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Canadian Air and  
Precipitation Monitoring  
Network (CAPMoN)

Réseau canadien  
d'échantillonnage des  
précipitations et de l'air  
(RCEPA)

# OPERATOR'S INSTRUCTION MANUAL -PRECIPITATION

RN828

CANADIAN AIR  
and PRECIPITATION  
MONITORING NETWORK  
(CAPMoN)

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APRIL 1985

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## RECORD OF CHANGES

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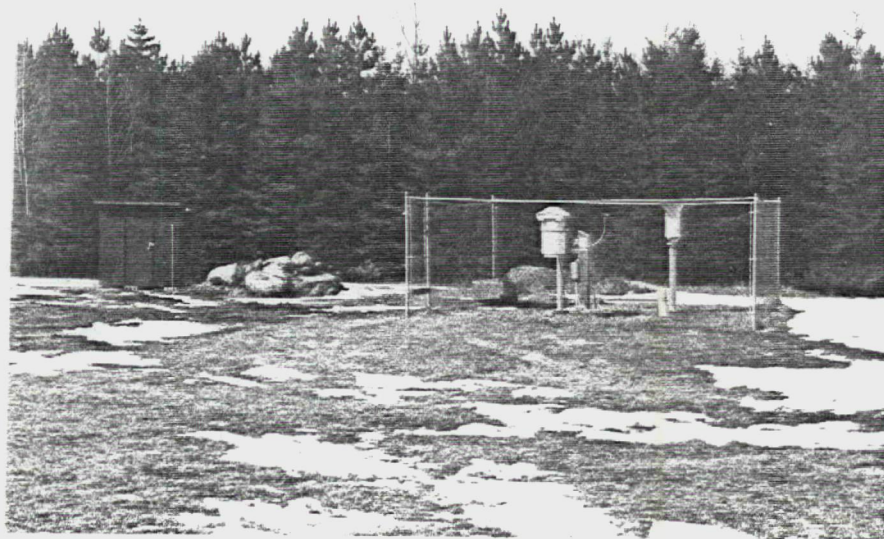
April 30, 1985

## Welcome to Precipitation Monitoring in CAPMoN

You have joined a team of dedicated people who are working together as part of the Canadian Air and Precipitation Monitoring Network (CAPMoN). Your valuable contribution in becoming an operator in CAPMoN is greatly appreciated and it is hoped that your involvement in the program will be both enlightening and enjoyable.

Your monitoring site is one of approximately 25 sites across Canada that collect daily precipitation samples. These samples are analyzed at a laboratory in Burlington, Ontario. The data from the sample analyses are used to determine the quality of precipitation that is occurring throughout Canada.





A CAPMoN Monitoring Site at the Warsaw Caves  
Conservation Area, Warsaw Ontario

## ABOUT THIS MANUAL

### It's Aim:

- To instruct both new and experienced operators in the correct operation of CAPMoN Precipitation Monitoring Sites and the collection of high quality precipitation samples. While this manual is meant to be used as part of an operator training program, it contains all the information necessary to operate a monitoring site. It is hoped that, as questions arise after initial training, operators will use this manual to find answers to questions which may arise day to day.

### It's Arrangement:

This manual is divided into five sections. They are:

#### Introduction To Precipitation Sampling

- This section describes some of the terms which are familiar to people dealing with the sampling of precipitation and are used in this manual. It then describes a CAPMoN monitoring site and what a typical sample handling area looks like. It goes on to describe the various instruments and equipment that you will be involved with in operating a CAPMoN site.

#### Daily Duties of Operators

- This section tells you all you need to know to operate a site on a daily basis; this includes the sampling procedures, the paper work and how to store and ship your samples to the laboratory for chemical analysis.

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### Other Duties Of The Operator

- This section describes the other tasks that are necessary to keep things running smoothly at your site.

### What To Do If Things Go Wrong

- While one never plans on it, occasionally things can go wrong. This section will give you the information necessary to correct small problems that might arise, and for bigger problems, who to contact for help.

### Summary of the Daily Operating Procedures

- Included for quick reference is a summary of the operator's daily sampling procedures, followed by an example of the operator's tasks during a typical month.

These five sections are numbered 1, 2, 3, 4, and 5 and each section is broken down into smaller sections (e.g., 1.1, 1.2, 1.3, etc.).

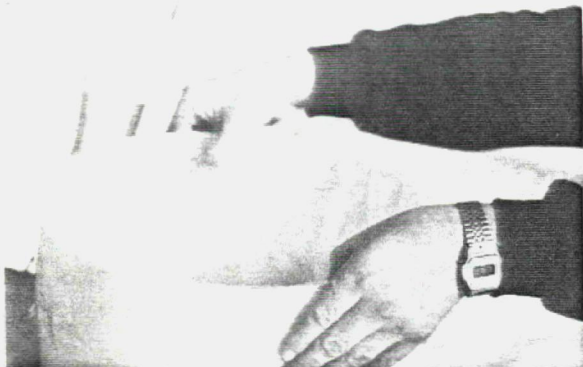
The contents of the manual are arranged with written text on the left hand page and illustrative photographs on the right hand page.

This manual has been written for you, the operator. If you have any comments about it's contents or format, please pass them along to your Regional Inspector so that appropriate changes or additions can be made.

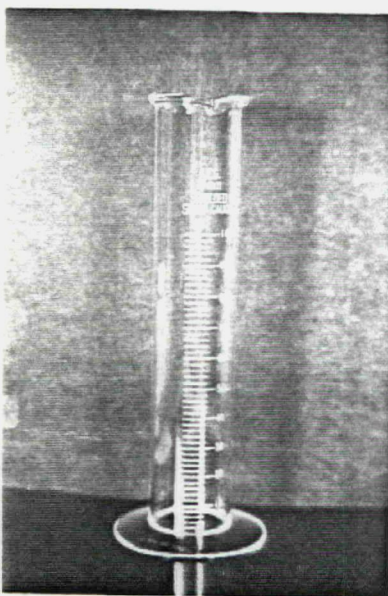
## TERMS USED IN THIS MANUAL

- CAPMoN** - Canadian Air and Precipitation Monitoring Network.
- Contamination** - any substance or material that makes a surface or a sample impure. For instance, touching the inside of a sample bag with your finger would result in contamination in the sample bag.
- Deionized Water** - ultra-clean water that contains none of the chemical components that the precipitation samples are analyzed for.
- Dry Deposition** - gases and particles that settle out of the atmosphere onto the earth or other surfaces.
- Exposed Bucket/Bag** - a bucket or bag that has been used for sampling precipitation.
- Gasket** - a material used to make a seal between two surfaces. A foam gasket covered with plastic is used to seal the collector hood to the bucket/bag and prevents sample evaporation or contamination when it is not precipitating.
- Graduate** - a cylinder (usually plastic or glass) that has markings on the side and is used to measure the depth of water in the rain or snow gauge.
- Kimwipes** - a trade name for very clean tissues used for cleaning the sample bucket, hood gasket and other surfaces.
- Meniscus** - the lowest part of the curve formed when water sits in a cylinder and curves up the sides.
- Precipitation** - any form of liquid or frozen water (rain, snow, hail, dew, frost, etc.) that falls on the ground.

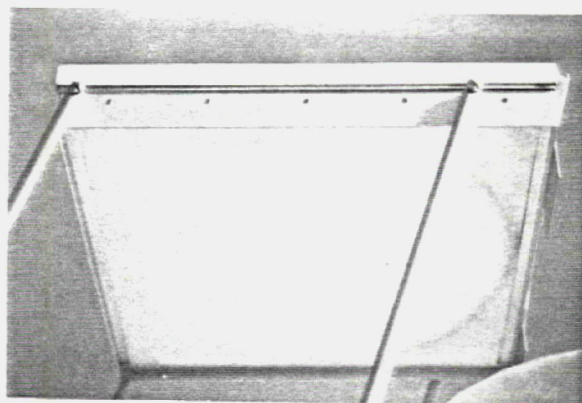
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'Contamination' of a sample bag  
by an operator's hands



A 'graduate' used to measure  
Snow Gauge contents



A 'gasket' attached to the collector cover  
(Note:gasket needs cleaning)

'Kimwipes'

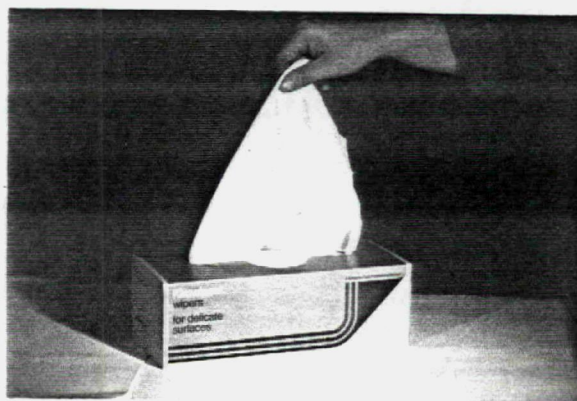


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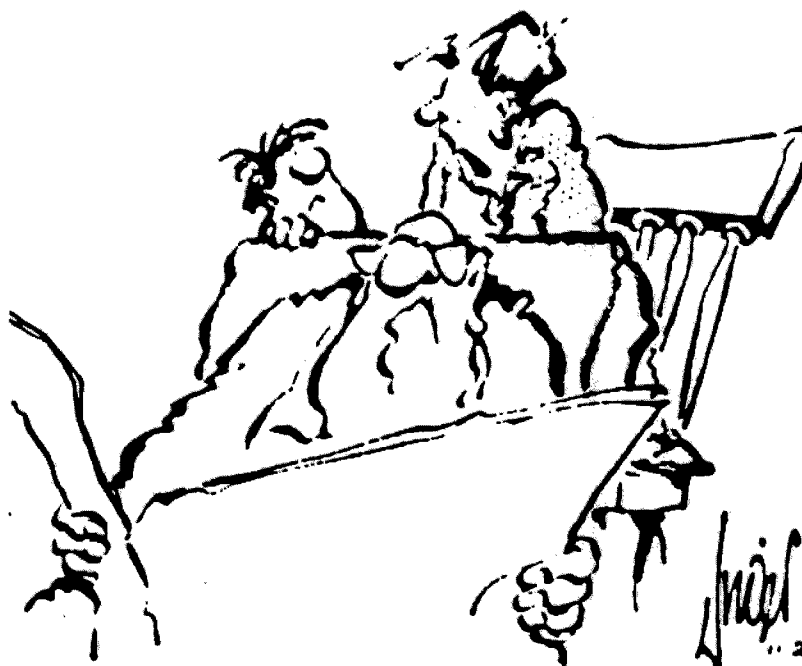
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**He wasn't always bald. It's acid rain.**

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## 1. INTRODUCTION TO PRECIPITATION SAMPLING

The precipitation sampling procedures described in this manual are carried out at the Monitoring Site and in the Sample Handling Area. The term "Monitoring Site" refers to the outdoor area where the precipitation collector and gauges are located. The "Sample Handling Area" is an indoor area which may or may not be located right at the Monitoring site. The two are discussed separately in this manual.

This is a good place in the manual to mention your CAPMoN Regional Inspector. This person has a thorough knowledge of all aspects of CAPMoN and can answer any questions you may have about the procedures discussed in this manual or about CAPMoN in general. His/her job is to work with you to ensure that things run smoothly at your site and that precipitation samples of the highest quality possible are collected. While he/she will be in touch with you on a regular basis, do not hesitate to telephone (collect) him/her if anything goes wrong or if you have any questions. The name, address and phone number of your contact persons are listed on page 4-2.

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## 1.1 ABOUT THE MONITORING SITE

Your monitoring site has been carefully selected from a number of sites in the surrounding area. This site was selected because it best satisfies the requirements for the collection of high quality precipitation samples.

The equipment at your site (as shown on the opposite page) has been carefully installed according to rigid installation criteria. The equipment should not be moved or adjusted except as noted in this manual. During periodic site visits, CAPMoN technical personnel will ensure that all equipment is in its correct position and will make any necessary adjustments at this time.



A Fenced Monitoring Site

Contained Within Fenced Area

- 1 Precipitation Collector
- 2 Snow Gauge
- 3 Rain Gauge
- 4 Electrical Service Post (with circuit breaker)

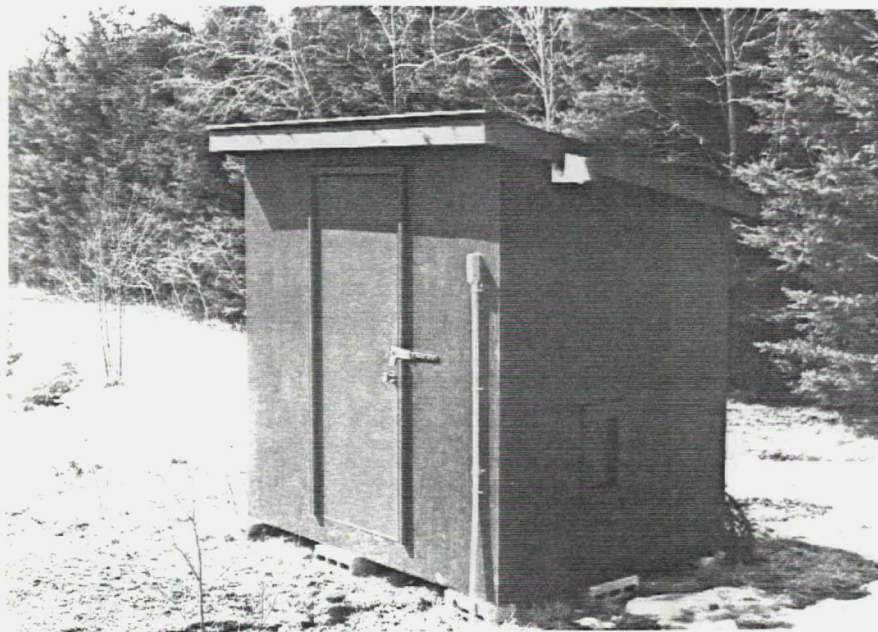
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## 1.2 ABOUT THE SAMPLE HANDLING AREA

Your sample handling area has been set up by CAPMoN personnel for ease of operation and to minimize the chance of sample contamination. Any changes that you would like to make to the area should be discussed with your CAPMoN Regional Inspector to make sure these changes will not affect sample quality. A typical sample handling area is shown on the opposite page.

Although it is discussed thoroughly later, a little should be said here about the upkeep of this area. Mistakes in sampling procedures that lead to sample contamination usually occur in the sample handling area. More mistakes occur in areas that are unkept and disorganized. The cleaner and more organized you keep your sample handling area, the better the quality of your samples will be.

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A Sampling Handling Hut

### 1.3 ABOUT THE EQUIPMENT AT THE SITE

Shown on the opposite page is the equipment you will use in the operation of your monitoring site. Each piece of equipment is described in more detail on the following pages.

A complete list of all equipment and supplies at your site is listed later (Section 3.10) in this manual.

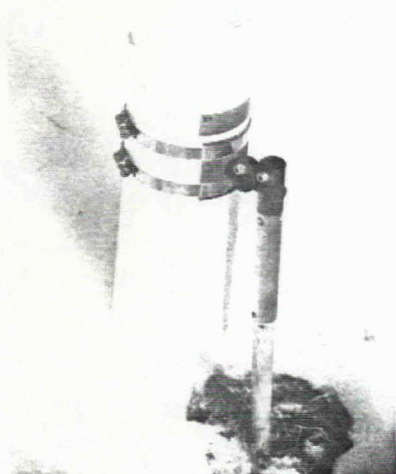
In the future, a Telescopic Crank Stand will be used to raise and lower the precipitation collector during winter months (to keep the collector at a minimum height above the snow pack). The design is not yet finalized. Therefore it is not included in this section.



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Precipitation Collector

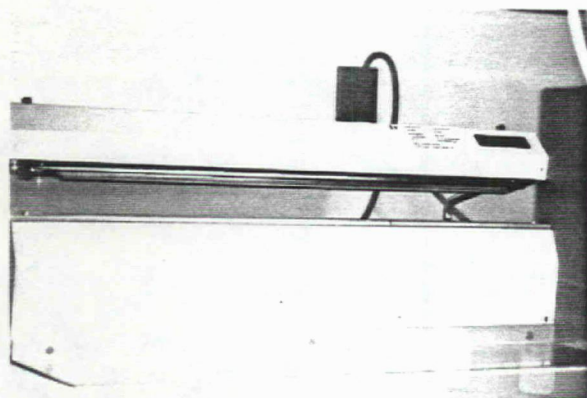
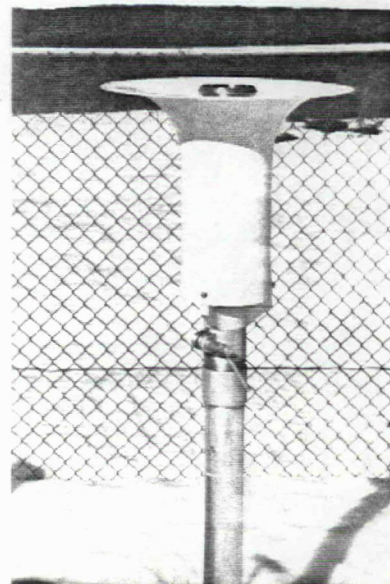


Weighing Balance



Rain Gauge

Snow Gauge



Bag Sealer

### 1.3.1 PRECIPITATION COLLECTOR

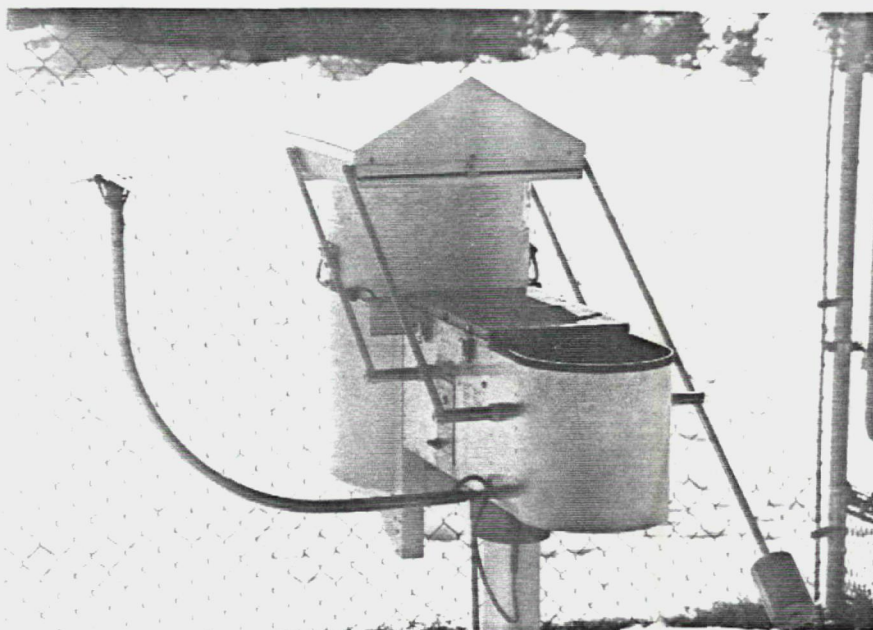
#### Purpose

To collect precipitation samples while not allowing the collected samples to be contaminated (by dry deposition, dust, pollen, etc.) or evaporated when precipitation is not occurring.

#### How It Works

When it begins to precipitate, a sensor detects the rain or snow and causes a cover to move off of a bucket. The falling precipitation is collected in a plastic bag that is supported in the bucket. When the precipitation ends, the bucket (with the collected sample in it) is covered again by the hood. The moveable hood has a sponge gasket underneath it to seal the top of the bucket in order to prevent evaporation or contamination of the collected precipitation sample. Every morning, you (the operator) must place a new plastic bag and bucket in the instrument so that a clean new sample may be collected.

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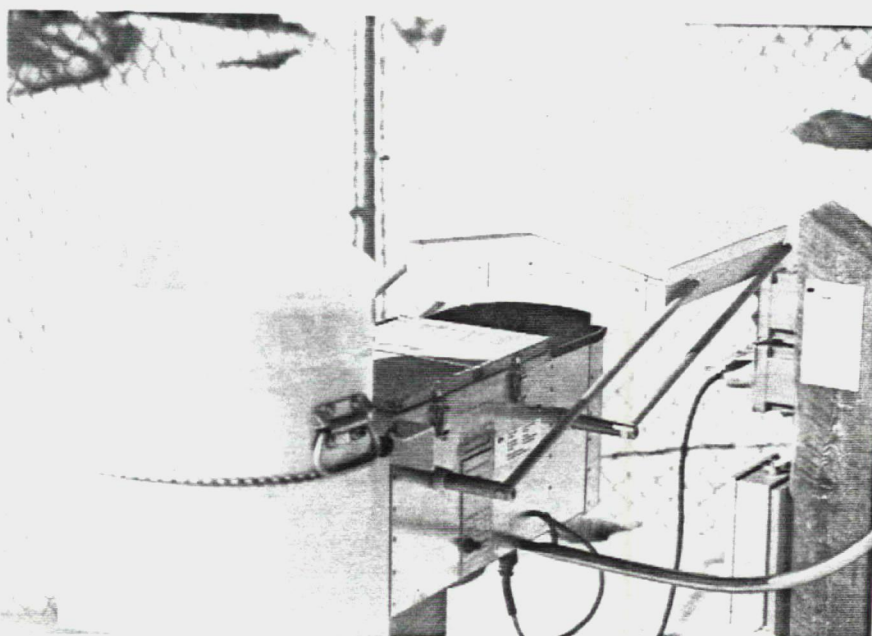
Precipitation Collector- Closed Position

NOTE: 1 Sensors on end of curved arm

2 Moveable peaked cover (with sliding gasket plate)

3 Sampler bucket containing plastic bag

4 Counterweight on end of cover support arm



Precipitation Collector- Open Position

(Collector opens when collecting precipitation sample)

### 1.3.2 RAIN GAUGE

#### Purpose

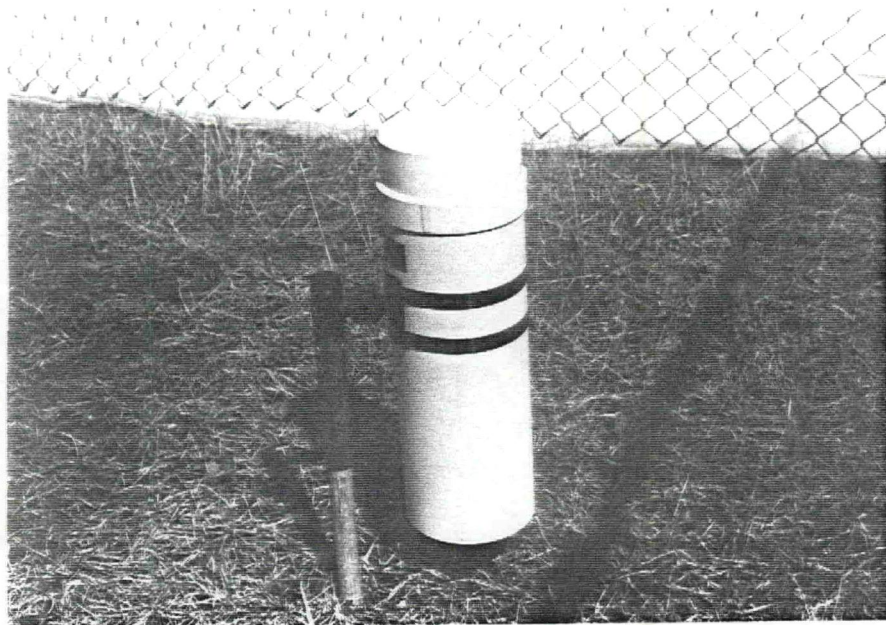
To obtain a daily measurement of the rain (or freezing rain) that has fallen.

#### How It Works

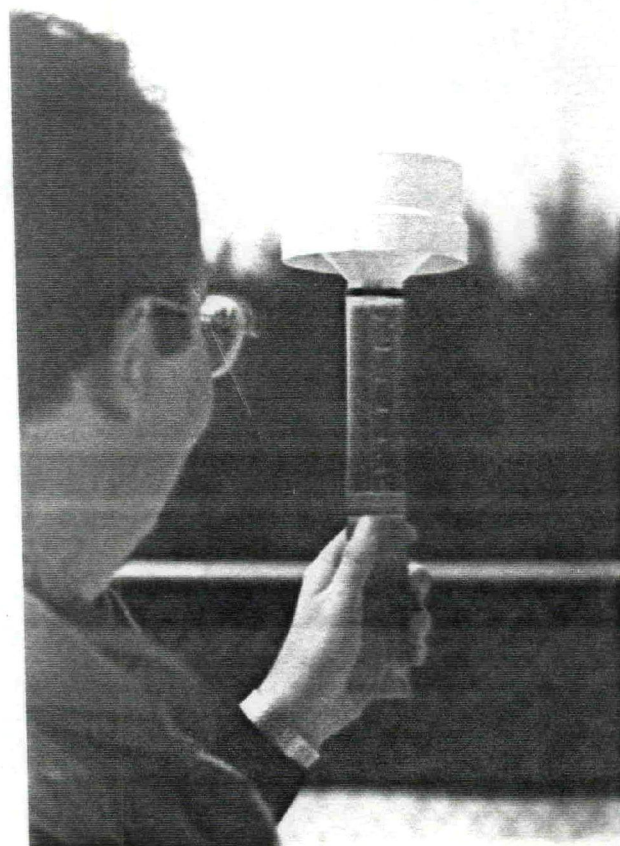
The rainfall is collected by a funnel and stored in a graduate cylinder. Each day the gauge is checked and the depth of rainfall that has occurred is obtained by reading the level of the water in the cylinder.



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Rain Gauge Installed at Site



Reading the Depth of Rain  
Collected by the Rain Gauge

### 1.3.3 SNOW GAUGE

#### Purpose

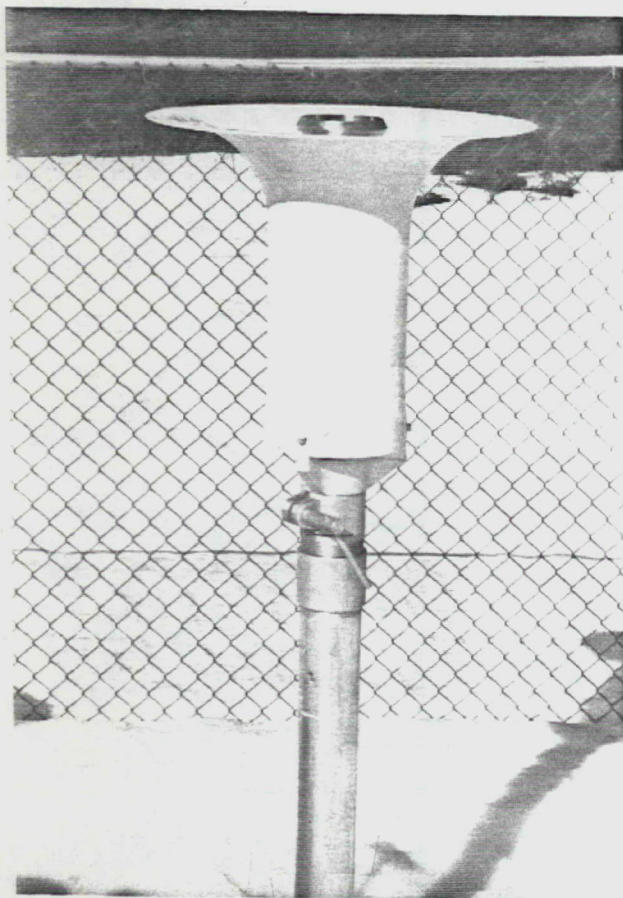
To obtain a daily measurement of the snow (or rain, or hail) that has fallen during winter months.

