



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

TECHNICAL SERVICES DIVISION
QUALITY ASSURANCE PROJECT PLAN
STANDARD OPERATING PROCEDURE

AIRMON SOP 105
DMS DATA REVIEW

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TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1. PURPOSE	4
2. SUMMARY OF METHOD	4
3. DEFINITIONS	7
4. HEALTH AND SAFETY WARNINGS.....	7
5. CAUTIONS.....	7
6. INTERFERENCES AND LIMITATIONS.....	7
7. PERSONNEL QUALIFICATIONS AND RESPONSIBILITIES.....	8
8. EQUIPMENT AND SUPPLIES	8
9. PROCEDURES.....	8
9.1 Procedure: General DMS Data Review	8
9.2 Procedure: Review DMS Calibration Report	8
9.3 Procedure: Review DMS Time-Series Graph.....	9
9.4 Procedure: Invalidate/Validate Data (Change QC and/or OP codes)	12
9.5 Procedure: Review DMS Chain-of-Custody (COC) Entry	17
9.6 Procedure: DMS Data Review Report.....	18
9.7 Procedure: Entering DMS e-Log Comment	19
9.8 Procedure: Export BAM Ambient Temperature DMS Data	19
9.9 Troubleshooting DMS Issues	20
10. DATA AND RECORDS MANAGEMENT.....	26
11. QUALITY CONTROL AND QUALITY ASSURANCE	27
11.1 Quality Control	27
11.2 Quality Assurance.....	28
12. AUTHORS	29
13. REFERENCES.....	29
14. APPENDIXES	30
14.1 Appendix A: Data Recovery using iPort	30
14.2 Appendix B: BAM Data Recovery.....	39

TABLE OF FIGURES:

Figure 1: DMS Data Flow Chart.....	5
Figure 2: DMS Organization	6
Figure 3: DMS Time-Series Graph Screen.....	9
Figure 4: DMS Review Data pull-down menu	11
Figure 5: DMS Data Review 'Save' screen.....	12
Figure 6: Reviewed DMS data indicating 'R'	12
Figure 7: DMS Time Series Graph Pull-down Menu	14
Figure 8: Change QC Codes Pull-Down menu.....	15
Figure 9: Change Op Codes Pull-Down Menu	15
Figure 10: DMS Log Comment Window	16
Figure 11: DMS Edit Data Screen	17
Figure 12: DMS 'C' Flagged Data Value.....	18
Figure 13: DMS Data Review Log Preview Screen.....	19
Figure 14: DMS BAM Temperature Time-Series Graph	20
Figure 15: Example of Missing DMS Data at Midnight	21
Figure 16: Example of 1-minute DMS Outlier Data Value.....	22
Figure 17: Check of a DAS Serial File	23
Figure 18: Example of a DAS Data log.....	24
Figure 19: Example of a DAS Event Viewer log	25
Figure 20: Example of a DMS Time Series Graph for Parametric Data	26

1. PURPOSE

This Standard Operating Procedure (SOP) describes general Data Management System (DMS) Level One Data Review by an air-monitoring AQIS. This SOP assumes an existing working knowledge of DMS and familiarity with its basic features and navigation. Additional detailed information is available in the DMS User Interface HELP menu.

2. SUMMARY OF METHOD

The DMS automatically collects processes and stores BAAQMD air-monitoring data. This includes 1-minute, 5-minute, and hourly instrument data as well as instrument parametric data collected by station Data Acquisition System's (DAS's). The air-monitoring station operator performs level-one data review in the DMS thru the User Interface (UI). The DMS UI has interactive screens that display data in both tabular and time-series graph formats.

Typical station operator DMS data review procedures include:

- Examination of the DMS reporting status for missing station/instrument/parameter data
- Analysis and review of individual time-series ambient pollutant and instrument parametric data graphs
- Evaluation of nightly auto-calibration ('autocal') or manual calibration results
- Data validation/invalidation as needed
- Maintenance of station and instrument DMS e-logs for assigned sites, instruments and equipment

