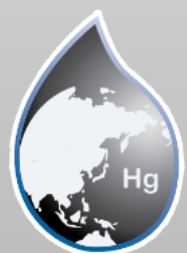


Standard Operating Procedures for APMMN

Da-Wei Lin and Guey-Rong Sheu

Department of Atmospheric Science, National Central University

July 27, 2016



Asia Pacific Mercury
Monitoring Network



Center for Environmental
Monitoring and Technology
National Central University

Current SOP

Asia – Pacific Mercury Monitoring Network (APMMN)

Mercury Wet Deposition Network Field Standard Operating Procedures

Version 1.3-, February, 2015

- Based on MDN/NADP SOP.
- Revised Ver. 1.3 by TEPA, USEPA, NADP, NCU, Vietnam and Thailand in 2015



The screenshot displays the APMMN website with a blue header. The logo on the left features a water drop with a map of Asia and the chemical symbol 'Hg'. The text 'Asia Pacific Mercury Monitoring Network' is to the right of the logo. The URL 'http://apmmn.org' is in the top right corner. A navigation bar contains links: 'About APMMN', 'Site Info', 'Workshops', 'Education', 'Training', and 'Publications'. The 'Publications' link is highlighted in green. Below this, a green box labeled 'Publications' contains a list: 'APMMN Field Sample SOP', 'Sampling and analysis method', and 'UNEP documents'. The 'APMMN Field Sample SOP' is selected. To the right, the title 'APMMN Field Sample SOP' is displayed above a thumbnail image of the document cover. Below the thumbnail, the text reads: '• APMMN Field Sample SOP [PDF]', 'Asia – Pacific Mercury Monitoring Network (APMMN)', 'Mercury Wet Deposition Network Field Standard Operating Procedures', and 'Version 1.3-, February, 2015'. On the far right, a 'RECENT NEWS' section lists several events with dates and locations, including 'APMMN 2016' in Bangkok, Thailand, and 'Mercury Monitoring Workshop 2016' in Chungli, Taiwan.

<http://apmmn.org>

Asia Pacific Mercury Monitoring Network

About APMMN Site Info Workshops Education Training Publications

Publications

- APMMN Field Sample SOP
- Sampling and analysis method
- UNEP documents

APMMN Field Sample SOP

• APMMN Field Sample SOP [PDF]

Asia – Pacific Mercury Monitoring Network (APMMN)
Mercury Wet Deposition Network Field Standard Operating Procedures
Version 1.3-, February, 2015

RECENT NEWS

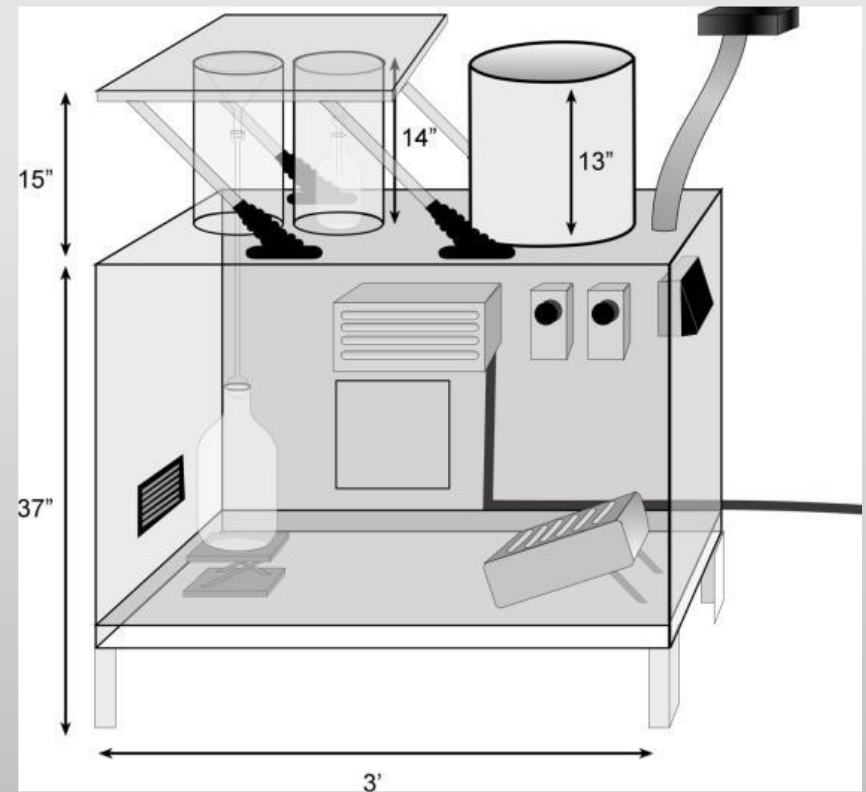
- > [APMMN 2016](#)
July 26-29, 2016
Bangkok, Thailand
- > [Mercury Monitoring Workshop 2016](#)
June 13-17, 2016
Chungli, Taiwan
- > [ICMGP 2015](#)
June 14-19, 2015
Jeju, Korea
- > [APMMN 2015](#)
June 22-25, 2015
Minamata, Japan
- > [IEP 2015](#)
April 22-24, 2015
Chungli, Taiwan

Wet-only precipitation collector in current APMMN SOP

MDN Site NC26



NADP-style Aerochem 301



Follow up...

