APPENDIX 3

STANDARD OPERATING PROCEDURES
IMPROVE PARTICULATE SAMPLERS
PREVENT STUDY
JUNE-SEPTEMBER 1990

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Introduction

Overview of IMPROVE Sampler used in PREVENT Study

The aerosol samplers used in the PREVENT study are variations of the sampler used in the IMPROVE (Interagency Monitoring of Protected Visual Environments) and National Park Service Congressionally mandated sampling networks. IMPROVE is a cooperative program of the National Park Service, Forest Service, Bureau of Land Management, Fish and Wildlife Service, and Environmental Protection Agency, whose primary purpose is the protection of visibility in class I areas. Since visibility impairment is produced primarily by scattering of light by fine particles, an essential part of the program is the measurement of particulate concentrations.

The standard IMPROVE particulate sampler consists of four fiilter modules, three for fine particles (0-2.5 μm) and one for PM10 particles (0-10 μm). Each filter module has solenoids and elapsed timers for two filters, but can be expanded to four filters. The controller clock is housed in a fifth module.

Each of the three primary sites in the PREVENT study will have a variation of this standard IMPROVE sampler, with a controller module, four or five fine modules, and a PM10 module. Each module will have solenoids and elapsed timers for four filters. The modules at the primary sites will be:

A	fine particles	Teflon
B	fine particles	nylon with denuder
N	fine particles + vapor	nylon without denuder
C	fine particles, gas artifact	primary and secondary quartz
D	PM10 particles	Teflon
QS	fine particles + SO_2 gas	Teflon + impregnated

The secondary sites in the PREVENT study will have a variation of the standard sampler in which the controller clock is inside the fine particle module. This variation is currently being used in the Northeast States Air Use Management (NESCAUM) Network. Each module in PREVENT has solenoids and elapsed timers for four filters. Almost all of the secondary sites have two independent fine modules, making it is possible to collect daily 24-h sample with a weekly change. The double-module configuration was used in the EPIC (Evaluation of Particles Impacting Canyonlands) study of winter 1990.

The sample change at a secondary site with double modules will consist of
(1) recording the flow rate gauges and elapsed times for the exposed filters,
(2) removing the 7 cassettes with exposed filters that have finished their 24 hours,
(3) transferring the partial sample that is being collected to the eighth position,
(4) inserting 7 cassettes with clean filters,
(5) recording the flow rate gauges for the clean filters.
(6) storing a blank cassette in the module

The instructions are posted inside the door of the module. The procedures are designed to minimize routine errors and enable the operator to identify any problems.

Fine Module

A fine filter module is shown in Figure 1. Before reaching the filters, the airstream passes through a cyclone that removes particles larger than 2.5 μm. The airstream with particles smaller than 2.5 μm goes through a filter that collects all the particles. The particular filter is determined by which of the four solenoids is open.