Air Monitoring Data Flow

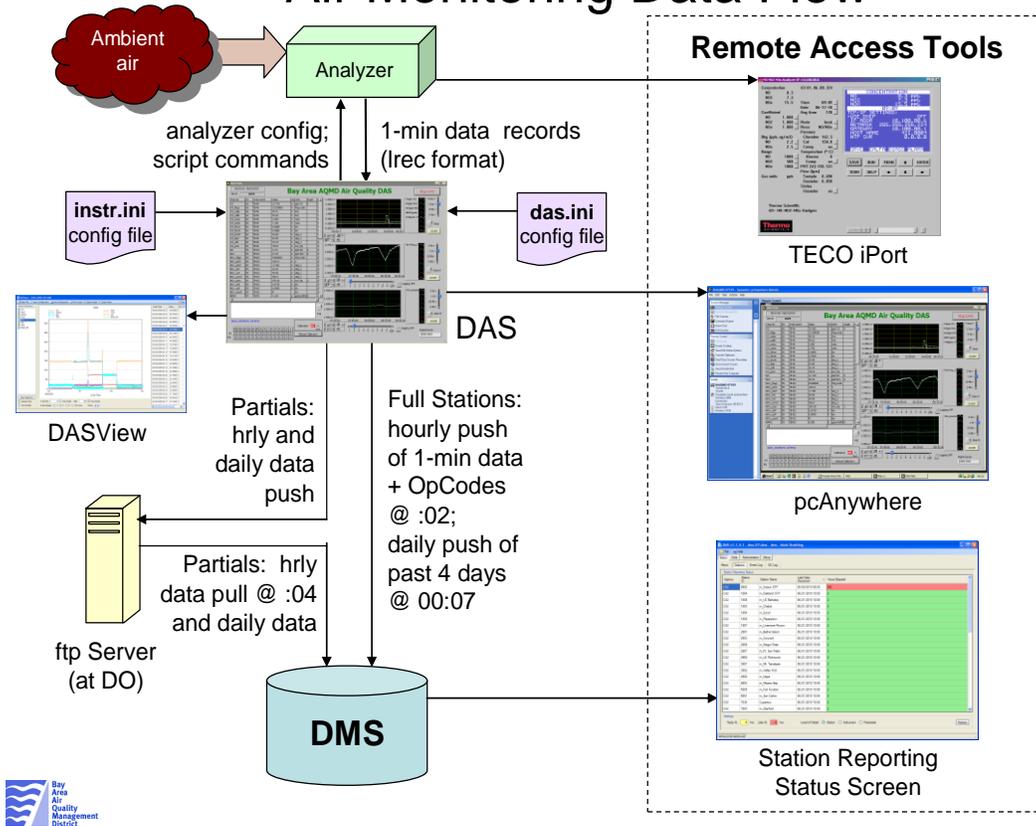


Figure 1: DMS Data Flow Chart

DMS Organization

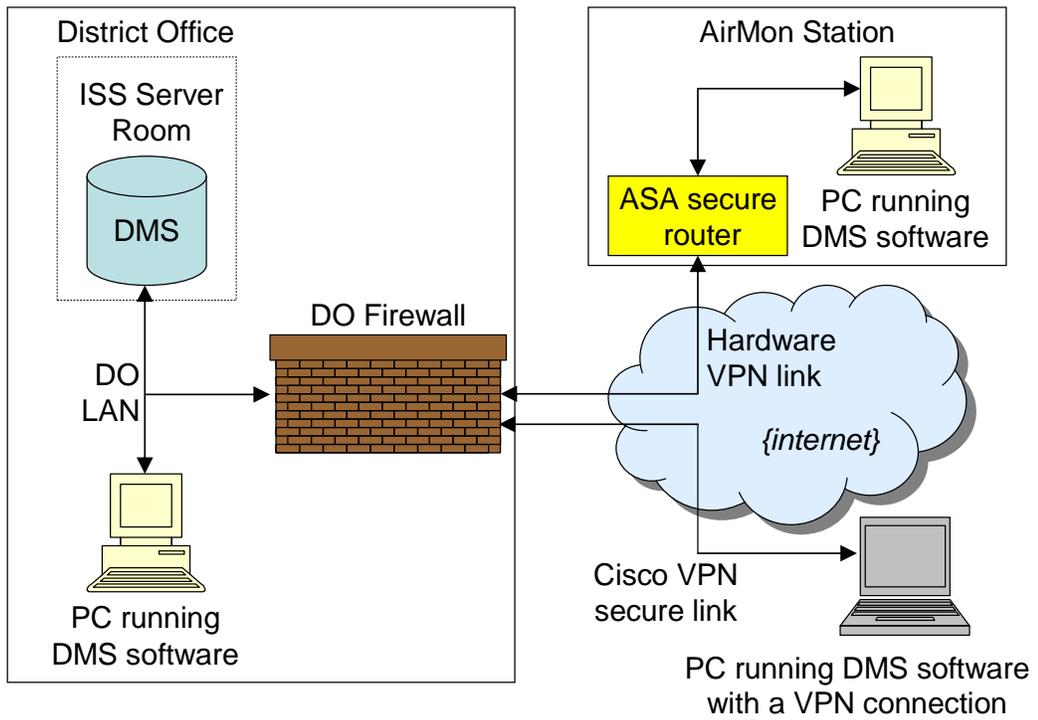


Figure 2: DMS Organization

3. DEFINITIONS

AQS	EPA Air Quality System database
AQIS	Air Quality Instrument Specialist
BAAQMD	Bay Area Air Quality Management District
CARB	California Air Resources Board
CFR	Code of Federal Regulations
CoC	Chain of Custody
DAS	Data Acquisition System
DMS	Data Management System
eLog	DMS Electronic instrumentation and station log
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
MQA	Meteorology and Quality Assurance Section
MQO	Measurement Quality Objective
NAAQS	National Primary And Secondary Ambient Air Quality Standards
OpCode	DMS Operation code (number)
PEG	BAAQMD Performance Evaluation Group
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QCCode	DMS QC Code (number)
SOP	Standard Operating Procedure
UI	User Interface

4. HEALTH AND SAFETY WARNINGS

NOTE: This section is not applicable and is left intentionally blank.

5. CAUTIONS

NOTE: This section is not applicable and is left intentionally blank

6. INTERFERENCES AND LIMITATIONS

NOTE: This section is not applicable and is left intentionally blank.

7. PERSONNEL QUALIFICATIONS AND RESPONSIBILITIES

Personnel should meet all minimum BAAQMD requirements and qualifications for an Air Quality Instrument Specialist (AQIS) I or II, Senior AQIS, and/or Supervising AQIS.

- The station operator AQIS is responsible for level-one DMS data review and validation.
- BAAQMD MQA personnel manage the DMS and complete all final data validation, review and submittal to EPA.

8. EQUIPMENT AND SUPPLIES

- Data Acquisition System (DAS) with appropriate cables and adaptors (RS-232, DB9, CAT-5, etc.) connected to the BAAQMD DMS
- Computer with connection to the District's DMS server

9. PROCEDURES

9.1 PROCEDURE: GENERAL DMS DATA REVIEW

The station operator reviews the following DMS items on a regular basis: Check District email account for any DMS autoQC test result notifications. On hourly data ingest, the DMS automatically performs various AutoQC data level 0.5 checks on 1-minute data records. E-mails are sent to the AQIS when an AutoQC check test result is unacceptable. A table summarizing the current DMS AutoQC checks is located on the District network drive at: <H:\Tech\DMS\autoQC\Standard autoQC tests.xlsx>

1. Run a "Calibration % Difference from True" export preview
2. Review the appropriate DMS time-series graphs and/or tabular data for all assigned full station, partial station and particulate instrumentation; validate/invalidate data as needed, complete data Chain of Custody (CoC) comments as needed
3. Run a "Review Summary" export preview to ensure that all data has been reviewed with no data review gaps
4. It is the operator's responsibility to ensure that review of any backfilled DMS data is completed upon notification by MQA of backfilled data ingest.
5. Update/maintain instrument and station e-logs as needed

9.2 PROCEDURE: REVIEW DMS CALIBRATION REPORT

The operator reviews nightly auto-cal results on a regular basis.

1. Select the DMS *Data < Export* screen.
2. Right-click on "Named Export" scroll-down list and select the appropriate calibration report;
3. Click the 'Preview' button to view the file-export results;

4. Check that all the nightly auto cal responses are within the recommended Quality Control (QC) and Measurement Quality Objectives (MQO) limits.