#### How It Works

The snowfall is collected in a large cylinder and each day is removed and melted. The resulting water depth is measured in a graduate and recorded.

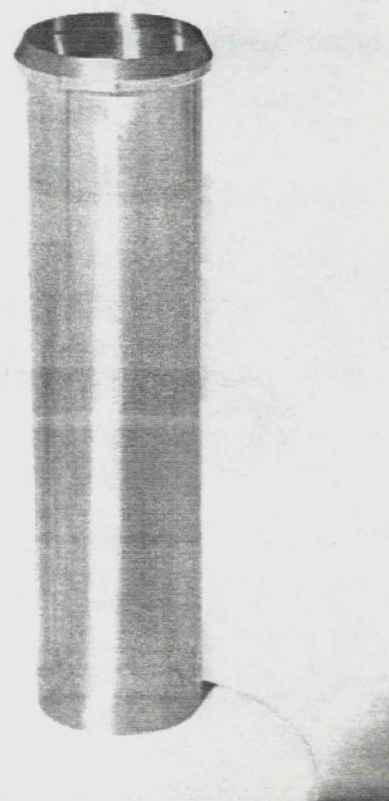
The inverted bell-shaped shield that surrounds the cylinder acts as a wind break so that a sample representing the actual snowfall on the ground is collected.

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Snow Gauge Installed at Site  
(with height adjustable stand)

Snow Gauge Container



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#### 1.3.4 SNOW RULER

##### Purpose

To determine the daily depth of snow on the ground.

##### How It Works

A pole, marked off in centimeters and installed in the ground at the site, is used to measure the depth of snow on a daily basis. The increase in the depth of snow from one day to another should be equal to the depth of snowfall that has occurred over the past twenty four hours. Of course a decrease in the depth from one day to the next indicates that some snow has melted or blown away.



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### The Snow Ruler

### 1.3.5 WEIGHING BALANCE

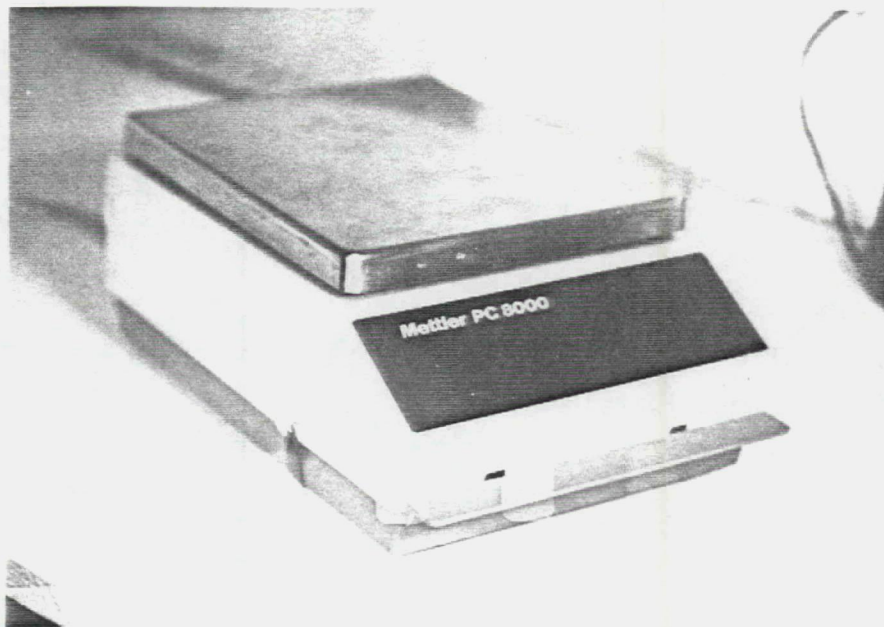
#### Purpose

To obtain the weight of daily precipitation samples.

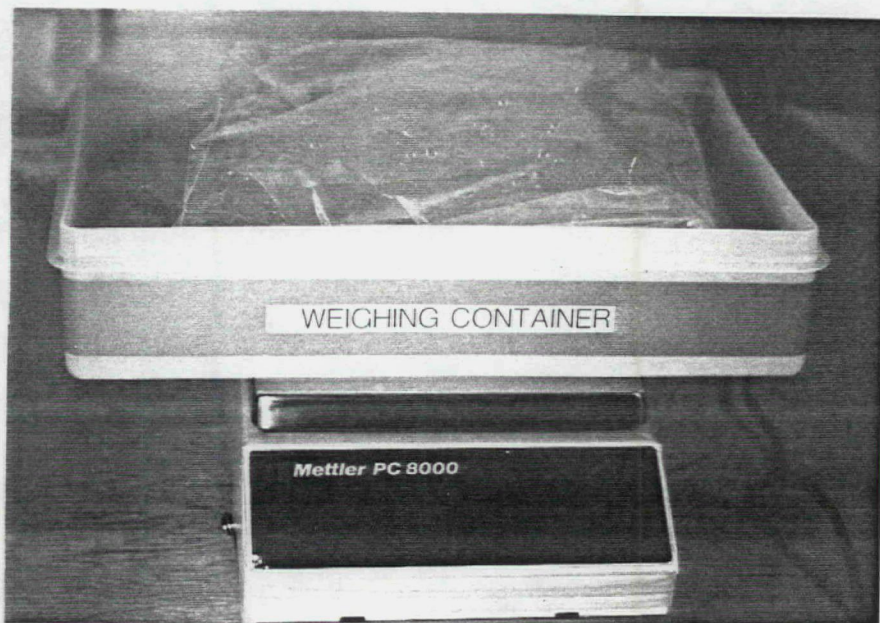
#### How It Works

The sample bag containing the precipitation is placed in a support container on top of the balance. After adjustment to compensate for the weight of the support container, the weight of the precipitation sample and bag is displayed on the balance.

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The Weighing Balance



Measuring the Weight of a Precipitation Sample

### 1.3.6 BAG SEALER

#### Purpose

To seal the plastic bags containing the precipitation so that samples cannot be spilled or contaminated.

#### How It Works

The bag containing the precipitation sample is folded flat and placed between the jaws of the bag sealer. The pedal is pushed down to close the jaws onto the bag. A metal strip in the jaws heats up very quickly and seals the sides of the plastic bag together. If the metal strip does not heat up long enough the bag does not seal. If the strip heats up for too long the plastic is over-melted and a poor seal results. An adjustable knob on the side of the bag sealer allows the heating time of the metal strip to be controlled.

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Using the Bag Sealer to Seal a Plastic Sample Bag

### 1.3.7 REFRIGERATOR

#### Purpose

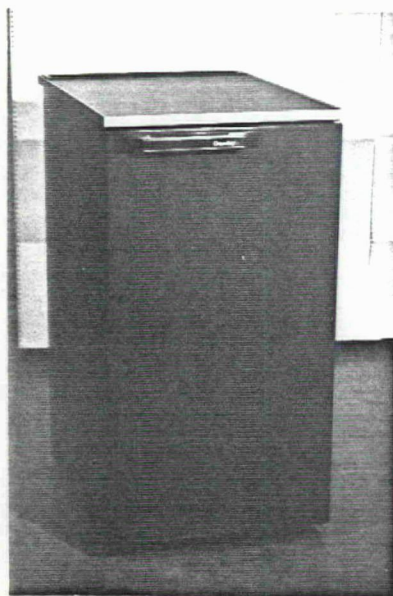
To keep precipitation samples at a temperature of 4°C until they are shipped to the laboratory.

#### How It Works

Samples are placed in plastic storage containers (to protect the sample bags from damage) and stored in the refrigerator. "Ice Packs" (used when shipping samples) are kept in the freezer compartment.



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The Sample Storage Refrigerator

Samples are Stored in Plastic  
Containers in the Refrigerator



(Note- "ice Packs" in freezer compartment)

### 1.3.8 SAMPLE SHIPPING BOXES

#### Purpose

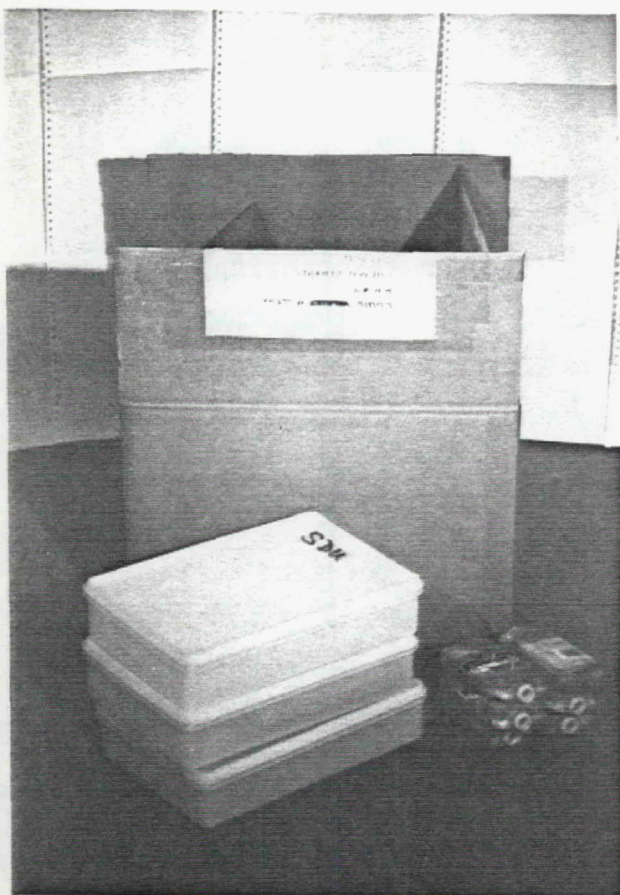
To protect samples from damage and keep them cool during shipment to the laboratory.

#### How They Work

Every two weeks, samples stored in plastic containers are placed in the shipping box along with frozen "Ice Packs" and a max./min. thermometer (to measure temperature extremes during shipping). The cardboard shipping container (lined on all sides with 6 cm of insulating foam) is then sealed and sent off the laboratory where the samples are unpacked and analyzed. The empty shipping boxes and ice packs are then sent back to the monitoring site for the next shipment of samples.



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A Shipping Box Ready for Loading  
with Sampler Containers  
and Ice Packs



The Shipping Box is Labelled and Ready for Shipment

## 2. DAILY DUTIES OF THE OPERATOR

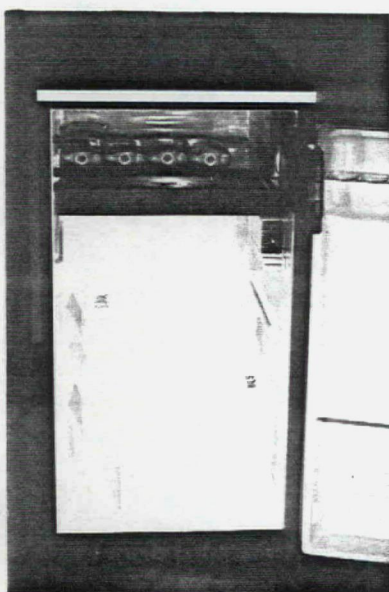
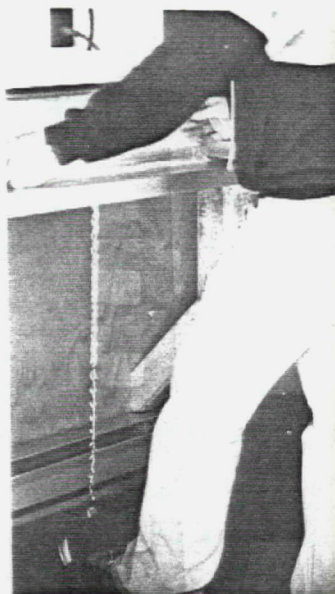
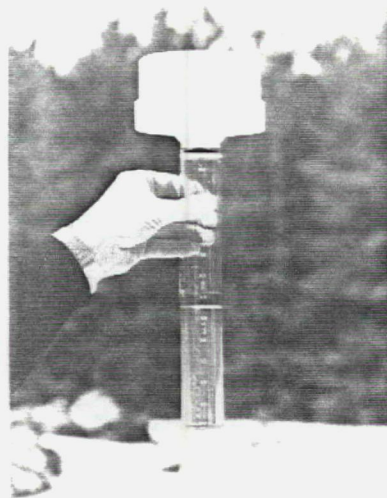
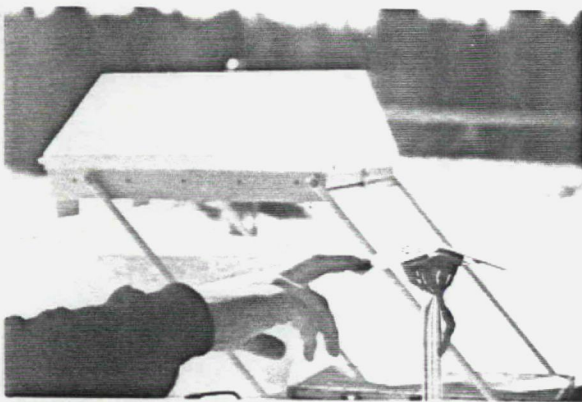
Your daily duties as a CAPMoN operator range from preparing for sampling through to the shipment of the collected samples to the laboratory.

The sequence of the daily duties is shown on the opposite page and is described step-by-step on the following pages.

At 8:00 a.m. (0800) local time every day (give or take 1 hour), seven days a week, the bucket/bag in the precipitation collector must be changed. Even though no precipitation may have occurred, the bucket/bag has been exposed to contamination from dry deposition and must be changed.

The eight (8) daily steps for sampling are described in the order in which they must be carried out. Every effort should be made to follow them exactly.

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Daily Duties of the operator involve Collecting Samples,  
Taking Precipitation Depth Measurements, Storing and Shipment  
of Collected Samples and Other Related Duties

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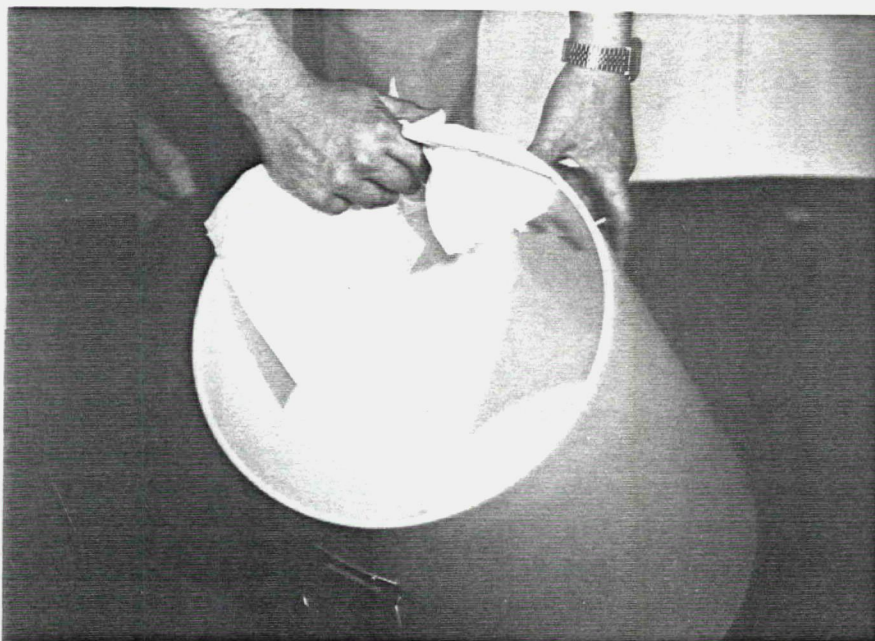
2.1 STEP 1: PREPARING FOR SAMPLING

Prior to 8:00 a.m. you should go to the Sample Handling Area and carry out the procedures listed below.

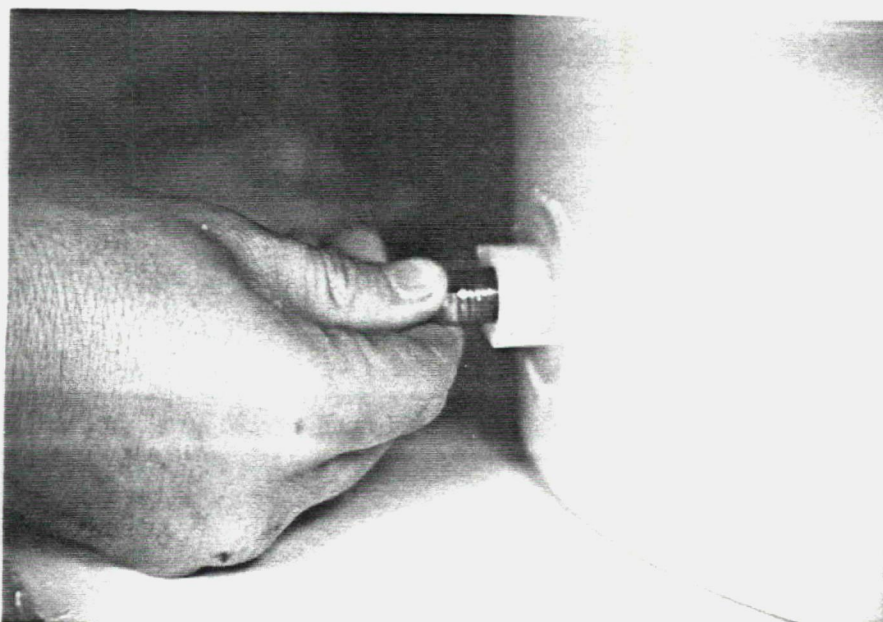
1. Check the inside and outside of the spare bucket for cleanliness. If dirt or particles can be seen, wipe the bucket clean using a Kimwipe and deionized water.
2. If the top of the bucket appears to be out of shape by more than 1 or 2 cm, press the sides until it is round.
3. Place the "Bucket Top" upside down onto its support stand.
4. Turn a Bucket Top Bag partially inside out, to the halfway point. (Be careful not to touch the surface of the bag that will come in contact with the bucket.)
5. Pull the partially inverted bag over the Bucket Top.
6. Unscrew the threaded drain plug from the side of the bucket.



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Cleaning A Sample Bucket

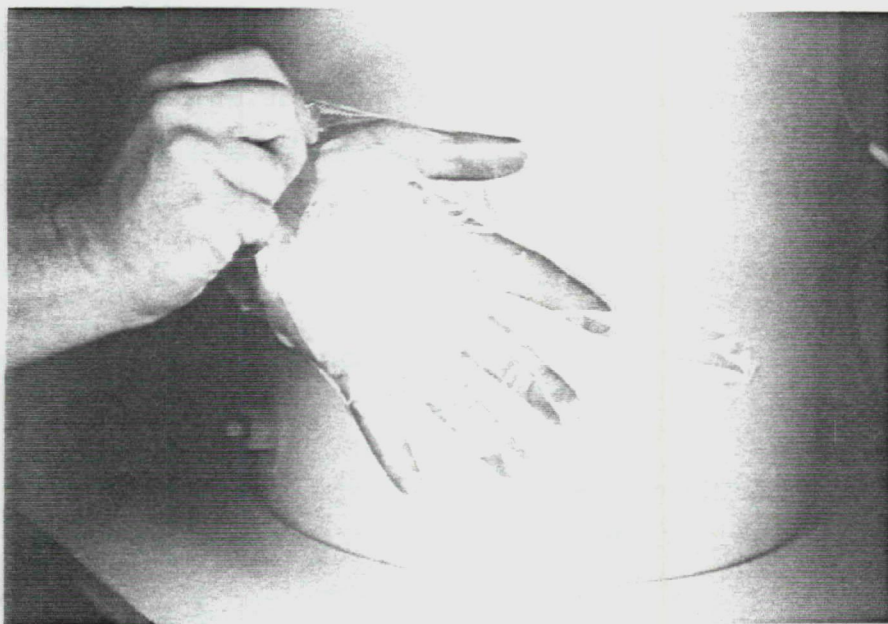


Removing the Threaded Drain Plug

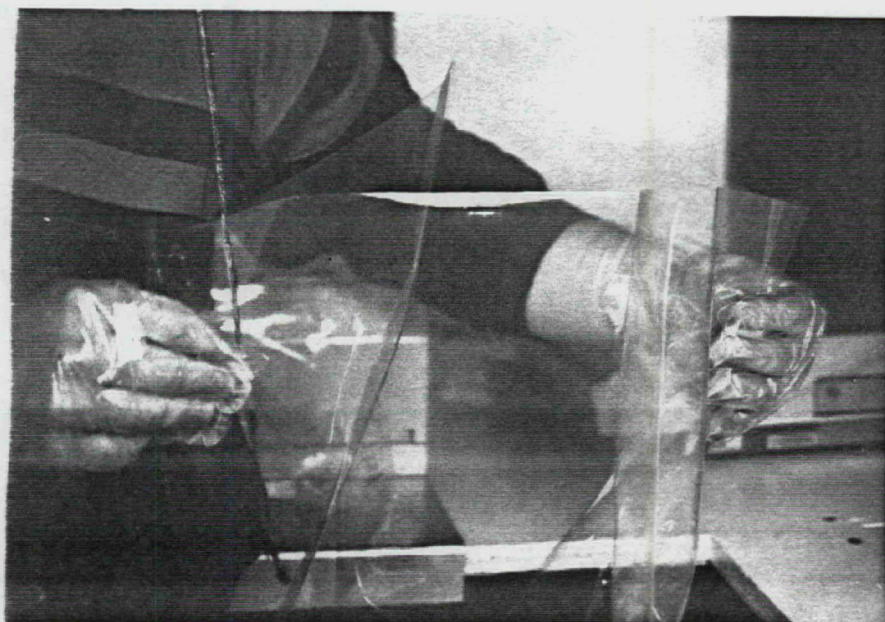
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STEP 1 Cont'd.

7. Open the package of sample bags.
8. Put on a new clean pair of disposable gloves. When you put on the gloves, make sure you never touch the outside of the glove fingers as this could contaminate the sample. Always pull the gloves from the box and put them on using the wrist end only.
9. Remove a clean sample bag from the package of bags.
10. Open the bag by pulling apart the two sides of the bag from the outside. Don't put your hands inside the bag or lean over the bag as particles can fall off your clothing into the sample bag.
11. Starting at the side of the bucket furthest from your body, insert the bag into the bucket. Fold about 8 cm (3 in) of the top of the bag over the outside of the bucket.
12. Take off and discard the gloves.



Putting on Clean Plastic Gloves



Pulling Open A Sample Bag

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STEP 1 Cont'd.

13. Smooth out any large wrinkles along the bucket rim by pulling down slightly on the part of the bag outside the bucket. Make sure to touch only the part of the bag on the outside of the bucket.

IMPORTANT

Do not lean over the bucket or touch the part of the bag that is inside the bucket. If you do touch the inside surface of the bag, or believe any chance of contamination may have occurred, get a new bag and start over. It won't take you long to repeat the procedure and the smallest amount of contamination can destroy an otherwise good sample.

14. Turn on the portable vacuum and press it against the bucket side, over the drain hole, until the bag is sucked tightly into place in the bucket.
15. If the bag does not fit tightly along the bucket rim, pull down on the outside part of the bag until the bag fits tightly along the bucket rim.
16. Use the vacuum unit again to help suck the bag down fully into place in the bucket.
17. Replace the threaded drain plug.



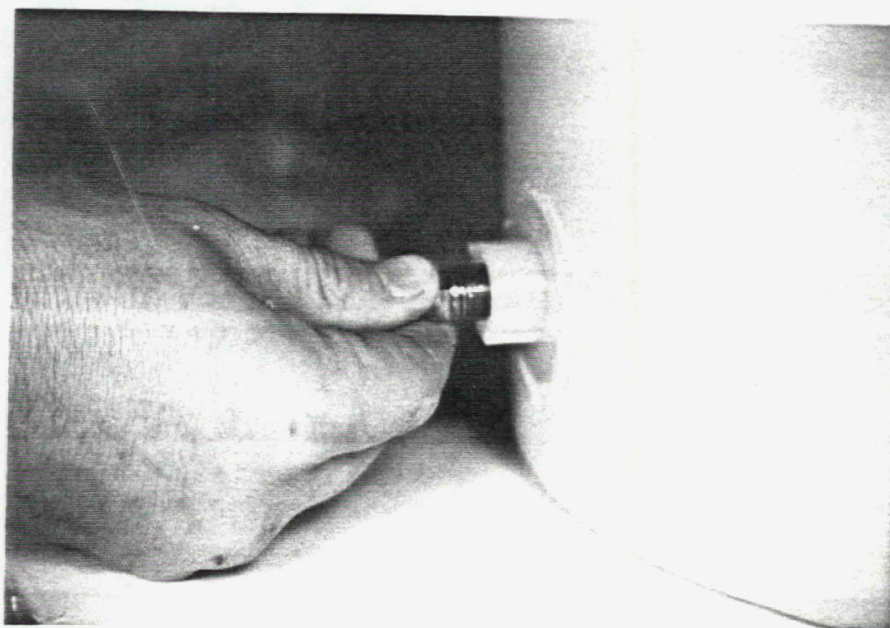
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Pulling Down the Sample Bag on the  
Outside of the Bucket



Evacuating Air From the Sample Bucket



Replacing the Threaded Drain Plug

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STEP 1 Cont'd.

18. Place the bucket top (with its covering bag) onto the bucket being careful not to touch the surface of the bag that will come into contact with the bucket/bag.
19. Turn on the balance so that it will warm up while you're collecting the sample at the Monitoring Site.
20. Check that the Balance is clean and sitting level.
21. Pick up the field note book, a pen, the prepared sample bucket, and go to the monitoring site to collect the sample. In winter months, when using the snow gauge, return to the hut after collecting the sample and get the spare snow gauge container.



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Placing the Bucket Top on the bucket



Turning on the Balance

## 2.2 STEP 2: SAMPLE COLLECTION AND INSTRUMENT INSPECTION

Now that you are prepared for sampling, you should take the clean bucket/bag to the monitoring site for sample collection and instrument inspection. Remember that samples must be collected at 8:00 in the morning, give or take one hour.

### IMPORTANT

If, in travelling to the site, the bucket top comes off, or for any other reason, you think the sample might have become contaminated, return to the sample handling area and repeat the bag loading procedure with a new sample bag and bucket top cover.

### IMPORTANT

When working near the precipitation collector, always stand downwind or crosswind from the instrument.