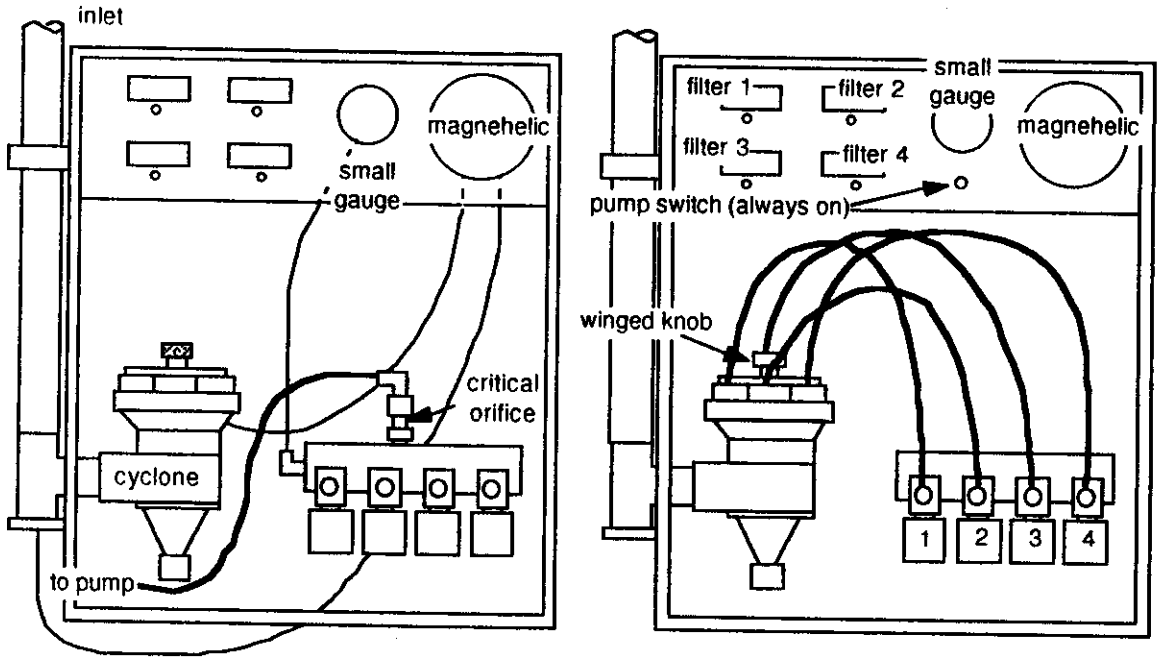

Figure 1. Schematic of module. The left figure shows the connections for the vacuum system. The right figure shows the connections for the filter cassettes and the appropriate timers and filter switches. The pump switch should always be left on. The filter positions of the right module in a double-module configuration are 5, 6, 7A, and 7B.

An almost constant flow rate is maintained by a critical orifice between the solenoids and the pump. The critical orifice is preset during the installation to provide the proper flow rate for the 2.5 μm cutpoint. It is necessary to measure the flow rate for each sample because a change in the pressure drop across the filter will produce a small change in the flow rate through the critical orifice.

The flow rate is measured in two ways by two gauges. The primary flow rate measurement is provided by a magnehelic gauge that reads the pressure drop of the air as it passes through the cyclone. As the flow rate increases, the pressure drop increases, causing the magnehelic reading to increase. A zero reading indicates that no air is passing through the cyclone. The second flow rate measurement is based on the pressure drop across the filter; this pressure drop is determined by a second gauge ('small gauge'). The relationship follows from the equation of air flow through a critical orifice. In this case, as the pressure drop increases, the flow rate decreases. We will be using these relationships to troubleshoot for errors when the filters are loaded.

The volume of air for each sampleis calculated from the average flow rate and the duration, measured by elapsed timers.

Sample Preparation

Primary sites: Teflon filters A and D are processed in Davis (loaded and unloaded into cassettes) and shipped to and from the field laboratories in special shipping boxes; the sample identification is done at the field laboratories. The other filters are loaded and unloaded at the field laboratories.

Secondary sites operated by UCD personnel: All filters are processed at Davis, with sample identification done at the field laboratories.

Secondary sites operated by local personnel: All filters are processed and pre-identified at Davis and sent to the site operator. Each box will be identified with the desired change date. The box will normally arrive 1 week before the date it is to be installed. Store the box in a clean location away from heat sources. If there is no box on the day before the change, call UCD and we will deliver one from a Washington field laboratory.

Inside the blue box will be eight filter cassettes and a field logsheet. These eight cassettes and this logsheet must always remain with this blue box. Each filter cassette will be identified by a large number 1-8 and by printed code on tags. The printed codes are primarily for the use of the UCD staff. The codes specify the site and start date and an internal ID for each sample and are also written on the logsheet.

The field logsheets are appended to these precedures.. At the top of the sheet is the identification code (site code and change date) that should match the identification code on the outside of the blue box. Below this, the logsheet is divided into three sections by vertical lines. On the left side are identification codes. The middle section provides data for the clean filters, before collection, while the right section provides data for the exposed filters, after collection.