9.3 PROCEDURE: REVIEW DMS TIME-SERIES GRAPH

The operator reviews the appropriate DMS time-series graphs and/or tabular data for all assigned full station, partial station and particulate instrumentation on a regular basis as follows;

1. Select the **DMS Data/Time-Series Graph** screen (Figure 3: DMS Time-Series Graph Screen)
2. Select the appropriate graph from the pull down menu;
3. Depending on the review period time frame desired, the operator should select the appropriate time duration;

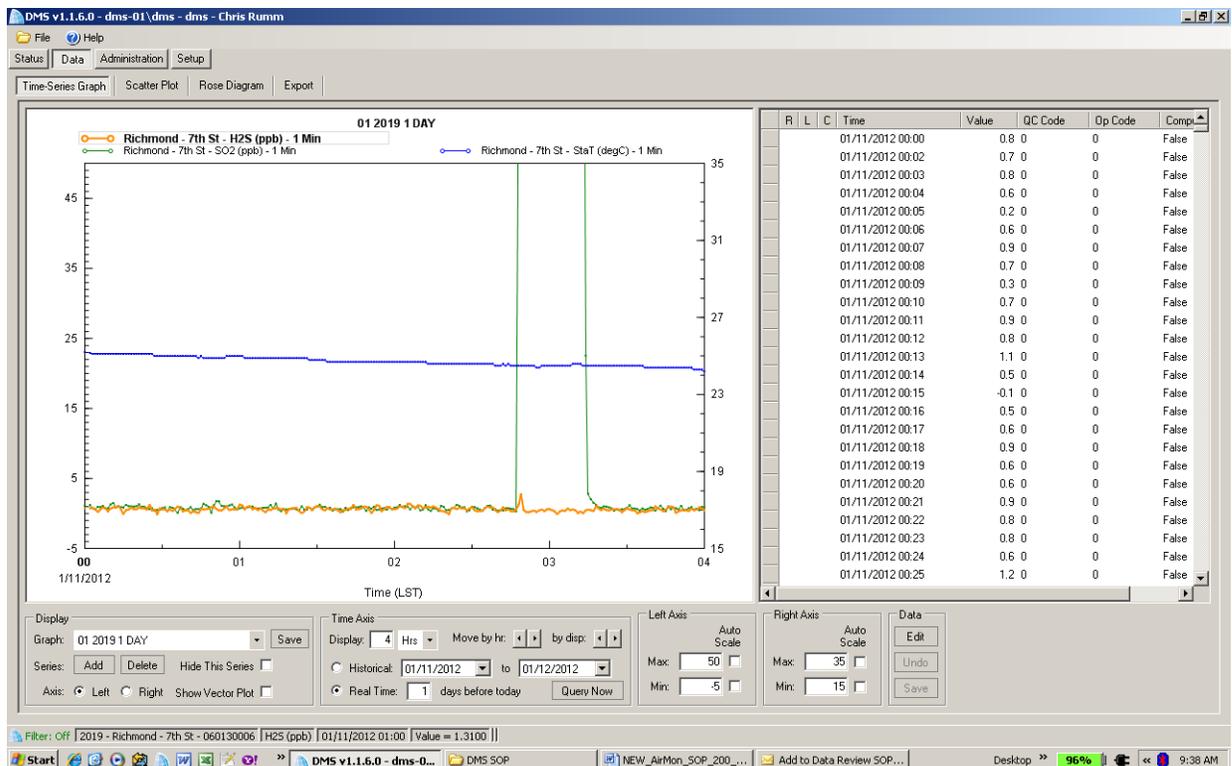


Figure 3: DMS Time-Series Graph Screen

4. Scroll through the graph for the time period under review; investigate any data points of interest. Confirm correct QC and OP coding for any periods of manual cal scripts, data invalidation using control bits, etc. Review data graph for signs of system malfunction such as:
 - a. A straight trace for several hours (other than minimum detectable baseline data).
 - b. Erratic instrument response such as spikes that are sharper than is possible for typical ambient pollutant concentration and normal instrument response time.
 - c. A long steady increase or decrease in instrument response.

- d. A cyclic pattern of the trace with a definite time period indicating an abnormal sensitivity to changes in temperature or parameters other than the pollutant concentrations.
 - e. Periods where the trace drops below the zero baseline.
 - f. Occasional negative concentration values possibly resulting from analyzer zero drift or analyzer noise when pollutant concentrations are near zero. DMS autoQC checks may be triggered for negative ambient data values outside of an acceptable range.
 - g. Consistent negative readings (more than two successive hours) indicate an analyzer problem and should be investigated. DMS autoQC checks may be triggered for negative ambient data values outside of an acceptable range.
 - h. Pollutant concentrations spatially across each pollutant network can be compared to determine if the values appear reasonable for the meteorological conditions. Investigate any sites that appear to be abnormally high or low compared to the rest of the network.
 - i. Investigate anomalies such as repeating values or patterns, and high rates of change.
 - j. Qualitatively cross check diurnal patterns at each monitoring site between pollutants and with other local pollutant data. For example: carbon monoxide (CO), nitric oxide (NO), and non-methane hydrocarbons (NMHC) concentrations usually increase and decrease together; NO and ozone (O₃) cannot coexist at high concentrations; ozone concentrations are generally low overnight and peak in the early to mid-afternoon hours.
5. Invalidate/validate data as needed (refer to Section 9.4 of this SOP)
 6. Ignore data gaps of less than 15 minutes within an hour when:
 - a. 45 minutes of valid data exist for that hour (and a valid hourly average can be generated)
 - b. ambient pollutant concentrations have not significantly changed during the gap
 - c. ambient pollutant concentrations are well below CA or EPA AQ standards
 - d. **NOTE:** If any of the above conditions are not met, data recovery should be conducted if feasible to restore or correct missing or invalidated data for ambient parameters. (see appendix 14.1 and 14.2 of this SOP)
 7. After the data review is complete:
 - a. Right click on the graph and select '**Review Data**'. (**NOTE:** Please Figure 4: DMS Review Data pull-down menu)
 - b. Ensure the '**Ambient Parameters Only**' box at the top of the dialog box is checked. Ensure that all appropriate parameters are checked. Select '**All**' if needed. (**NOTE:** see Figure 5: DMS Data Review 'Save' screen)
 - c. Confirm the '**Date Range-Start**' and '**End**' in the '**Mark as Reviewed**' box shows the appropriate starting and ending dates with start time at 00:00 and end time at 23:59.
 - d. Enter any data CoC comment as needed; comments entered here will be viewable by selecting '**Chain of Custody**' when a data point or ranges of data points are selected.
 - e. Hit '**Save**'

- f. The letter 'R' indicating that data has been reviewed should appear on the left side of the tabular data next to each reviewed data value; (**NOTE:** see Figure 6: Reviewed DMS data indicating 'R')

