APPENDIX A - SITE OPERATIONAL PROCEDURES

A1 Introduction

A major factor in ensuring high quality from the Automatic Urban and Rural Monitoring Network will be the regular visits to each monitoring site carried out by locally based personnel. These site visits will allow the following functions to be undertaken:

(1) Precalibration checks;

(2) Changing particulate monitor filter;

(3) Calibration of analysers;

(4) Postcalibration checks, safety and security inspection.

Together with these routine weekly functions, there will be instances when non-routine site visits will be necessary, in the event of apparent instrument or system malfunction.

Local site operators have been trained in all aspects of normal equipment operation by the MU unit, and in the relevant calibration procedures by the QA/QC unit. Operators must retain copies of instrument manuals at each site, and are required to familiarise themselves with normal operating principles and characteristics of the instrumentation.

Calibration procedures differ from instrument to instrument, but the basic principle is common to all analyser types, with the exception of the particulate analyser. As described in Chapter 10, weekly calibrations will take the form of a simple two-point calibration. More detailed instrument tests will be undertaken by QA/QC unit personnel, in combination with the 6 monthly instrument intercalibration and servicing exercise (see Section 13).

Each analyser must be calibrated exactly *as found*. In this way, any instrumental drifts which may have occurred since the previous calibration will be exactly quantified, with there being no possibility that changes in response have been caused by any operator action.

There may be a mixture of different makes of analyser on site, and reference to other sections of the LSO Manual may be necessary. The instructions for any particle analyser (TEOM, TEOM FDMS, Partisol or BAM) will also be found elsewhere. In the past, sites were generally equipped with data loggers, but these are being phased out it favour of using the analysers' internal logger, and this instruction assumes that this is the case.

Acting only on advice from the MU, instrument adjustments may be performed to optimise analyser sensitivity. If such adjustments are found to be necessary, the instrument will be recalibrated after a suitable initial stabilisation period typically 15 minutes, so allowing the production of provisional revised calibration factors. However, full stabilisation of the instrument may take several hours and hence, ideally the instrument should be recalibrated after say a further 24 hours. The MU will advise on this. It is not anticipated that instrument adjustments of this sort will occur frequently.

The following sections of manual describe step-by-step procedures which must be followed during site visits. It is essential that the procedures are followed as written, for weekly and non-routine site visits, to ensure that reliable and accurate air quality measurements are made. However, the sequence in which zero and span calibrations are performed is not critical.

The exact specification of the calibration systems at each monitoring may differ slightly. The control of gas delivery into the analysers may use an excess flow meter, or an in-line critical orifice restricting the pressure. Training in the use of these systems is provided by the QA/QC Unit as required.

A2 Preparation

1. Upon arrival at the site, check the pollutant levels on the front panel of each analyser and the chart trace to see if an episode is occurring i.e. pollution levels during the last hour are above, or close to, the trigger values as discussed in Section 10.6 (O_3 >~70 ppb, NO_2 >~75 ppb, SO_2 >~90 ppb and CO >~10 ppm). If an episode is occurring phone MU before proceeding any further.

2. Take a new set of check and calibration sheets and enter Site, Date and Operator and Start Time.

3. Ensure the Operational Manual is to hand, and follow the instructions carefully.

3. Ensure that the toolkit supplied with the site is complete.

A3 Precalibration Checks

In this section, a number of initial visible checks are made on the equipment. Some checks require a tick and some require a value to be recorded on the precalibration sheet. Complete all the checks for all the analysers and ancillary equipment. When all checks are complete, inform the MU if any are not correct, before proceeding with the calibration.

A3.1 CO Analyser

The API 300 CO analyser has a 2-line alphanumeric display and 3 status LED display lights on the front panel. The display is divided into 4 fields, Mode Field, Key Definition, Message and Concentration.

1. In normal operation, the Mode field will show "SAMPLE", with the SAMPLE LED illuminated and the CAL and FAULT LEDs off. Check these and record on precalibration checklist.

