MDN Sample Change-out, Aerochem Collector

Items needed:

- MDN Observer Form (MOF), as started the previous week
- MOF, for current week's sample
- shipping cooler for deployed sample bottle and sample train (previous week's sample)
- shipping cooler for sample and sample train to be deployed (current week's sample)
- fresh (< 6 months old) Reverse Osmosis (RO) water in a plastic squeeze bottle
- Formula 409 cleaner*
- paper towels or lab wipes

Precautions:

MDN samples are analyzed for mercury in the parts per trillion (ppt) range. Use care when handling the sample bottle and glassware to avoid contaminating the sample inadvertently.

Upon receipt of the cooler box, inspect the contents of the shipping cooler containing the glassware and sample bottle that will be deployed. Report any problems (e.g., broken glassware, missing glassware, bottle leakage) to the site liaison (see **Contact Information** section of this document). Memos detailing new information from the analytical laboratory may be included in the cooler as well.

Instructions:

1. Approach the collector from the direction that faces into the wind (downwind). This will help prevent accidental contamination of the sample. If there is snow or ice on the collector lid, brush it off before proceeding.

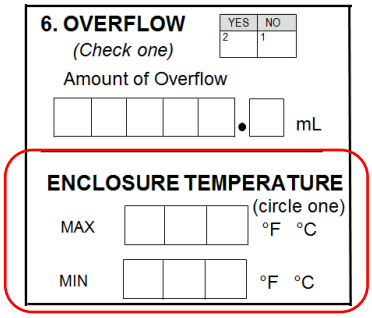
2. Complete block 2 (**Observer – OFF)** of the MOF for the sample to be retrieved. Enter the name of the Observer who is removing the sample.

3. Observe condition of the equipment and the site. List any unusual conditions in block 9 (**Remarks**) of the MDN Observer Form (MOF). See the Appendix to this document for a sample MOF.

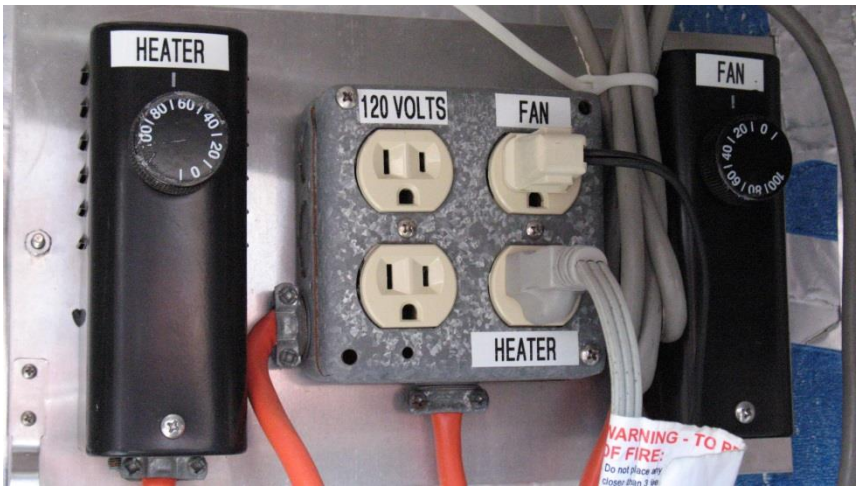
*__Disclaimer:__ Use of a trade or manufacturer's name does not constitute an endorsement by the University of Wisconsin, the Wisconsin State Laboratory of Hygiene, the National Atmospheric Deposition Program, or project sponsors.

9. REMARKS	*For example: equipment malfunction, extreme weather conditions, contamination, farming, burning, logging, leakage, etc.*

4. Open the door to the collector. In block 6 (**Enclosure Temperature**) of the MOF, record the minimum and maximum temperatures from the min/max thermometer located inside the collector. Circle either °F or °C.