Critical Evaluation of a Modified Automatic Wet-Only Precipitation Collector for Mercury and Trace Element Determinations

MATTHEW S. LANDIS AND
GERALD J. KEELER*

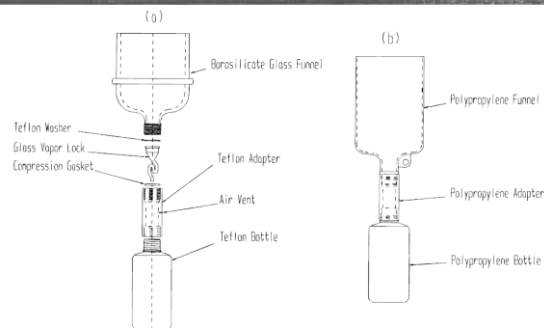


FIGURE 2. Diagram of the UM-B sampling trains for the collection of Hg (a) and trace elements (b).

Modified
Based on UM-B



Taiwan style
MIC type

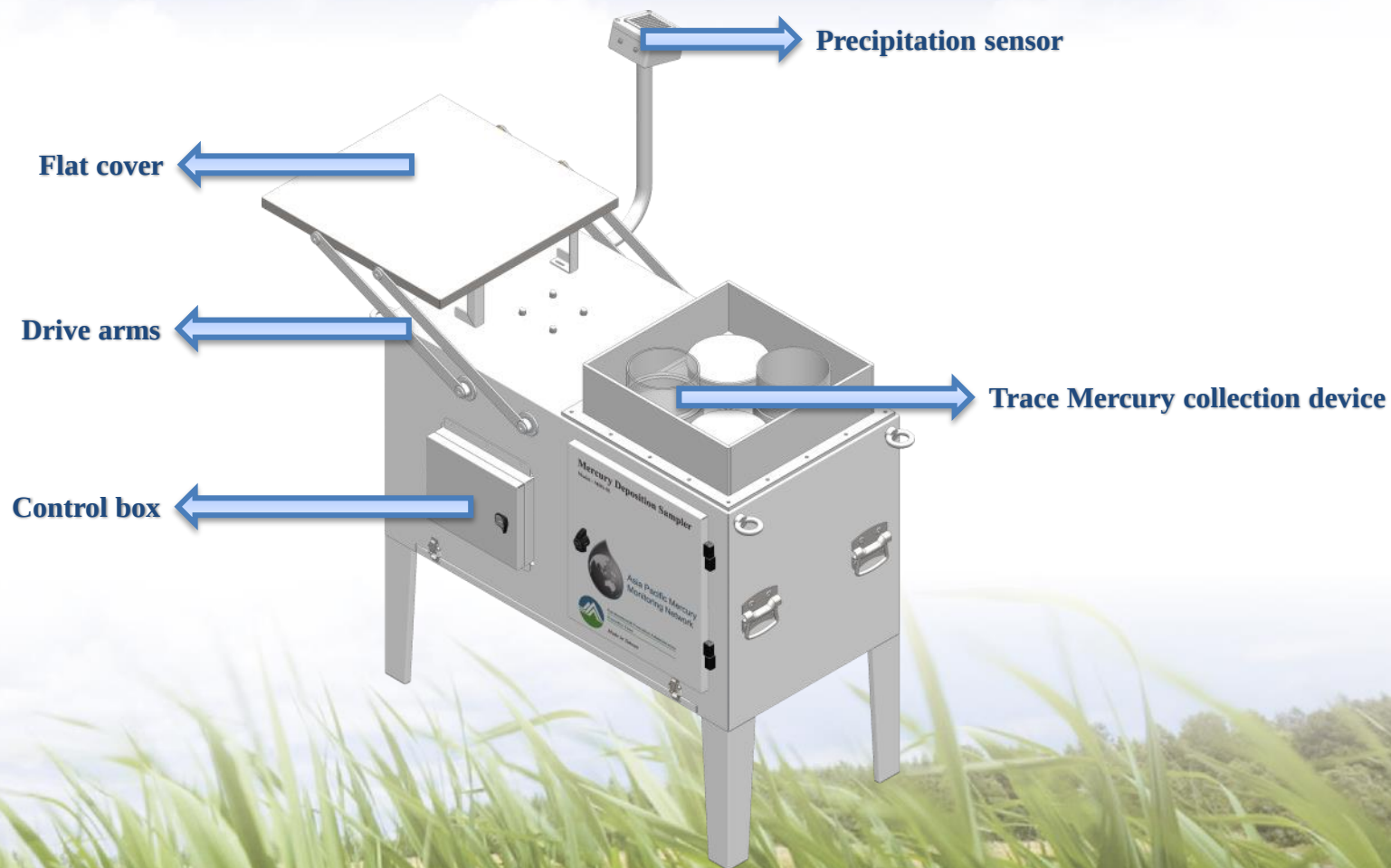
Mercury Deposition Sampler



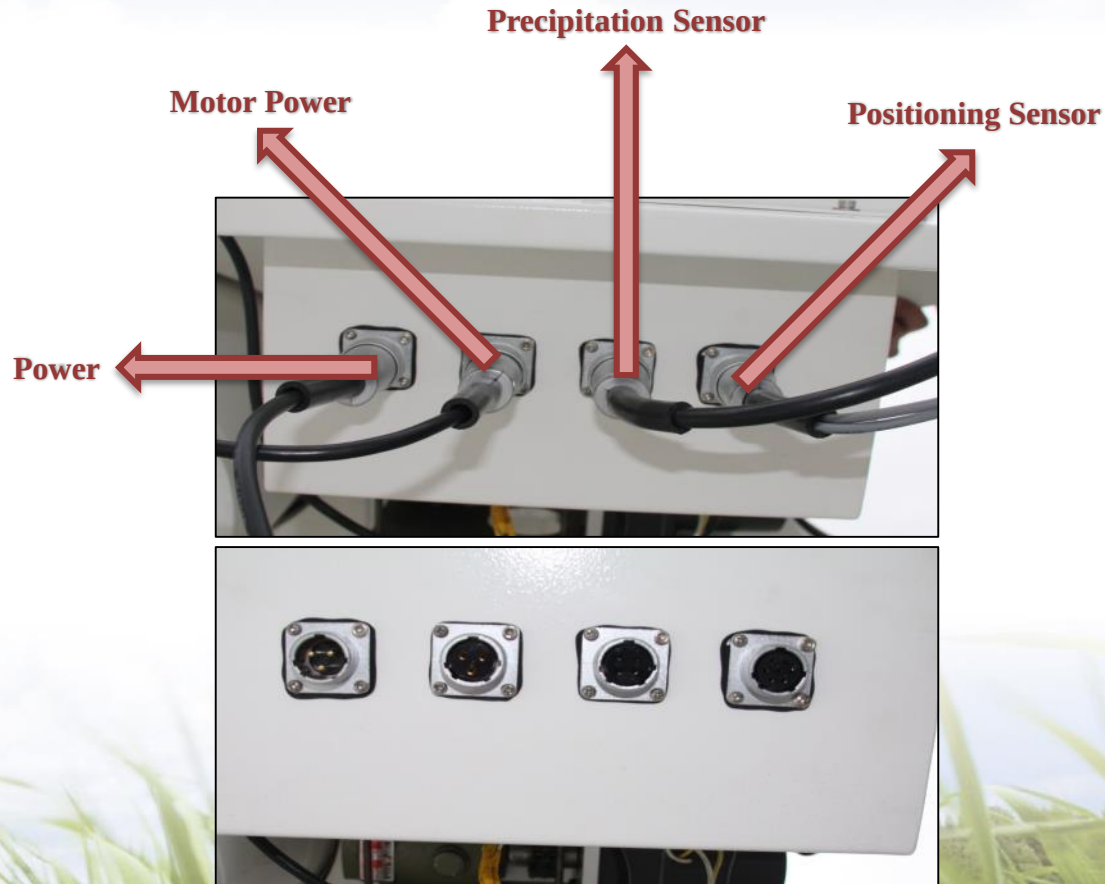
General Manager
Cheng Jung Huang

E-mail : asir@machine-shop.com.tw

External item of the equipment



Internal item of the equipment



Internal item of the equipment



Shaft coupling

Sensor positioning sheet

Flat cover closing positioning sensor

Flat cover opening positioning sensor

Description of Operation

When precipitation sensor detects precipitation.



“Precipitation” light on controller monitor will be on. Then “Heater” will light on and shine followed by setting.

Cover open	Precipitation	Manual OFF
		
Cover close	Heater	Auto ON
		
Setting	Stop	

For example, set Heater ON to 10 seconds and Heater OFF to 5 seconds. “Heater” light will repeat shining 10 seconds and then going out 5 seconds until “Precipitation” light off.

Description of Operation

When “Precipitation” lights on, flat cover will open and start to collect mercury deposition



While the flat cover opening, Sensor positioning sheet will synchronously rotate with it until be detected by Flat cover opening positioning sensor with lighting on. Then flat cover will stop. “Cover open” on controller monitor will light on.



Cover open	Precipitation	Manual OFF
☒	☒	
Cover close	Heater	Auto ON
☐	☒	
Setting	Stop	

Description of Operation

When precipitation sensor doesn't detect precipitation.



“Precipitation” light on controller monitor will be off. Then “Heater” will light of.

Cover open	Precipitation	Manual OFF
		
Cover close	Heater	Auto ON
		
Setting	Stop	

Description of Operation

When “Precipitation” lights off, flat cover will close.



While the flat cover closing, Sensor positioning sheet will synchronously rotate with it until be detected by Flat cover closing positioning sensor with lighting on. Then flat cover will stop. “Cover close” on controller monitor will light on



Cover open	Precipitation	Manual OFF
☐	☐	
Cover close	Heater	Auto ON
☒	☐	
Setting	Stop	

Description of Operation

When “Precipitation” lights off, flat cover will close.