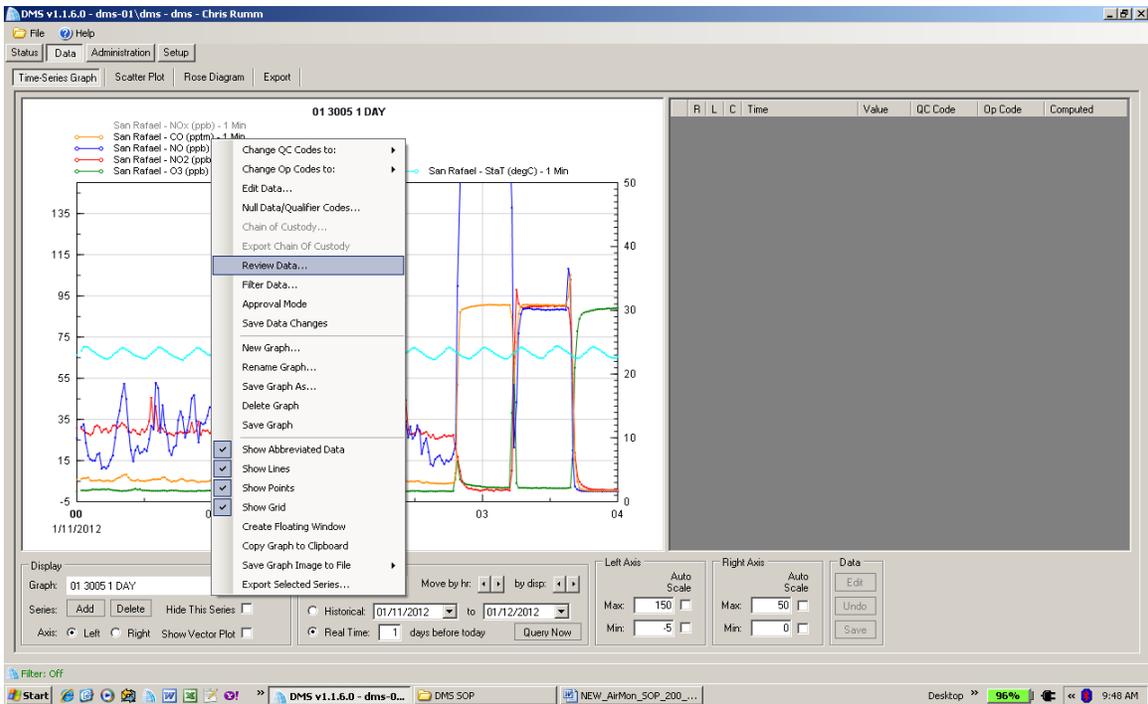


Figure 4: DMS Review Data pull-down menu

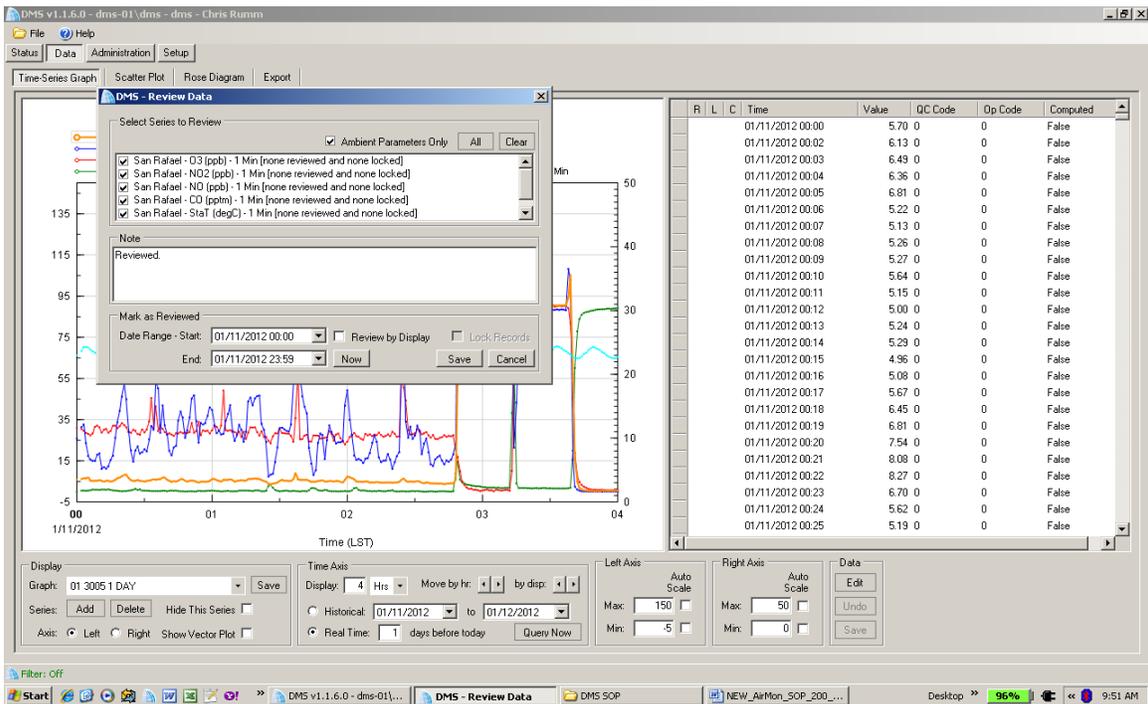


Figure 5: DMS Data Review 'Save' screen

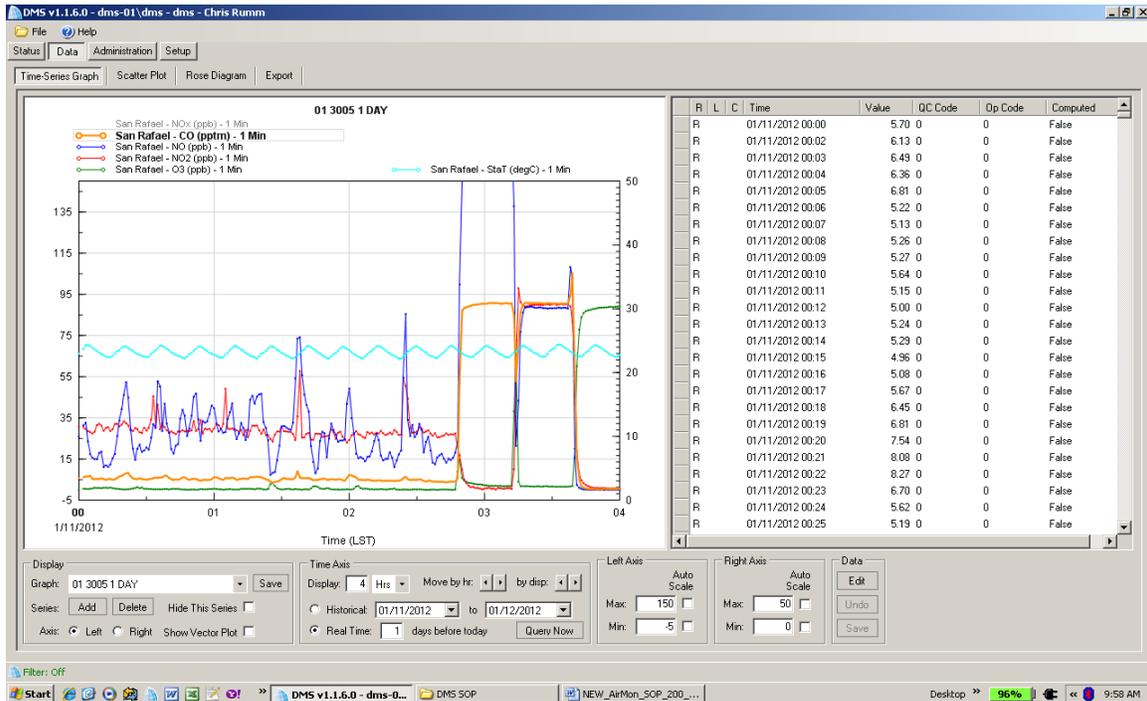


Figure 6: Reviewed DMS data indicating 'R'