2. If the red FAULT light is flashing, a warning message has been generated and is still active, due to some instrument operating parameter falling outside preset ranges. If the FAULT light is flashing, two additional buttons will be identified in the Key Definition area of the display, namely MSG (message) and CLR (clear). Press the message button and record the warning message given in the message area of the screen and press clear.

3. If the red "FAULT" light is off and a message display is visible, a fault has occurred, but has been automatically rectified. Record the message and press clear.

4. A number of instrument internal operational parameters can be accessed by pressing the test (left hand) button to obtain each parameter in turn. Press this and record the result displayed in the message area of the display against the appropriate parameter on precalibration checklist. When all parameters on the precalibration checklist have been noted,

press the test button once more. This will display the current time on the instrument display.

A3.2 NO_X Analyser

The API 200 NO_X analyser has a 2-line alphanumeric display and 3 status LED display lights on the front panel. The display is divided into 4 fields, Mode Field, Key Definition, Message and Concentration.

1. In normal operation, the Mode field will show "SAMPLE", with the SAMPLE LED illuminated and the CAL and FAULT LEDs off. Check these and record on precalibration checklist.

2. If the red FAULT light is flashing, a warning message has been generated and is still active, due to some instrument operating parameter falling outside preset ranges. If the FAULT light is flashing, two additional buttons will be identified in the Key Definition area of the display, namely MSG (message) and CLR (clear). Press the message button and record the warning message given in the message area of the screen and press clear.

3. If the red "FAULT" light is off and a message display is visible, a fault has occurred, but has been automatically rectified. Record the message and press clear.

4. A number of instrument internal operational parameters can be accessed by pressing the test (left hand) button to obtain each parameter in turn. Press this and record the result displayed in the message area of the display against the appropriate parameter on precalibration checklist. When all parameters on the precalibration checklist have been noted, press the test button once more. This will display the current time on the instrument display.

A3.3 SO_2 Analyser

The API 100 SO_2 analyser has a 2 line alphanumeric display and 3 status LED display lights on front panel. The display is divided into 4 fields, Mode Field, Key Definition, Message and Concentration.

1. In normal operation, the Mode field will show "SAMPLE", the SAMPLE LED illuminated and the CAL and FAULT LEDs off. Check these and record on precalibration checklist.

2. If the red FAULT light is flashing, a warning message has been generated and is still active, due to some instrument operating parameter falling outside of the preset levels. If the FAULT light is flashing, two additional buttons will be identified in the Key Definition area of the display, namely MSG (message) and CLR (clear). Press the message button and record the warning message given in the message area of the screen and press clear.

3. If the red "FAULT" light is off and a message display is visible, a fault has occurred, but has been automatically rectified. Record the message and press clear.

4. A number of instrument internal operational parameters can be accessed by pressing the test (left hand) button to obtain each parameter in turn. Press this and record the result displayed in the message area of the display against the appropriate parameter on precalibration checklist. When all parameters on the precalibration checklist have been noted, press the test button once more. This will display the current time on the instrument display.

A3.4 Ozone Analyser

The API 400 O_3 analyser has a 2 line alphanumeric display and 3 status LED display lights on front panel. The display is divided into 4 fields, Mode Field, Key Definition, Message and Concentration.

1. In normal operation, the Mode field will show "SAMPLE", the SAMPLE LED illuminated and the CAL and FAULT LEDs off. Check these and record on precalibration checklist.

2. If the red FAULT light is flashing, a warning message has been generated and is still active due to some instrument operating parameter falling outside of the preset levels. If the FAULT light is flashing, two additional buttons will be identified in the Key Definition area of the display, namely MSG (message) and CLR (clear). Press the message button and record the warning message given in the message area of the screen and press clear.

3. If the red "FAULT" light is off and a message display is visible, a fault has occurred, but has been automatically rectified. Record the message and press clear.