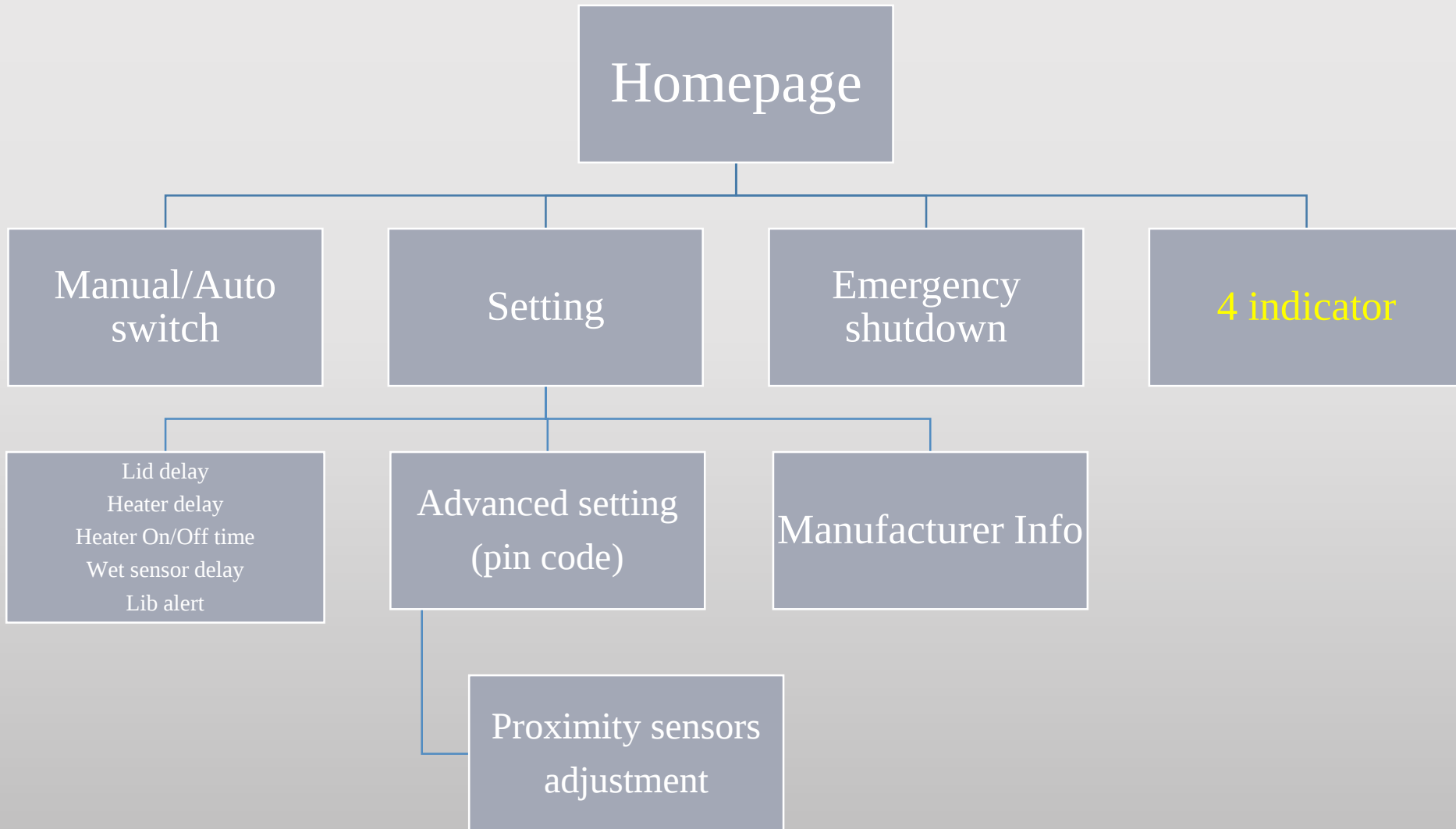


While the flat cover closing, Sensor positioning sheet will synchronously rotate with it until be detected by Flat cover closing positioning sensor with lighting on. Then flat cover will stop. “Cover close” on controller monitor will light on