## INSTRUMENT INSPECTION

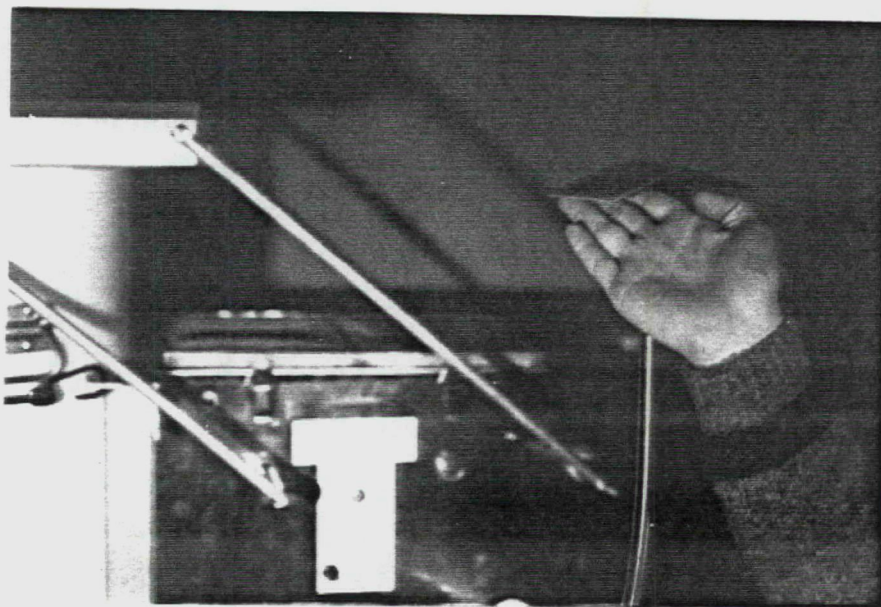
### Case 1: If Precipitation Is Occurring At The Site

1. Place the clean bucket on the ground upwind of the instrument. In winter, when bucket is placed on the ground, snow will sometimes stick to the bucket bottom. Stamp down a flat spot in the snow for the bucket.
2. Check that the moveable hood is in the OPEN position and touch the sensors to make sure they feel warm. If the hood is closed or the sensors are either hot or cold, make a note in the field book and later contact the Regional Inspector.

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Travelling to the Site at 8:00 AM



Checking that Sensors Feel Warm

STEP 2 Cont'd.

Case 2: If Precipitation Is Not Occurring At The Site

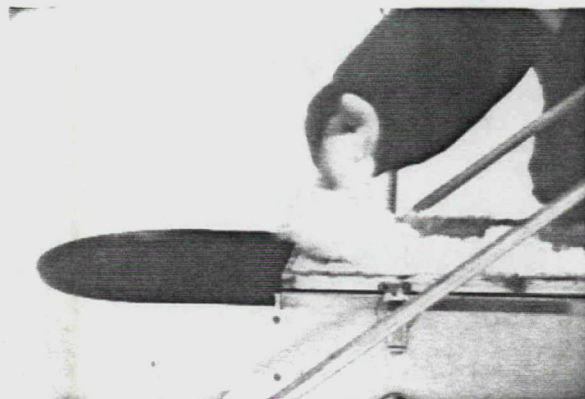
1. Place the clean bucket on the ground upwind of the instrument. In winter, when bucket is placed on the ground, snow will sometimes stick to the bucket bottom. Stamp down a flat spot in the snow for the bucket.
2. Inspect the seal between the bucket and the gasket on the underside of the moveable hood. Note any gaps in your field book and later notify the Regional Inspector.
3. Turn the collector off. Using the brush provided, clean any debris (leaves, sticks, snow or ice) off the top of the collector. Make sure the bucket is tightly sealed before doing so.
4. Turn the collector on. Touch a wetted finger to the sensor grids. If the grids are not warm or the hood does not move or does not move smoothly, note the details in the field book and later contact the Regional Inspector.



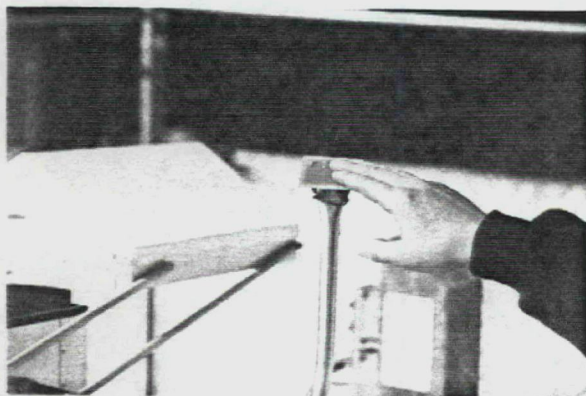
April 30, 1985



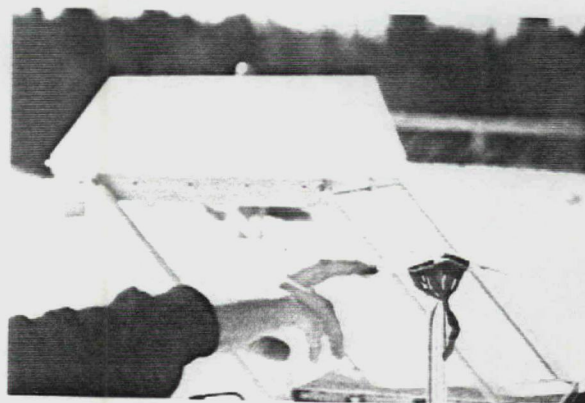
Inspecting Seal Between the Gasket  
and Bucket Top



Clearing any Accumulated Snow  
off the Collector



Checking that Sensors Feel Warm



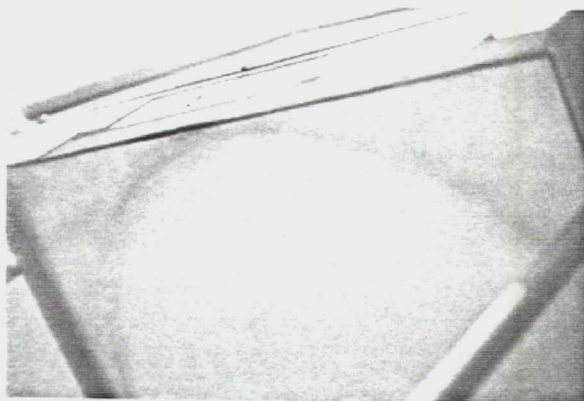
Activating the Cover



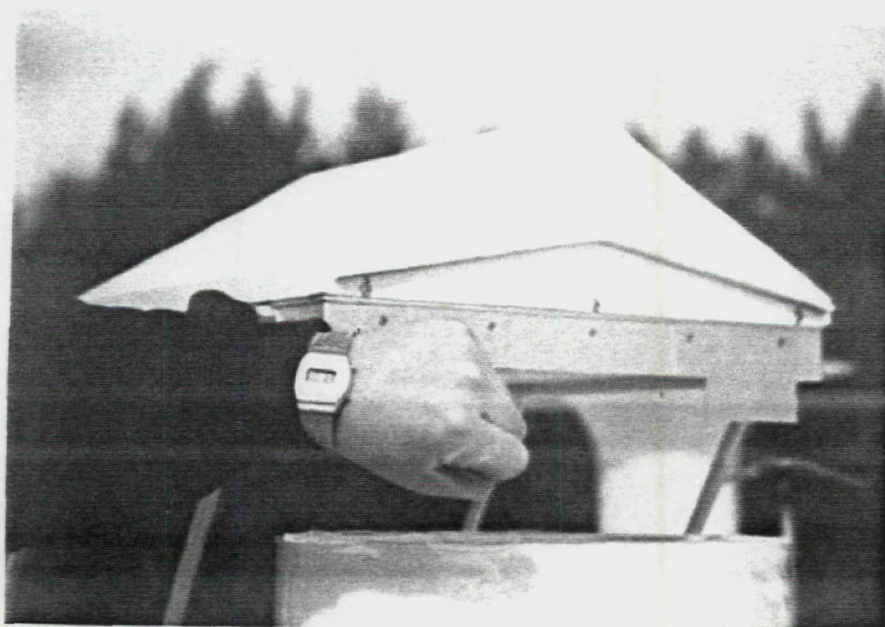
STEP 2 Cont'd.

5. When the collector opens, check the gasket for cleanliness, cracks, holes, or any evidence of moisture on the plastic surface next to the foam, and any discoloration of the foam itself. If any of these problems do exist, the gasket will need to be changed (see Section 3.1, page 3-5 "Changing the Gasket").
6. Wait and make sure the hood returns to cover the bucket about two minutes after opening.

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Checking the Condition of the Gasket



Ensure the Collector Hood Returns After 2 Minutes

STEP 2 Cont'd.

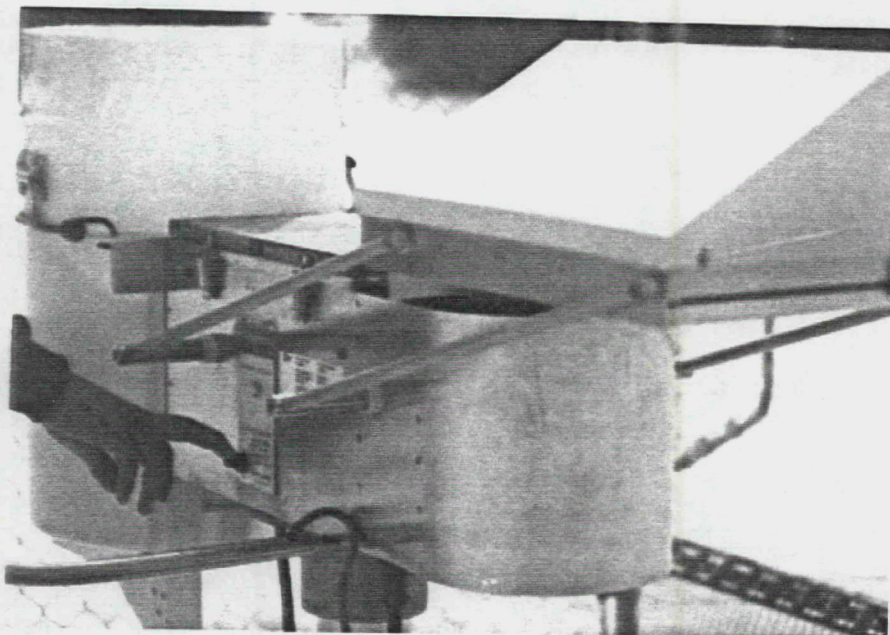
7. Activate the collector by touching the sensor. Wait until the hood reaches the other side of the collector then, turn off the switch.
8. With the clean bucket on the ground, take the bucket top off the clean bucket and put it onto the exposed bucket.

DURING WINTER:

Check the bucket bracket for snow or ice. If there is snow or ice clean the bucket bracket. Make sure that snow or ice do not fall into the clean open bucket. If it does then you have to prepare the new clean bucket again. Before placing the new bucket make sure no snow sticking to the bottom of the clean bucket.

9. Remove the exposed bucket from the collector. Place the exposed bucket on the ground.

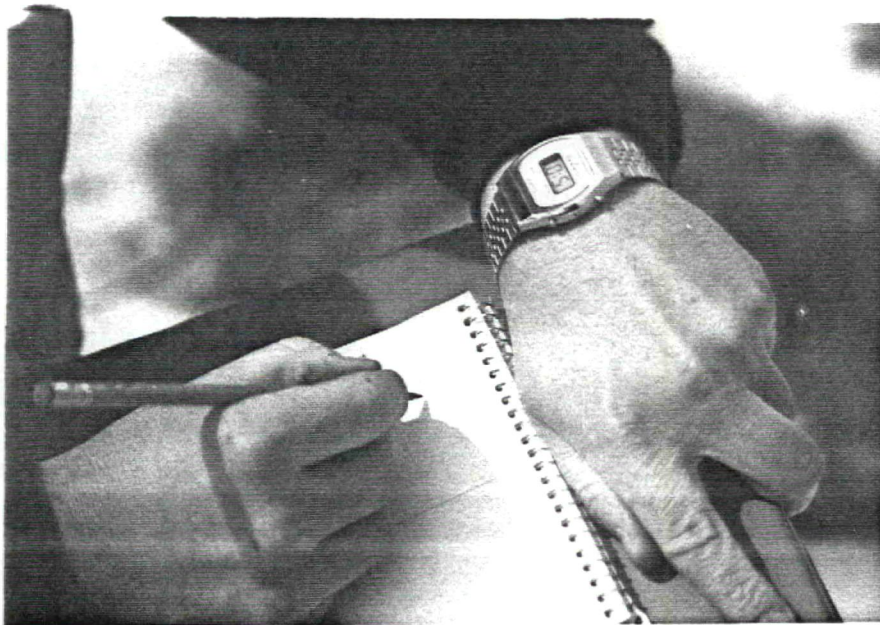
April 30, 1985



After activating the Collector, turn OFF the Switch

STEP 2 Cont'd.

10. Put the clean bucket in the collector.
11. Turn the switch back to the ON position and make sure the cover hood returns to the CLOSED position.
12. Note the time in the field book to the closest half hour.
13. Adjust the crank stand (if one is supplied at your site) until the top of the bucket is 1.5 meters above the snow surface (adjustment made in winter only).
14. Take the exposed bucket/bag back to the Sample Handling Area.
15. Return to the site for the precipitation measurement.  
IF - Freezing Rain - Take the spare Rain Gauge Funnel and Graduate to the site.  
IF - Snow - Take the spare Snow Gauge container to the site.



Note the Sample Change Time in the Field Book

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## 2.3 STEP 3: PRECIPITATION MEASUREMENTS

In summer a standard Rain Gauge is used to and in winter a Nipher Snow Gauge is used, as well as a Snow Ruler.

The Regional Inspector will inform you in autumn when to change from using the rain gauge to the snow gauge, and in spring, when to switch back to the rain gauge.

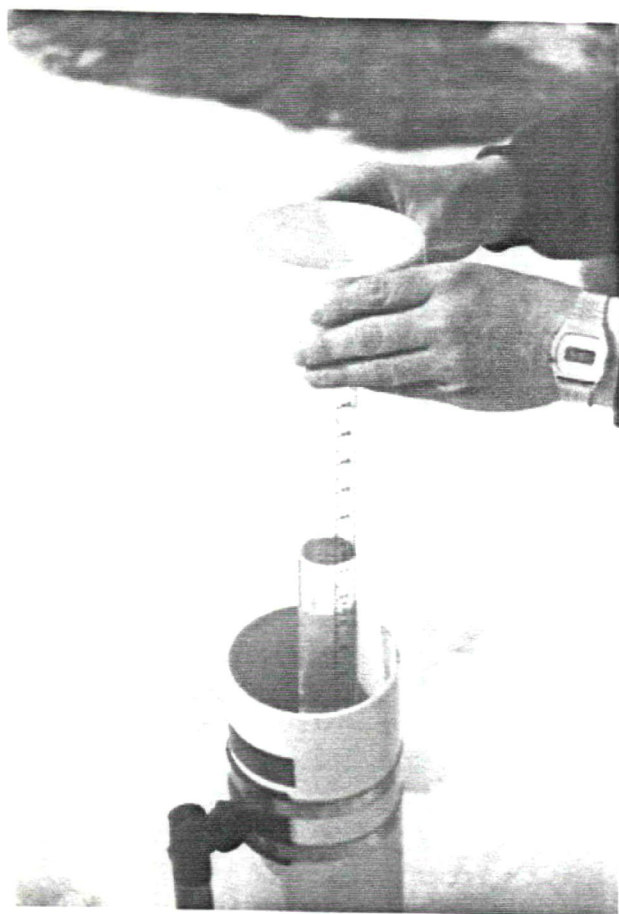
### 2.3.1 Taking A Rain Gauge Measurement

The Type B Rain Gauge is used to measure the amount of rain, drizzle, freezing rain, and hail which occurred over the same period as the CAPMoN precipitation sample was collected (24 hours).

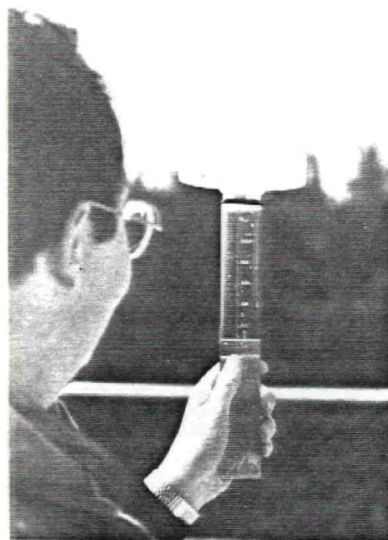
1. Check that the gauge is level and secure, also check for any chips or cracks (the plastic graduate can easily freeze and crack during cold weather). Note the details in your field book and transfer the information to Sample History Form. After completion of the sample handling procedures, return to take corrective action.
2. Remove the funnel and attached clear plastic graduate from the outer cylinder.
3. Hold the graduate vertical and read the level of water at the lowest part of the curved water surface (meniscus). Discard the water in the graduate after the measurement has been taken.
4. When the meniscus is between two scale marks on the graduate, the closer mark is recorded. If you read the meniscus as being exactly midway between two marks record the mid-value.
5. When there is a small amount of water in the graduate but the meniscus is below 0.2 mm, record the word "Trace". Discard the water after the measurement has been taken. The amount 0.1 mm will not be recorded at any time.



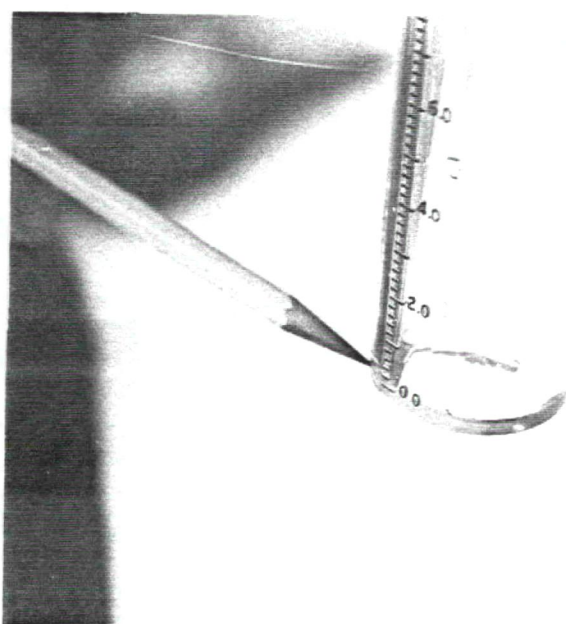
April 30, 1985



Removing the Funnel and Graduate



Reading the Graduate



Record a Trace Amount if Meniscus is not Above 0.2 mm

STEP 3 Cont'd.

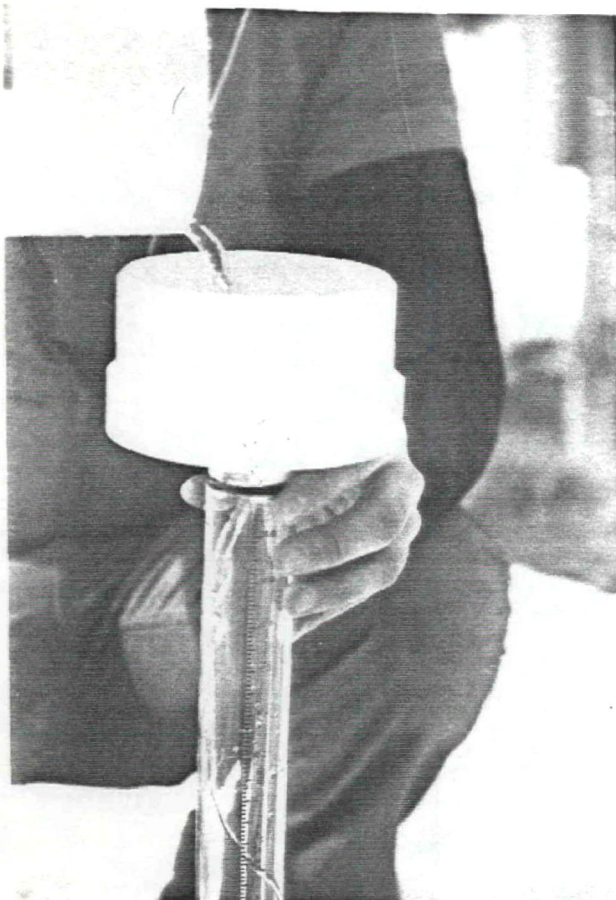
6. If the graduate has overflowed into the outer cylinder (rainfall greater than 25 mm), first read the contents of the graduate (should be 25.0 mm) then refill the graduate (to less than 25 mm) from the outer cylinder and repeat until all the water from the outer cylinder has been measured.

For example:

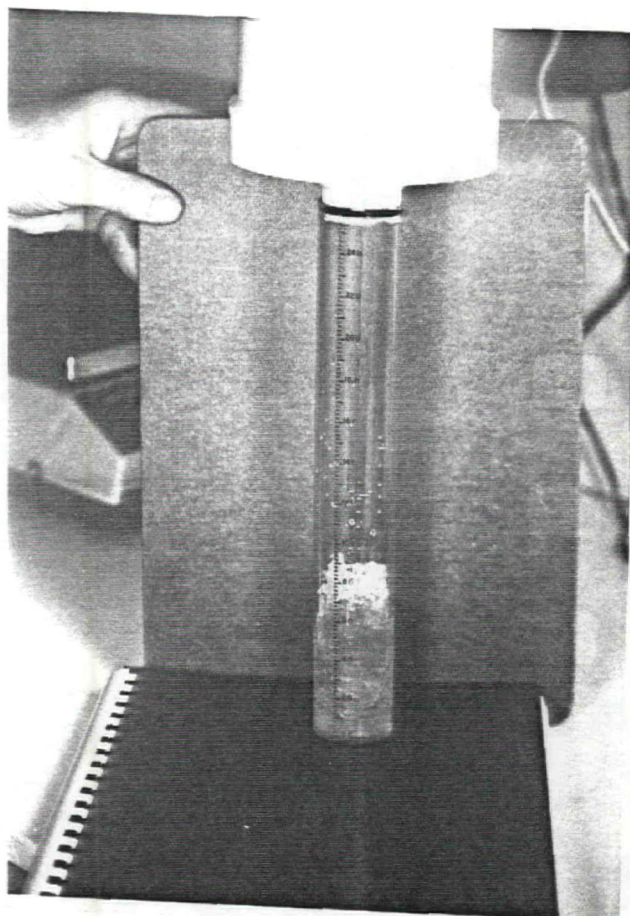
Original graduate measurement	25.0 mm
Next measurement	23.8 mm
Next measurement	<u>10.4 mm</u>
 Total rainfall	 <u>59.2 mm</u>

7. If rain or freezing rain has frozen in the funnel or graduate, remove the funnel and graduate and replace it with the spare funnel and graduate. Take the frozen funnel and graduate indoors, place it in the mounting bracket provided, cover it with plastic and allow it to melt. When melted, note the water level (normally done the next sampling day).
8. Record the measurement and the occurrence of any spills, overflow or other observations in the field book.

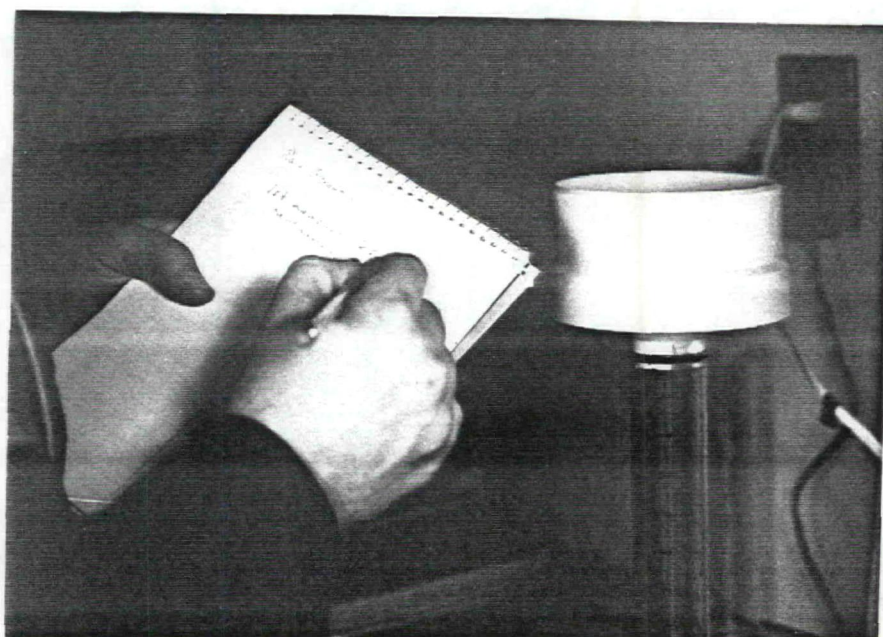
April 30, 1985



Measuring the Graduate overflow



Allow Freezing Precipitation to Melt  
in Sample Handling Area



Recording Results in the Field Book

STEP 3: Cont'd.

2.3.2 Taking Snow Measurements (Nipher and Ruler)

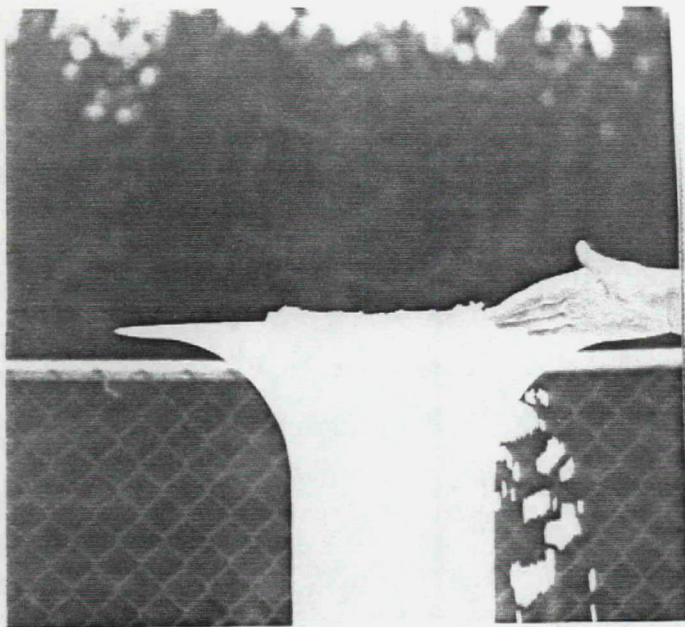
The "Nipher Shielded" Snow Gauge is used to measure the amount of snow or other precipitation (during winter months) which occurred over the same period as the CAPMoN precipitation sample was collected (24 hours).

The Regional Inspector will determine when to switch from the snow gauge to the rain gauge in the spring and autumn.

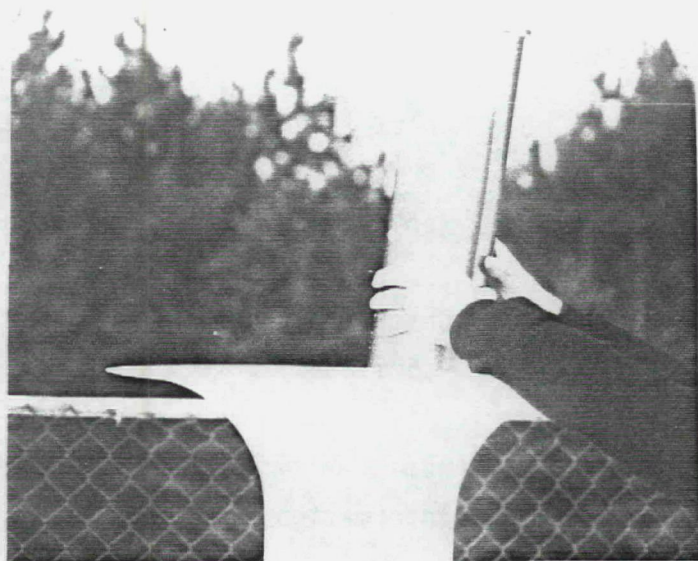
1. If snow is bridging across the shield over the container, the shield should be hit sharply. The snow falling into the container should be treated as a regular sample and you should record "snow bridging" in the field book.
2. Gently remove the container from the shield and check the container for any dents.
3. Brush away any snow accumulated on the shield.
4. Check for any chips or cracks in the shield.



