	<= 0.005
Iron (Fe)	<0.05	ppm	<= 0.1
Lead (Pb)	<0.002	ppm	<= 0.002
Lithium (Li)	<0.002	ppm	<= 0.002
Magnesium (Mg)	<0.01	ppm	<= 0.02
Manganese (Mn)	<0.002	ppm	<= 0.002
Mercury (Hg)	<0.005	ppm	<= 0.005
Molybdenum (Mo)	<0.002	ppm	<= 0.002

Note: The data listed is valid for all package sizes of this lot of the product, expressed as an extension of the catalogue number listed above. If there are any questions with this certificate, please call Customer Services on +44(0)1509 555500.



Issues of sample delivery

Issues of sample delivery

1. Clearance delay (typo)

	INVOICE DATE	04Apr2024
	CONSIGNEE	
	DA-WEI LIN DEPARTMENT OF ATMOSPHERIC SCIENCE NATIONAL CONTROL UNIVERSITY S1-712, 300 CHUNGDA ROAD, CHUNGLI EXT 65585 dwilin@g.nw.edu.tw Taoyuan District, Taoyuan City 320317 TW +886-3-422-7151	
	CONSIGNEE OR IMPORTER'S TAX NUMBER	
	CONSIGNEE'S EMAIL CONTACT	
☐	IMPORTER	

Issues of sample delivery

1. Clearance delay (incomplete address)

AUSTRALIA	
Receiver :	Contact:
DEPARTMENT OF ATMOSPHERIC SCIENCES	+88634227151
PROFESSOR GUEY-RONG-SHEU	+88634227151
300 JHUNG-PA ROAD	grsheu@atm.ncu.edu.tw
330001 TAOYUAN CITY	
TAIWAN	

Issues of sample delivery

2. Record incomplete

The image shows a sample delivery record form. A red circle is drawn around the weight recording section, which is currently empty. The form includes fields for Date (Month, Day, Year, Hour, Minute), Bag Open?, Leak?, Full Wt., Empty Wt., Net Wt., Leak Wt., and Total Wt. The text 'No weight record' is overlaid in red on a grey background at the bottom right of the form.

Date	Month	Day	Year	Hour	Minute

Bag Open? ☒ Yes ☐ No Leak? ☐ Yes ☒ No

Full Wt.							
Empty Wt.							
Net Wt.							
Leak Wt.							
Total Wt.							

and motor are operating properly. Lid in correct position
rated properly during the week

No weight record

Issues of sample delivery

3. Record missing



**THANK
YOU!**