5. Adjust the thermostat to help maintain the minimum and maximum temperatures inside the enclosure between 40 and 100°F (4 to 38°C). Consider the expected weather conditions for the next week when adjusting the thermostat.



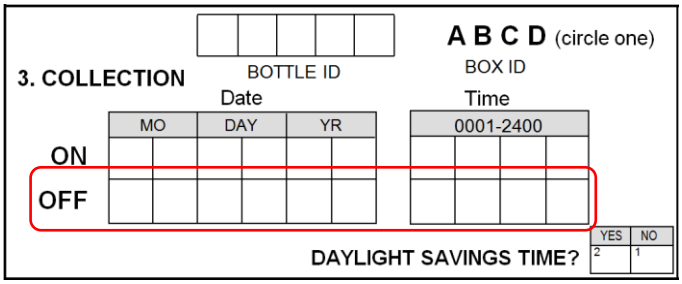
Retrieving the deployed sample bottle.

6. Position the shipping cooler for the deployed sample bottle near the collector so it may be accessed easily.

7. Put on a pair of clean gloves. Lower the lab jack so the sample bottle clears the thistle tube.

8. Retrieve the sample bottle cap from the zip lock bag for the deployed sample bottle, and re-cap the sample bottle. Avoid touching the interior surface of the bottle cap.

9. Verify the ID of the sample bottle with the value listed in block 3 (**Bottle**) of the MOF. Enter the OFF Date and Time, i.e., the date and time the sample was collected. The Date is expressed in the form MMDDYY. Time is expressed based on a 24-hr clock.



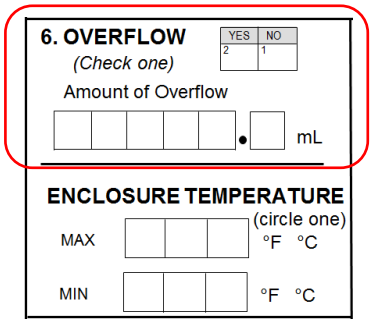
10. Hold the bottle to the light and inspect the sample for visible contamination. Indicate in block 5 (**Sample Conditions**) of the MOF whether any of the listed contaminants are present in the sample. Check the appropriate box for item #6 in block 5 (**Sample Conditions**) to indicate whether the sample spilled or was otherwise compromised while handling. Describe any problems in block 9 (**Remarks**).

5. SAMPLE CONDITION
*Check type of contamination for each sample . Describe **all** contamination in Block 9, including any not listed here.*

YES	NO		YES	NO		YES	NO	
2	1	1. Bird droppings	2	1	3. Soot/ash/dirt particles	2	1	5. Leaves/twigs/pollen/plant matter
2	1	2. Cloudy or discolored	2	1	4. Insects/animal matter	2	1	6. Handling contamination

11. Place the sample bottle in its zip lock bag, seal the bag, and return the sample bottle to its original shipping cooler.

12. Using a graduated cylinder, measure the volume of any liquid in the overflow container. Record this value in block 6 (**Overflow**) of the MOF. Dispose of the liquid after measuring. Do NOT pour liquid from the overflow container into the sample bottle. Doing so will invalidate the sample.



13. Trigger the sensor using a damp paper towel, or by placing a few drops of deionized water on the grid sensor. When the lid is midway between the chimney-side and dry-side bucket, turn off power to the collector. This will allow easy access to the entire collector for cleaning.

14. Retrieve the glass funnel and thistle tube from the chimney. Remove the blue clip that holds the funnel and thistle tube together. Separate the funnel and thistle tube, returning each to its zip lock bag, and then to the shipping cooler.