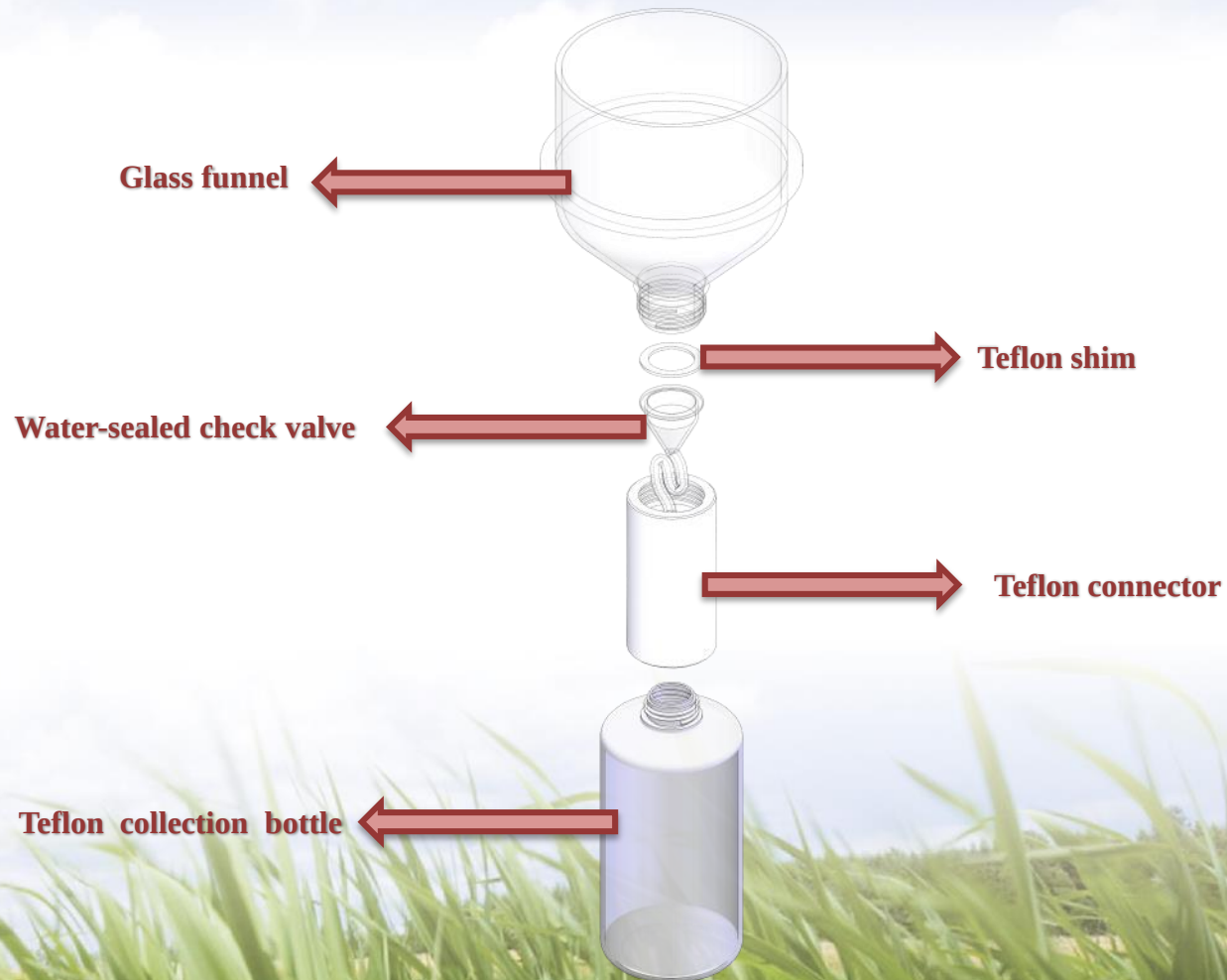


Cover open	Precipitation	Manual OFF
☐	☐	
Cover close	Heater	Auto ON
☒	☐	
Setting	Stop	