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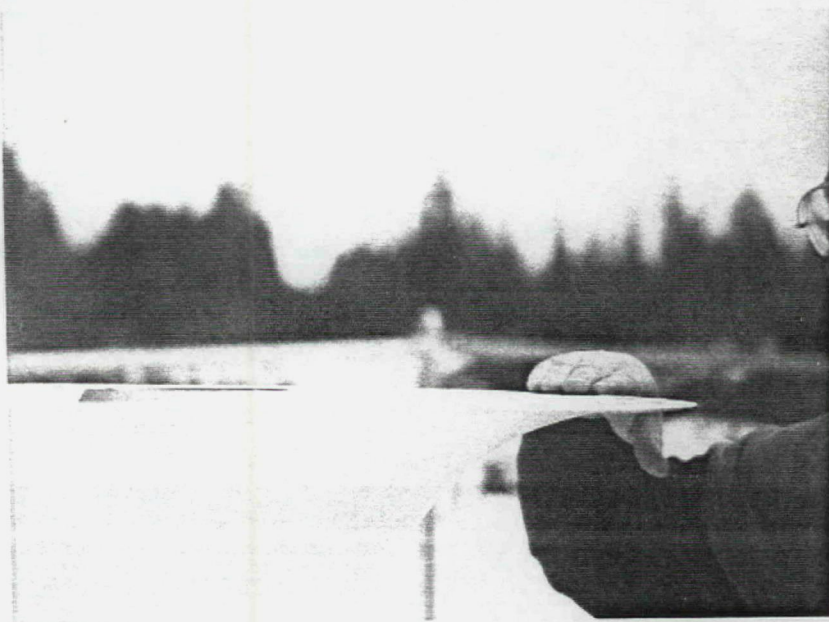
Clearing Snow off the Snow Gauge



Removing the Container  
from the Snow Gauge



Checking Container for dents

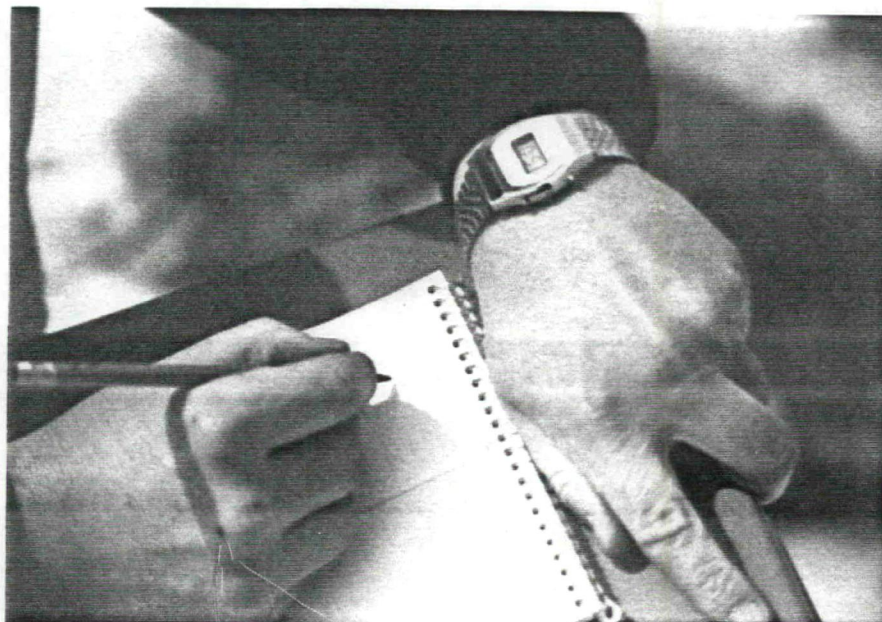


Checking Gauge Shield For Cracks or Chips

STEP 3 Cont'd.

5. Check that the gauge is level and secure.
6. Replace the container in the gauge with the spare container.
7. Check that the top of the shield and container are adjusted to 1.5 meters above the snow surface.
8. Note any details in your field book and transfer the information onto the Sample History Form.
9. Measure the depth of snow to the nearest cm from the scale on the snow ruler.
10. Record the depth in the field book.

### Taking a Snow Depth Measurement



Record the Depth Measurement in the Field Book



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STEP 3 Cont'd. (Snow Measurements)

11. Take the container back to the Sample Handling Area for melting and measurement. If the precipitation is in the form of rain, the container contents can be measured directly with the snow gauge graduate.
12. The following measurement procedures for the snow gauge melted water should be carried out after the exposed sample bag has been sealed, labelled, and stored in the refrigerator.
13. For containers with precipitation in them, allow the precipitation to melt in the Sample Handling Area. This should be done either at room temperature, or, if you are able to measure the amount of water within an hour or so, the container can be placed near a heat source, such as a hot air register.

The melted water should then be measured in the snow gauge graduate.

IMPORTANT

When melting the contents of the container near a heat source, the container should be checked regularly so that the melted water does not evaporate.

14. If the snow must be melted quickly, a measured amount of warm water from the graduate can be added to the sample to melt it, the water from the container can then be measured in the graduate and the added amount of warm water subtracted off.



Collected Frozen Precipitation Should Be Covered  
and Allowed to Melt

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## 2.4 STEP 4: SAMPLE BAG REMOVAL FROM THE BUCKET

These procedures are carried out in the Sample Handling Area.

1. Place the bucket in its storage bracket and remove the drain plug to reduce the vacuum effect on the bag.
2. Remove the bucket top and place it upside down on the bench (the protective bag cover can be removed any time after this).
3. Put on a clean pair of disposable plastic gloves.
4. By sliding your fingers up under the fold by the side bag seals of the bag, gently lift the bag out of the bucket. Make sure the bag does not unfold.

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Putting on Clean Plastic Gloves



Removing the Sample Bag From the Bucket



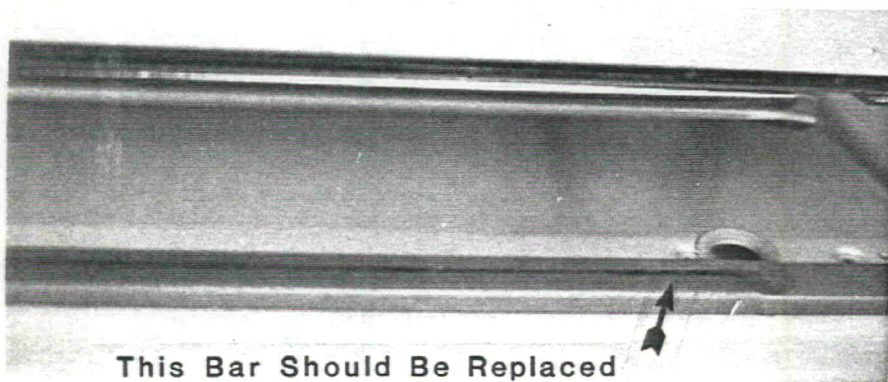
2.5      STEP 5: BAG SEALING

1.    Make sure the Bag Sealer Timer Knob is set to the predetermined setting (usually 4) before sealing a bag. It is always best to carry out a test seal on an unused sample bag.
  
2.    Check to make sure the plastic over the heater element is not blackened or burnt through. If it is, the bar needs replacing. Replace the bar with your spare bar and contact your regional inspector to replace the spare bar.

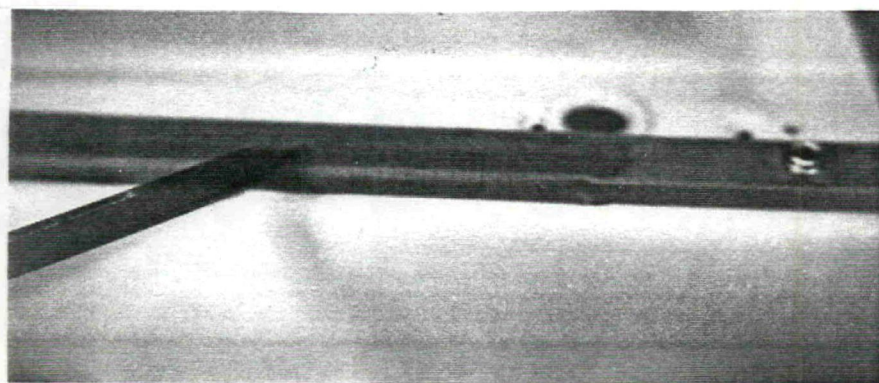
April 30, 1985



Check the Sealer Timer Knob



This Bar Should Be Replaced



This is a New Bar



STEP 5 Cont'd.

2.5.1 NO PRECIPITATION IN THE BAG

If no precipitation has occurred, the collected sample bag is called a "Dry Bag". The following procedures apply only to the dry bags.

1. Hold the top part of the bag by its outer sides and fold over the top of the bag about 3 cm (1 inch) below the folded-over part of the bag.
2. Place the dry bag into the jaws of the bag sealer.
3. Smooth out any wrinkles and gently press the air out of the bag.
4. Double seal the bag (with seals 3 cm/1 inch apart) about 3 cm (1 inch) below the lower edge of the folded-over part of the bag.
5. Remove the plastic gloves.

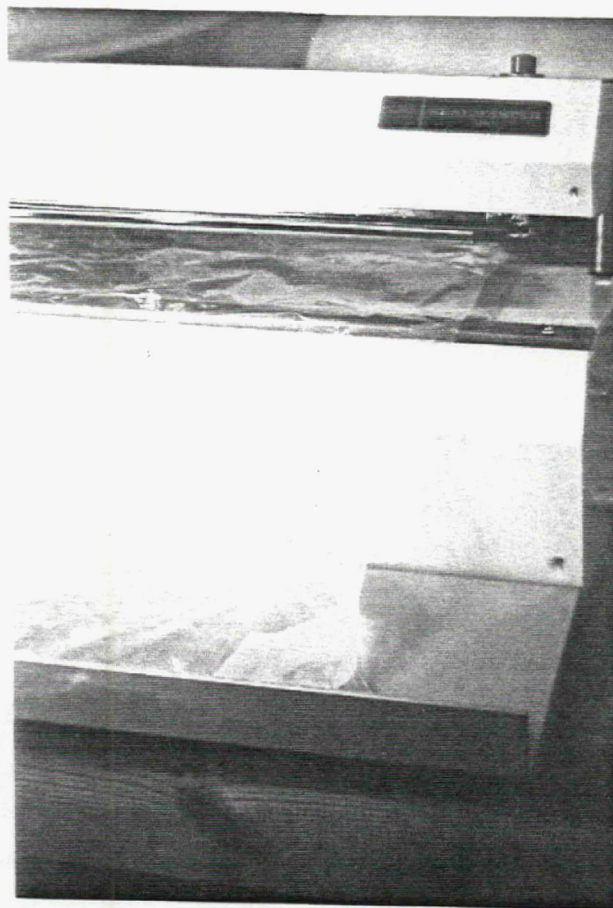
2.5.2 PRECIPITATION IN THE BAG

1. Place the bag on the support bracket attached to the front of the bag sealer.
2. Hold the top part of the bag by its outer sides and fold over the top of the bag about 3 cm (1 inch) below the folded-over part of the bag.
3. Gently knock any rain or snow inside the bag below the fold to the bottom of the bag.

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Folding over Top of the Bag



Place Bag Onto Sealer Support Bracket



Place Bag Into Jaws of Heat Sealer

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STEP 5 Cont'd. (Precipitation In The Bag

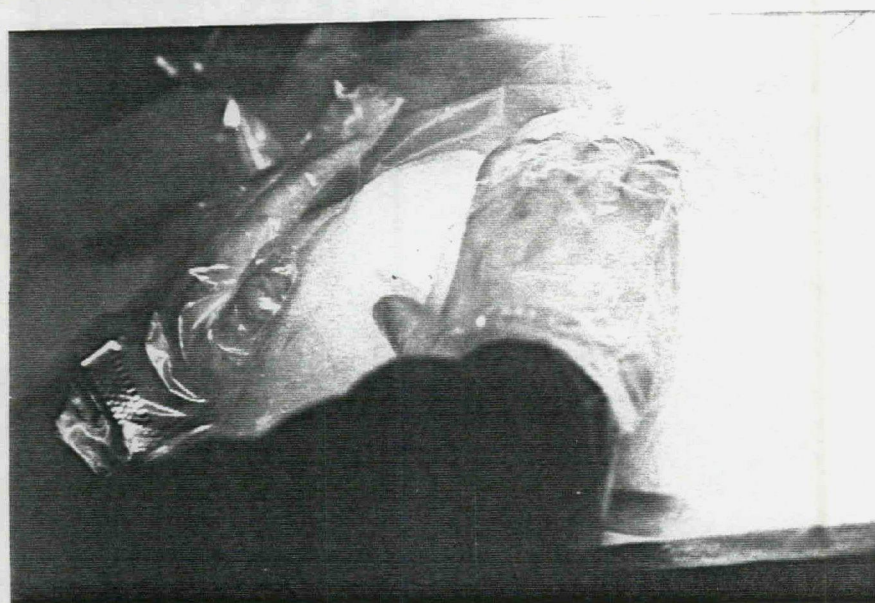
4. Without unfolding the bag, gently pull the top of the bag through the jaws of the bag sealer until the bottom just rests on the support bracket.
5. Using both hands, press the bag against the bag sealer until all the air is out of the bag.
6. If snow is in the bag, gently squeeze the outside of the bag until it compresses into a small clump along the bottom of the bag.
7. Smooth the bag along the heater bar to get rid of all wrinkles and folds. Do not make the seal until you are satisfied that the bag is perfectly flat all along the heater element.



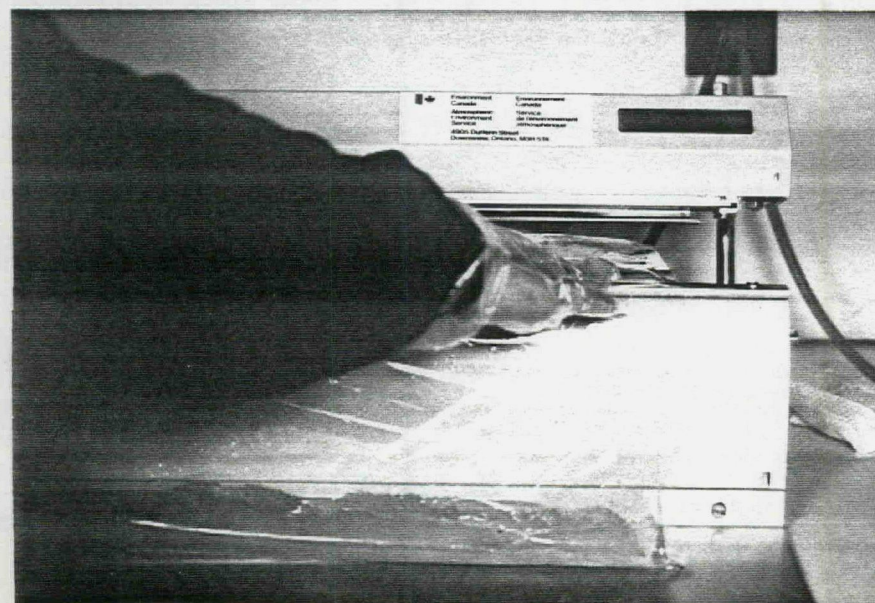
April 30, 1985



Evacuating Air  
From Sample Bag



Compressing a Snow Sample



Smooth Out Wrinkles  
In Bag Along Sealer Bar

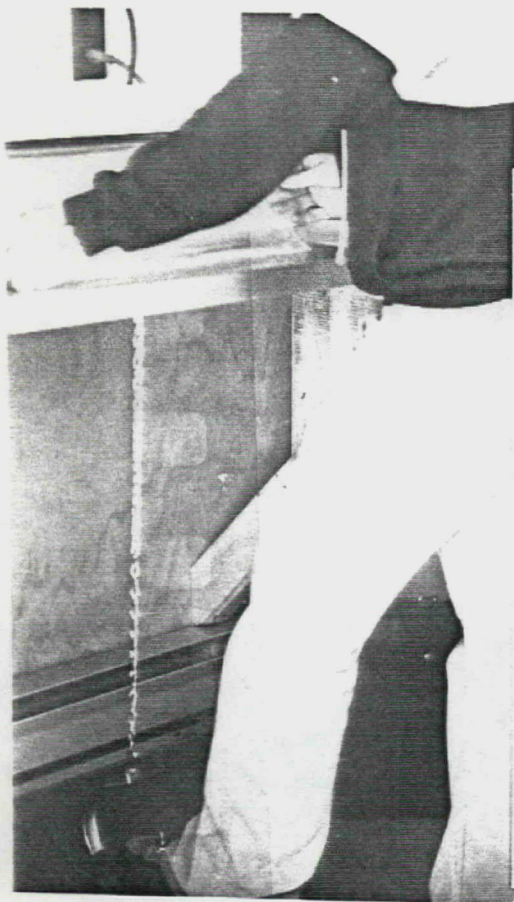
April 30, 1985

STEP 5 Cont'd. (Precipitation In The Bag)

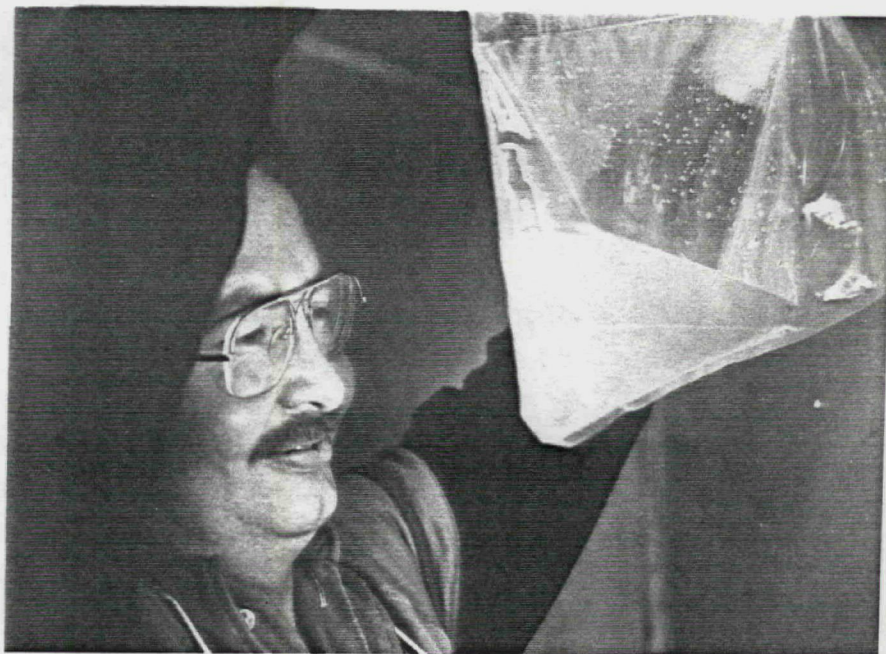
8. Press down on the sealer pedal and wait 2 or 3 seconds after the buzzer stops before releasing the foot pedal.
9. Make a second seal 1 cm (1/2 inch) above the first.
10. Check the seals to make sure there are no small holes or areas unsealed.
11. Do a final leak check by turning the bag upside down and looking for leaks. If you do find leaks, the bag will need to be sealed again (any leaks should be noted in the REMARKS section of the Sample History Form).
12. Remove the plastic gloves.



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Pressing Down On Bag Sealer  
Pedal To Seal Sample



Inspecting the Sample



Checking the Sample Seal For Leaks



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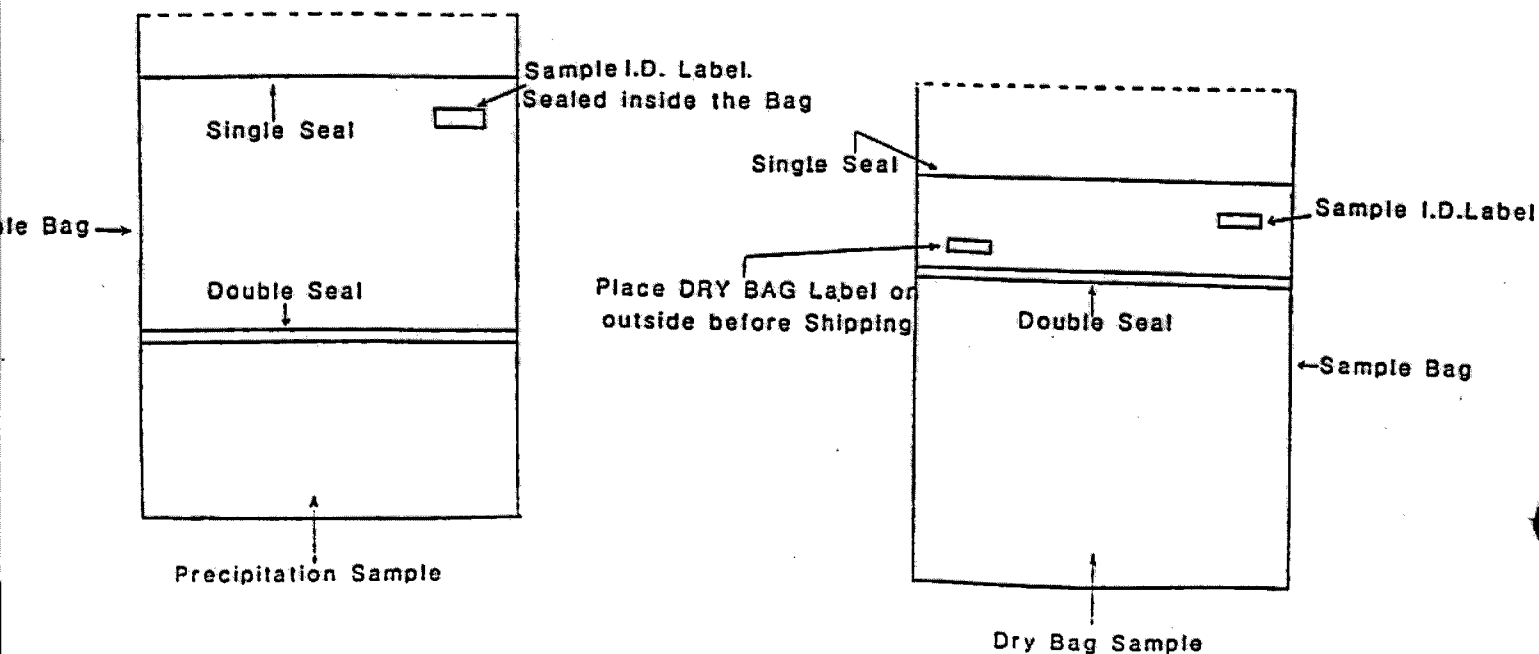
## 2.6 STEP 6: SAMPLE BAG LABELLING

1. Label the bag (wet or dry) with the next consecutively-numbered I.D. sticker.
2. Choose one dry bag randomly every week and label it with a "Dry Bag" sticker. This bag is to be submitted to the laboratory with the other samples.

### IMPORTANT

Make sure you stick the label inside the upper portion of the bag above the double seals.

Place another seal above the label completely enclosing the label in the bag to prevent losing the sample identification.



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Labelling A Dry Bag

2.7      STEP 7: SAMPLE AND BAG WEIGHING

The precipitation samples are weighed to determine the amount of sample collected. Dry bags are weighed to measure the weights of the empty bags. The procedure for weighing samples and dry bags is the same.

1. The balance should be on already. If it is not, turn it on now by pressing the control bar and let it warm up for several minutes.
2. If the display does not read 0.0 g, press the control bar again.
3. Place the plastic weighing container (identified by the red tape on its sides) on the balance pan and press the control bar so that 0.0 g is displayed again.
4. Place the Reference Weight in the middle of the container and read the displayed weight. The weight should be recorded on the Sample History Form (described later). Return the Reference Weight to the container provided.

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Place Weighing Container On Balance and Zero the Display

STEP 7 Cont'd.

5. Watch the display return to 0.0 g (if it does not, press the control bar again). Fold the bag and place the precipitation sample or dry bag in the plastic container (making sure the bag fits neatly in the container).
6. Wait for the display to stabilize and record the weight on the Sample History Form.
7. Remove the sample and plastic container from the balance and lift the control bar to turn the balance off.
8. Inspect the precipitation sample at this time for particulate matter, organic matter or other material in the sample (record observations on the Sample History Form).

NOTE

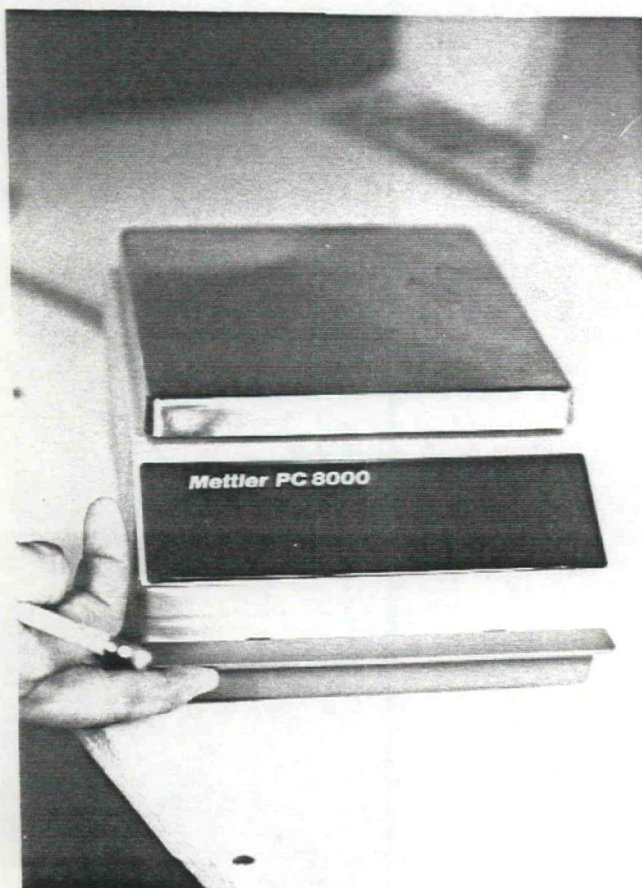
Do not leave any objects on the balance.