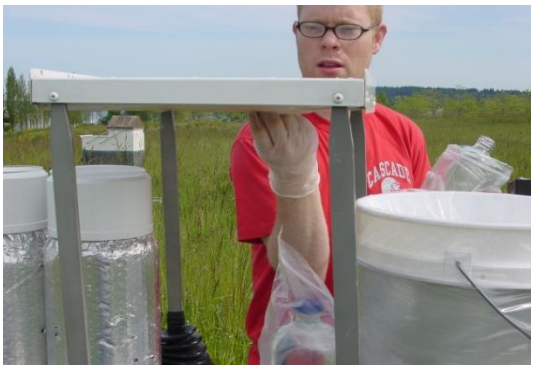
15. Close the cooler for the newly retrieved sample, and move it out of the way.

Cleaning the collector.

16. Spray Formula 409 cleaner onto a paper towel. Use the paper towel to clean the collector surfaces. Start by cleaning the white, plastic chimney caps, and work down toward the body of the collector.


17. Remove the plastic bag from the dry-side bucket, and replace it with a new plastic bag. A new bag is included with the shipping cooler containing the new glassware and sample bottle. A weight may be used to help keep the bag in place during the course of the week.

18. Put on a clean pair of gloves. Moisten a lab wipe with RO water. Clean the underside of the collector lid, e.g., the surface of the lid pad.



19. Verify correct operation of equipment (sensor, motorbox, and raingage). Complete block 4 (**Site Operations**) of the MOF. Inspect the lid pad for damage. Request a new lid pad if needed. Indicate if the raingage has been winterized, and the date and time antifreeze was added to the raingage. Include additional comments in block 9 (**Remarks**).

4. SITE OPERATIONS *Check YES, NO, or U (Unable to determine) for each sample. If **NO** or **U** for Item 1 or 2, describe in Block 9 and **call NADP Site Support 1-800-952-7353***

YES	NO	U
2	1	0
2	1	0
2	1	0

YES	NO
2	1
2	1

1. The **collector sensor heater** and **motor box** operated properly. Lid is in correct position
2. Raingage operated properly during the week.
3. Collector opened and closed at least once during the week, **other than for testing.**
4. Raingage in winterized state during sampling period (antifreeze in bucket).
5. Fresh antifreeze added during sampling period? Date_____ Time_____

Deploying new sample train and bottle.

20. Position the shipping cooler with the glassware to be deployed so it may be accessed easily (refer to Step 6). Switch to the MOF for the sample to be deployed.

21. Complete block 1 (**Site)** of the MOF for the sample to be deployed. This includes:
    a. the name of the Site,
    b. the 4 character ID of the Site (e.g.,WI06).

1. SITE

Name _____ SITE ID

22. Open the zip lock bags that contain the funnel and the thistle tube, but leave them inside the bags. Connect the thistle tube to the funnel, and secure them with a blue clip.

23. With the thistle tube and funnel still in their bags, place the funnel in the chimney of the collector. Pull the funnel bag so it just covers the funnel.

24. Turn the power back on to the collector. This will cause the collector to close. As the collector lid approaches the funnel, pull the bag from the funnel gently.

25. Inspect the zip lock bag containing the new sample bottle. In block 9 (**Remarks**) of the MOF indicate any damage to the sample bottle, and any leakage that may have occurred during shipment from the HAL to the site. In block 3 (**Collection**) of the MOF record the ID of the new sample bottle and the Box ID. The letter for the box ID can be found on the inside flaps of the box (i.e. WI06-A).

26. Put on a pair of clean gloves. Remove the sample bottle from its zip lock bag, place the sample bottle in the overflow container inside the collector, and loosen (but do not remove) the cap.

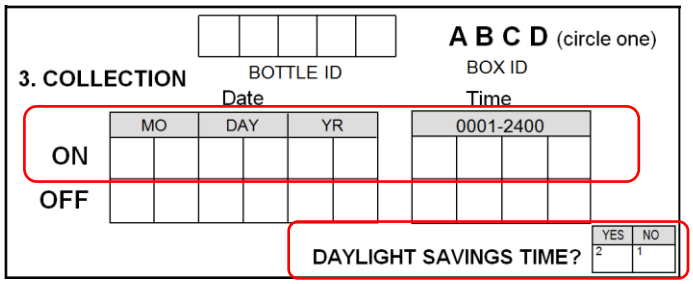
27. Place the overflow container (and sample bottle) on the lab jack beneath the thistle tube. Raise the lab jack so the capped mouth of the sample bottle is near the bagged end of the thistle tube.