9.4 PROCEDURE: INVALIDATE/VALIDATE DATA (CHANGE QC AND/OR OP CODES)

- Precision data **will be invalidated** when auto cal and/or manual calibration result is attributable to station calibrator issues or station zero air issues, and is documented in the appropriate DMS e-log(s) and DMS CoC comment.
- Precision data **will not be invalidated** when auto cal and/or manual calibration result is attributable to instrument performance issues and is documented in the appropriate DMS e-logs.
- Ambient 1 minute data **will be invalidated** if data is deemed not correctable, (i.e. instrument component failure), and is documented in the appropriate DMS e-log(s) and DMS CoC comment.
- Negative 1 minute ambient data invalidated by DMS zero QC checks resulting from negative zero drift or misadjusted instrument will remain invalid if **all three** criteria listed below are met:
 - 45 minutes of valid data exist for that hour (and a valid hourly average can be generated) **and;**
 - Ambient pollutant concentrations are not likely to be significantly changed during the period **and;**
 - Ambient pollutant concentrations are well below (up to 75% of NAAQS) CA or EPA AQ standards.

- Ignore data gaps of less than 15 minutes within an hour when all three criteria listed below are met:
 - 45 minutes of valid data exist for that hour (and a valid hourly average can be generated) **and;**
 - ambient pollutant concentrations have not significantly changed during the gap **and;**
 - ambient pollutant concentrations are well below (up to 75% of NAAQS) CA or EPA AQ standards
- If any of the above conditions are not met, data recovery should be conducted if feasible to restore or correct missing or invalidated data for ambient parameters. (see appendix 14.1 and 14.2 of this SOP)
- **NOTE:** Ambient data correction and adjustment will be performed on hourly data only, by MQA, with justification provided by AQIS (i.e. pump pressure shifts, instrument miss-adjustment, data shift or data drift caused by instrument component failure).
- The operator **invalidates/validates** DMS data for the following:
 - Instrument and/or support equipment malfunction or failure
 - Inability to pass a required QC check
 - Periods when an instrument and/or its sample path are off-line, undergoing maintenance or repairs and/or when DMS data is not ambient data
 - Periods when data does not meet BAAQMD, PEG and/or CARB and/or EPA performance or system audit criteria and is not the result of audit equipment issues or performance
 - Periods of data from an instrument that fails required residence time criteria
 - Suspect data values (QC code = '5') **must** be evaluated and changed to either valid (QC code = '0') or invalid (QC code = '9')
 - Periods of data between nightly auto cal responses outside of acceptable MQO limits

The operator **may** elect to change QC or Op codes for the following:

- **Span/mid-range auto cal and/or manual calibration data may be invalidated** when auto cal and/or manual calibration result is attributable to station calibrator issues or station zero air issues
- Occasional 1-minute outlier data values attributable to instrument electronic anomalies (non-ambient data spikes, etc.)
- Periods when reactive materials, solvents and excessive particulates in the probe and sample inlet tubing could be possible interferences. DMS data may be invalidated if sampling system contamination is suspected.
- **NOTE:** the operator **must** make a data CoC comment (required in DMS to save QC or Op code changes) and enter comments in the appropriate DMS e-logs.

Two procedures may be used by the operator to change QC and Op codes:

1. Method A:
 - a. Select the appropriate data values

- b. Right-click to display the pull-down menu; (Figure 7: DMS Time Series Graph Pull-down Menu)
- c. Select either **Change QC Codes to:** or **Change Op Codes to:** (Figure 8: Change QC Codes Pull-Down menu; Figure 9: Change Op Codes Pull-Down Menu)
- d. Select the appropriate new QC or Op code
- e. Select **Save**
- f. Enter the appropriate comment in the DMS Log Comment (Figure 10: DMS Log Comment dialog box and select the **Enter Comment** tab to save; Select the **Cancel Save and undo Changes** to cancel;
- g. **NOTE:** You must save the changes to the data before the Chain of Custody window will open.