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Weighing A Precipitation Sample



Turning off the Balance

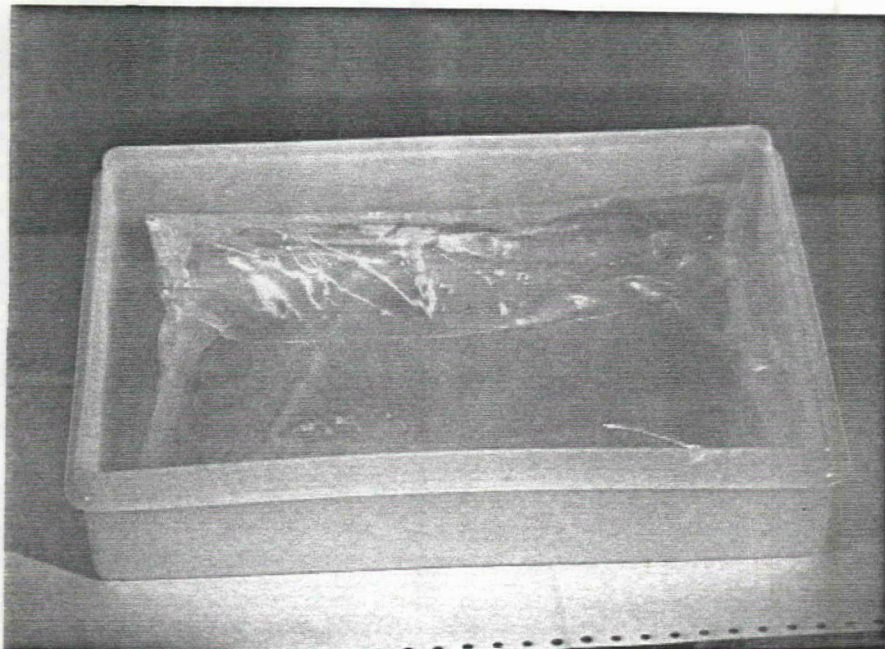


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## 2.8 STEP 8: SAMPLE STORAGE IN THE REFRIGERATOR

1. Place the sample bag in one of the two sizes of plastic storage containers provided.
2. Samples less than 2500 g can be stored in the smaller 4 litre containers. Samples greater than this should be stored in the larger 8 litre container.
3. Each container should be filled with as many samples as will comfortably fit into the container. Watch out for corners of bags hanging outside the container which could be ripped when the lid is snapped on.

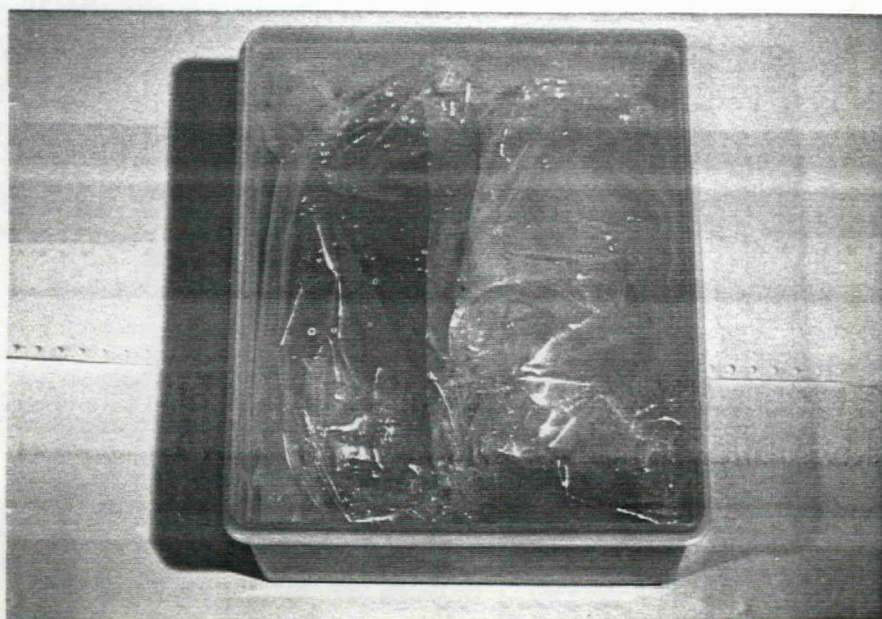
April 30, 1985



Place Sample In A  
Plastic Container



Samples Greater Than 2500 g  
Need To Be Stored in  
4L Containers



Each Container Should Be  
Comfortably Filled With Samples

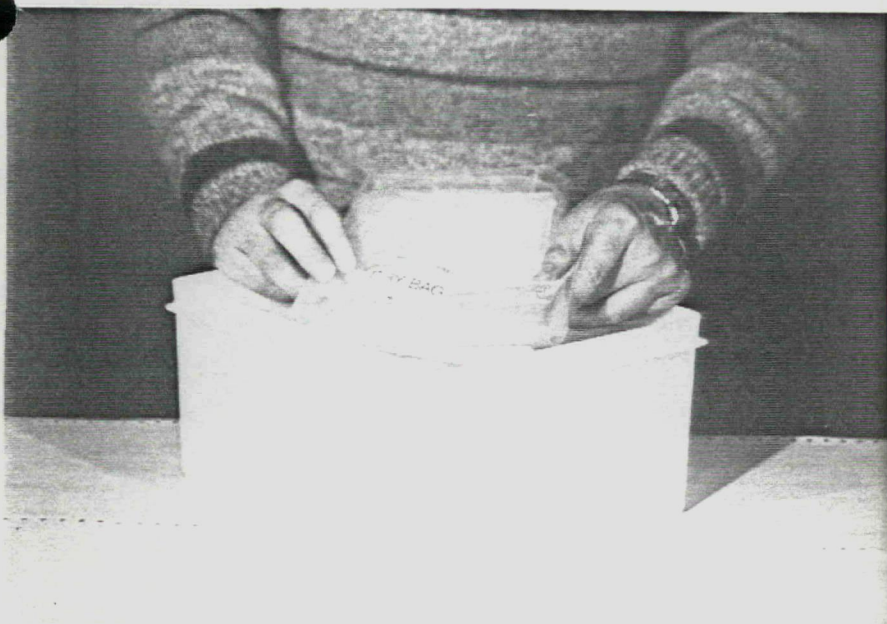
April 30, 1985

STEP 8 Cont'd.

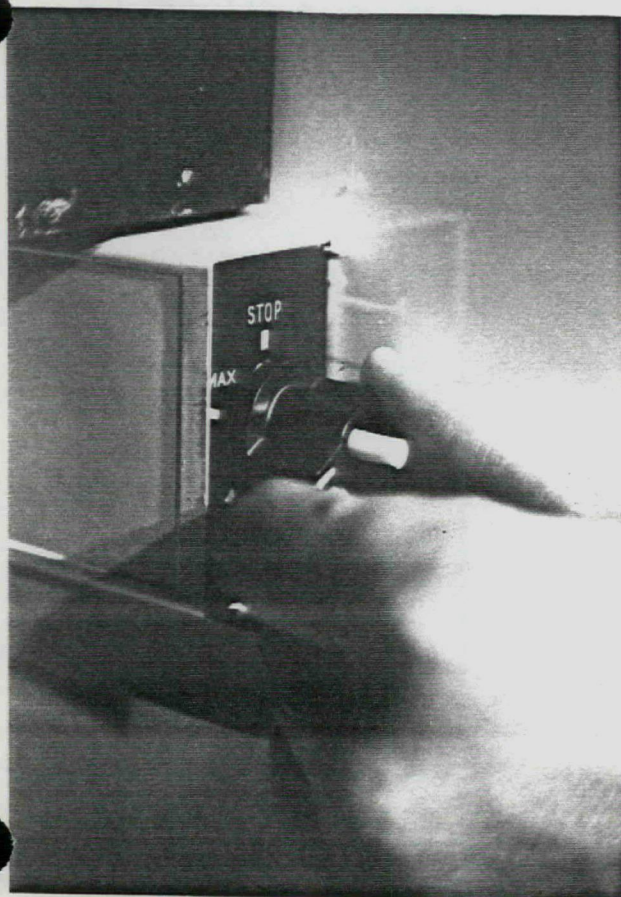
4. One randomly selected Dry Bag (if any) each week should be included in a sample container. Other dry bags are to be stored in cardboard box on the site.
5. The sample storage container should be placed in the refrigerator.
6. Check the thermometer in the refrigerator to ensure the temperature is between 3°C and 5°C, if not, the refrigerator thermostat should be adjusted to obtain 4°C.
7. Check that the fridge is clean, dry and free of ice buildup. If there is ice buildup greater than 1/2 cm (1/4 inch) refer to Page 3-13.



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One Dry Bag Per Week Is Added To A Sample Container



If Required, Refrigerator Thermostat Should  
Be Adjusted To Maintain 4 Degree Centigrade

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## 2.9 AVOIDING SAMPLE CONTAMINATION

You, the operator, represent the greatest risk for contaminating precipitation samples. This is because you get closer to and have more physical contact with the sample than anyone else. Some of the many sources of contamination that can occur at your site are:

### GASES

- car exhaust, cigarette smoke, smoke from a chimney, or burning garbage.

### HUMAN CONTACT

- touching the sample, the inside of the sample bag, or the hood gasket on the collector.

### "FALL OFF"

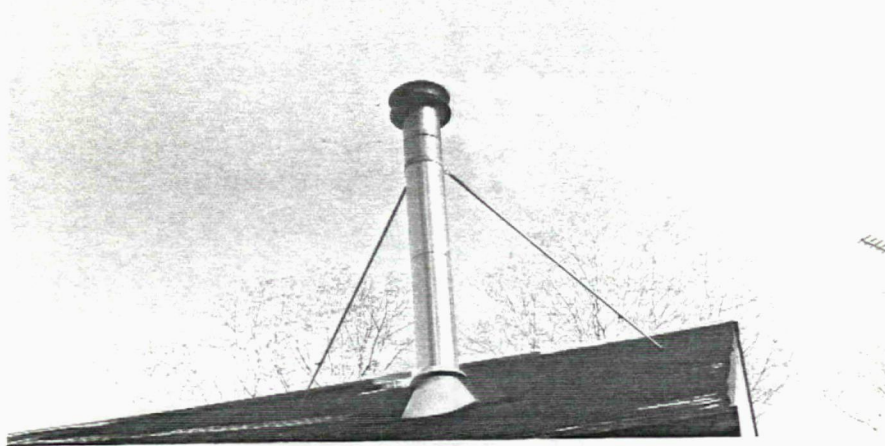
- particles or hair falling off clothing or skin, dust stirred up in the sample handling area.

### EMISSION SOURCES

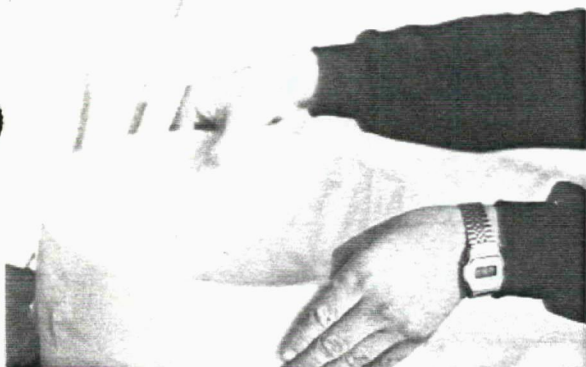
- dusty roads or parking lots, dusty fields, fruit tree spraying.



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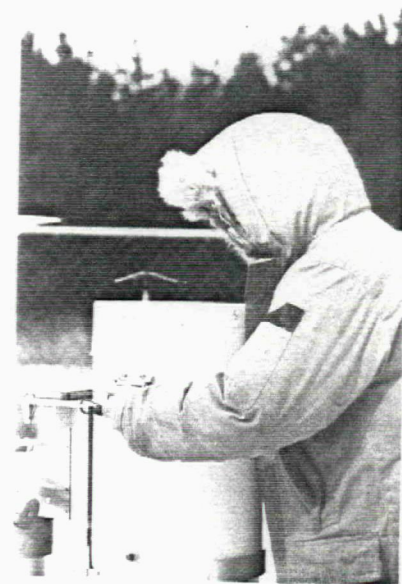
Household Chimney



Touching Inside of Bucket/Bag



Vehicle Exhaust



Hair or Particles  
Falling Into Bucket While  
Leaning Over Bucket

AVOIDING SAMPLE CONTAMINATION Cont'd.

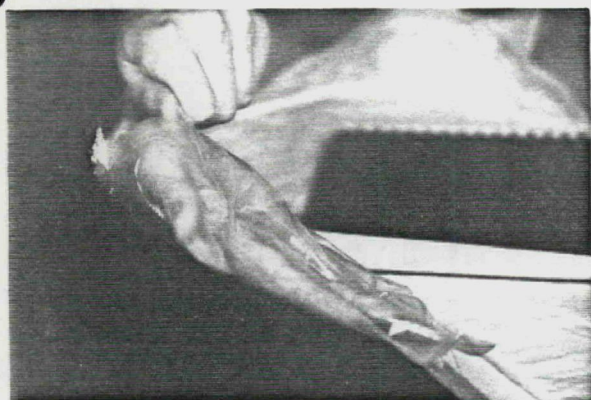
While you have no control over some sources of contamination, many of them you do. Some things to remember when around precipitation samples are:

- \* Handle plastic disposable gloves by the wrists only.
- \* The plastic disposable gloves should only be used to touch ultra-clean surfaces, like the sample bag or bucket. If you touch any other surface (clothing, vacuum unit, etc.), discard the gloves and put on new, clean ones.
- \* Never lean over the top of an open sample bucket.
- \* Never touch the inside of a sample bag.
- \* Never try to remove insects or leaves from a precipitation sample.
- \* keep your sample handling area clean and dust free.
- \* Clean snow, ice and debris off the top of your sampler.
- \* Never smoke near the instrument or in the Sample Handling Area.
- \* Do not park cars near the collector.
- \* Report any changes in land use or possible emission sources near the site to your Regional Inspector.

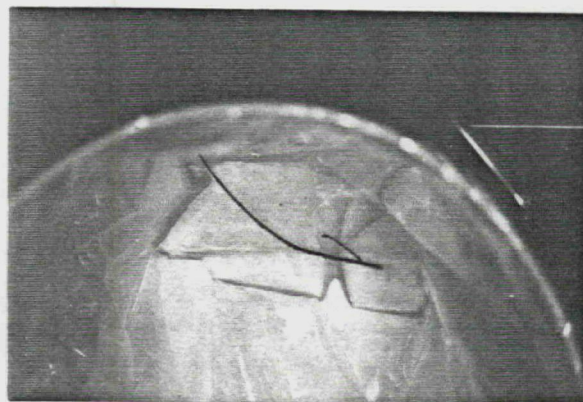
REMEMBER

One fingerprint on the inside surface of a sample bag can contaminate the whole precipitation sample.

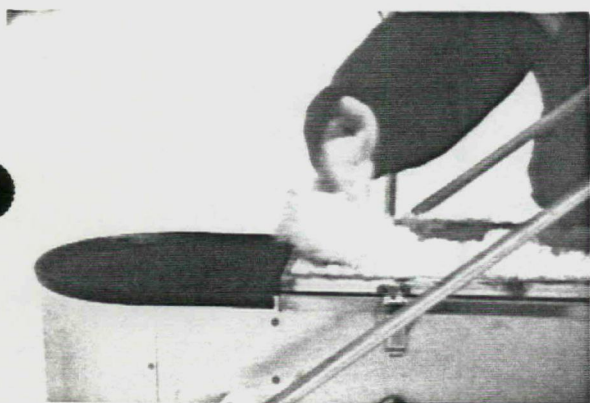
April 30, 1985



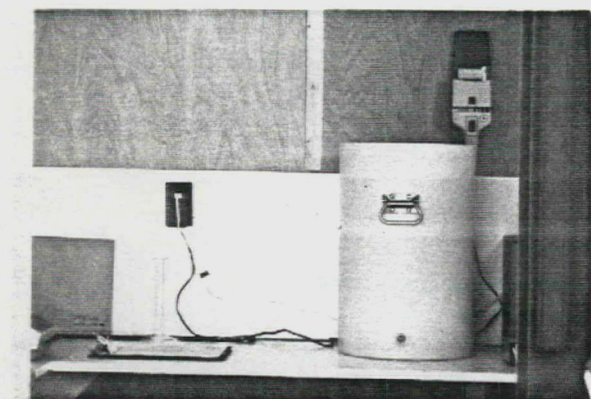
Proper Handling of Plastic Gloves



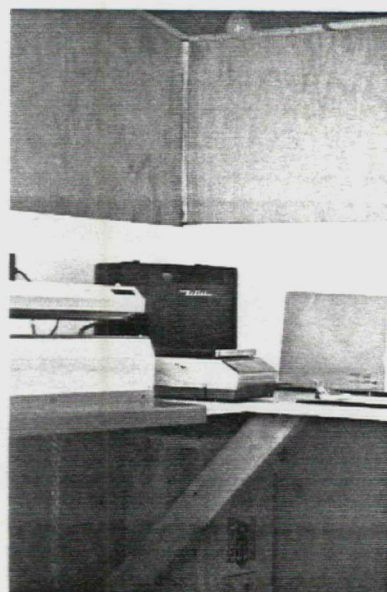
Not Trying To Remove Material From Bucket/Bag



Keep Snow Cleared off Collector



Keeping Sample Handling Area  
Clear and Dust Free





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## 2.10 YOUR FIELD BOOK

Your field book provides a record of your daily operations and observations as a CAPMoN operator. It records information used to fill out the Daily Sample History Form. It describes to the Regional Inspector (during site visits) which items at the site need attention or repair. It also acts as a reference guide for information that is required months after sample collection to help explain trends or peculiarities in the sampling data. You should take your field book with you every time you go to the Monitoring Site.

### Things to remember about your field book:

1. Use your field book to record all observations (e.g., rain gauge measurement, sampler malfunction, blowing dust) at the site. These observations should be transferred later to the Sample History Form.
2. Fill out the field book each day.
3. Record all observations. Someone parking their car near the sampler one day may not seem important, but can later help explain a contaminated sample.
4. It is your record to precipitation sampling activities and observations at your site.
5. Transfer as much information as possible from your field book to the Sample History Form.

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Your Field Book



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## 2.11 FILLING OUT THE SAMPLE HISTORY FORM

The Sample History Form is a three page form made of pressure-sensitive paper. Carbon paper is not needed with this type of form. Like other multiple copy forms, a hard surface and a black ball point pen give best results. The first two copies (white and yellow) of the form are sent to the laboratory with the precipitation samples. The third page (pink) stays with you and should be filed in the file box provided at the site. The darkly shaded areas (see facing page) on the form are for laboratory use only.

April 30, 1985

Environment Canada  
Service de l'environnement  
Service de l'environnement  
Service de l'environnement

## CAPMoN SAMPLE HISTORY FORM

Station Name: ANYSTATION  
Collector No: A1112  
Shipping Box No: 3

DATE REC'D: 21 07 85  
TEMP (°C): 17 MIN 11 MAX 24

PERIOD COVERED: 21 07 85 TO 23 07 85  
DATE SHIPPED: 23 07 85

Submitters Name: John Doe

FOR LABORATORY USE ONLY				PRECIPITATION				WEIGHT				STANDARD GAUGE				FIELD COMMENTS			
LAB NUMBER	LAB WEIGHT (g)	COM- SUBS (g)	SUBS (g)	START DATE				END DATE				REFERENCE (g)	SAMPLE BAG (g)	CATCH (mm)	TYPE (mm)	SNOW ON GROUND (cm)	FIELD COMMENTS		
				DAY	MO	YR	HR	DAY	MO	YR	HR								
198	11	07	85	08	11	11	11	208	4	270	6	2	4	10	1		2030	20	
199	01	07	85	08	11	11	11	208	1	34	8						2030	20	
199	21	07	85	08	11	11	11	199	9	34	8						2030	20	
200	11	07	85	08	11	11	11	120	0	812	1	9	1	10	1		2433	50	
201	10	07	85	08	11	11	11	179	9	35	0						2433	50	
202	12	07	85	08	11	11	11	120	0	1	9	0	1	10	1		2130	50	
203	12	07	85	08	11	11	11	120	0	1	9	0	1	10	1		2030	50	
204	02	07	85	08	11	11	11	199	2	76	4						31	45	
205	02	07	85	08	11	11	11	200	0	84	7						2030	50	
206	12	07	85	08	11	11	11	200	0	84	7						2030	50	
207	22	07	85	08	11	11	11	200	0	84	7						2030	50	
208	12	07	85	08	11	11	11	199	9	202	7	1	2	10	1		2030	50	

**LAB COMMENTS**

1 - LEAKED IN TRANSIT  
2 - LESS THAN 10 ML  
3 - 10 TO 100 ML  
4 - 100 TO 500 ML  
5 - NOT RECEIVED  
6 - UNIDENTIFIED  
7 - OTHER - SPECIFY

**PRECIPITATION OCCURRED**

0 - NO  
1 - YES  
2 - UN- CERN- TAIN

**PRECIPITATION TYPE**

1 - RAIN  
2 - SNOW  
3 - FREEZING RAIN  
4 - MIXED RAIN  
5 - SNOW ON GROUND  
6 - FROST

**STANDARD GAUGE TYPE**

10 - RAIN GAUGE  
11 - SNOW GAUGE  
12 - RECORDING RAIN GAUGE

**SAMPLE SUBMISSION**

0 - NO SUBMISSION  
1 - PRECIPITATION SAMPLE SUBMITTED  
2 - DRY BAG SUBMITTED

**SAMPLE QUALITY**

10 - SAMPLE CLEAN AND CLEAR  
20 - PARTICLES IN SAMPLE  
30 - ORGANIC MATERIAL SPECIFY  
40 - SAMPLE FOR LEAF GRASS - SPECIFY  
50 - SAMPLE FOR LEAF GRASS - SPECIFY  
60 - SAMPLE FOR LEAF GRASS - SPECIFY  
70 - SAMPLE FOR LEAF GRASS - SPECIFY  
80 - SAMPLE FOR LEAF GRASS - SPECIFY  
90 - SAMPLE FOR LEAF GRASS - SPECIFY

**UNUSUAL OCCURRENCES**

40 - DUST IN AIR  
41 - CULTIVATION SPRAYING  
42 - FERTILIZER IN AIR  
43 - INSTRUCTION AT ON NEAR SITE  
44 - SHOW PLOUGHING AT SITE  
45 - SHOWING SHOW COLLECTED AT SITE  
46 - SHOWING SHOW COLLECTED AT SITE  
47 - SHOWING SHOW COLLECTED AT SITE  
48 - SHOWING SHOW COLLECTED AT SITE  
49 - SHOWING SHOW COLLECTED AT SITE

**UNUSUAL OCCURRENCES**

40 - DUST IN AIR  
41 - CULTIVATION SPRAYING  
42 - FERTILIZER IN AIR  
43 - INSTRUCTION AT ON NEAR SITE  
44 - SHOW PLOUGHING AT SITE  
45 - SHOWING SHOW COLLECTED AT SITE  
46 - SHOWING SHOW COLLECTED AT SITE  
47 - SHOWING SHOW COLLECTED AT SITE  
48 - SHOWING SHOW COLLECTED AT SITE  
49 - SHOWING SHOW COLLECTED AT SITE

**REMARKS**

① SAMPLE 200 (19-20 JULY/85) - COLLECTOR FOUND ON JULY 20 WITH BURN FUSE AND HOOD OPEN. CONTACTED REGIONAL INSPECTOR WHO FIXED SAMPLER ON JULY 20 IN AFTERNOON. DRY BAG SAMPLE 201 ALSO BULK AS COLLECTOR WAS OPEN FROM 0815 UNTIL FIXED AT 1400.

② SAMPLE 204 (23-24 JULY/85) - SMOULDED SMOKE AT SITE AT 1400. SUSPECT SMOKE FROM FOREST FIRE IN AREA.

③ SAMPLE 208 (27-28 JULY/85) - SMOULDED SMOKE AT SITE AT 1400. SUSPECT SMOKE FROM FOREST FIRE IN AREA.

**REMARKS**

① SAMPLE 200 (19-20 JULY/85) - COLLECTOR FOUND ON JULY 20 WITH BURN FUSE AND HOOD OPEN. CONTACTED REGIONAL INSPECTOR WHO FIXED SAMPLER ON JULY 20 IN AFTERNOON. DRY BAG SAMPLE 201 ALSO BULK AS COLLECTOR WAS OPEN FROM 0815 UNTIL FIXED AT 1400.

② SAMPLE 204 (23-24 JULY/85) - SMOULDED SMOKE AT SITE AT 1400. SUSPECT SMOKE FROM FOREST FIRE IN AREA.

③ SAMPLE 208 (27-28 JULY/85) - SMOULDED SMOKE AT SITE AT 1400. SUSPECT SMOKE FROM FOREST FIRE IN AREA.

## 2.12 GENERAL INSTRUCTIONS FOR FILLING OUT THE SAMPLE HISTORY FORM

- \* One row of the form should be filled out every day whether precipitation did or did not occur.
- \* The form should always be kept in the Sample Handling Area and not taken to the Monitoring Site because of the chance of loss or damage. You have a field book that is taken to the site for recording site information.
- \* One form covers a two week sampling period.
- \* The top of the form is filled in only when samples are being prepared for shipment to the laboratory. The rest of the form should be filled in daily.
- \* Numbers only should be filled in on the form except for: written remarks; Station Name; Submitter's Name; and Operator's Initials.
- \* In the Field Comments columns, up to 4 comments can be made.

Environment Canada  
Atmospheric Environment Service

Service  
environnement  
atmosphérique

## CAPMon SAMPLE HISTORY FORM

Environment Canada  
Atmospheric Environment Service

Service  
environnement  
atmosphérique

DATE REC'D:                  

TEMP (°C):

PERIOD COVERED:                  

STATION NAME:

DATE SHIPPED:                  

DATE SHIPPED:

DATE SHIPPED:                  

DATE SHIPPED:

DATE SHIPPED:                  

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DATE SHIPPED:

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## 2.13 DETAILED INSTRUCTIONS ON HOW TO FILL OUT THE SAMPLE HISTORY FORM

<u>Entry</u>	<u>Description</u>
NAQUADAT I.D. NUMBER, TIME ZONE, PROJECT NUMBER:	The NAQUADAT Number, Time Zone and Project Number appear on pre-printed labels attached to the Sample History Forms. Operators are not required to fill in this information.

### TO BE COMPLETED WHEN SHIPPING SAMPLES

STATION NAME:	Print the name of your CAPMoN monitoring site.
SUBMITTER'S NAME:	Print the name of the operator carrying out the sample shipping procedures.
PERIOD COVERED:	Print the two week sampling period (Day, Mo-Month, Yr-Year) from the start date of the first sampling period to the start date of the last sampling period.
DATE SHIPPED:	Print the day, month and year the samples leave the site for shipment to the laboratory.
COLLECTOR I.D.:	Print the identification number of the CAPMoN precipitation collector. The number is found on a label attached to the face of the collector. In the exceptional circumstance where more than one collector was used during the two week period, enter the number of the first collector and note the number and starting date of the other collector in the "REMARKS" section at the bottom of the form.
BOX NUMBER:	Print the numbers of the shipping boxes used to transport the samples to the laboratory. This is a one digit number which appears on the inside flap of the shipping box.



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[illegible]

# CAPMoN SAMPLE HISTORY FORM

PERIOD COVERED

				8	
DAY		MO		YR	

STATION NAME

				8	
DAY		MO		YR	

SUBMITTER'S NAME

DATE SHIPPED

				8	
DAY		MO		YR	

COLLECTOR NO.

--	--	--	--

SHIPPING BOX NO.

☐

Canadian Air and  
Precipitation Monitoring  
Network (CAPMON)  
Réseau canadien  
d'échantillonnage des  
précipitations et de l'air  
(RCEPA)



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SAMPLE -

NUMBER  
001 - 400

Print the sample number which appears (beside the site name) on the label you have attached to the sample. The first sample of each year will be numbered 001 and the sample numbers then run consecutively for the rest of the year.

SUBMISSION

Refer to SAMPLE SUBMISSION codes at the bottom of the form. These SAMPLE SUBMISSION codes indicate to the laboratory whether a sample, Dry Bag or nothing at all has been shipped to them.