28. Remove the bag from the thistle tube, remove the cap from the sample bottle, and raise the lab jack to connect the mouth of the sample bottle to the bulb of the thistle tube. Store the bottle cap in the zip lock bag that contained the sample bottle. Seal the bag to prevent accidental contamination.

29. Reset/clear the min/max thermometer. For an analog thermometer, turn the knob at the bottom of the thermometer. For a digital thermometer, push the "Clear" button while displaying the maximum temperature, and then again while displaying the minimum temperature.

30. Close and secure the door to the collector.

31. Complete the ON portion of block 3 (**Collection**) of the MOF to include the Date and Time that the sample bottle was deployed. Indicated if the time is Daylight Saving Time.

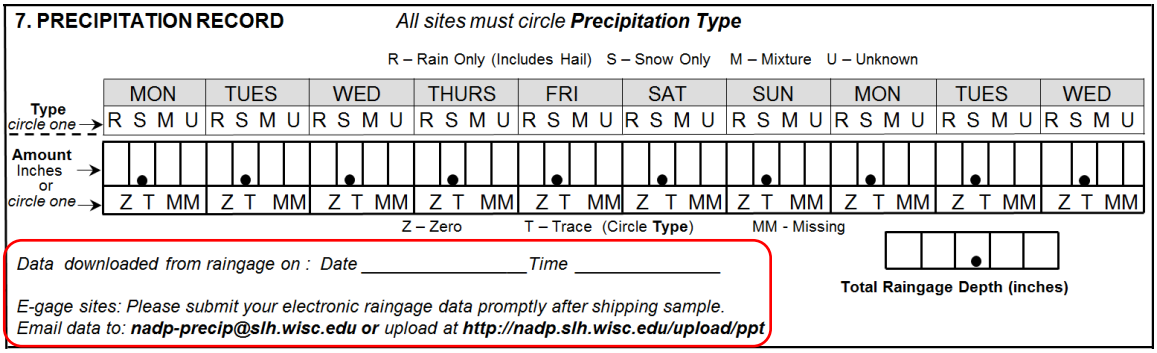


32. Store the MOF for use next week. Switch to the MOF for the previous week's sample, the sample that will be shipped for analysis.

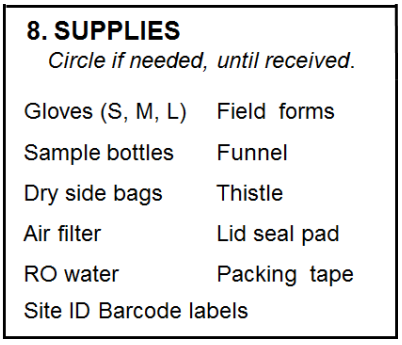
Incorporating data from raingage.

33. Complete block 7 (**Precipitation Record**) of the MOF to include the daily precipitation values, and the type of precipitation (i.e., rain, snow, mixed, unknown) for each day with precipitation. Refer to the appropriate SOP for downloading data from the electronic

raingage. Record the date and time the electronic raingage data was downloaded. Raingage data should be sent to nadp-precip@slh.wisc.edu or uploaded to http://nadp.slh.wisc.edu/upload/ppt each week, regardless if there was precipitation or not.



34. In block 8 (**Supplies**) of the MOF, circle any supplies that are needed.



35. Remove the pink copy from the MOF and store it with the site's records. Place the white copy of the MOF in the cooler containing the glassware and sample bottle from the previous week.

36. Tape the cooler shipping box containing the glassware, sample bottle, and MOF from the previous week and ship it to the HAL for analysis. It is not necessary to tape the cooler if it is shipped back in the box.