Control panel

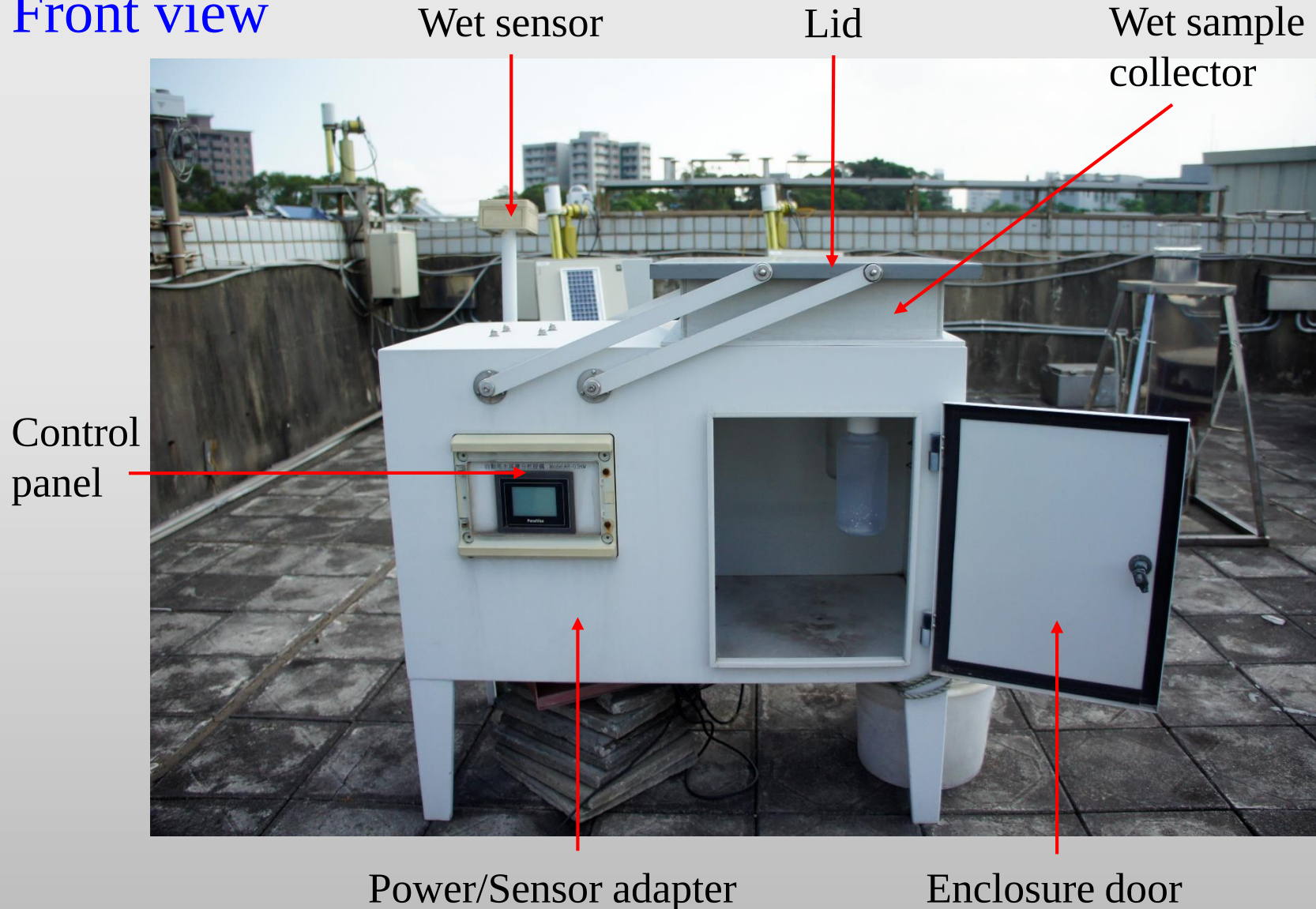


Trace mercury collection device



Wet-only precipitation collector-MIC type

Front view

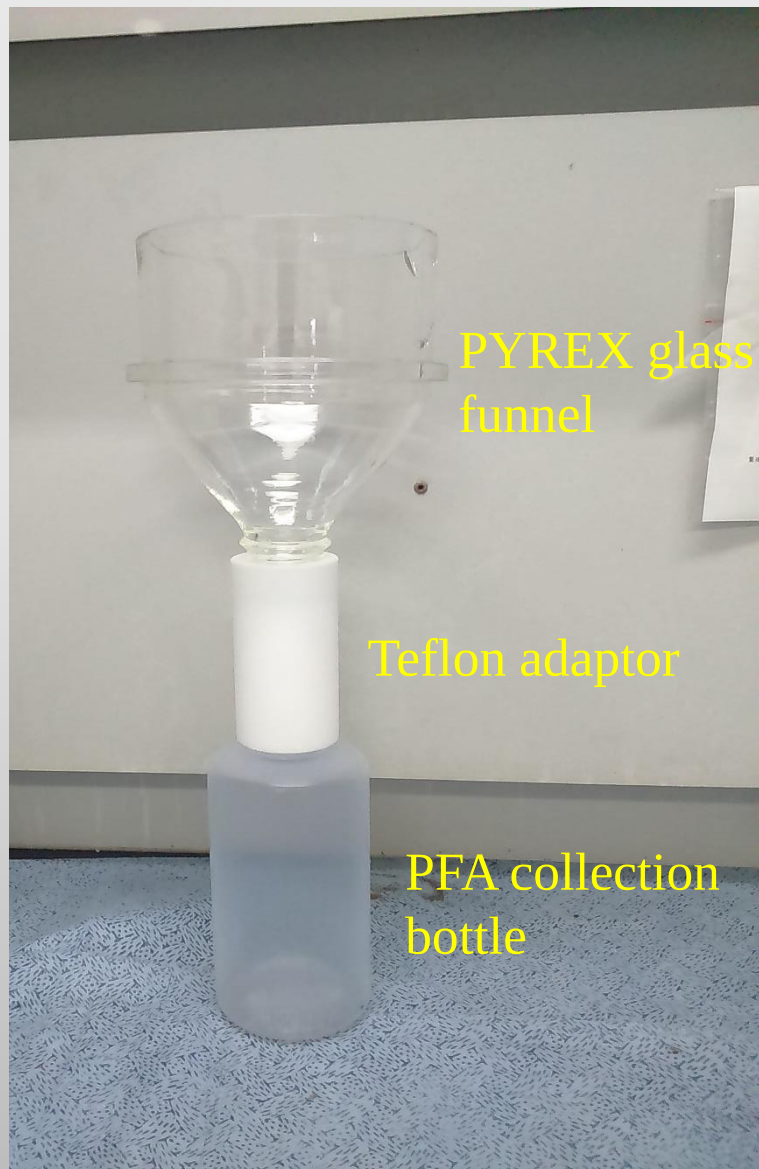


MIC type

Top view

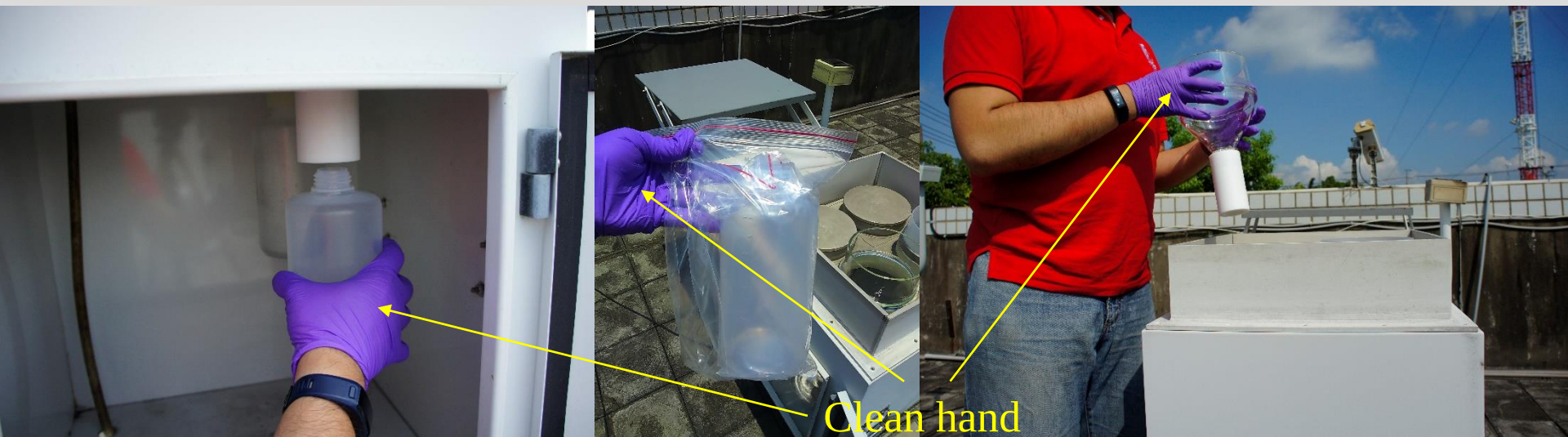


Mercury collection device



Retrieve your sample

- Changes on Tuesday morning between 8 to 10 AM local time.
- Approach collector **facing into the wind**
- Fill in the NOF