Enter 0 NO SUBMISSION - when no precipitation sample or dry bag is being submitted to the laboratory. This will be filled in on all days when dry bags were collected but not submitted and on exceptional days when samples were missed or lost.

Enter 1 PRECIPITATION SAMPLE SUBMITTED - when a precipitation sample is submitted.

Enter 2 DRY BAG SUBMITTED - when the weekly dry bag sample is submitted.

[illegible]

0 = NO SUBMISSION  
1 = PRECIPITATION  
SAMPLE  
SUBMITTED  
2 = DRY BAG  
SUBMITTED

SAMPLING PERIOD -

**START DATE:** Enter the day, month, year and nearest hour (e.g., 8:20, enter 08, 8:32, enter 09) when the clean bucket/bag combination was placed in the precipitation collector.

**END DATE:** Enter the day, month, year and nearest hour when the bucket/bag combination was removed from the precipitation collector. Usually the same time the day after it was placed in the precipitation collector.

**NUMBER OF DAYS:** Enter the number of days (1, 2, 3, etc.) which the sample or dry bag remained in the collector (normally 1).

[illegible]



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PRECIPITATION -

**OCCURRED** Refer to "PRECIPITATION OCCURRED" codes at the bottom of the form. This code indicates whether or not precipitation occurred during the sampling period.

Enter 0 NO - When no precipitation occurred (i.e., no precipitation was found in the collector or gauges, and none was observed).

Enter 1 YES - when precipitation was known to have fallen during the sampling period. Precipitation may be found in either the collector or the gauges, but not always both.

Enter 2 UNCERTAIN - when it is unknown whether precipitation occurred or not. this code will be used rarely, when both the precipitation collector and the standard gauge are not working and the operator did not know if precipitation fell at the site.

**TYPE:** To be filled in only when precipitation was known to occur during the sampling period. Refer to "PRECIPITATION TYPE" codes at the bottom of the form. During some precipitation events, operators may not be at or near the site (e.g., overnight events). In these cases, operators must use some judgement (e.g., weather reports) when specifying precipitation type.

**TIME:** Enter "1" in any (or all) of the six-hour time blocks when precipitation was known to occur. If precipitation occurred during one of the six hour time blocks and carried over for less than 30 minutes into the next time block, only the first block should be given a "1". If precipitation occurred for only a short period of time (e.g., 5 minutes) during the first time block, it is still given a "1".

[illegible]

PRECIPITATION OCCURRED	PRECIPITATION TYPE
0 = NO	1 = RAIN
1 = YES	2 = SNOW
2 = UN- CERTAIN	3 = FREEZING RAIN
	4 = MIXED
	5 = DEW OR FROST

WEIGHT

REFERENCE  
(grams):

Enter the measured value of the standard reference weight.

SAMPLE/BAG  
(grams):

Enter the measured weight of the sealed precipitation sample or Dry Bag. All precipitation samples and all dry Bags (even those not submitted to the laboratory) must be weighed and reported.

[illegible]

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STANDARD GAUGE

**CATCH (mm):** "STANDARD GAUGE CATCH" is measured every day (even if the collector is not working) and refers to the amount of precipitation collected in the rain or snow gauge during the past 24 hours. It is measured by determining the depth, in mm, of liquid water in the graduated cylinder of the rain or snow gauge. Enter the measured amount of water to the nearest 0.1 g. Amounts less than 0.2 mm should be entered as T (Trace) after the decimal point.

**TYPE:** Refer to "STANDARD GAUGE TYPE" codes at the bottom of the form. This column indicates the type of instrument used to measure the standard gauge catch. An entry of 10 or 11 is normal.

**NO. OF DAYS:** Enter the number of days sampled by the snow or rain gauge. If the precipitation collector was not working, the rain or snow gauge must still be operated and a daily entry should be made.



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[illegible]

STANDARD GAUGE						
CATCH (mm)	TYPE 10-12		NO. OF DAYS			
		.				
		.				
		.				
		.				
		.				
		.				
		.				
		.				
		.				
		.				
		.				
		.				
		.				
		.				
		.				
		.				

STANDARD  
GAUGE  
TYPE

10 = RAIN  
GAUGE

11 = SNOW  
GAUGE

12 = RECORD-  
ING GAUGE

SNOW ON GROUND  
(cm)

Enter the depth of snow on ground (cm) measured by the snow ruler. Do not use a decimal point. When no snow exists, leave blank.

57      58      59

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FIELD COMMENTS -

**SAMPLE QUALITY:** Refer to the "SAMPLE QUALITY" codes at the bottom of the form. This column is meant to describe the quality of the precipitation samples and the dry bags submitted.

Enter 20     **SAMPLE CLEAN AND CLEAR** - if there is no foreign material in the precipitation sample.

Enter 21     **PARTICULATES IN SAMPLE** - if small particles of dirt or dust appear in the sample. If a large number of particles are visible, note this with the sample date in the REMARKS section at the bottom of the form.

Enter 22     **ORGANIC MATERIAL IN SAMPLE** - if organic material (grass, algae, fibres, tree needles, tree leaves, bird droppings, hair, feathers, pollen etc.) is visible in the sample. The material should be described in the REMARKS section of the form.

Enter 23     **INSECT(S) IN SAMPLE** - if one or more insects (spider, mosquito, fly, etc.) are visible in the sample.

Enter 24     **BULK SAMPLE - COLLECTOR OPEN WHEN PRECIPITATION NOT OCCURRING** - for collected precipitation samples and dry bags exposed when it was not precipitating. This will occur when: (a) the precipitation collector was OPEN when it should not have been, (b) the operator left the collector in the OPEN position because it was not working. Note in the REMARKS section the time of any dry periods when the collector was open and whether this occurred before or after precipitation.

[illegible]



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FIELD COMMENTS

SAMPLE QUALITY Cont'd.

- Enter 25     PARTIAL SAMPLE - PART OF EVENT MISSED - for precipitation samples which represent only part of the precipitation which fell during the 24 hour period. This includes power failures and collector malfunctions where only part of the precipitation event was collected. Note all details related to the partial sample in the REMARKS section.
- Enter 26     Sample spilled or leaked before being weighed.
- Enter 27     Sample leaked after being weighed.
- Enter 26 & 27     SAMPLE LEAKED BEFORE AND AFTER BEING WEIGHED - if the sample leaked both before and after being weighed, enter 26 in this column and 27 in any empty "FIELD COMMENTS" column for that day.
- Enter 28     OTHER - SPECIFY - if something else which could affect sample or measurement quality is observed. Specify details in the REMARKS section.

FIELD COMMENTS

SAMPLE  
QUALITY  
20-28

[illegible]

60 61

20 = SAMPLE CLEAN AND CLEAR  
21 = PARTICLES IN SAMPLE  
22 = ORGANIC MATERIAL IN  
SAMPLE (EG. LEAF, GRASS) —  
SPECIFY  
23 = INSECT(S) IN SAMPLE  
24 = BULK SAMPLE — COLLECTOR  
OPEN WHEN PRECIPITATION  
NOT OCCURRING  
25 = PARTIAL SAMPLE — PART OF  
EVENT MISSED  
26 = SAMPLE SPILLED OR LEAKED  
BEFORE BEING WEIGHED  
27 = SAMPLE LEAKED AFTER  
BEING WEIGHED  
28 = OTHER — SPECIFY

FIELD COMMENTS

**INSTRUMENTS**

Refer to the "INSTRUMENTS" codes at the bottom of the form. These codes relate to the operating condition of the CAPMoN instruments. Notes taken on instrument operation should be transferred to the form using these codes.

Enter 30     COLLECTOR OPERATED PROPERLY - if the precipitation collector appeared to operate properly over the sampling period. This code will normally be filled in every day unless a problem is detected with the collector.

Enter 31     COLLECTOR DID NOT OPEN DURING PRECIPITATION (NO SAMPLE) - for days when the collector did not open during periods of precipitation.

Enter 32     COLLECTOR OPEN FOR ONLY PART OF EVENT (PARTIAL SAMPLE) - for days when the collector was only open during part of the period of precipitation.

Enter 33     COLLECTOR OPENED BEFORE AND/OR AFTER PRECIPITATION (BULK SAMPLE) - for days when the collector was open during the period of precipitation and for some time (greater than 5 minutes) before or after the precipitation.

Enter 34     COLLECTOR OPERATED MANUALLY - on days when the operator manually opened and closed the collector hood. Note in the REMARKS section the time of opening and closing and when the precipitation started and ended.

Enter 35     POOR HOOD - BUCKET SEAL - on days when the gasket on the underside of the collector hood did not make a tight seal with the bucket rim or the gasket condition was poor.

## FIELD COMMENTS

INSTR.  
30-39

## INSTR = INSTRUMENTS

- 30 = COLLECTOR OPERATED PROPERLY
- 31 = COLLECTOR DID NOT OPEN DURING PRECIPITATION (NO SAMPLE)
- 32 = COLLECTOR OPENED ONLY FOR PART OF EVENT (PARTIAL SAMPLE)
- 33 = COLLECTOR OPENED BEFORE AND/OR AFTER PRECIPITATION (BULK SAMPLE)
- 34 = COLLECTOR OPERATED MANUALLY
- 35 = POOR HOOD-BUCKET SEAL
- 36 = CRANK STAND NOT OPERATING PROPERLY
- 37 = RAIN OR SNOW GAUGE NOT OPERATING PROPERLY
- 38 = BALANCE OR HEAT SEALER NOT OPERATING PROPERLY
- 39 = OTHER — SPECIFY

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FIELD COMMENTS

INSTRUMENTS Cont'd.

- Enter 36     CRANK STAND NOT OPERATING PROPERLY - if the telescopic crank stand is operating improperly. Details of the problem should be noted in the REMARKS section.
- Enter 37     RAIN OR SNOW GAUGE NOT OPERATING PROPERLY - if the rain or snow gauge was operating improperly. Note the details of the problem in the REMARKS section.
- Enter 38     BALANCE OR HEAT SEALER NOT OPERATING PROPERLY - if the balance or heat sealer is operating improperly. Note the details in the REMARKS section.
- Enter 39     OTHER - SPECIFY - if other instrument problems occur. Note details of the problem in the REMARKS section. Problems include instruments vandalized, bucket broken.



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[illegible]

INSTR = INSTRUMENTS	
30	= COLLECTOR OPERATED PROPERLY
31	= COLLECTOR DID NOT OPEN DURING PRECIPITATION (NO SAMPLE)
32	= COLLECTOR OPENED ONLY FOR PART OF EVENT (PARTIAL SAMPLE)
33	= COLLECTOR OPENED BEFORE AND/OR AFTER PRECIPITATION (BULK SAMPLE)
34	= COLLECTOR OPERATED MANUALLY
35	= POOR HOOD-BUCKET SEAL
36	= CRANK STAND NOT OPERATING PROPERLY
37	= RAIN OR SNOW GAUGE NOT OPERATING PROPERLY
38	= BALANCE OR HEAT SEALER NOT OPERATING PROPERLY
39	= OTHER — SPECIFY

[illegible]

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FIELD COMMENTS

UNUSUAL  
OCCURRENCES

Refer to "UNUSUAL OCCURRENCES" codes at the bottom of the form. These codes refer to unusual occurrences at or near CAPMoN sites which could affect the quality of the collected samples. Under usual operating conditions, this column will not be filled in. Details of any unusual occurrences should be noted in the REMARKS section after the code is entered.

Enter 40     DUST IN AIR - if particulates, dirt, dust or other materials are observed to be windborne at the site during the sampling period. Examples include: strong winds causing nearby soil to be windborne, road dust reaching sites when vehicles pass by, pine pollen in the air.

Enter 41     CULTIVATION/SPRAYING/FERTILIZING NEAR SITE - on days when major agricultural activity occurred near the site. Of particular note are: cultivation and harvesting of crops, spraying of insecticides/herbicides, application of fertilizer (solid or liquid).

Enter 42     CONSTRUCTION AT OR NEAR SITE - if construction is observed to take place within 500 m (quarter mile) of the CAPMoN site. This includes building construction, road construction, excavation, cable laying, pipe laying, road resurfacing, etc. Specify details in REMARKS section.

Enter 43     SNOWPLOUGHING AT SITE - if snowploughing or snow blowing took place within 100 m (300 ft) of the site during the sampling period. Indicate in REMARKS whether ploughed or blown snow could have entered the sample bucket/bag.

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[illegible]

**UNUSUAL OCCURRENCES**

- 40 = DUST IN AIR
- 41 = CULTIVATION/SPRAYING/  
FERTILIZING NEAR SITE
- 42 = CONSTRUCTION AT OR NEAR  
SITE
- 43 = SNOW PLOUGHING AT SITE
- 44 = BLOWING SNOW COLLECTED
- 45 = SMOKE/ODOUR/ASH DETECTED  
AT SITE
- 46 = STANDARD GAUGE SPILLED OR  
OVERFLOWED — MEASUREMENT  
LOW
- 47 = OPERATOR NOT ABLE TO  
COLLECT SAMPLE DAILY —  
SPECIFY REASONS
- 48 = BUCKET TOP LESS THAN 1 M  
ABOVE SNOW SURFACE
- 49 = OTHER — SPECIFY

[illegible]

64 65

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FIELD COMMENTS

UNUSUAL OCCURRENCES Cont'd.

- Enter 44     BLOWING SNOW COLLECTED - if you think blowing snow was collected in the sample bucket/bag. Blowing snow is snow that was originally on the ground but was picked up and blown by high winds. Falling snow being blown by the wind should not be given code 44.
- Enter 45     SMOKE/ODOUR/ASH DETECTED AT SITE - if smoke, odour or ash was detected at the site. Note in the REMARKS section any known causes of the smoke, odour or ash (e.g., forest fires, garbage fires, chemical spills, septic tank odours, fertilizing, industrial emissions, wood burning stove emissions, livestock grazing).
- Enter 46     STANDARD GAUGE SPILLED OR OVERFLOWED - MEASUREMENT LOW - if the rain or snow gauge contents spilled or overflowed before the depth was measured in the graduate cylinder. Specify details in REMARKS section.
- Enter 47     OPERATOR NOT ABLE TO COLLECT SAMPLE DAILY - SPECIFY REASON - if the CAPMoN instrumentation was not operated during the sampling period. This code will be used only in the rare situation when access to the site was limited or operators were not available. Note in the REMARKS section the reasons for the operator's absence.
- Enter 48     BUCKET TOP LESS THAN 1 M ABOVE THE SNOW SURFACE - when the top of the collector bucket was less than 1 m above the snow surface, e.g., the crank stand did to work.
- Enter 49     OTHER - SPECIFY - for other unusual occurrences which could affect the sample quality. Specify the details in the REMARKS section. Examples include severe weather (hurricanes, tornadoes), nearby explosions, vandalism.

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[illegible]

### UNUSUAL OCCURRENCES

- 40 = DUST IN AIR
- 41 = CULTIVATION/SPRAYING/  
FERTILIZING NEAR SITE
- 42 = CONSTRUCTION AT OR NEAR  
SITE
- 43 = SNOW PLOUGHING AT SITE
- 44 = BLOWING SNOW COLLECTED
- 45 = SMOKE/ODOUR/ASH DETECTED  
AT SITE
- 46 = STANDARD GAUGE SPILLED OR  
OVERFLOWED — MEASUREMENT  
LOW
- 47 = OPERATOR NOT ABLE TO  
COLLECT SAMPLE DAILY —  
SPECIFY REASONS
- 48 = BUCKET TOP LESS THAN 1 M  
ABOVE SNOW SURFACE
- 49 = OTHER — SPECIFY

[illegible]



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FIELD COMMENTS

**SITE HISTORY**

Refer to "SITE HISTORY" codes at the bottom of the form. These codes record the operating history of the site. Any site inspections, problems, or changes in site operations should be indicated on the day which they take place.

Enter 50    **REGION CONTACTED REGARDING PROBLEM - NOTE NAME AND PROBLEM DESCRIPTION** - on days when a problem occurred with the instrumentation, the site, or the sampling procedures and a Regional Inspector was contacted for corrective action. Note in the REMARKS section, the name of the person contacted at the AES Regional Office, or the name of a person with whom a message was left. Also note the nature of the problem needing corrective action.

Enter 51    **REGION RETURNED CONTACT - NOTE NAME** - on the day when a Regional Inspector returned contact regarding the problem specified in code 50. Normally this will be on the same day that the region was contacted and both codes 50 and 51 will be entered in the FIELD COMMENTS area on that day.

Enter 52    **INSTRUMENT(S) REPAIRED - SPECIFY DETAILS** - on days when problems with the instrumentation were repaired. Note details of the repairs in the REMARKS section.

[illegible]

FIELD COMMENTS

SITE HISTORY Cont'd.

- Enter 53    NEW COLLECTOR INSTALLED - SPECIFY I.D. NUMBER - on a day when a new precipitation collector is installed to replace a defective collector. Note the new collector number in the REMARKS section.
- Enter 54    NEW HOOD GASKET - on a day when the hood gasket is replaced with a clean new one.
- Enter 55    SITE INSPECTION - NOTE NAME OF INSPECTOR - on days when a Regional Inspector, a member of AES Headquarters staff or an external auditor carried out a site inspection. Note the name of the inspector in the REMARKS section.
- Enter 56    NEW OPERATOR - SPECIFY NAME - on the first day that a new operator carries out the sampling procedure. The names of the new operator and the operator being replaced should be specified in the REMARKS section. The AES Regional Inspector who provided training to the new operator should also be specified.
- Enter 57    NEW PROCEDURE - SPECIFY - on the first day that a new or modified sampling procedure is started at the site. Such changes in procedure will only start after a notice or telephone call is given to the site by AES Regional Inspectors.
- Enter 58    SITE CHANGE - SPECIFY DETAILS - on days when physical changes are made to the CAPMoN site or its surroundings. Note the nature of the site changes in the REMARKS section of the form. Possible changes include: instrument position moved, ground covered changed, trees planted or removed, buildings constructed within 100 m of site, new pollution sources started within 50 km of site, meteorological tower installed on-site, other instruments installed on-site.

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1. Name of the vessel  
2. Date of departure  
3. Name of the master  
4. Name of the commanding officer  
5. Name of the observer

## CAPMOB SAMPLE HISTORY FORM

(To be filled out by the observer)

1. Date of departure  
2. Date of arrival  
3. Name of the vessel  
4. Name of the master  
5. Name of the commanding officer  
6. Name of the observer

DATE RECEIVED: DAY MO YR

TIME RECEIVED: HRS MIN

DATE SHIPPED: DAY MO YR

SHIPMENT NO.         

SHIPPING BOX NO.

FOR LABORATORY USE ONLY

LAB. NO.         

LAB. NAME

SAMPLE NO.         

DATE OF COLLECTION DAY MO YR

TIME OF COLLECTION HRS MIN

COLLECTOR NO.

LAB. COMMENTS

1. VESSEL NAME & NO.

2. DATE OF DEPARTURE

3. DATE OF ARRIVAL

4. NAME OF MASTER

5. NAME OF COMMANDING OFFICER

6. NAME OF OBSERVER

SAMPLE NO.         

DATE OF COLLECTION DAY MO YR

TIME OF COLLECTION HRS MIN

COLLECTOR NO.

LAB. COMMENTS

1. VESSEL NAME & NO.

2. DATE OF DEPARTURE

3. DATE OF ARRIVAL

4. NAME OF MASTER

5. NAME OF COMMANDING OFFICER

6. NAME OF OBSERVER

SAMPLE NO.         

DATE OF COLLECTION DAY MO YR

TIME OF COLLECTION HRS MIN

COLLECTOR NO.

LAB. COMMENTS

1. VESSEL NAME & NO.

2. DATE OF DEPARTURE

3. DATE OF ARRIVAL

4. NAME OF MASTER

5. NAME OF COMMANDING OFFICER

6. NAME OF OBSERVER

SAMPLE NO.         

DATE OF COLLECTION DAY MO YR

TIME OF COLLECTION HRS MIN

COLLECTOR NO.

LAB. COMMENTS

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5. NAME OF COMMANDING OFFICER

6. NAME OF OBSERVER

SAMPLE NO.         

DATE OF COLLECTION DAY MO YR

TIME OF COLLECTION HRS MIN

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LAB. COMMENTS

1. VESSEL NAME & NO.

2. DATE OF DEPARTURE

3. DATE OF ARRIVAL

4. NAME OF MASTER

5. NAME OF COMMANDING OFFICER

6. NAME OF OBSERVER

SAMPLE NO.         

DATE OF COLLECTION DAY MO YR

TIME OF COLLECTION HRS MIN

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2. DATE OF DEPARTURE

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5. NAME OF COMMANDING OFFICER

6. NAME OF OBSERVER

SAMPLE NO.         

DATE OF COLLECTION DAY MO YR

TIME OF COLLECTION HRS MIN

COLLECTOR NO.

LAB. COMMENTS

1. VESSEL NAME & NO.

2. DATE OF DEPARTURE

3. DATE OF ARRIVAL



4. NAME OF MASTER

5. NAME OF COMMANDING OFFICER

6. NAME OF OBSERVER

SAMPLE NO.         

DATE OF COLLECTION DAY MO

FIELD COMMENTS	
<div style="text-align: center; margin-bottom: 10px;">  </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="text-align: center; margin: 0;"><b>SITE HISTORY</b></p> </div> <div style="padding: 5px;"> <p>50 = REGION CONTACTED REGARDING PROBLEM — NOTE NAME AND PROBLEM DESCRIPTION</p> <p>51 = REGION RETURNED CONTACT — NOTE NAME</p> <p>52 = INSTRUMENT(S) REPAIRED — SPECIFY DETAILS</p> <p>53 = NEW COLLECTOR — SPECIFY I.D. NUMBER</p> <p>54 = NEW HOOD GASKET</p> <p>55 = SITE INSPECTION — NOTE NAME OF INSPECTOR</p> <p>56 = NEW OPERATOR — NOTE NAME</p> <p>57 = NEW PROCEDURE — SPECIFY</p> <p>58 = SITE CHANGE — SPECIFY DETAILS</p> <p>59 = OTHER — SPECIFY</p> </div>	<div style="text-align: center; margin-bottom: 10px;">  </div> <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;"><b>SITE HISTORY</b></p> </div> <div style="border: 1px solid black; height: 150px; margin-top: 5px;"></div> <div style="text-align: center; margin-top: 10px;"> <p>66    67</p> </div>

FIELD COMMENTS

SITE HISTORY Cont'd.

Enter 59    OTHER - SPECIFY DETAILS - on days when other factors related to the operation of the site occur. Note details in the REMARKS section of the form. Examples are: special study started, duplicate collector started operation, new sample handling area started up, etc.



FIELD COMMENTS

SITE  
HISTORY  
50-59

- 50 = REGION CONTACTED REGARDING PROBLEM — NOTE NAME AND PROBLEM DESCRIPTION
- 51 = REGION RETURNED CONTACT — NOTE NAME
- 52 = INSTRUMENT(S) REPAIRED — SPECIFY DETAILS
- 53 = NEW COLLECTOR — SPECIFY I.D. NUMBER
- 54 = NEW HOOD GASKET
- 55 = SITE INSPECTION — NOTE NAME OF INSPECTOR
- 56 = NEW OPERATOR — NOTE NAME
- 57 = NEW PROCEDURE — SPECIFY
- 58 = SITE CHANGE — SPECIFY DETAILS
- 59 = OTHER — SPECIFY

[illegible]

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OPERATOR'S  
INITIALS

Enter the initials of the CAPMoN operator who carried out the sampling procedures each day.

NOTE

The initials of the back-up operator will appear here either when he/she has undergone a mandatory monthly supervised sample change or whenever he/she acted as the regular operator for the sample change.

[illegible]

REMARKS

Note any details related to the comment codes entered on the form. Add any further comments which may be of interest. Start each comment or remark with the sample number and (start/end) date(s) of the sampling period to which it applies. Attach an extra sheet of paper to the form if further space is required.

- . NOTE: Regular operator - if you have supervised your back-up during a mandatory monthly sample change, note this in the space provided, in the form of "I supervised (name) during a sample change on (date)". (Regular operator signature).

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[illegible]

REMARKS.

April 30, 1985

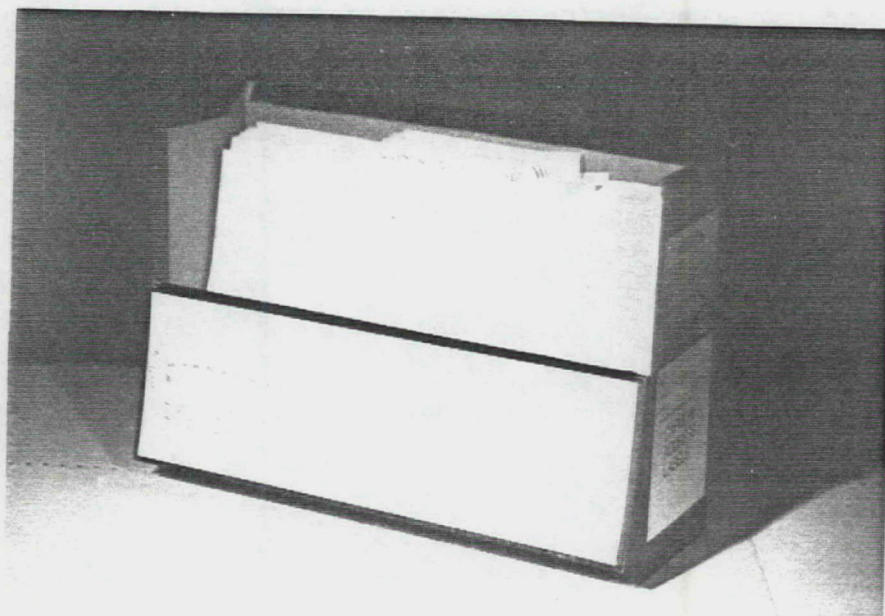
## 2.14 SAMPLE SHIPMENT

The samples are to be shipped every two weeks to the laboratory in Burlington, Ontario. If no precipitation samples were collected (only Dry Bags) start at procedure #13.

1. Prior to shipment complete the information at the top for the Sample History Form.
2. Check each plastic storage container in the refrigerator to make sure no samples have leaked. You should re-seal any leaking bags and make a note on the Sample History Form.
3. Take a min/max thermometer from the refrigerator and reset all the needles to 4°C using the reset knob. Place it in one of the plastic containers among the samples.