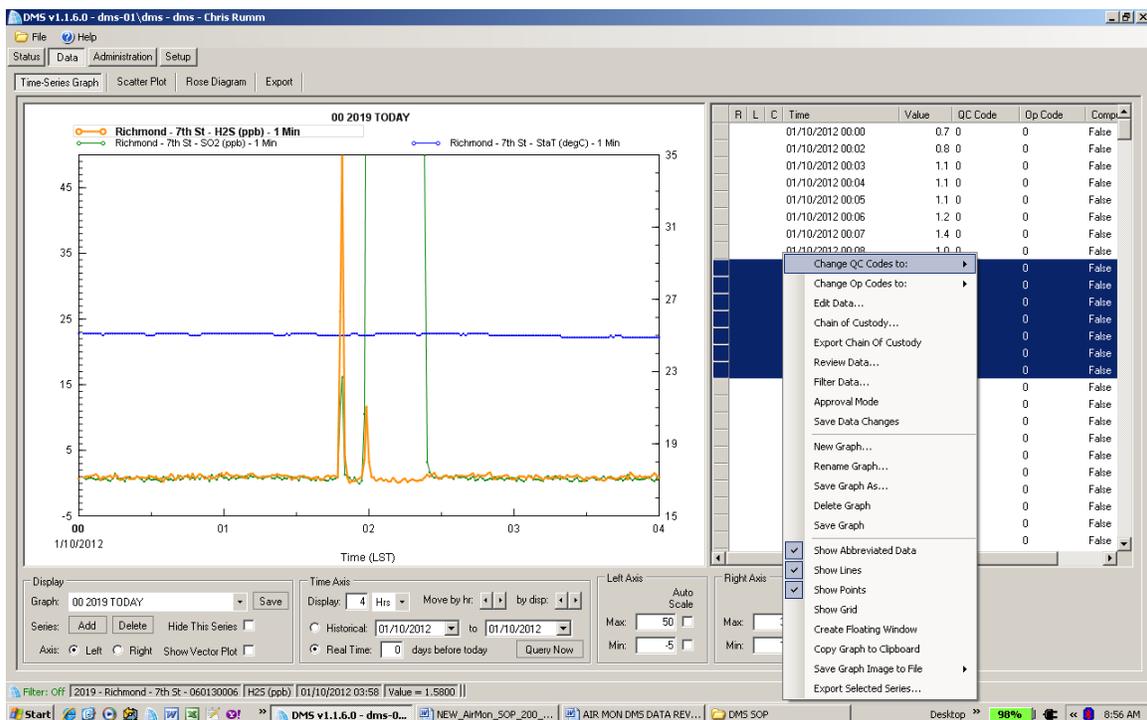


Figure 7: DMS Time Series Graph Pull-down Menu

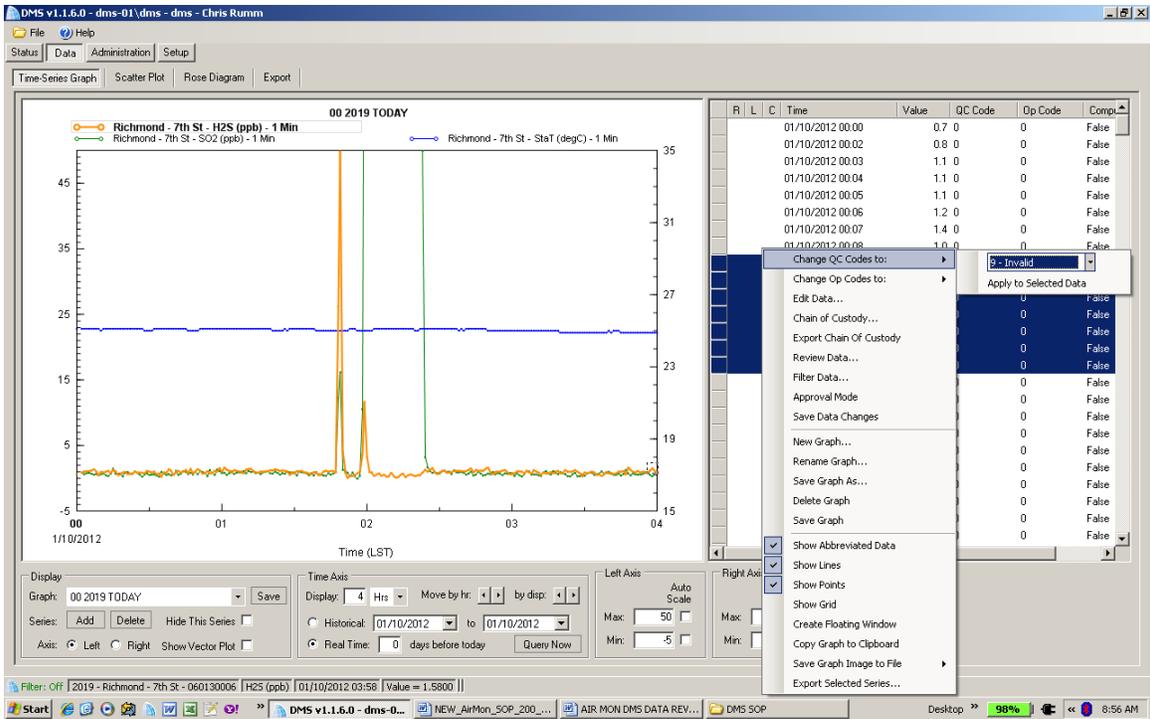


Figure 8: Change QC Codes Pull-Down menu

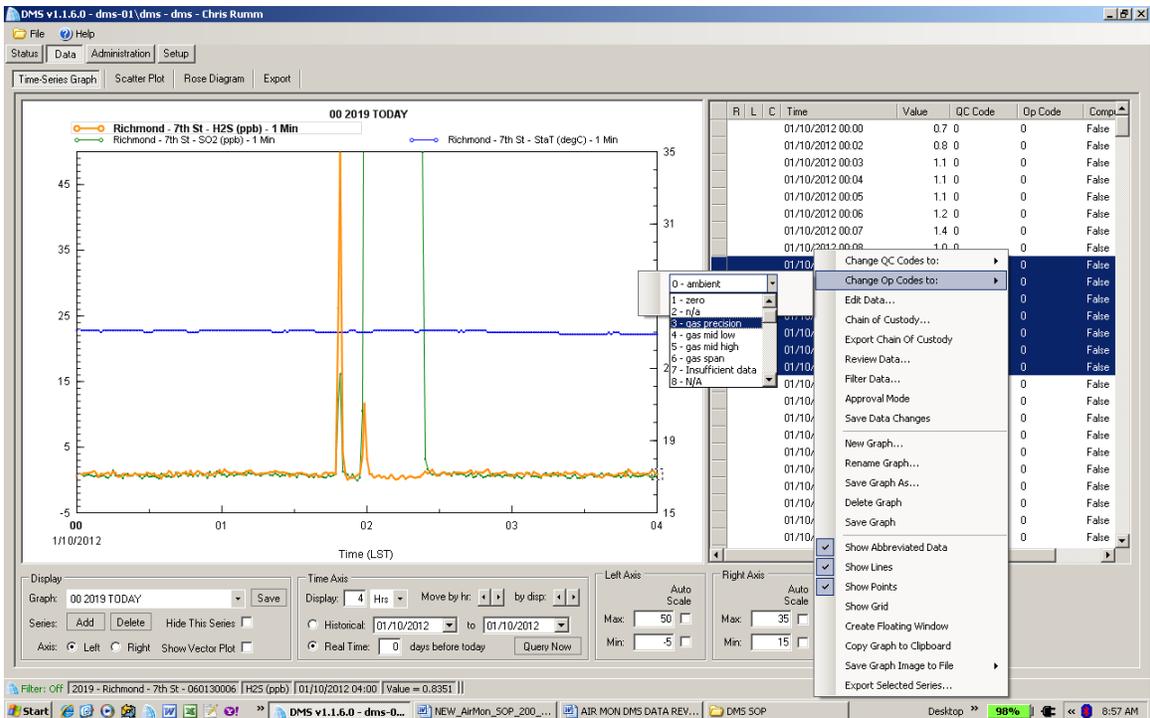


Figure 9: Change Op Codes Pull-Down Menu

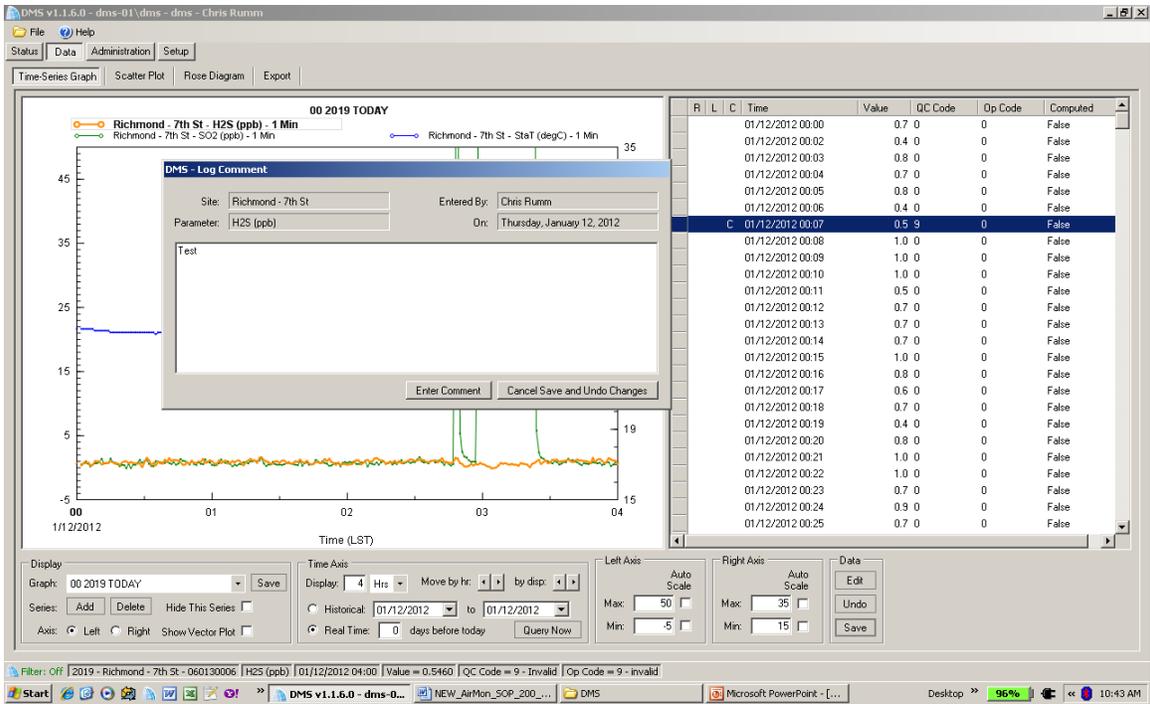


Figure 10: DMS Log Comment Window

2. Method B:

- a. Select the appropriate data values;
- b. Select the **Edit** tab; a new window should open :

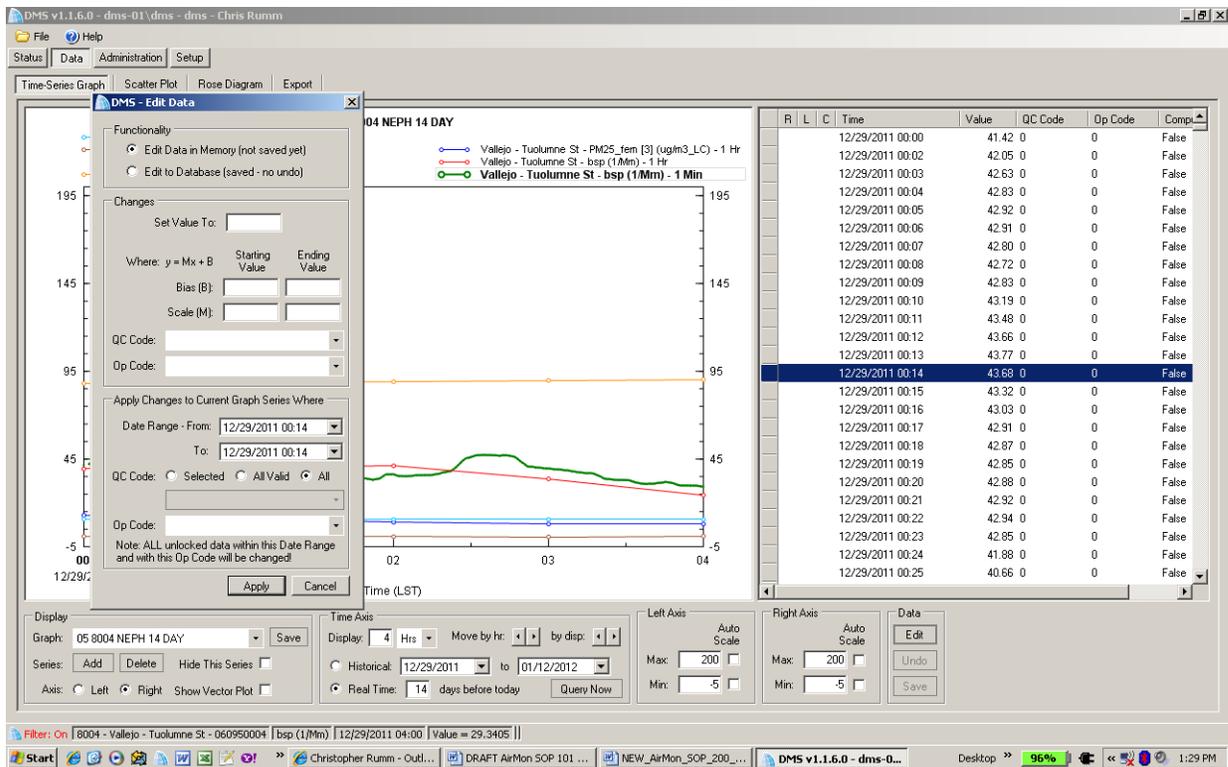


Figure 11: DMS Edit Data Screen

- c. Change the appropriate QC codes and/or Op codes; use the pull-down menu to make a selection; **NOTE:** Do not modify any data values.
- d. **Select Apply;**
- e. **Select Save;** a DMS 'Log Comment' text box will appear
- f. Enter a new comment;
- g. **Select Enter Comment** to save or **Cancel Save and Undo Changes** to cancel;

9.5 PROCEDURE: REVIEW DMS CHAIN-OF-CUSTODY (COC) ENTRY

Any modifications made to the data are documented and retained in the DMS Chain of Custody (CoC) table. Each data point that has undergone a change of value or been assigned a new QC or Op code has its own chain of custody (or history) associated with it. A data point with a Chain of Custody record is marked with a 'C' in the data table (Figure 12: DMS 'C' Flagged Data Value); the operator should review any data values flagged 'C';

To review a chain of custody record:

1. Select the row(s) of data or data point(s) that have been modified with a 'C' flag,
2. Right-click the selection;
3. **Select Chain of Custody;**
4. The DMS Chain of Custody window will open displaying the comment(s)
5. **OPTIONAL:** Chain of Custody Reports are available in the DMS *Data < Export* screen for the operator to use and modify.