Network Observer Form (NOF)

OBSERVER FORM				Send Completed Form With Each Shipping		LAB ID		Courier/Tracking #																																																																																																																																																																										
1. STATION Name _____ ID		2. OBSERVER Print name _____ Initials		HAL/APMPN Use Only Sample Receipt Name (print): _____ Date Cooler # Time Bag Open? ☐ Yes ☐ No Leak? ☐ Yes ☐ No Full WL <table border="1" style="width: 100%; height: 20px;"><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> Empty WL <table border="1" style="width: 100%; height: 20px;"><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> Net WL <table border="1" style="width: 100%; height: 20px;"><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> Leak WL <table border="1" style="width: 100%; height: 20px;"><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> Total WL <table border="1" style="width: 100%; height: 20px;"><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>																																																																																																																																																																														
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8. OVERFLOW (check one) Overflow mL		9. ENCLOSURE TEMPERATURE MAXIMUM deg. C MINIMUM																																																																																																																																																																																

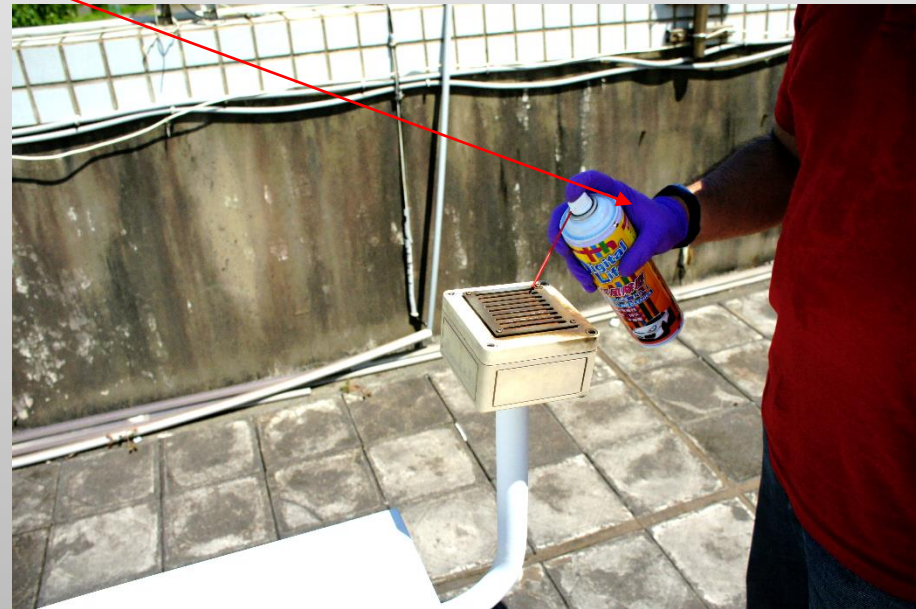
1. Station
2. Observer
3. Bottle
4. Observations
5. Site operations
6. Precip. record
7. Overflow
8. Enclosure Temp.
9. Remarks

MAL/APMMN
use only

Cleaning the collector

- Clean any surface have dirt with paper towel
- Clean any debris off sensor by brush or compressed air

Dirty hand



Deployment of new sample collector

- Use new gloves !
- Install new sample collector.
- Avoid to touch the inner wall of glass funnel
- Start the next week NOF
- Close the lid and enclosure door



Weigh, transfer and storage

- Weigh the sample bottle and subtracting the pre-sample weight of bottle (recode it on the NOF)
- Transfer the sample from 1L to 150ml sample bottle
- Label the sample with sampling site ID, start/end date
- Place the sample into **double** sealable plastic bag
- Store the sample in a Hg-free and secure place (or refrigerator) if not shipping immediately.
- Capture rain gauge data
- Complete the NOF



Sample label

- The most important part of taking sample

Site ID

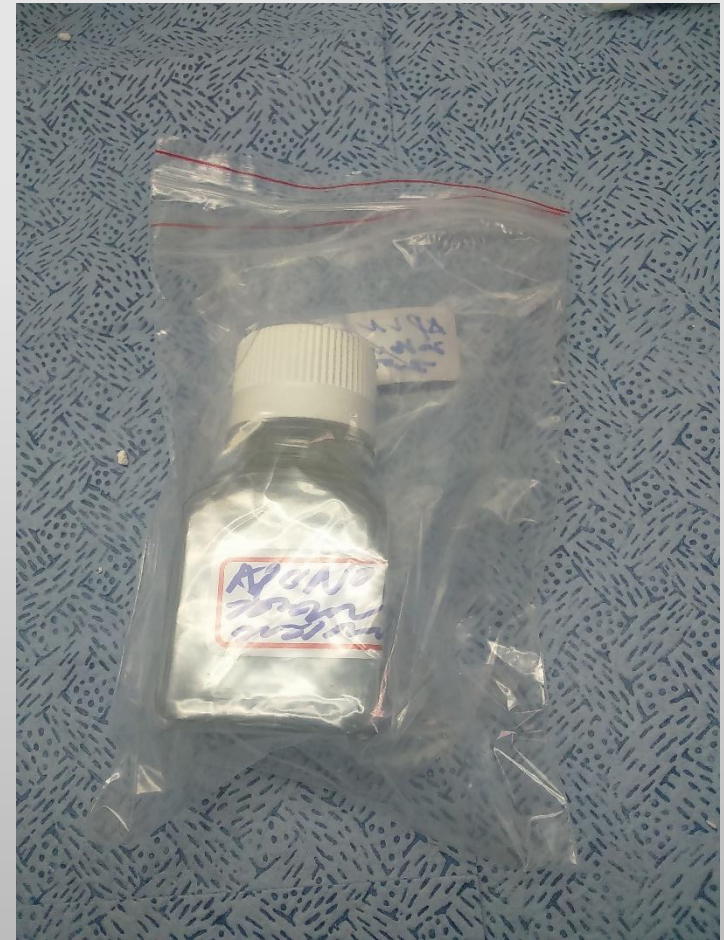
Start Date (MM/dd/yyyy)

End Date

APTW01

07/12/2016

07/19/2016



Shipping Info.