4. A number of instrument internal operational parameters can be accessed by pressing the test (left hand) button to obtain each parameter in turn. Press this and record the result displayed in the message area of the display against the appropriate parameter on precalibration checklist. When all parameters on the precalibration checklist have been noted, press the test button once more. This will display the current time on the instrument display.

A3.5 Air Sampling Manifold (where fitted)

Record the following checks on the precalibration checklist.

1. Check that the sample manifold is intact and shows no sign of possible leakage.

2. Check that the blower motor is operating by listening and feeling for vibration on the motor housing.

3. Check that the instrument sample inlet tubes are connected to the manifold and the sample inlet port at the back of the rack and that these connections are secure and leak-tight.

A3.6 Modem (where fitted)

1. Check that the AA, TR and MR red lights are displayed on the modem and record on the precalibration checklist.

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A3.7 Zero Air Generator

Check the condition of the scrubbers, two of which are self indicating; silica gel turns from orange to clear and purafil from purple to brown as it becomes exhausted. A diagram of the zero air generator is shown in Figure D5, Appendix D.

1. Check that at least 25% of the silica gel is still orange. If less than 25% of the silica gel is orange proceed to section A3.11 - Changing the Silica Gel.

2. Check that at least 25% of the purafil is still purple. If less than 25% of the purafil is purple, note on the calibration record sheet, but continue with calibration.

3. Check that all connections are secure and tight.

A3.8 Changing the Silica Gel

If it is necessary to change the silica gel proceed as follows.

NOTE: If no silica gel is available, proceed with the full calibration of all analysers as normal, noting the fact that the silica gel needs replacing on the record sheet. Inefficient silica gel will only affect the zero on the CO analyser.

1. Remove the canister containing the silica gel from the zero air assembly. Use two spanners to remove the swagelock compression fittings from the canister.

2. Remove the metal screw top, spring, metal and fabric spacer from the canister.

3. Empty the spent silica gel into a suitable container. The spent silica gel can be regenerated in an oven by the LSO or disposed of. Take care not to breathe in any silica gel dust, as it is harmful.

4. Refill the canister with the fresh silica gel retained on site.

5. The packing order of the components should be as shown in Figure D5.

6. Replace the metal and fabric spacers. Replace the spring. Ensure that the rubber "O" ring is situated in the screw on top of the canister. Screw the metal top of the canister on to the canister.

7. Using two spanners, reconnect the swagelock compression fittings onto the canister. Take care not to crack the sides of the plastic canister by over-tightening the fittings.

8. Mark the date on the "Date of Change" sticker on the silica gel canister.

9. Reassemble the zero air generator assembly.

A3.9 Completion of Precalibration Checks

If any of the above checks are not correct, inform MU before proceeding with calibration.

If all correct, proceed to section A4.

A5 Analyser Calibration Procedure

Results of the calibration will be taken from both the data logger display and the instrument's display and recorded on the calibration record sheets. The on-site chart recorder is to be used to determine that the instrument has fully stabilized in its response to the gas sample being introduced at its inlet.

When closing the gas cylinder valves care should be taken not to overtighten the valves on the gas regulator. Overtightening can damage the needle valve mechanism resulting in the outlet valve failing to open. The main valve on the top of each cylinder should, however, be tightly closed to avoid venting the cylinder.

In order to have a full and complete set of instructions for each analyser, instructions for opening gas cylinder valves are contained within the calibration procedure for each analyser. However, when all analysers are being calibrated, it will be advantageous for all cylinders to be opened at the same time, after ensuring that the needle valves in the cabinet are closed. All cylinders can then be closed at the same time at the end of the calibration session.

A5.2 Analyser Stability Criteria

Analysers with A and E suffix (ie M100A, M200E, etc) have a built in stability function. This can be accessed by pressing the 'TEST' button on the front panel until 'STABIL' or 'NOx STABIL', as appropriate, is displayed. During calibration, if this value is close to zero (< 1 ppb for NO, NO_X and O_3, < 2 ppb for SO_2 and < 0.5 ppm for CO) then the analyzer can be considered to have stabilised.