Controller Clock

Figure 2 shows the clock that is in the door of the right filter module of a double-module configuration. In all other cases the solenoid numbers are 1, 2, 3, 4. The left side of the clock contains the clock and status lights. The right side override and programming buttons. The programming will be done by the UCD staff during installation. To adjust the time on the clock, hold down the set time button and press either the m+ or m- button This should not be necessary.

Above the hour on the left half are a series of lights to indicate whether any solenoid is open. A '0' indicates closed and a '1' indicates open. Only one solenoid of the eight should be open at any time. When you arrive, one of the solenoids will be open and the corresponding indicator light will be on '1'. When you leave, one of the solenoids should be opened. The appropriate solenoids are:

	when you arrive	when you leave
double-module secondary	7A will be on	turn 7B on
primary (Fr,Su,Tu morning)	4 will be on	turn 1 on
primary (Fr,Su,Tu morning)	2A will be on	turn 1 on

At the top of the right half of the clock are four Override buttons that will manually open or close a solenoid. These are toggle buttons: they will open a solenoid that is closed or close one that is open. When you arrive you will close the solenoid that is open using the corresponding Override. Before you leave you will open the appropriate solenoid using the corresponding Override.

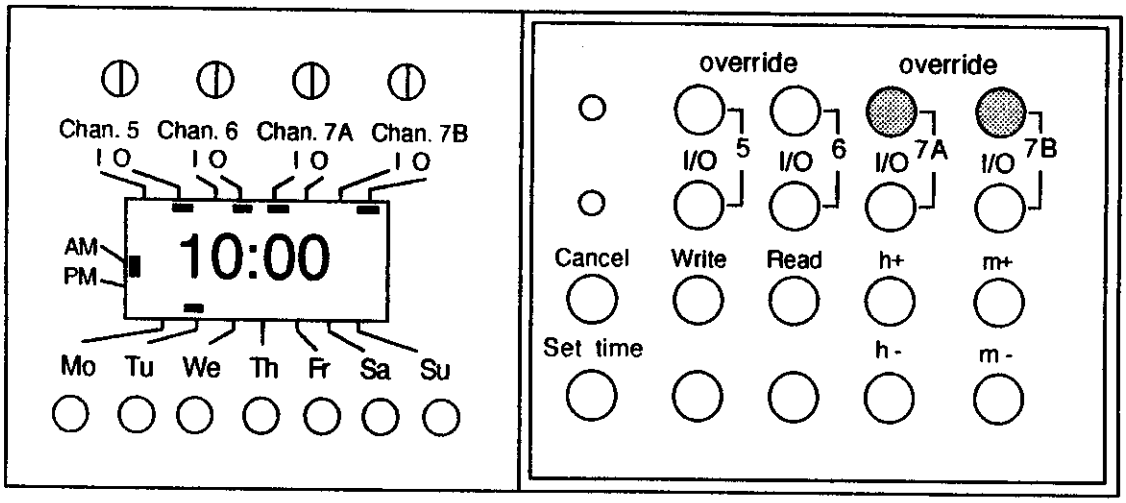

Figure 2. Clock controller for solenoids 5,6,7A, and 7B.

Sample Changing at Secondary Site with Double Module

Preparation for Sample Changing You will need to take to the site:

1. The empty box to put in last week's exposed filters. Inside should be the partially filled field logsheet and 7 red caps.
2. The full box containing the clean filters to be inserted. Inside will be eight filters and a field logsheet.

Sample Changing I--Removal of Exposed Filters

1. Record the date, time, and your name in the appropriate blanks in the right section of the partially filled logsheet in last week's blue box. Record the temperature in °C.
2. Press Override 7A in the controller clock of the right module to close solenoid 7A. All the solenoids will now be closed, with all.the indicator lights at '0', and the magnehelic gauge will drop to 0. Inside one of the modules will be last week's field blank (filter 8). Transfer this to last week's blue box.
3. Remove the dynamic field blank from inside one of the modules and place in the empty blue box. The cassette will be filter 8 and have caps at both ends.
4. Record the small gauge reading in either module. This should be at the green line near 20 " Hg. If the pressure drops below the red line, call UCD. Either the

pump is failing or there is a leak in the hoses between the solenoids and the pump.