Ship samples at least **monthly** by int'l logistics service

Ex:



- Pack samples and NOFs singly or in bulk
- Cold shipping is unnecessary

Da-Wei Lin

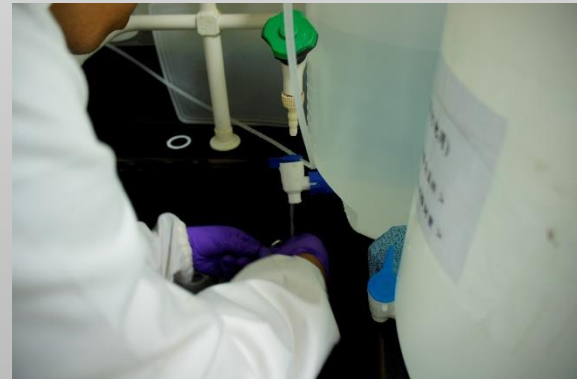
Rm. ATM-101 (VHF antenna area)

No. 300, Chungda Rd., Chungli Dist., Taoyuan City 32001, Taiwan

Phone : 886-923-607952

Acid clean of used glassware

- Separate the collection device and soak within 10% reagent-grade hydrochloric acid for 72 hours (**except O-ring**)
- Rinse thoroughly each component with deionized water ($\rho \geq 18.2 \text{ M}\Omega$) at least **3 times**
- Air dry each component in the clean bench
- Cover each component with clean plastic bag and store
- Assemble each component before use



Problem occur in past year

Case 1:

No sealable plastic bag (double bags)

No lable on sample bottle



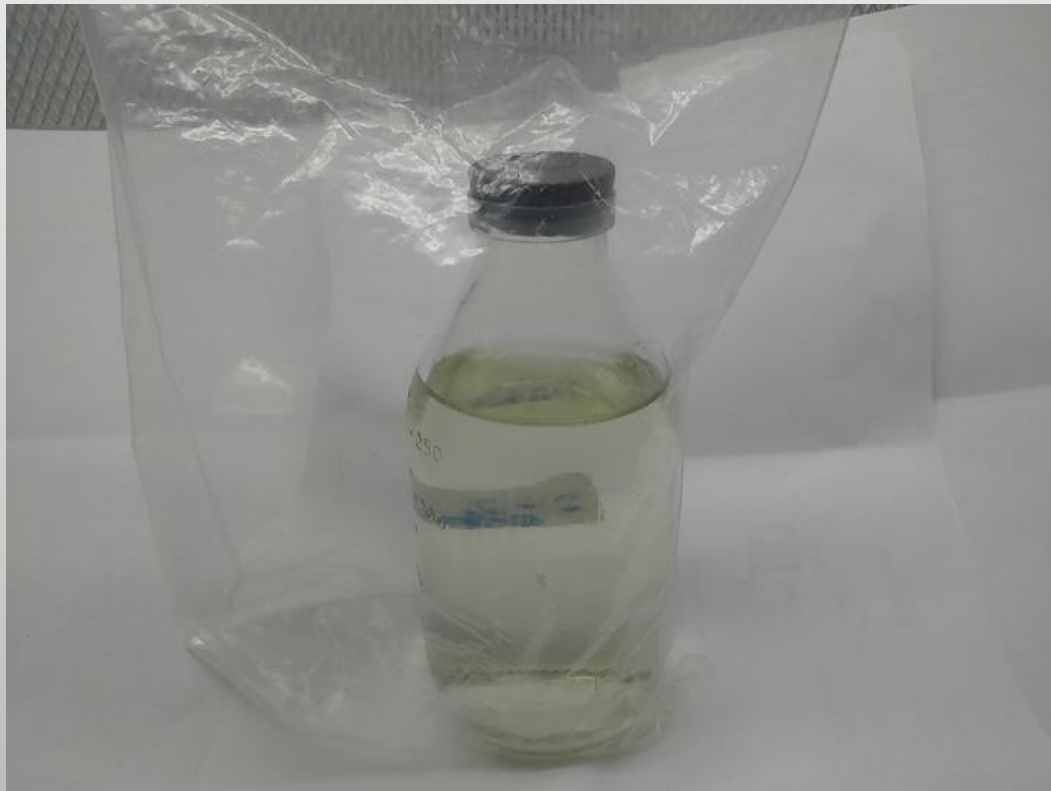
Problem occur in past year

Case 2:

Single sealable plastic bag only

Number of Sample bottle and NOF were unequal

Not use the suggest PETG bottle



Problem occur in past year

Case 3:

No label on the bottle

No NOF





THANK YOU

Da-Wei Lin
APMMN Site Liaison
dwlin@g.ncu.edu.tw



Asia Pacific Mercury
Monitoring Network



Center for Environmental
Monitoring and Technology
National Central University