A5.3 CO Analyser

The two-point calibration of a carbon monoxide analyser will be carried out as follows:

1. Record the instrument number and instrument running range on the calibration record sheet.

2. Switch CO "out of service" by pressing the "Cal" button on the front panel **once** only. This allows calibration data to be flagged. Do not press "Cal Z" or "Cal S". The sample light should now flash.

3. (a) Uncap CO zero air inlet situated on the front of the instrument rack, or where a zero air cylinder is supplied, connect the tubing and turn the cylinder on.

   (b) If fitted turn the CO inlet selection valve from "CO AMBIENT" to "CO WEEKLY ZERO / SPAN".

4. Connect the zero air generator to this zero air inlet. Plug in or switch on zero air generator. Check that flow indicator shows a flow of 1.9 ± 0.1 litres per minute. Adjust if necessary using the tap on the output of the zero air generator. Where a zero air cylinder is used, ensure there is sufficient pressure or flow as appropriate.

5. Allow the analyser to stabilise on zero air for a period of not less than 10 minutes. Verify that stabilisation has occurred on the chart recorder, i.e. the CO recorder trace does not vary by more than 1 scale division in one centimetre along the time axis. The CO trace is channel 4 and is coloured blue.

6. Record three consecutive CO readings from the data logger and instrument display, i.e. after 3 ten second updates on the data logger display.

7. Switch off the zero air generator and disconnect it from the zero air port. Replace the cap on the zero air inlet and tighten until finger-tight. Then with a spanner, tighten further by one quarter turn.

8. Open CO in air cylinder main valve by turning it fully anticlockwise. Read cylinder pressure from right hand dial and cylinder number from tag on cylinder, and enter these on the calibration record. Do not attempt to use the cylinder if the pressure indicated is less than 300 psi. In this event contact MU.

9. Adjust the regulator secondary pressure to 15 psi, as read from left hand dial, by turning regulator primary (right hand) valve. Slowly open the regulator outlet (left hand) valve fully.

10. By gradually turning the CO calibration gas control valve inside the hut, adjust the flow through the flow meter to produce 1.0 (±0.1) litres per minute.

11. Allow the analyser to stabilise on this sample for a period of not less than 10 minutes. Ensure that the flow measured by the flow meter remains stable during this time. Adjust the flow, if necessary, to 1 litre per minute. Verify that stabilisation has taken place by examining the chart recorder, i.e. the CO recorder trace does not vary by more than 1 scale division in one centimetre along the time axis.

12. Record three consecutive CO readings from the data logger and instrument display. The signal should show a large deflection from the zero point previously obtained.

13. If fitted turn the CO inlet selection valve from "CO WEEKLY ZERO / SPAN" to "CO AMBIENT".

13. In the following order, fully close the CO calibration gas control valve (in hut), the regulator outlet valve (do not overtighten), the main cylinder valve (tightly) and the primary regulator valve. This traps gas in the regulator, thus ensuring a positive pressure and hence, no ingress of ambient air. Note that the pressure regulator dials should remain at their previous setting, if a marked decrease is observed there is a leak in the system, and the MU should be informed.

14. By considering previous calibration results, satisfy yourself that the calibration has proceeded successfully. The zero value should not differ by more than ~0.25 ppm from the previous calibration. The span calibration value should not differ by more than 5% from that obtained during the previous calibration. If in doubt, repeat the relevant procedure. If the results of this are also unsatisfactory, contact the MU.

15. Change the CO sample inlet filter, following the instructions given in section A5.6.

16. Switch the CO out-of-service control to "off" by pressing “Exit”. The sample light will continue to flash until the end of the current 15-minute mean.