5. Record the final flows and elapsed times for all 8 filters, pressing one switch at a time: 1,2,3,4 in the left module and 5,6,7A,7B in the right module. All times for filters 1-6 should be approximately 24.00 hours; 7A and 7B will be less.
6. Gently press the reset buttons for all elapsed timers so that they read zero.
7. Remove filters 1,2,3,4 from the left module and filters 5,6,7B from the right module. (The filter 7 attached to solenoid 7B will have last week's date. Do not remove the filter with today's date attached to solenoid 7A.)

   To remove the filters, first loosen the winged knob holding the cassettes down. Then, one filter at a time, unscrew the hose from the solenoid and remove the cassette from the cyclone manifold. Put a red cap on each cassette and place the cassette in last week's blue box.

8. Last week's blue box should now have 8 filters and a complete logsheet.
9. Move the hose for the remaining filter 7 (with today's date) from solenoid 7A to 7B.

Sample Changing II--Insertion of Clean Filters

1. Record the date, time, and your name in the appropriate blanks in the center section of the new logsheet in this week's blue box.
2. Insert 7 clean filters: 1,2,3,4 in the left module and 5,6,7 in the right module. Attach the new filter 7 with next week's date to solenoid 7A. (Today's filter 7 should already be connected to 7B.)

   To insert the clean filters, attach the cassette end to one of the holes on the cyclone manifold. Chose whichever hole is most convenient. Connect the hose to the solenoid finger-tight only: do not use wrench or pliers. Store the red cap in the blue box. When all four cassettes are installed and firmly seated on the cyclone manifold, tighten the winged knob.

3. Verify that all 8 elapsed timers read zero.
4. Record the initial flows for all 8 filters, pressing one switch at a time: 1,2,3,4 in the left module and 5,6,7A,7B in the right module.

See Troubleshooting note on next page.

5. Place the field blank (filter 8) inside either module without attaching. Do not remove either the red or the yellow cap.

6. Press Override 7B in the controller clock of the right module to open solenoid 7B. The clock indicator light for 7B will change from '0' to '1' (all others will remain at '0'), and the magnehelic will no longer read zero. Store the logsheet in this week's blue box.

> Troubleshooting: if gauges are not on the green
> The primary purpose of having two gauges is to help you avoid problems in installing the cassettes. Under normal conditions, the gauges will both be on the green, or one will go up slightly and the other down. However, two problems can occur. (1) If the magnehelic reads low and the small gauge is normal for any filter, check the connections of all four cassettes to the cyclone. This is a common problem and you should always be alert for this condition. (2) If both gauges read low, check all connections between the four hoses and solenoids. If a change is made to correct a leak, repeat the gauge readings for this module.

Last weeks's blue box should have 8 filters and a complete logsheet. Reverse the mailing label so that the address is now UC Davis and send immediately via US mail. Avoid leaving the box in a dirty or hot location.

Sample Changing at Secondary Site with Single Module

The following changes apply to a site with a single module. The site must be serviced twice each week.

First change (8:00 A.M.): Stop filter 7 using the override for channel 3. Record end readings for exposed filters 4-7 and remove filters. Insert clean filters 1-4 and take initial readings. Start filter 1 using override for channel 1.

Second change (anytime on fourth day): Stop filter 4 using the override for channel 4. Record end readings for filters 1-3. Remove filters 1-3 (but not 4) and replace with filters 5-7 (5 in 1, 6 in 2, 7 in 3). Filter 4 will remain in the sampler in position 4; there is no shift of the position of the current filter as is done with a double-module configuration.. Record initial readings for filters 5-7 (solenoids 1-3). Restart filter 4 using the override for channel 4.

