

MDN Sample Change-out, modified ACM 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
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.

Before going to the field site, 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) to the site liaison (see **Contact Information** section of this document). If the cooler contains requested supplies, a *Supplies* sticker will be affixed to the top of the cooler. 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. Observe condition of the equipment and the site. List any unusual conditions in block 10 (**Remarks**) of the MDN Observer Form (MOF). See the Appendix to this document for a sample MOF.



* **Disclaimer:** The use of trade or manufacturer's name does not constitute an endorsement by the NADP, its sponsors, the University of Illinois or the Illinois State Water Survey.

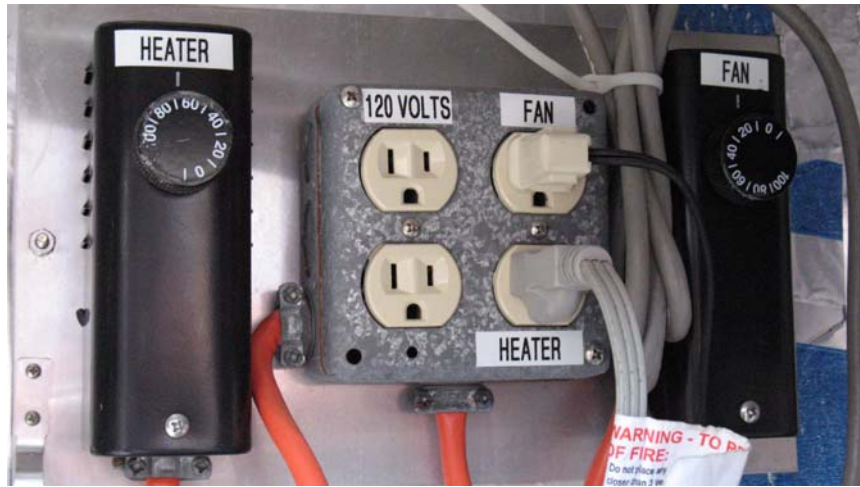
10. REMARKS For example: equipment malfunction, extreme weather conditions, contamination, farming, burning, logging, leakage, etc.

3. Open the door to the collector. In block 9 (**Enclosure Temperature**) of the MOF, record the minimum and maximum temperatures from the min/max thermometer located inside the collector.

9. ENCLOSURE TEMPERATURE

| | | | | |
|---------|--|--|--|----|
| MAXIMUM | | | | °F |
| MINIMUM | | | | °F |

4. 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.

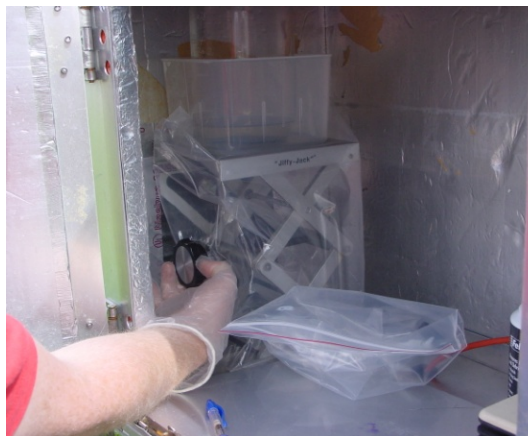


Retrieving the deployed sample bottle.

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



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



7. 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.
8. 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.

| | | | | | | | | | | | |
|------------------|-----|---------------|-----|------|------|----------|----------|----------|--|--|--|
| 3. BOTTLE | | Sample Bottle | | | | M | D | N | | | |
| | | Date | | | Time | | | | | | |
| ON | OFF | Month | Day | Year | Hour | Minute | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

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

| | | | | | |
|------------------------|----|---|--|-----|-------------------------------------|
| 5. OBSERVATIONS | | Check yes or no if samples were observed to have any of the following. Describe all observations in Block 10. | | | |
| Yes | No | | | Yes | No |
| | | 1. Bird Droppings | | | 4. Insect/animal matter |
| | | 2. Cloudy or discolored | | | 5. Leaves/twigs/pollen/plant matter |
| | | 3. Soot/ash/dirt particles | | | 6. Handling contamination |

10. Place the sample bottle in its zip lock bag and return the sample bottle to its shipping cooler.
11. Using a graduated cylinder, measure the volume of any liquid in the overflow container. Record this value in block 8 (**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.

| | | | |
|--------------------|--|-----|----|
| 8. OVERFLOW | | Yes | No |
| (check one) | | | |
| Overflow | | | |

12. 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.
13. 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.