A5.4 NO_X Analyser

The two-point calibration of the nitrogen oxides analyser will be carried out as follows:

1. Record the instrument number and instrument running range on the calibration record sheet.

2. Switch NOx "out of service" by pressing the “Cal” button on the front panel **once** only. This allows calibration data to be flagged. Do not press “Cal Z” or “Cal S”. The sample light should now flash. This allows calibration data to be flagged.

3. Uncap NO_X zero air inlet situated on the front of the instrument rack, or where a zero air cylinder is supplied, connect the tubing and turn the cylinder on.

4. Connect the zero air generator to the zero air inlet of the nitrogen oxides analyser. Plug in or switch on zero air generator. Check that flow indicator shows a flow of 1.9 ± 0.1 litres per minute. Adjust if necessary using the tap on the output of the zero air generator. Where a zero air cylinder is used, ensure there is sufficient pressure or flow as appropriate.

5. Allow the analyser to stabilise on zero air for a period of not less than 10 minutes. The “Stab” value should be less than 1ppb

6. Record three consecutive sets of NO_X, NO and NO_2 readings from the data-logger and instrument display, i.e. after 3 ten second updates on the data logger display.

7. Switch off the zero air generator/cylinder and disconnect it from the zero air port. Replace the cap on the zero air inlet and tighten until finger-tight. Then, with a spanner, tighten further by one quarter turn.

8. Open NO in nitrogen cylinder main valve by turning it fully anticlockwise. Read cylinder pressure from right hand dial and cylinder number from

tag on cylinder, and enter these on the calibration record. Do not attempt to use the cylinder if the pressure indicated is less than 300 psi. In this event contact MU.

9. Adjust the regulator secondary pressure to 15 psi, as read from left hand dial, by turning regulator primary (right hand) valve. Slowly open the regulator outlet (left hand) valve fully.

10. By gradually turning the NO calibration gas control valve inside the hut, adjust the flow through the flow meter to produce 1.0 (±0.1) litres per minute.

11. Allow the analyser to stabilise on this sample for a period of not less than 10 minutes. Ensure that the flow measured by the flow meter remains stable during this time. Adjust the flow, if necessary, to 1 litre per minute. Verify that stabilisation has taken place by checking the "Stab" value is less than 1ppb

12. Record three sets of NO_X, NO and NO_2 readings from the data logger and instrument display. The readings should be taken as close as possible to each other, but need not be in consecutive 10 sec periods if this is not possible. The NO signal should be similar to the NO_X signal, and show a large deflection from the zero point previously obtained. The NO_2 signal should be close to zero.

13. In the following order, fully close the NO calibration gas control valve (in hut), the regulator outlet valve (do not overtighten), the main cylinder valve (tightly) and the primary regulator valve. This traps gas in the regulator, thus ensuring a positive pressure and hence, no ingress of ambient air. Note that the pressure regulator dials should remain at their previous setting, if a marked decrease is observed there is a leak in the system, and the CMCU should be informed.

14. Turning now to the NO_2 in air calibration cylinder, repeat steps 8 to A

15. Record three sets of NO_X, NO and NO_2 readings from the data logger and instrument display. The readings should be taken as close as possible to each other, but need not be in consecutive 10 sec periods if this is not possible. Verify that the readings are reasonable: the NO signal should be close to that obtained while performing the zero calibration, with the

NO_X and NO_2 signals showing approximately the same large deflection from this zero point.

16. Repeat step 13.

17. By considering previous calibration results and the chart recorder trace obtained from the calibration just performed, satisfy yourself that the calibration has proceeded successfully. The zero values on all channels should not differ by more than ~4 ppb from the previous calibration. The span calibration values should not differ by more than 5% from those obtained during the previous calibration. If in doubt, repeat the relevant procedure. If the results of this are also unsatisfactory, contact the MU.