Sample Changing at Primary Site

At the primary site, each module will be handled identically. There will be four cassettes per module. Four exposed cassettes will be removed. and four clean cassettes will be inserted. Four changes will be made each week at 8:00 A.M., on Friday, Sunday, Tuesday, and Wednesday.

Initial Steps

1. When you arrive at the site on Friday, Sunday, or Tuesday, filter 4 will be on. On Wednesday, filter 2 will be on. Press the override for this filter; all solenoids will then be closed. Do not use the manual override.
2. For modules A and D, use the empty box labelled A-D. For B and N, use B-N. (At Paradise there will be no N.) For C and QS, use box C-S.

Removal of Exposed Filters

Follow the steps of the double module for each module in sequence.

Insertion of Clean Filters

Follow the steps of the double module for each module in sequence.

Resumption of Sampling

Press the channel 1 override to begin sampling. Verify that the magnehelics all read normal and the filter 1 elapsed timers have all begun to move.

Programming the Controller Clock

The clock will be programmed by the UCD staff at the beginning of the study. The programs for the primary sites are given below. There is no program for the change hour: Fr, Su, Tu, We 8:00 AM; changes this time will be made by manual override. However, if the operator does not arrive before noon, the solenoid will close.

program	days	hour	off	on
1	Fr, Su, Tu, We	8:00 PM	1 off	2 on
2	Sa, Mo, Th	8:00 AM	2 off	3 on
3	Sa, Mo, Th	8:00 PM	3 off	4 on
4	Fr, Su, Tu	12:00 PM	4 off	
5	We	12:00 PM	2 off	

The programs for the secondary sites with double modules are given below. There are 5 sets of programs depending on the change day for the site.

change day = Friday all hours = 8:00 AM

	left module		right module (5,6,7A,7B)		(1,2,3,4)
1	Sa	1 on	1	We	5 on	1 on
2	Su	1 off, 2 on	2	Th	5 off, 6 on	1 off, 2 on
3	Mo	2 off, 3 on	3	Fr	6 off, 7A on	2 off, 3 on
4	Tu	3 off, 4 on	4	Sa	7A, 7b off	3, 4 off
5	We	4 off				

change day = Saturday all hours = 8:00 AM

	left module		right module (5,6,7A,7B)		(1,2,3,4)
1	Su	1 on	1	Th	5 on	1 on
2	Mo	1 off, 2 on	2	Fr	5 off, 6 on	1 off, 2 on
3	Tu	2 off, 3 on	3	Sa	6 off, 7A on	2 off, 3 on
4	We	3 off, 4 on	4	Su	7A, 7b off	3, 4 off
5	Th	4 off				

change day = Sunday all hours = 8:00 AM

	left module		right module (5,6,7A,7B)		(1,2,3,4)
1	Mo	1 on	1	Fr	5 on	1 on
2	Tu	1 off, 2 on	2	Sa	5 off, 6 on	1 off, 2 on
3	We	2 off, 3 on	3	Su	6 off, 7A on	2 off, 3 on
4	Th	3 off, 4 on	4	Mo	7A, 7b off	3, 4 off
5	Fr	4 off				

change day = Monday all hours = 8:00 AM

	left module		right module (5,6,7A,7B)		(1,2,3,4)
1	Tu	1 on	1	Sa	5 on	1 on
2	We	1 off, 2 on	2	Su	5 off, 6 on	1 off, 2 on
3	Th	2 off, 3 on	3	Mo	6 off, 7A on	2 off, 3 on
4	Fr	3 off, 4 on	4	Tu	7A, 7b off	3, 4 off
5	Sa	4 off				

change day = Tuesday all hours = 8:00 AM

	left module		right module (5,6,7A,7B)		(1,2,3,4)
1	We	1 on	1	Su	5 on	1 on
2	Th	1 off, 2 on	2	Mo	5 off, 6 on	1 off, 2 on
3	Fr	2 off, 3 on	3	Tu	6 off, 7A on	2 off, 3 on
4	Sa	3 off, 4 on	4	We	7A, 7b off	3, 4 off
5	Su	4 off				