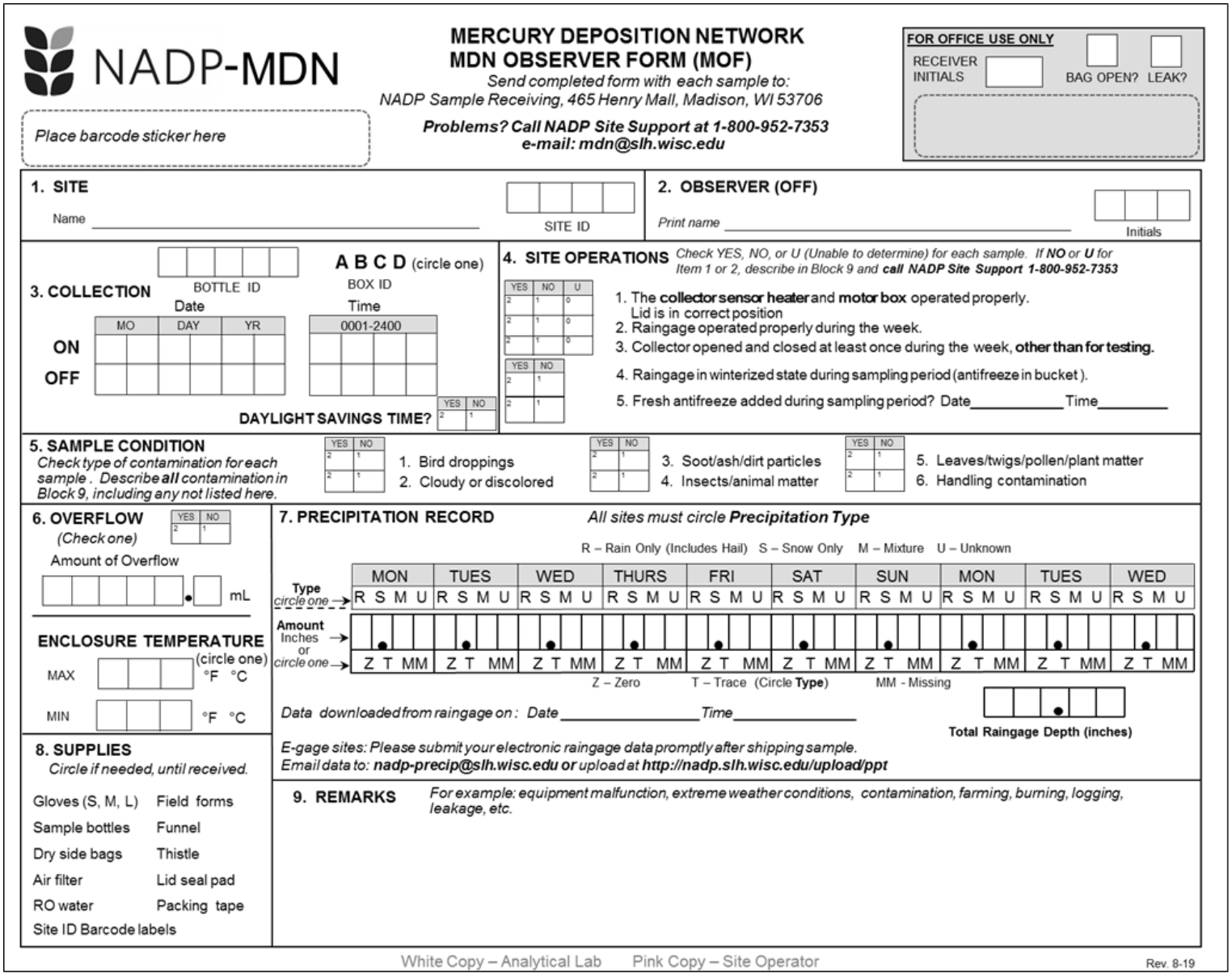
37. Store the cooler for the (new) current week for use next week.