18. Change the NO_X analyser sample inlet filter following the instructions given in section A5.6.

19. Switch the NO_X back in service by pressing "Exit". The sample light will continue to flash until the end of the current 15-minute mean

A5.5 SO_2 Analyser

The two-point calibration of a sulphur dioxide analyser will be carried out as follows:

1. Record the instrument number and instrument running range on the calibration record sheet.

2. Switch SO_2 "out of service" by pressing the "Cal" button on the front panel **once** only. This allows calibration data to be flagged. Do not press "Cal Z" or "Cal S". The sample light should now flash. This allows calibration data to be flagged.

3. Uncap SO_2 zero air inlet situated on the front of the instrument rack, or where a zero air cylinder is supplied, connect the tubing and turn the cylinder on.

4. Connect the zero air generator/cylinder to this zero air inlet. Plug in or switch on zero air generator. Check that flow indicator shows a flow of 1.9 ± 0.1 litres per minute. Adjust if necessary using the tap on the output of the zero air generator. Where a zero air cylinder is used, ensure there is sufficient pressure or flow as appropriate.

5. Allow the analyser to stabilise on zero air for a period of not less than 10 minutes. Verify that stabilisation has occurred by checking the "Stab" value is less than 1ppb.

6. Record three consecutive SO_2 readings from the instrument display, i.e. after 3 ten second updates on the data logger display.

7. Switch off the zero air generator/cylinder and disconnect it from the zero air port. Replace the cap on the zero air inlet and tighten until finger-tight. Then with a spanner, tighten further by one quarter turn.

8. Open SO_2 in air cylinder main valve by turning it fully anticlockwise. Read cylinder pressure from right hand dial and cylinder number from tag on cylinder, and enter these on the calibration record. Do not attempt to use the cylinder if the pressure indicated is less than 300 psi. In this event contact MU.

9. Adjust the regulator secondary pressure to 15 psi, as read from left hand dial, by turning regulator primary (right hand) value. Slowly open the regulator outlet (left hand) valve fully.

10. By gradually turning the SO_2 calibration gas control valve inside the hut, adjust the flow through the flow meter to produce 1.0 (±0.1) litres per minute.

11. Allow the analyser to stabilise on this sample for a period of not less than 10 minutes. Ensure that the flow measured by the flow meter remains stable during this time. Adjust the flow, if necessary, to 1 litre per minute. Verify that stabilisation has taken place by checking the "Stab" value is less than 1ppb.

12. Record three consecutive SO_2 readings from the data logger and instrument display. The signal should show a large deflection from the zero point previously obtained.

13. In the following order, fully close the SO_2 calibration gas control valve (in hut), the regulator outlet valve (do not overtighten), the main cylinder valve (tightly) and the primary regulator valve. This traps gas in the regulator, thus ensuring a positive pressure and hence, no ingress of ambient air. Note that the pressure regulator dials should remain at

their previous setting, if a marked decrease is observed there is a leak in the system, and the MU should be informed.

14. By considering previous calibration results obtained from the calibration just performed, satisfy yourself that the calibration has proceeded successfully. The zero value should not differ by more than ~4 ppb from the previous calibration. The span calibration value should not differ by more than 5% from that obtained during the previous calibration. If in doubt, repeat the relevant procedure. If the results of this are also unsatisfactory, contact the MU.

15. Change the SO_2 sample inlet filter, following the instructions given in section A5.6.

16. Switch the SO_2 back into service by pressing the "Exit" button. The sample light will continue to flash until the end of the current 15-minute mean..

A5.6 Ozone Analyser

1. There is no longer a requirement to perform the two point calibration of the ozone analyser during each site visit. The analyser performs an internal zero/span daily, and this is adequate for data ratification purposes. Calibrations for scaling ratified data are carried out every three months by the QA/QC Unit using a photometer.

A5.7 Changing Analyser Sample Inlet Filters

The analyser sample inlet filters situated on the front of the instrument rack will be changed on a monthly basis at background sites and fortnightly at roadside sites. In the event of a filter appearing badly soiled, the site operator shall inform the MU. Most API analysers have the filter mounted inside the front panel, which hinges down to allow access. Some API-equipped sites have the sample filter holder mounted on the front panel.