Filter Loading Procedures for Primary Sites

The following precedures describe how to download and upload the filter casstte for the primary sites. The operations will be done in the evenings at the field laboratories on the following schedule. The purpose is to keep the filters in the cassettes for 72 hours. The schedule is:

evenings	unload	load
Thursday	Tues, DFB	Fri, Sat
Friday	Wed, Thur	-------
Saturday	-------	Sun, Mon
Sunday	Fri, Sat	-------
Monday	-------	Tues, DFB
Tuesday	Sun, Mon	Wed, Thur
Wednesday	-------	-------

A. Unloading the Cassettes (Tues, Wed, Fri, Sun evenings)

1. There will be three boxes of exposed filters: A-D, B-N, and C-S. Each box will contain four cassettes, except B-N at Paradise, which will contain two cassettes.

2. Modules A and D in box A-D should be ready for shipment to Davis. Check that the field logsheet is inside the A-D box. Verify that the logsheet has been correctly filled out. Reverse the shipping label so that is will be sent to Davis. Do not mail the A-D box until the unloading of all cassettes is completed, as it may be necessary to annotate the logsheet .

3. Modules B and N nylon filters (Box B-N)

   a. Remove the protective cap from the B-1 cassette and verify its cleanliness. If required, wipe the inside of the cap with a Kimwipe damplened with ethanol.

   b. Remove the cassette top and lock ring. Transfer the nylon filter to a Petri dish and transfer the accompanying Sample Identification tag from the cassette to the Petri dish.

   c. Place the Petri dish in the nylon Petri box.

   d. Record the sample-identification number on the RTI-Ion Contractor Inventory.

   e. Check the condition and the cleanlinessof the the O-ring. (The nylon cassettes have no drain disks.) Discard theO-ring if deformed. Clean the filter grate and O-ring by gently brushing with the camel-hair brush reserved for nonquartz cassettes.

   f. Reassemble the cassette.

g. Repeat for all nylon filters in the B-N box.

4. Module C quartz filters (Box C-S)

a. Remove the protective cap from the C-1 cassette and verify its cleanliness. If required, wipe the inside of the cap with a Kimwipe damplened with ethanol.

b. Transfer each quartz filter to a Petri dish and transfer the accompanying Sample Identification tag from the cassette to the Petri dish.

c. Place the Petri dishes in the quartz Petri box and record the sample-identification numbers on the DRI-Carbon Contractor Inventory. Keep the filters in a paired sequence, with the secondary following the corresponding primary.

d. Disassemble each section of the cassette and clean. Check the condition and the cleanlinessof the drain disk and the O-ring. Discard the drain disk if dirty and the O-ring if deformed. If replacing the O-ring at this time, use only Viton O-rings. Clean the filter grate and O-ring by gently brushing with the camel-hair brush for quartz cassettes. Make certain no debris is retained under the lip of the anti-twist lock ring. Brush the debris into a waste receptacle. Be careful not to raise or breathe any filter debris dust during this operation. The quartz debris is highly electrostatic and can contaminate other samples.

f. Reassemble the cassette. Make certain that two silicone rubber gaskets are used in the cassette cap of the first section.

g. Repeat for all module C quartz filters in the box. Return the Petri box to the refrigerator.

5. Module QS Teflon+impregnated filters (Box C-S)

a. Remove the protective cap from the S-1 cassette and verify its cleanliness. If required, wipe the inside of the cap with a Kimwipe damplened with ethanol.

b. Transfer the Teflon filter to a Petri dish and transfer the accompanying Sample Identification tag from the cassette to the Petri dish.

c. Place the Petri dish in the Teflon Petri box and record the sample-identification number on the Teflon-Q Inventory.

d. Transfer the impregnated filter to a Petri dish and transfer the accompanying Sample Identification tag from the cassette to the Petri dish.