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

Cleaning the collector.

15. 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.



- 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.



- 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).



- Verify correct operation of equipment (sensor, motorbox, and raingage). Complete block 6 (**Site Operations**) of the MOF. Inspect the lid pad for damage. Request a new lid pad if needed. Include additional comments in block 12 (**Remarks**).

| 6. SITE OPERATIONS | | Check yes or no for all samples. If no for item 1 or 2 call HAL. |
|--------------------------|--------------------------|---|
| yes | no | |
| <input type="checkbox"/> | <input type="checkbox"/> | 1. Collector sensor and motor are operating properly. Lid is in correct position. |
| <input type="checkbox"/> | <input type="checkbox"/> | 2. Rain gauge operated properly during the week. |
| <input type="checkbox"/> | <input type="checkbox"/> | 3. Event recorder worked properly and accurately recorded the openings and closings of the collector. |
| <input type="checkbox"/> | <input type="checkbox"/> | 4. Rain gauge data has been submitted to the Program Office or Belfort Chart is with the MOF. |

22. 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.



23. 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.
24. Inspect the zip lock bag containing the new sample bottle. In block 10 (**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 (**Bottle**) of the MOF record the ID of the new sample bottle.
25. Put on a pair of clean gloves. Remove the sample bottle from its zip lock bag, place the sample bottle in the overflow container, and loosen (but do not remove) the cap.
26. 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.
27. 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.



28. 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.



29. Close and secure the door to the collector.

30. Complete the ON portion of block 3 (**Bottle**) of the MOF to include the Date and Time that the sample bottle was deployed.

| | | | | | | | | | |
|------------------|-----|---------------|------|------|--------|---|--|--|--|
| 3. BOTTLE | | Sample Bottle | | M | D | N | | | |
| | | Date | | Time | | | | | |
| ON | Mon | Day | Year | Hour | Minute | | | | |
| OFF | | | | | | | | | |


31. 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.

Contact Information.

Please contact the MDN site liaison at 877-622-6960 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)