Detailed instructions for sample inlet filter changing (panel-mounted holder):

1. Unscrew 2 brass nuts on filter holder.

2. Lift top cover of filter holder off bottom section.

3. Remove "O" ring and used filter.

4. Inspect filter for signs of excessive soiling and inspect "O" ring.

5. Take clean filter from box using the tweezers supplied and insert into base of filter holder.

6. Replace "O" ring in filter holder.

7. Replace top of filter holder and secure with brass nuts. The brass nuts should be hand tightened.

8. Check that teflon lines to filter holder are well secured.

Detailed instructions for sample inlet filter changing (Internal holder):

1. Pull the two black knobs on the top edge of the front panel, and drop the panel down to horizontal

2. Unscrew the black top ring from the holder, and remove along with the glass disc and rubber sealing ring

3. Remove white "O" ring and used filter.

4. Inspect filter for signs of excessive soiling and inspect "O" ring.

5. Take clean filter from box using the tweezers supplied and insert into base of filter holder.

6. Replace "O" ring in filter holder, with notches uppermost.

7. Replace top of filter holder, glass disc and sealing ring; this should be hand tightened.

8. Close the front panel and secure by pushing the black knobs.

A6 Postcalibration Checks, Safety and Security Inspection

As the AURN will report time-averaged concentration data, it is important that operators critically assess the operating condition of the analysers over the time scales used in making discrete measurements. Such assessments may not be possible by consideration of averaged data, as the averaging process may mask such factors as excessive noise or cyclic response changes etc. Information on analyser performance over very short time periods is important, as this will alert network managers as to whether instrumentation faults are developing.

Performing calibration checks at weekly intervals, as detailed previously, is an excellent means of assessing instrument performance characteristics. For instance, excessive rise or fall times, possibly due to flow constrictions having developed, will be easily noted by a simple calibration of the analyser. Similarly, "noisy" analyser outputs, which may be caused by inefficient photomultiplier tube cooling systems, will be immediately apparent by observing the analyser output while sampling zero air.

In addition, seemingly unimportant occurrences, such as an analyser air pump being noisy, may be indicative that the unit is liable to malfunction; this should be reported by the operator.

Obviously, the level to which these problems will be detected will depend upon the experience and familiarity with the equipment of each individual operator, but the operator must critically review the calibration he/she has undertaken and comment on any unusual or suspect results or occurrences. In addition, the postcalibration check sheet must be completed as follows:

1. All checks detailed in section A3 must now be repeated and recorded on the postcalibration check sheet as follows:

    (i) CO Analyser

    (ii) NO_X Analyser

    (iii) SO_2 Analyser

    (iv) Ozone Analyser

    (v) TEOM/FDMS (not required when filter not changed)

(vi) Air Sampling Manifold (not required if precalibration was OK)

(vii) Modem

2. Complete the final check section of the postcalibration check sheet.

3. Complete the calibration end time.

4. Inspect the cabinet inside and outside for security and safety purposes, paying particular attention to electrical and telephone connections. Check for any signs of vandalism, especially if this may affect safety or lead to a deterioration in data quality. Immediate action must be taken to rectify any situation which may lead to members of the public or monitoring personnel being at risk.

5. Check that the roof area and fittings are secure, that there are no loose items left on the roof and then stow the ladder safely inside the hut.

6. Check that all cylinders except the CO autocal cylinder are firmly closed and the cylinder store locked.

7. Ensure the cabinet is clean and tidy.

8. Upon completion of the calibration and on returning to your office, photocopy the entire check-lists and calibration sheets. These copies should be faxed to the MU, fax number 0207 261 1425 and also to the QA/QC unit, fax number 0870 190 6610. Keep the copies at your office and when you next visit the site return the original calibration sheets to the monitoring site. In this way a backup will be kept of the calibration history of all the instruments.