e. Place the Petri dish in the SO_2 Petri box and record the sample-identification number on the DRI-SO_2 Contractor Inventory.

f. Disassemble each section of the cassette and clean. Check the condition and the cleanlinessof the drain disk and the O-ring. Discard the drain disk if

dirty and the O-ring if deformed. If replacing the O-ring at this time, use an EP O-ring. Clean the filter grate and O-ring in the quartz section by gently brushing with the camel-hair brush for quartz cassettes. Clean the filter grate and O-ring in the Teflon section by gently brushing with the camel-hair brush for nonquartz cassettes. Follow the same steps for quartz debris as with the module C filters.

g. Reassemble the cassette. Make certain that <u>two</u> silicone rubber gaskets are used in the cassette cap of the first section.

h. Repeat for all module S cassettes in the box. Return the SO_2 Petri box to the refrigerator.

B. Loading the Cassettes (Thurs, Sat, Mon, Tues evenings)

1. Supplies

a. Blue Box A-D: The preweighed Teflon filters for modules A and D will be received from Davis in blue boxes identified by a sequential box label. Select the box with the lowest sequential number. Inside the box will be a field logsheet, 4 A cassettes, and 4 D cassettes. The field logsheet will have media ID's for each A and D cassette. The reverse side, which is for the other cassettes, will be blank.

b. Blue Box B-N: This will contain 8 single cassettes (4 for Paradise).

c. Blue Box C-S: This will contain 8 double cassettes.

d. Page of premade labels for the site and supply of removeable labels.

e. Forceps, quartz and nonquartz brushes, supply of drain disks and O-rings.

f. Supply of nylon, prefired quartz, impregnated, and Teflon filters. The quartz filters will be stored in the refrigerator in separate containers.

2. Preparation of Field Logsheet

a. Verify that the dates for the two top rows on the premade labels agrees with the dates you are preparing.

b. Place a white label on the outside of the box with the site name and the change date.

c. Fill in the site name and dates at the top of the logsheet.

d. Fill in the sample dates for all samples on both sides of the sheet. These should agree with the dates on the premade labels.

3. Modules A and D (Box A-D)

   a. Arrange the four A cassettes sequentially. Check that each A cassette has a small mask (1.1 cm^2).

   b. Place the first premade label on a removeable label and attach the removeable label to filter 1. Verify both sample ID and media ID on the field logsheet.. The mask code should be M2. Place the cassette in the box

      Repeat for the remaining A cassettes.

   c. Repeat steps a and b for the four D cassettes. Check that each D cassette has no mask and the mask code is M0

4. Modules B and D nylon filters (Box B-N)

   a. Remove the 8 cassettes and arrange sequentially.

   b. Check the cleanliness of the red cap of the B1 cassette.

   c. Remove the casette top and the lock ring. Check that the top has a single flat gasket. Recheck the condition and cleanliness of the O-ring. Replace any parts removed during the unloading process. Be careful to return the filter grate with the finer grids oriented up and the large bar grids down. If necessary, reclean the grate and O-ring with the proper brush. The nylon cassette has no drain disk.

   d. Obtain a clean nylon filter from the supply and load it into the cassette directly on the diffusion and grid support.

   e. Attach the Sample Identification Tag on the cassette following the procedures for the A cassette.

   f. Put the cassette in the Blue Box. Repeat for the remaining 7 cassettes.

5. Module C quartz filters (Box C-S)

   a. Remove the 8 cassettes in Box C-S and arrange sequentially.

   b. Check the cleanliness of the red cap of the C1 cassette.

   c. Disassemble each section of the cassette. Check that the first section has two flat gaskets and the second a single flat gasket. Two gaskets are needed for the top section to provide spacing so that the hold-down retainer of the cyclone will fit.Recheck the condition and cleanliness of the drain disk and the O-ring. Replace any parts removed during the unloading process. Be careful to use Viton O-rings. Be careful to return the filter grate with the finer grids oriented up and the large bar grids down. If necessary, reclean the grate and O-ring with the quartz brush.

d. Obtain a clean prefired quartz filter from the supply and load it into the bottom section of the cassette on the drain disk. Repeat for the top section.

e. Attach Sample Identification Tags on both sections of the cassette following the procedures for the A cassette.

f. Put the cassette in the Blue Box. Repeat for the remaining three C cassettes. Return the supply of prefired quartz filters to the refrigerator.