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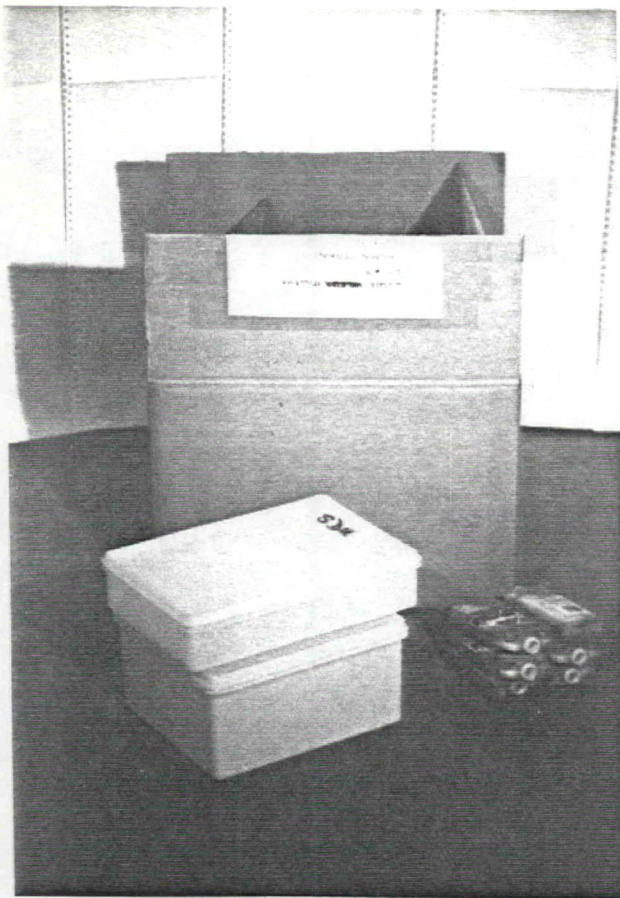


File Copies of Sample History Form

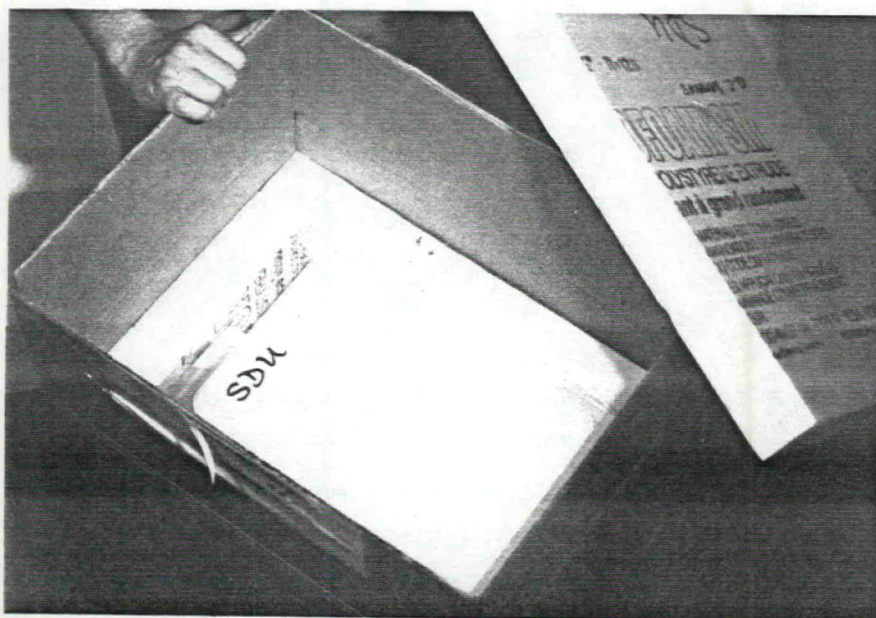
SAMPLE SHIPMENT Cont'd.

4. Place 3 four litre containers in a cardboard shipping box. If only one or two containers are full of samples make up the space with empty containers.
5. Place 2 large and 3 small ice packs in the sides of the shipping box.
6. Place the top two copies of the Sample History Form (white and yellow) inside a plastic ziploc bag and place it on top of the plastic containers.
7. Insert the foam cover.

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Depending on Sample Size, One 4L  
And One 8L Container  
(Or Three 4L Containers)  
And Ice Packs  
Would Be Placed Into Shipping Box



Cover Is Placed Into Box

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SAMPLE SHIPMENT Cont'd.

8. Tape the box shut using the tape dispenser.
9. Attach a pre-printed label addressed to the Canadian Center for Inland Waters in Burlington, Ontario.
10. File the third copy (pink) of the Sample History Form in the site file box.
11. Ship the sample box following the procedure arranged by the Regional Inspector.

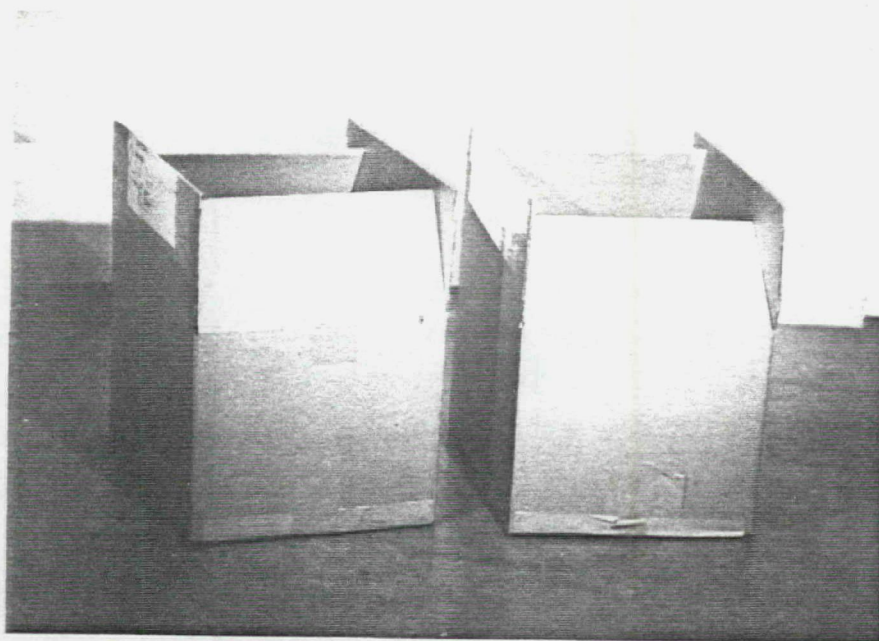
IMPORTANT

Packed samples should not sit for more than three hours before shipment.

12. For large samples (greater than 2500 g), an 8 litre plastic container and 4 litre container should be used in the shipping box.
13. If more samples are collected in two weeks than can be shipped in one box, send two boxes and note this in the REMARKS section of the Sample History Form. In the second box put a piece of paper stating the Site Name, Date of Shipping, and Number 2 of 2 boxes shipped. Fill out a supplementary CAPMoN History Form. Insert it in a plastic ziploc bag and place it inside the second box on top of plastic containers.



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Use Two Boxes If Necessary

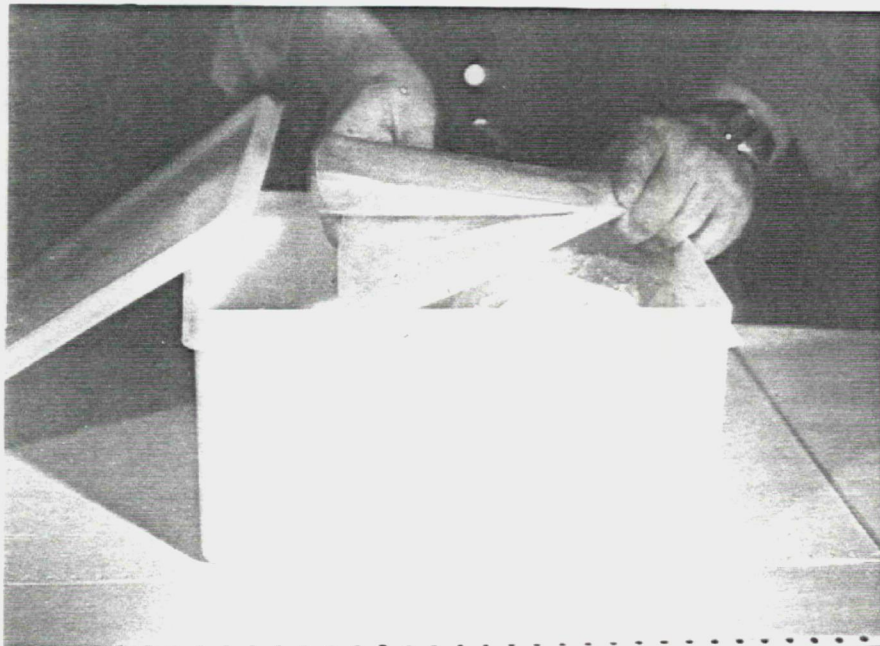
SAMPLE SHIPMENT Cont'd.

Only Dry Bags Collected

14. Prior to shipment, complete the information at the top of the Sample History Form.
15. Place the two Dry Bags (one selected randomly each week) in one 4 litre container. Place the container along with two empty 4 litre containers in a cardboard shipping box.
16. Place the top two copies of the Sample History Form (white and yellow) on top of the plastic containers.
17. Insert the foam cover and tape the box shut.
18. Attach a pre-printed address label.
19. File the third copy (pink) of the Sample History Form.
20. Ship the sample box following the procedure arranged by the Regional Inspector.



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Ensure One Dry Bag Per Week (If Available)  
Is Included In One Sample Container

### 3. OTHER DUTIES OF THE OPERATOR

As well as the daily sampling procedures, there are inspection and maintenance duties you must perform on a monthly or as required to ensure that all equipment at your site keeps operating properly. It is also necessary to check for any changes at your Monitoring Site or in your Sample Handling Area. These checks and duties are described on the following pages.

If you find any problems, they should be noted in the field book and on the Sample History Form. The problems should be corrected by you if possible, otherwise the AES Regional Inspector should be contacted (phone collect) as soon as possible. Refer to page 4-2 for the Inspector's name and phone number.

#### **\*DANGER\***

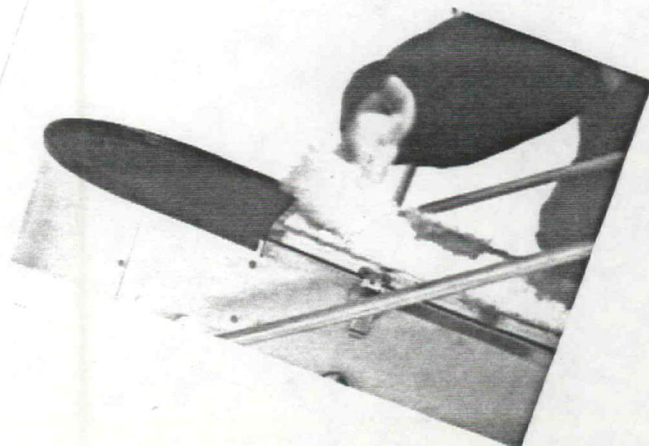
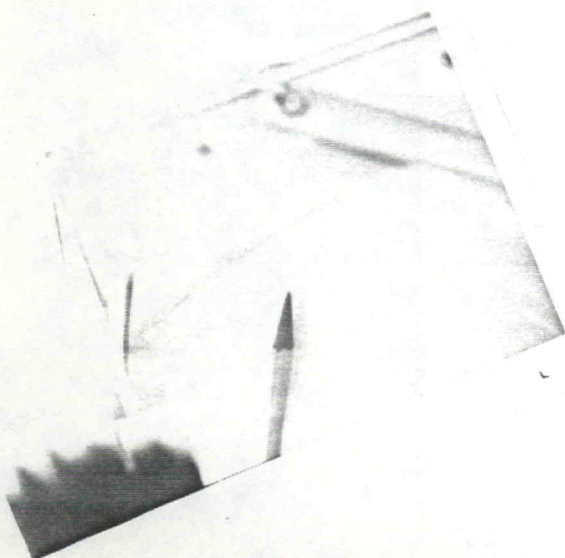
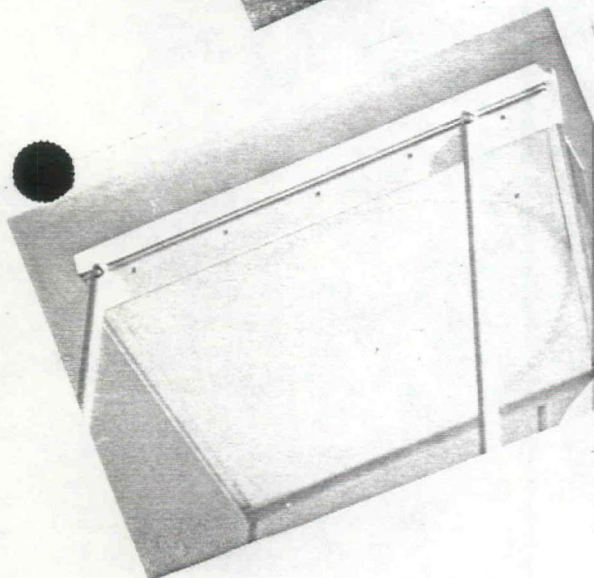
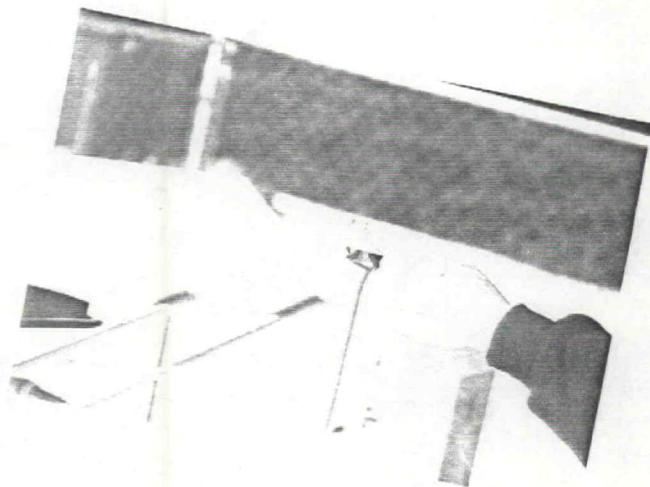
Under no conditions should an Operator open the precipitation collector cover for servicing or adjustment unless the operator has been trained to do so by an authorized CAPMoN representative.

#### IMPORTANT

Once a month, it is required that back-up operators carry out a sample change under the supervision of the primary operator. The day that this takes place, the back-up operator will place his initials on the S.H.F. and the primary operator will enter into the remarks section of the S. Hist. Form that the B/U operator has undergone a supervised sample change.

If your B/U operator lapses more than 3 months on a supervised sample change, he/she will be decertified and will not be allowed to conduct a sample change until he/she is retrained.

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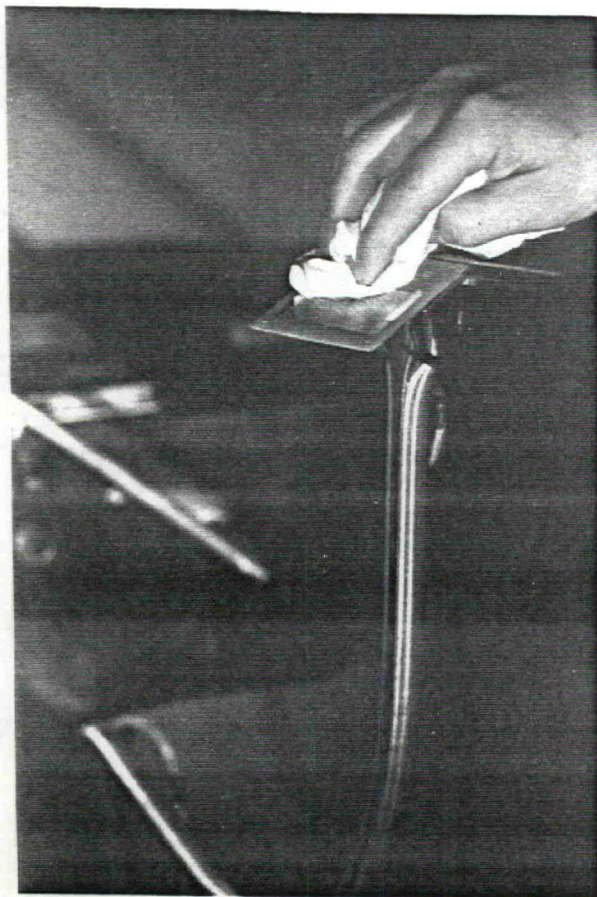


### 3.1 ROUTINE MAINTENANCE OF THE PRECIPITATION COLLECTOR

#### As Required

1. Sensor grids should be cleaned with a Kimwipe which has been dampened with deionized water. The weather (wind or cold temperatures) sometimes requires this cleaning to be delayed by a day or two. In winter, wipe the sensor grids with a dry Kimwipe.





Cleaning the Sensor Grids

ROUTINE MAINTENANCE OF THE PRECIPITATION COLLECTOR Cont'd.

MONTHLY

2. CHANGING THE GASKET -



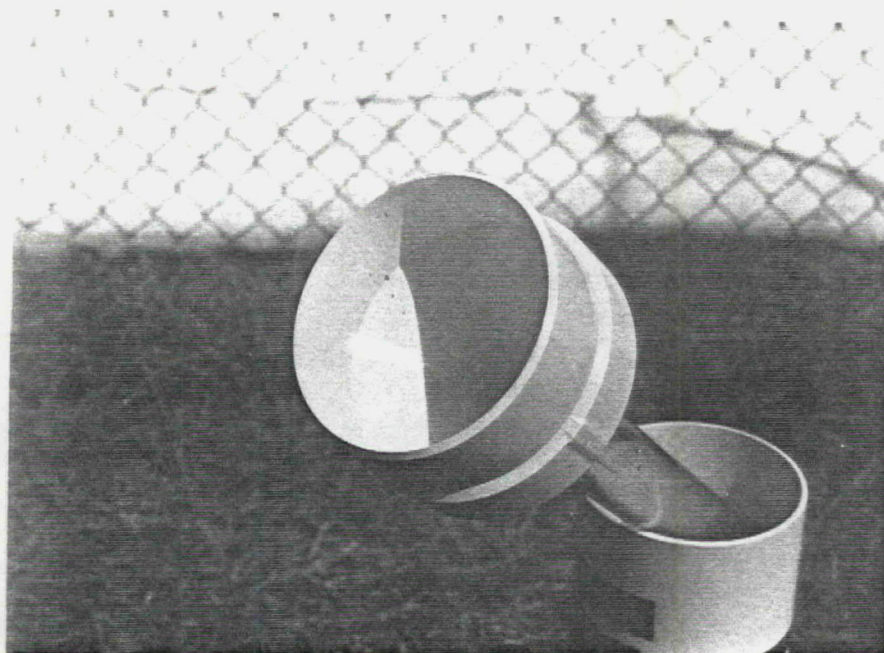
April 30, 1985

### 3.2 ROUTINE MAINTENANCE OF THE RAIN GAUGE

#### MONTHLY

1. Clean the funnel with a Kimwipe and water.
2. Clean the graduate with a bottle brush and water.
3. Dry the graduate and funnel before re-using.

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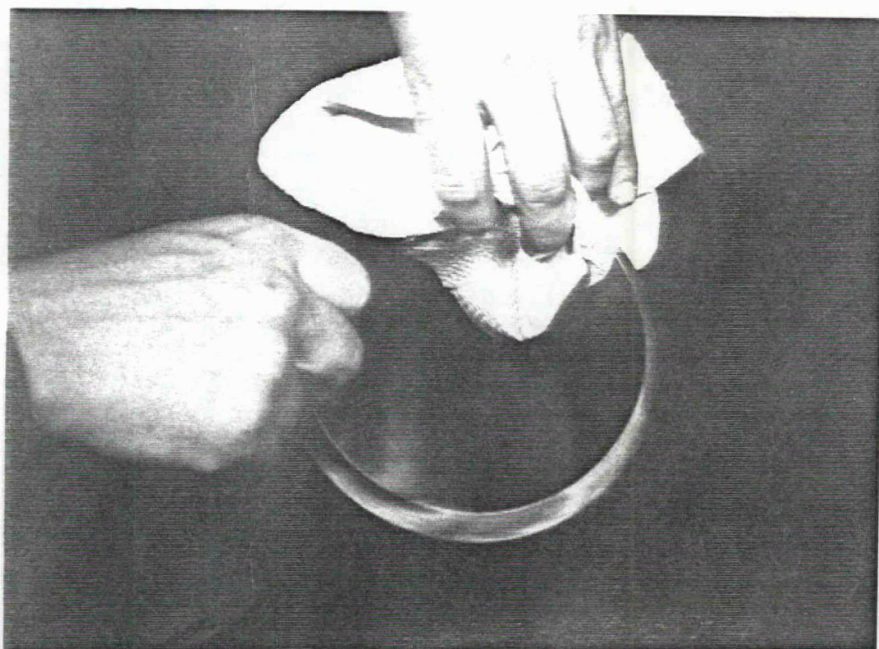
Clean the Rain Gauge Monthly

### 3.3 ROUTINE MAINTENANCE OF THE SNOW GAUGE

#### MONTHLY

Clean the inside of both containers with a Kimwipe and tap water.

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Cleaning Gauge Container

### 3.4 ROUTINE MAINTENANCE OF THE REFRIGERATOR

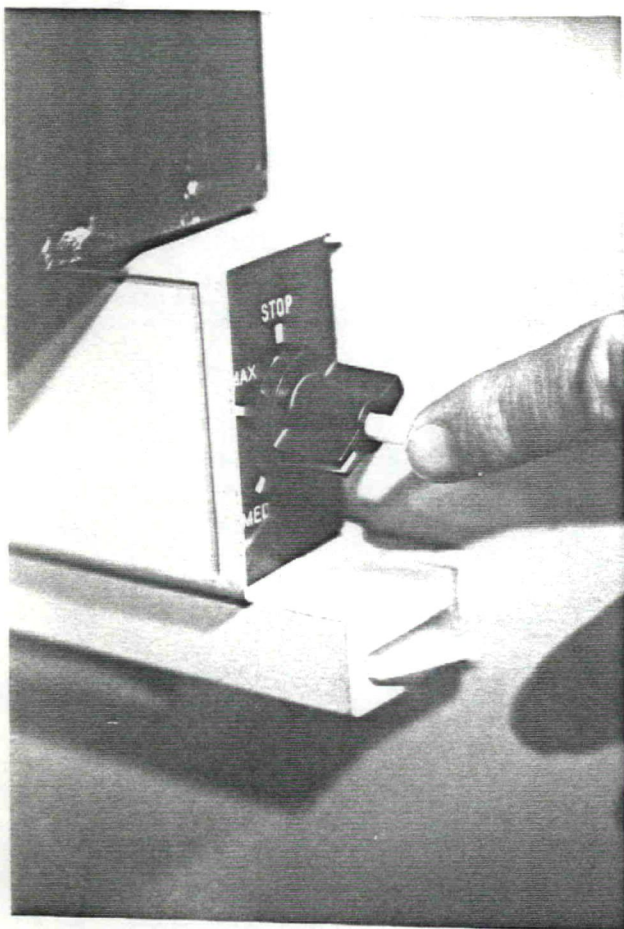
#### MONTHLY

If ice buildup on the freezer is greater than 1/2 cm (1/4 inch), the fridge should be defrosted (only defrost when no samples are in the fridge, i.e., after shipping).

- remove ice packs from the freezer compartment;
- push the defrost button in the center of the thermostat control dial (do not set the dial to 0). The fridge will restart automatically after defrosting is complete.
- wipe moisture from the freezer and defroster tray after the fridge has finished defrosting.



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Pushing Refrigerator  
Automatic Defrost Button

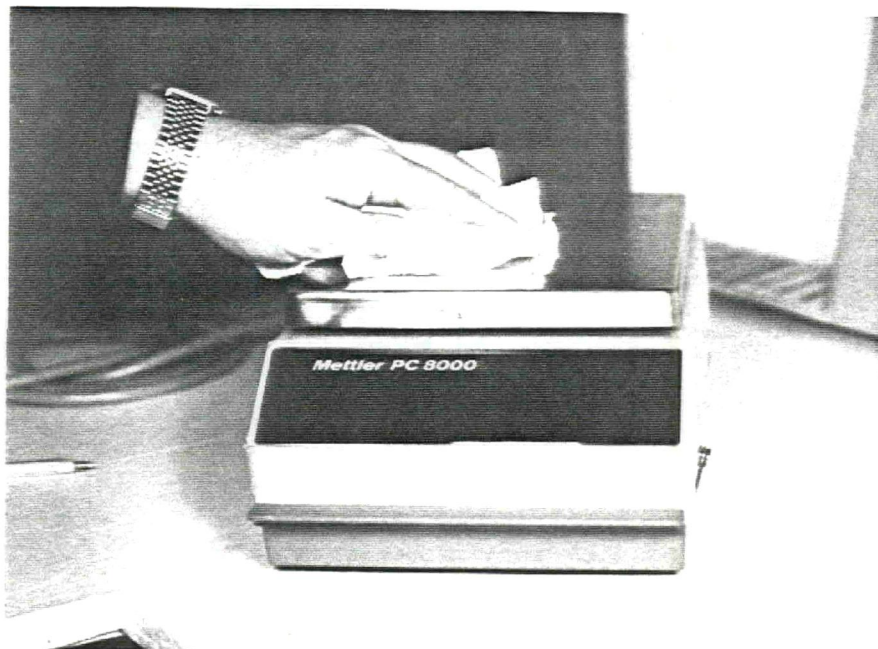


Cleaning Moisture off the Freezer After Defrost Complete

### 3.5 ROUTINE MAINTENANCE OF THE BALANCE

#### MONTHLY

Gently wipe the top and sides of the balance with a moist Kimwipe.  
Wipe dry with a second Kimwipe.



Cleaning the Weighing Balance

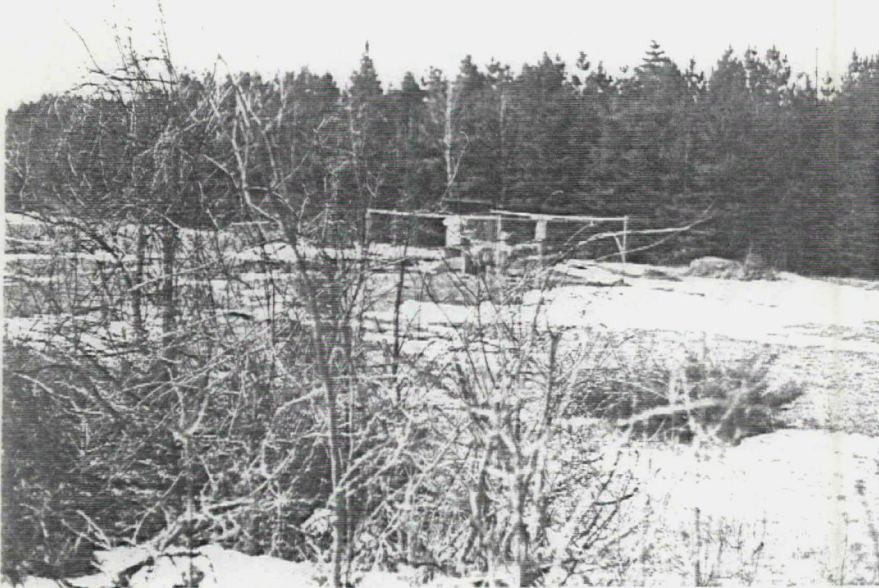
### 3.6 ROUTINE MAINTENANCE OF THE SAMPLING SITE

#### AS REQUIRED

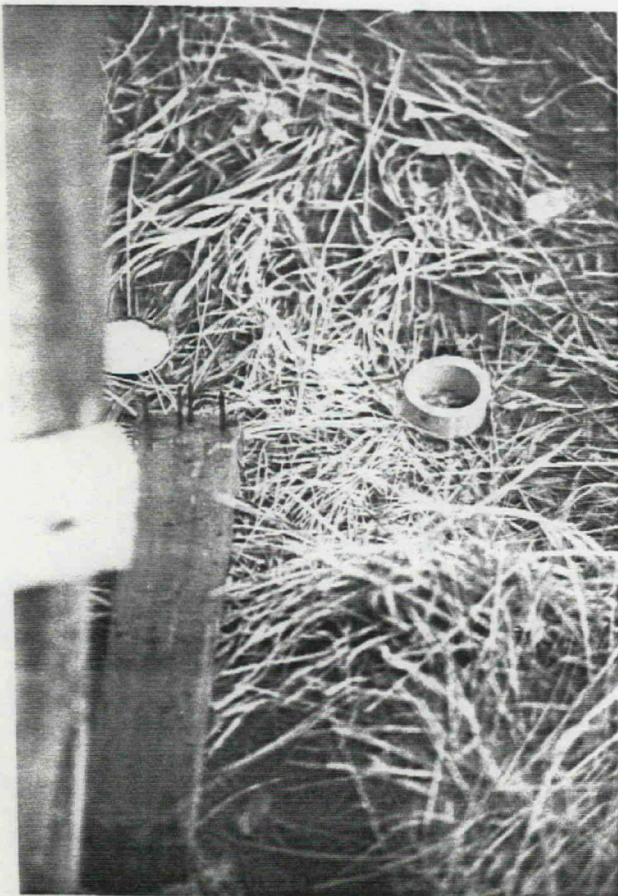
1. The ground vegetation (grass, weeds, brush) within a radius of 50 meters (160 ft) of the precipitation collector should be cut to ground level whenever it reaches a height of 15 cm (6 inches).
2. Because of the dust that can be created, grass cutting should not be carried out if you think it might rain in a short while.
3. After grass cutting, any dust gathered on the precipitation collector should be cleaned off with a Kimwipe dampened with water.
4. Any debris (brush piles, blowing trash) should be cleaned from the site.
5. Grass cutting should be reported in the REMARKS Section of the Sample History Form.