Contact Information.

Please contact the NADP site liaison at 800-952-7353 or mdn@slh.wisc.edu if you have any questions, or if any problems are encountered. The site liaison can:

- help troubleshoot equipment problems,
- order replacement parts,
- explain the MOF, and
- explain the steps in this manual in greater detail.

Appendix – Sample MDN Observer Form (MOF)



NADP-MDN

MERCURY DEPOSITION NETWORK
MDN OBSERVER FORM (MOF)

Send completed form with each sample to:
NADP Sample Receiving, 465 Henry Mall, Madison, WI 53706

Problems? Call NADP Site Support at 1-800-952-7353
e-mail: mdn@slh.wisc.edu

Place barcode sticker here

FOR OFFICE USE ONLY
RECEIVER INITIALS | BAG OPEN? | LEAK?

1. SITE
Name _____ SITE ID

2. OBSERVER (OFF)
Print name _____ Initials

3. COLLECTION
BOTTLE ID
A B C D (circle one) BOX ID

	Date MO	DAY	YR	Time 0001-2400
ON				
OFF				

DAYLIGHT SAVINGS TIME? YES 2 | NO 1

4. SITE OPERATIONS *Check YES, NO, or U (Unable to determine) for each sample. If **NO** or **U** for Item 1 or 2, describe in Block 9 and **call NADP Site Support 1-800-952-7353***

	YES	NO	U
1. The **collector sensor heater** and **motor box** operated properly. Lid is in correct position	2	1	0
2. Raingage operated properly during the week.	2	1	0
3. Collector opened and closed at least once during the week, **other than for testing.**	2	1	0
4. Raingage in winterized state during sampling period (antifreeze in bucket).	2	1	
5. Fresh antifreeze added during sampling period? Date_____ Time_____	2	1	

5. SAMPLE CONDITION
*Check type of contamination for each sample . Describe **all** contamination in Block 9, including any not listed here.*

	YES	NO
1. Bird droppings	2	1
2. Cloudy or discolored	2	1
3. Soot/ash/dirt particles	2	1
4. Insects/animal matter	2	1
5. Leaves/twigs/pollen/plant matter	2	1
6. Handling contamination	2	1

6. OVERFLOW (Check one) YES 2 | NO 1
Amount of Overflow _____ mL

ENCLOSURE TEMPERATURE (circle one)
MAX °F °C
MIN °F °C

7. PRECIPITATION RECORD *All sites must circle **Precipitation Type***

R – Rain Only (Includes Hail) S – Snow Only M – Mixture U – Unknown

	MON	TUES	WED	THURS	FRI	SAT	SUN	MON	TUES	WED
Type *circle one* →	R S M U	R S M U	R S M U	R S M U	R S M U	R S M U	R S M U	R S M U	R S M U	R S M U
Amount Inches or *circle one* →	Z T MM	Z T MM	Z T MM	Z T MM	Z T MM	Z T MM	Z T MM	Z T MM	Z T MM	Z T MM

Z – Zero T – Trace (Circle **Type**) MM - Missing

Data downloaded from raingage on : Date _____ Time _____

Total Raingage Depth (inches)

E-gage sites: Please submit your electronic raingage data promptly after shipping sample.
*Email data to: **nadp-precip@slh.wisc.edu** or upload at **http://nadp.slh.wisc.edu/upload/ppt***

8. SUPPLIES
Circle if needed, until received.

Gloves (S, M, L)	Field forms
Sample bottles	Funnel
Dry side bags	Thistle
Air filter	Lid seal pad
RO water	Packing tape
Site ID Barcode labels	

9. REMARKS *For example: equipment malfunction, extreme weather conditions, contamination, farming, burning, logging, leakage, etc.*

White Copy – Analytical Lab Pink Copy – Site Operator Rev. 8-19