6. Module QS Teflon+impregnated filters (Box C-S)

a. Check the cleanliness of the red cap of the S1 cassette.

c. Disassemble each section of the cassette. Check that the first section has two flat gaskets and the second a single flat gasket. Recheck the condition and cleanliness of the drain disk and the O-ring. Replace any parts removed during the unloading process. Be careful to return the filter grate with the finer grids oriented up and the large bar grids down. If necessary, reclean the grate and O-ring with the proper brush.

d. Obtain a clean impregnated filter from the supply and load it into the bottom section of the cassette on the drain disk. Obtain a clean Teflon filter from the supply and load it into the top section of the cassette on the drain disk.

e. Attach Sample Identification Tags on both sections of the cassette following the procedures for the A cassette. The Teflon filter is denoted by "Q".

f. Put the cassette in the Blue Box. Repeat for the remaining three S cassettes. Return the supply of impregnated filters (SO_2) to the refrigerator.

B. Leak-Testing the Cassettes (following loading)

1. Verify that all cassettes are present and have been loaded with clean filters.

2. Verify that all cassettes have the proper Sample Identification Tags and agree with the field logsheet.

3. Leak-test all cassettes that have just been loaded (B, N, C, S). Test the cassettes one box at a time. Mount each cassette on the leak-test element. Hand tighten the nut. Remove the protective cap and place the leak-cap gently over the open cassette face. If the flow rate is less than 1 L/min (3.5 L/min for quartz), the system is considered airtight. If the flow rate exceeds this, find and remove the leaks by recentering the components and replacing O-rings.

Special care is required for the C and S quartz filters. Because of the fragility of the filters, it is not possible to get as good a seal. The criterion for modules C and S is 3.5 l

L/min. Begin by tightening the secondary filter and then the primary filter. Be careful to tighten each quartz segment only to "firm" hand tightness. Excessive

tightening will cause the lock ring to sever the edges of the filter, producing a significant leak. Replace all quartz filters that have been overtightened.

Replace the protective red cap.

4. When finished with a box, securely fasten. Check that the box has been correctly labelled for the site and date.

Cassette Labelling Procedures for Secondary Sites

The following precedures describe how to prepare the filter cassettes for the secondary sites. The preparation will be done at the field laboratories any time before the site visit. Do not prepare the filters at the site. A suggested routine would be to prepare the filters the night before the filters are taken to the site.

1. Determine the appropriate site from the site sheet and circle the date.

2. Select the page of premade labels for this site. Verify that the first date on the page of premade labels is one day after the change day. Cut out the next 8 labels; this will contain 7 labels for each day of the week plus one label marked "Fri-DFB".

3. Select a blue box of clean filters. Select the box with the lowest sequential number on the box label. Inside the box will be a field logsheet and 8 cassettes. The field logsheet will have media ID's for each cassette.

   Place a white label on the outside of the box with the site name and the change date.

4. Fill in the site name and dates at the top of the logsheet. Fill in the sample dates for all samples on the sheet. These should agree with the dates on the premade labels.

5. Arrange the 8 filters sequentially. Check that each filter has a large mask (2.2 cm^2) and a mask code of M1.

6. Place the first premade label (that is not a DFB) on a removeable label and attach the removeable label to filter 1. The date of filter 1 should be the day after the change date. Verify both sample ID and media ID.

   Repeat for the remaining 6 non-DFB labels for cassettes 2-7. Filter 2 will be the day after filter 1, etc.

7. Attach the "Fri-DFB" label to filter 8.

8. Place the 8 cassettes and the logsheet in the box and close securily. Repeat steps 1-7 for the other sites.