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Grass and Shrubs Should Be kept Cut To A Height of  
Less Than 15 cm



Debris Around The Site Can Be Not Only  
a Contamination Source But Also  
a Safety Hazard

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### 3.7 ROUTINE MAINTENANCE OF THE SAMPLE HANDLING AREA

#### MONTHLY

1. In order that dust levels be kept as low as possible, clean the Sample Handling Area (most importantly the bench top) with clean water only. No soaps or cleansers (e.g., ammonia) should be used to clean the area.
2. All materials and supplies should be stored properly so that no chance of contamination exists for the precipitation samples.





### 3.8 CHANGES TO THE SITE

Changes that might occur at your site and can affect the quality of your precipitation samples should be reported on the Sample History Form. These changes include:

- the addition of small sources of pollution such as wood stoves, generators, parking lots, garbage dumps, sand piles or exposed dirt near the collector;
- other changes at the site such as changes to the local ground cover, topography, access roads to the site, electrical supply and instrument position;
- the addition of any new monitoring instruments or gauges. Prior to any new equipment being installed on your site, permission should be obtained from your Regional Inspector.

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Changes At or Near the Site  
(e.g.Cultivation of Fields) Should Be Noted

### 3.9 CHANGES TO THE AREA NEAR THE SITE

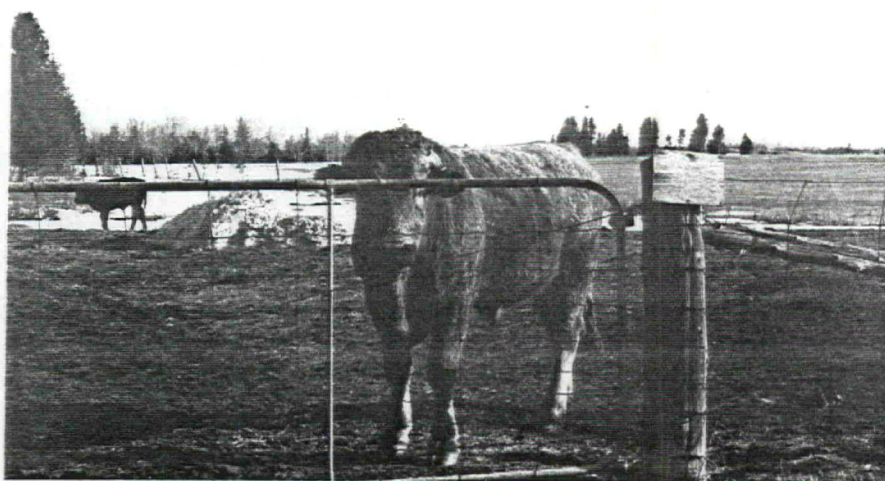
You, better than anyone else, will know of any changes that might occur in the area near your site. While these changes may seem quite normal, their impact on precipitation samples can be quite severe. Any noted changes should be reported on the Sample History Form (Site History Comment #58). It is always better to report any change than to decide the change is unimportant. Types of changes include:

- construction of any new or additional pollution sources within 50 km (30 miles) of your site (e.g., power plants, pulp and paper mills, smelters, chemical plants, or other major industries);
- new or additional agricultural activity within 500 m (1/3 mile) of your site (e.g., cultivation, spraying, grazing of livestock);
- the construction of any new roads, railways, or canals within 500 m (1/3 mile) of your site;
- any other construction within 500 m (1/3 mile) of your site including building construction, road resurfacing and major landscaping.

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Change To the Use of Surrounding Land (e.g. Gravel Pits)  
Can Affect Precipitation Samples



Change In Agricultural Land Use Can Affect Precipitation Samples

### 3.10 INVENTORY OF SUPPLIES AT THE SITE

When your site is installed, the instruments and spare parts to be located on-site are:

- 1 Precipitation Collector (Model A100 or B200) plus
  - 2 polyethylene buckets
  - 1 polyethylene bucket cover
  - 1 stand (straight pipe or telescopic)
  - 2 spare hood gaskets
  - 1 package of heater circuit fuses (1.5 A)
  - 1 package of control circuit fuses (2.0 A)
  - 2 spare sensors
  - 1 spare printed circuit control board
  - 1 brush for cleaning snow or debris off sampler
- 1 Rain Gauge (Type B) plus
  - 1 spare funnel and graduated cylinder assembly
  - 1 bottle brush
- 1 Snow Gauge including receiver and graduate plus
  - 1 spare copper receiver
  - 1 adjustable stand
  - 1 spare graduated cylinder
- 1 Snow ruler
- 1 Balance (Model PC8000) plus
  - 1 spare 250 MA fuse
  - 1 plastic weighing container
  - 1 standard reference weight
  - 1 carrying case
- 1 Heat Sealer (with pedal) plus
  - 1 front-mounted sample support bracket
  - 2 spare heater bars
- 1 Refrigerator plus
  - 1 refrigerator thermometer
- 1 Vacuum pump plus
  - 1 recharger and mounting bracket

Your Regional Inspector should be contacted if you do not have all of the above supplies, or if any are broken or the spare parts used.



At the end of each year your site will be restocked with all the supplies (listed below) you will need to operate your site on a daily basis for the following year. If for some reason you think you need more supplies before the next restocking, contact your Regional Inspector and more supplies will be sent to you. Below is a list of the yearly supplies for a monitoring site:

- plastic sample bags (400 per year)
- plastic disposable bucket top covers (400 per year)
- disposable plastic gloves (16 boxes per year)
- numbered bag labels (400 per year)
- dry bag labels (300 per year)
- CAPMoN Sample History Forms (50 per year)
- CAPMoN Instruction Manual (1)
- cardboard shipping boxes (styrofoam lined)
  - sent to the site as needed
- plastic shipping containers (4 l, and 8 l)
  - sent to the site as needed
- ice packs (large and small)
  - sent to the site as needed
- min/max shipping thermometers
  - sent to the site as needed
- document file box
- Kimwipes
- deionized water
- field book.

You will not be stocked with a year's worth of shipping supplies (shipping containers, shipping boxes, ice packs, and min/max thermometers) as these are returned to your site on a regular basis.

4. WHAT TO DO IF THINGS GO WRONG

By correctly following the sampling and maintenance procedures, your site should operate with very few problems. However, if things do go wrong with a piece of equipment or with a sampling procedure, immediately telephone (collect) your Regional Inspector. Your Regional Inspector will be checking in with you monthly, however do not hesitate to contact him/her if anything goes wrong or if you have any questions.

Instructions are included in this section for small problems which might occur at your site which you can correct yourself.

IMPORTANT

Any problem, large or small, should always be noted in your field book and on that week's Sample History Form.

If you are unable to carry out the sampling procedures due to illness or other reasons, contact your backup operator. If this person is also unable to carry out the procedures, your Regional Inspector should be contacted immediately so that other arrangements can be made. UNDER NO CIRCUMSTANCE should a person who has not received training by the Regional Inspector be allowed to carry out the Daily Sampling Procedures.

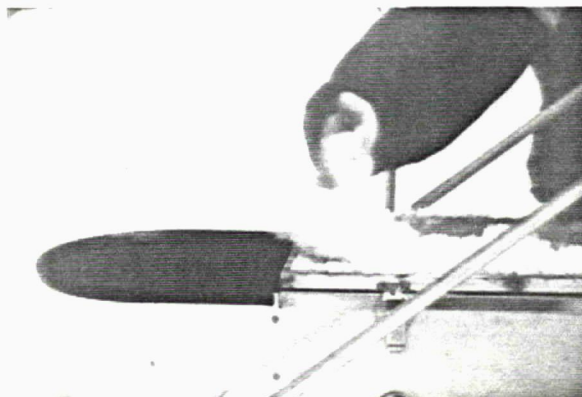
ADDRESSES AND TELEPHONE NUMBERS OF  
CONTACT FOR PERSONS IN REGION

#### 4.1 PROBLEMS WITH THE PRECIPITATION COLLECTOR

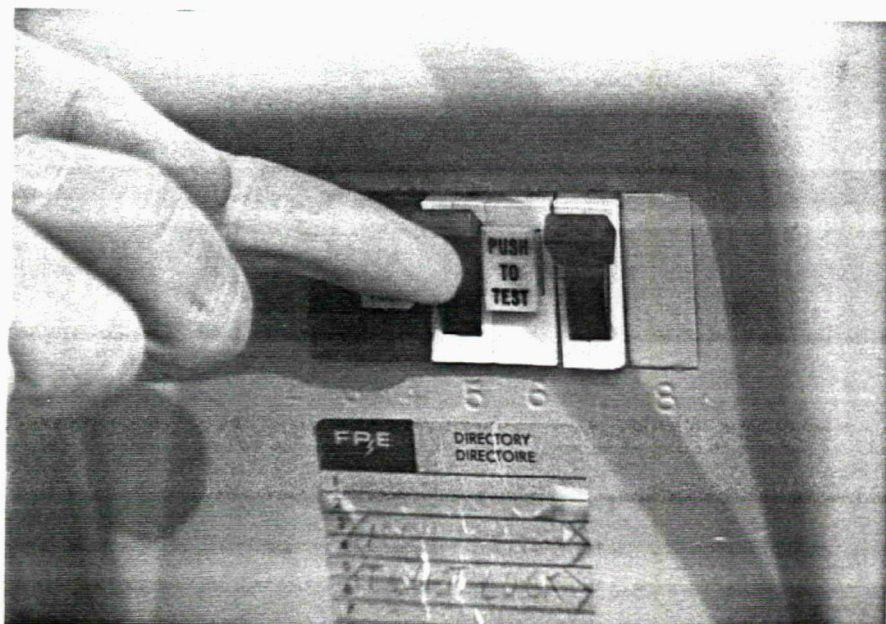
Problem	Possible Solution
Gasket is dirty, damaged or accidentally touched by operator	<ul style="list-style-type: none"><li>- Follow gasket changing instructions</li></ul>
Snow, ice or debris have accumulated on the collector	<ul style="list-style-type: none"><li>- Clean off using brush. Watch out that the sample does not get contaminated</li></ul>
Sampler won't work	<ul style="list-style-type: none"><li>- Check that circuit breaker/fuse has not tripped</li><li>- Check that instrument plug is securely in place and twisted to lock</li><li>- Check that ON/OFF switch is ON</li><li>- Check whether sensor grids need cleaning or replacing</li></ul>
Hood does not sit flat on bucket	<ul style="list-style-type: none"><li>- Check for snow buildup on bucket bottom or debris on bucket support</li><li>- Check that the gasket is properly in place in collector hood</li></ul>
Other problems	<ul style="list-style-type: none"><li>- Contact Regional Inspector.</li></ul>

April 30, 1985

Keep Snow Cleaned off the Collector



Keep Snow Cleared off  
the Bucket Support



Checking the  
Circuit Breaker

#### 4.2 PROBLEMS WITH THE RAIN GAUGE

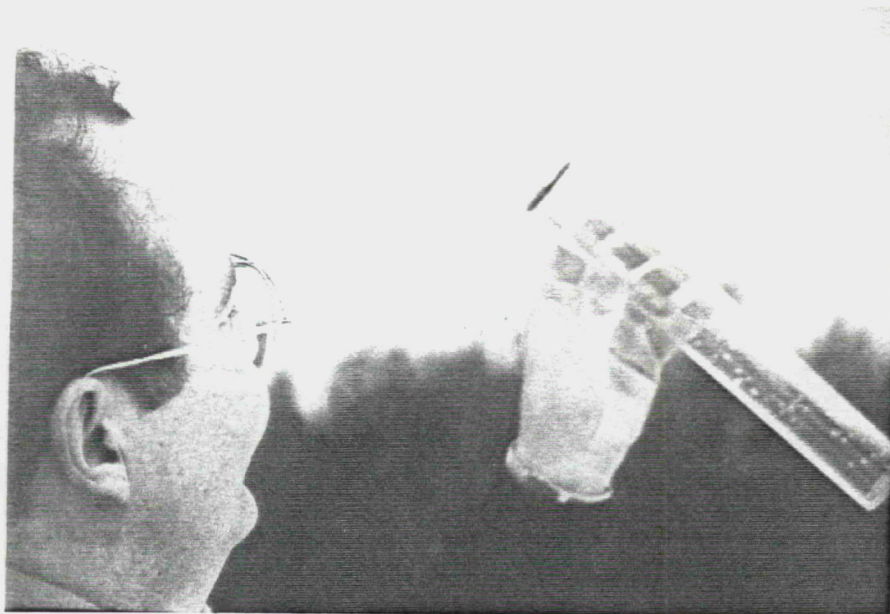
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Problem	Possible Solution
<hr/>	
Gauge not level	- Push gauge back to level until Regional Inspector can properly level gauge
Funnel, graduate or outer container chipped or cracked	- Replace with spare parts and contact Regional Inspector to send more spare parts
Ice or snow frozen in funnel or graduate	- Follow procedure discussed in Step 3 (P. 2-23 Paragraph 7)
Other problems	- Call Regional Inspector.

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April 30, 1985



Checking the Rain Gauge Funnel and Graduate For Chips and Cracks

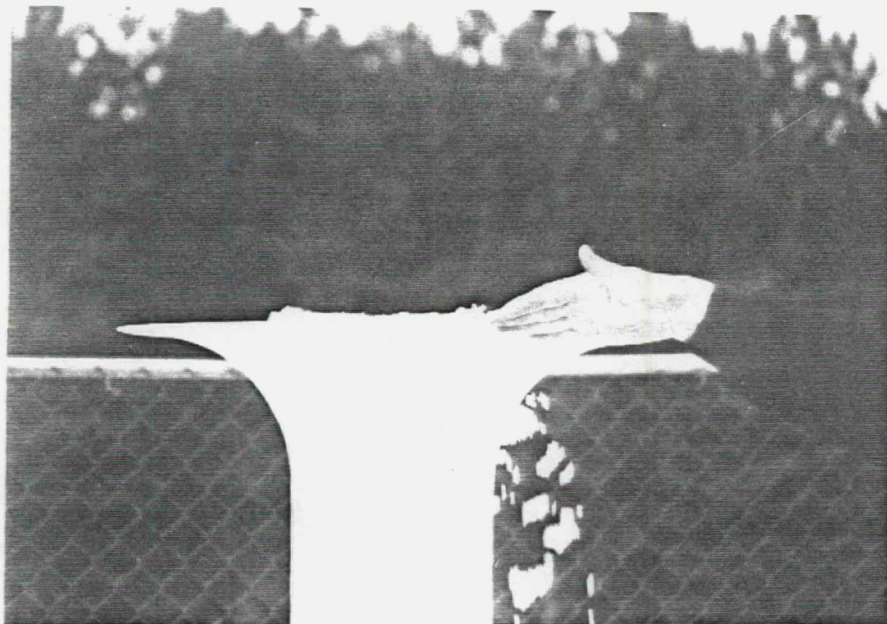
#### 4.3 PROBLEMS WITH THE SNOW GAUGE

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Problem	Possible Solution
<hr/>	
Gauge not level	- Push gauge back to level until Regional Inspector can properly level gauge
Snow or ice buildup on gauge	- Gently brush off. While removing snow or ice it is a good idea to remove container from the gauge so no falling or blowing snow will end up in the container
Gauge stand can't be raised or lowered due to freezing up by ice	- Without using excessive force bang the side of the support pipe with a piece of wood to try to dislodge ice
Gauge stand can't be raised to height of 1.5 m due to depth of snow	- Raise gauge to maximum height, note approximate height in field book and contact the Regional Inspector
Other problems	- Contact Regional Inspector.

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April 30, 1985



Keeping Snow Cleared off the Snow Gauge

April 30, 1985

#### 4.4 PROBLEMS WITH THE WEIGHING BALANCE

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Problem	Possible Solution
<hr/>	
Any problem	- Contact Regional Inspector.
<hr/>	

April 30, 1985



Mettler PC8000 Weighing balance

#### 4.5 PROBLEMS WITH THE REFRIGERATOR

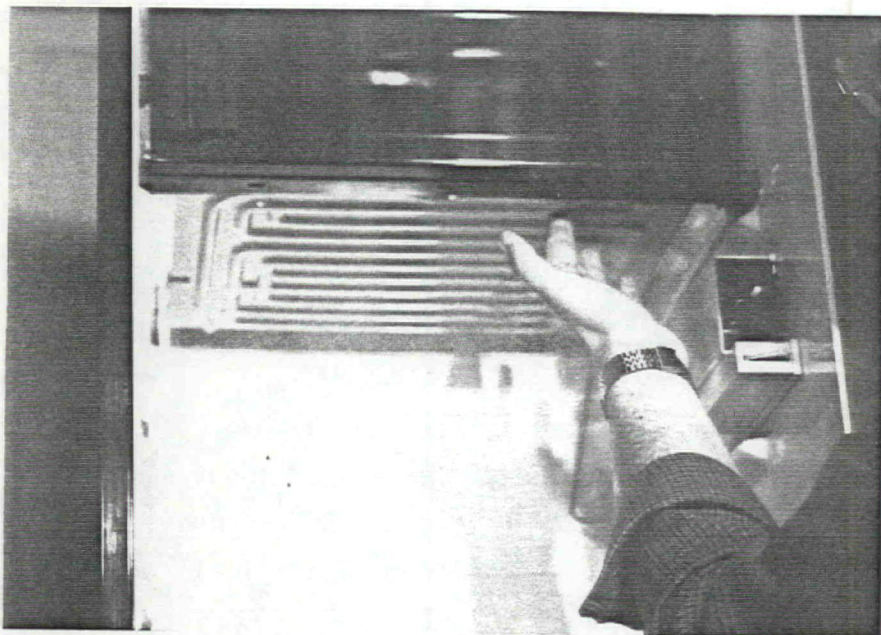
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Problem	Possible Solution
<hr/>	
Refrigerator won't get cold	<ul style="list-style-type: none"><li>- Check that the fridge is plugged in</li><li>- Check that thermostat is at correct setting</li><li>- Check that fridge is not in defrost cycle</li></ul>
Ice buildup on freezer	<ul style="list-style-type: none"><li>- Defrost fridge (only when no samples are in fridge)<ul style="list-style-type: none"><li>- remove ice packs from freezer</li><li>- push defrost button</li><li>- after defrost cycle finishes wipe moisture from freezer and empty tray</li></ul></li><li>- replace ice packs</li></ul>
Temperature inside fridge not between 3°C and 5°C	<ul style="list-style-type: none"><li>- Adjust thermostat</li><li>- Defrost if necessary</li></ul>
Other problems	<ul style="list-style-type: none"><li>- Contact Regional Inspector.</li></ul>

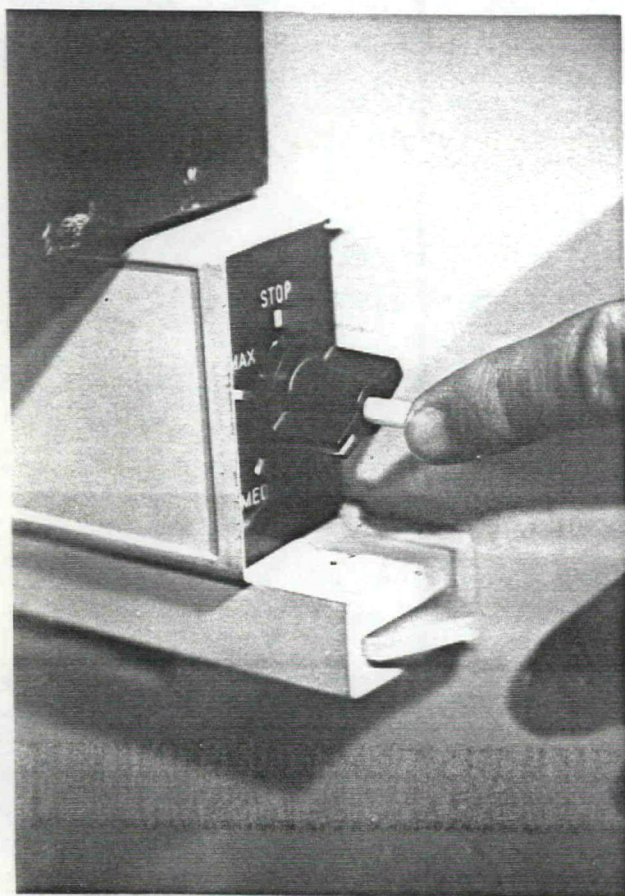
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April 30, 1985



Checking the refrigerator Freezer For Ice Build-up



Pushing the Refrigerator  
Automatic Defrost Button

#### 4.6 PROBLEMS WITH THE BAG SEALER

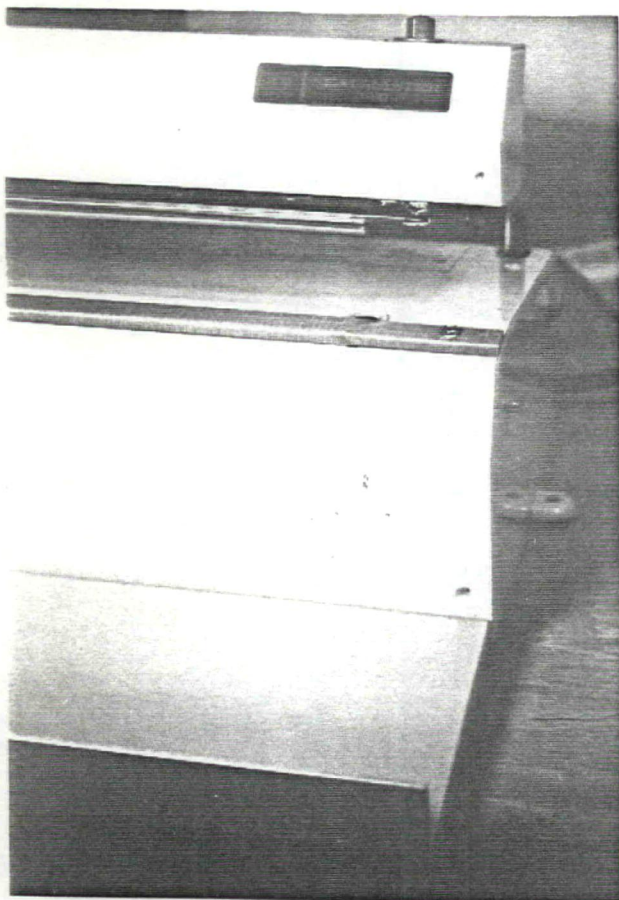
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Problem	Possible Solution
<hr/>	
Bag seal leaking	<ul style="list-style-type: none"><li>- Check for folds along the seal line. Reseal bag</li><li>- Check timer setting on bag sealer (should be about 4)</li><li>- Make sure foot pedal is held down several seconds after buzzer stops (prevents seal from separating)</li></ul>
Bag seal seems melting (seal will be quite "wavy")	<ul style="list-style-type: none"><li>- Wait 30 seconds between seals - allow heater bar to cool down</li><li>- Heater bar may need replacing</li><li>- Check time setting on bag sealer (should be about 4)</li></ul>
Heater element blackened	<ul style="list-style-type: none"><li>- Contact Regional Inspector</li></ul>
Jaws won't hold bag tightly	<ul style="list-style-type: none"><li>- Adjust chain on pedal so more pressure can be applied</li></ul>
Sample bag falling off bag support	<ul style="list-style-type: none"><li>- Sample support bracket mounting upside down on sealer</li></ul>
Other problems	<ul style="list-style-type: none"><li>- Contact Regional Inspector.</li></ul>

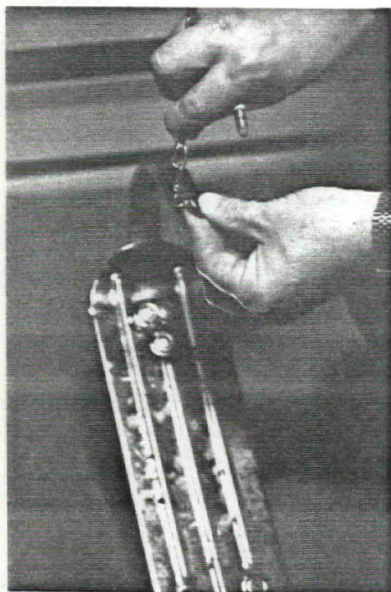
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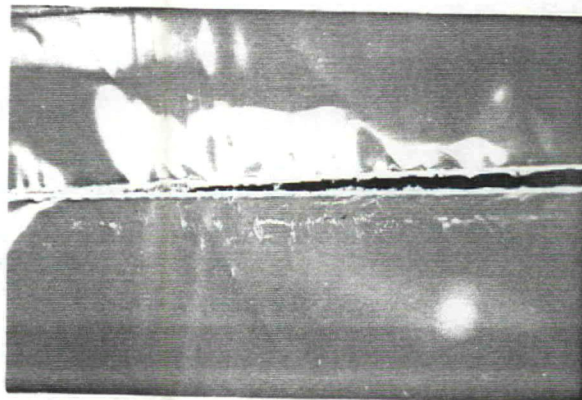
April 30, 1985



Correct Mounting Configuration  
of Sealer Support Bracket



Adjusting the Pedal Chain



Sample Bag Sealing Time Too Long

5.        SUMMARY OF THE DAILY OPERATING PROCEDURES

April 30, 1985





April 30, 1985

DOCUMENT IMPROVEMENT PROPOSAL

The purpose of this form is to solicit comments from users regarding the contents of this document. The identification of deficiencies or errors, any constructive criticism or other comments that will enhance the use of this document are encouraged and welcomed. If additional pages are required, attach them to this form and submit in an envelope to:

Atmospheric Environment Service  
Air Quality Monitoring and Assessment Division  
4905 Dufferin Street  
Downsview, Ontario  
M3H 5T4

Comments:

Submitted By:

Telephone  
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Date

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