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--------------------------|---|----------------------|--|--------------------------|----------------------|--------------------------|-------------------------|--------------------------|----------------------------|--------------------------|--|--|-----|------|-----|--------------------------|--------------------------|-------------------------|--------------------------|-------------------------------------|--------------------------|---------------------------|--------------------------|-----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---|--|--|----------------------|--|--|--|--|--|--|--|--|--|--|--|---|---|----|---|---|----|---|---|----|---|---|----|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|---|--|--|--|--|--|--|--|--|--|--|--|
|  National Atmospheric Deposition Program | | MDN OBSERVER FORM Send Completed Form with Each Shipping Cooler | | Courier/Tracking # _____ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MERCURY DEPOSITION NETWORK | | Problems? Call the HAL toll free at 1-877-622-6960 | | LAB ID | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. STATION Name _____ ID <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | 2. OBSERVER ON OFF Name _____ Name _____ Initials <input type="text"/> <input type="text"/> Initials <input type="text"/> <input type="text"/> | | HAL/NADP Use Only Sample Receipt Name (print): _____ Date <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Cooler # <input type="text"/> <input type="text"/> <input type="text"/> Time <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Bag Open? <input type="checkbox"/> Yes <input type="checkbox"/> No Leak? <input type="checkbox"/> Yes <input type="checkbox"/> No Full Wt. <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Empty Wt. <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Net Wt. <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Leak Wt. <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Total Wt. <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. BOTTLE Sample Bottle <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Date <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Time <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> ON OFF | | 4. ANALYSIS TYPE Total Mercury <input type="text"/> MethylMercury <input type="text"/> Trace Metals <input type="text"/> Field Blank <input type="text"/> System Blank <input type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. OBSERVATIONS Check yes or no if samples were observed to have any of the following. Describe all observations in Block 10. | | 6. SITE OPERATIONS Check yes or no for all samples. If no for item 1 or 2 call HAL. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Yes</td><td>No</td></tr> <tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>1. Bird Droppings</td><td><input type="checkbox"/></td></tr> <tr><td>2. Cloudy or discolored</td><td><input type="checkbox"/></td></tr> <tr><td>3. Soot/ash/dirt particles</td><td><input type="checkbox"/></td></tr> </table> | | Yes | No | <input type="checkbox"/> | <input type="checkbox"/> | 1. Bird Droppings | <input type="checkbox"/> | 2. Cloudy or discolored | <input type="checkbox"/> | 3. Soot/ash/dirt particles | <input type="checkbox"/> | <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td>Yes</td><td>No</td></tr> <tr><td><input type="checkbox"/></td><td><input type="checkbox"/></td></tr> <tr><td>4. Insect/animal matter</td><td><input type="checkbox"/></td></tr> <tr><td>5. Leaves/twigs/pollen/plant matter</td><td><input type="checkbox"/></td></tr> <tr><td>6. Handling contamination</td><td><input type="checkbox"/></td></tr> </table> | | | Yes | No | <input type="checkbox"/> | <input type="checkbox"/> | 4. Insect/animal matter | <input type="checkbox"/> | 5. Leaves/twigs/pollen/plant matter | <input type="checkbox"/> | 6. Handling contamination | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Yes | No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1. Bird Droppings | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Cloudy or discolored | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. Soot/ash/dirt particles | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Yes | No | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="checkbox"/> | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. Insect/animal matter | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. Leaves/twigs/pollen/plant matter | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. Handling contamination | <input type="checkbox"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. PRECIPITATION RECORD | | 8. OVERFLOW <input type="checkbox"/> Yes <input type="checkbox"/> No (check one) Overflow <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Precip. Type <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="12" style="text-align: center;">R - Rain Only (includes Hail) S - Snow Only M - Mixture U - Unknown</td></tr> <tr><td>MON</td><td>TUES</td><td>WED</td><td>THURS</td><td>FRI</td><td>SAT</td><td>SUN</td><td>MON</td><td>TUES</td><td>WED</td><td>THURS</td><td>FRI</td></tr> <tr><td>R S M U</td><td>R S M U</td><td>R S M U</td><td>R S M U</td><td>R S M U</td><td>R S M U</td><td>R S M U</td><td>R S M U</td><td>R S M U</td><td>R S M U</td><td>R S M U</td><td>R S M U</td></tr> </table> | | R - Rain Only (includes Hail) S - Snow Only M - Mixture U - Unknown | | | | | | | | | | | | MON | TUES | WED | THURS | FRI | SAT | SUN | MON | TUES | WED | THURS | FRI | 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 | R S M U | R S M U | <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="12" style="text-align: center;">Inches or Circle one</td></tr> <tr><td>Z</td><td>T</td><td>MM</td><td>Z</td><td>T</td><td>MM</td><td>Z</td><td>T</td><td>MM</td><td>Z</td><td>T</td><td>MM</td></tr> <tr><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td><td><input type="text"/></td></tr> <tr><td colspan="12" style="text-align: center;">Total Precipitation <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/></td></tr> </table> | | | Inches or Circle one | | | | | | | | | | | | Z | T | MM | Z | T | MM | Z | T | MM | Z | T | MM | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | Total Precipitation <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | | | | | | | | | | |
| R - Rain Only (includes Hail) S - Snow Only M - Mixture U - Unknown | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| MON | TUES | WED | THURS | FRI | SAT | SUN | MON | TUES | WED | THURS | FRI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 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 | R S M U | R S M U | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Inches or Circle one | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z | T | MM | Z | T | MM | Z | T | MM | Z | T | MM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | <input type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Total Precipitation <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. ENCLOSURE TEMPERATURE MAXIMUM <input type="text"/> <input type="text"/> <input type="text"/> °F MINIMUM <input type="text"/> <input type="text"/> <input type="text"/> °F | | 10. REMARKS For example: equipment malfunction, extreme weather conditions, contamination, farming, burning, logging, leakage, etc. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. SUPPLIES Circle if needed, until received Gloves Field Forms Rain Gauge Charts Sample Bottles Rain Gauge Ink Dry Side Bags Lid Seal Pad Air Filter RO Water | | HAL USE ONLY Preservation: HCl <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> mL <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> BrCl <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> mL <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Composition: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> mL <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Split: <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> mL <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Split Bottle ID <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Comp Bottle ID <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

WHITE - Program Office Copy

YELLOW - HAL Copy

PINK - Site Operator Copy

Rev. 2/12