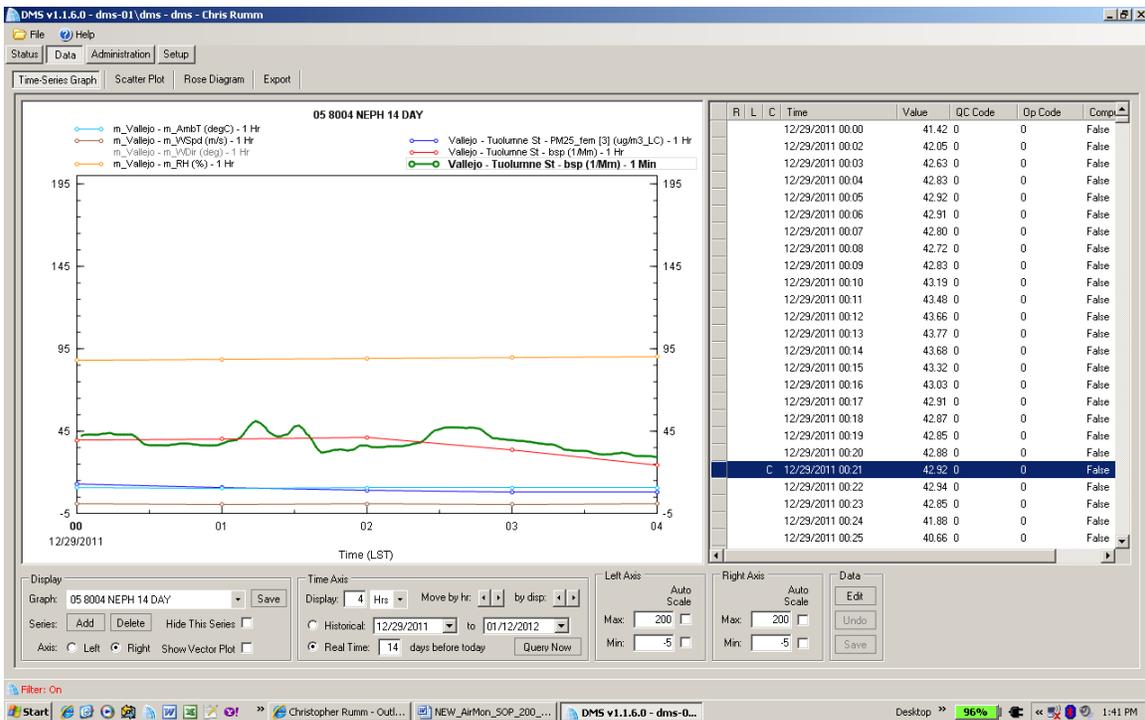


Figure 12: DMS 'C' Flagged Data Value

9.6 PROCEDURE: DMS DATA REVIEW REPORT

1. Select the DMS *Data* < *Export* screen
2. Select the appropriate **Named Export** from the pull-down list;
3. Select **Preview** to view; (see Figure 13: DMS Data Review Log Preview Screen)
4. If any data is missing review, the operator shall complete a review of the appropriate data

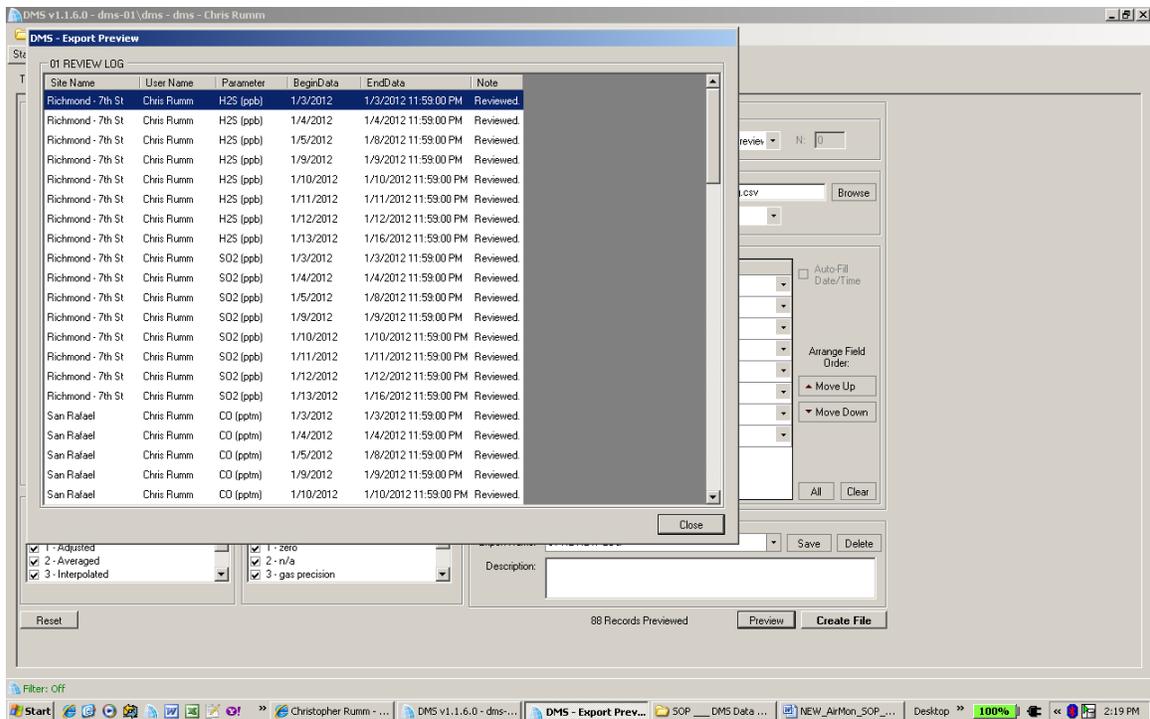


Figure 13: DMS Data Review Log Preview Screen

9.7 PROCEDURE: ENTERING DMS E-LOG COMMENT

Following the completion of any activity with the potential to affect data, including instrument service or maintenance, QC activities, etc., the operator should enter applicable information into the appropriate DMS instrument and/or station e-Log.

NOTE: The instrument must already be entered and activated in the *DMS < Select Instrument* screen. Only staff with DMS instrument management rights can move and activate instruments.

1. Go to the *Administrative < Log* screen
2. From the scroll-down '**Site Selector**' tab, select the current station number; select the appropriate Log Query and Export boxes
3. Scroll down to the appropriate instrument; add information concerning the current log entry
4. Select '**Save Comment**'; Select the '**Query Now**' box and check to ensure that the new e-log entry has been correctly saved

9.8 PROCEDURE: EXPORT BAM AMBIENT TEMPERATURE DMS DATA

The station operator may elect to set up a DMS time-series graph of either a BAM or FEM BAM ambient temperature data in order to calculate PM10 run information.

1. Select the *DMS Data/Time-Series Graph* screen
2. Select 'New Graph'
3. Give the new graph a name;
4. Set up graph with the following:

- 1 hour Duration
- Daily avg Aggregation
- Select site, uncheck “ambient parameter only” box, select BAM-AMB Temp
- Graph setup “Real Time” - 14 days displayed

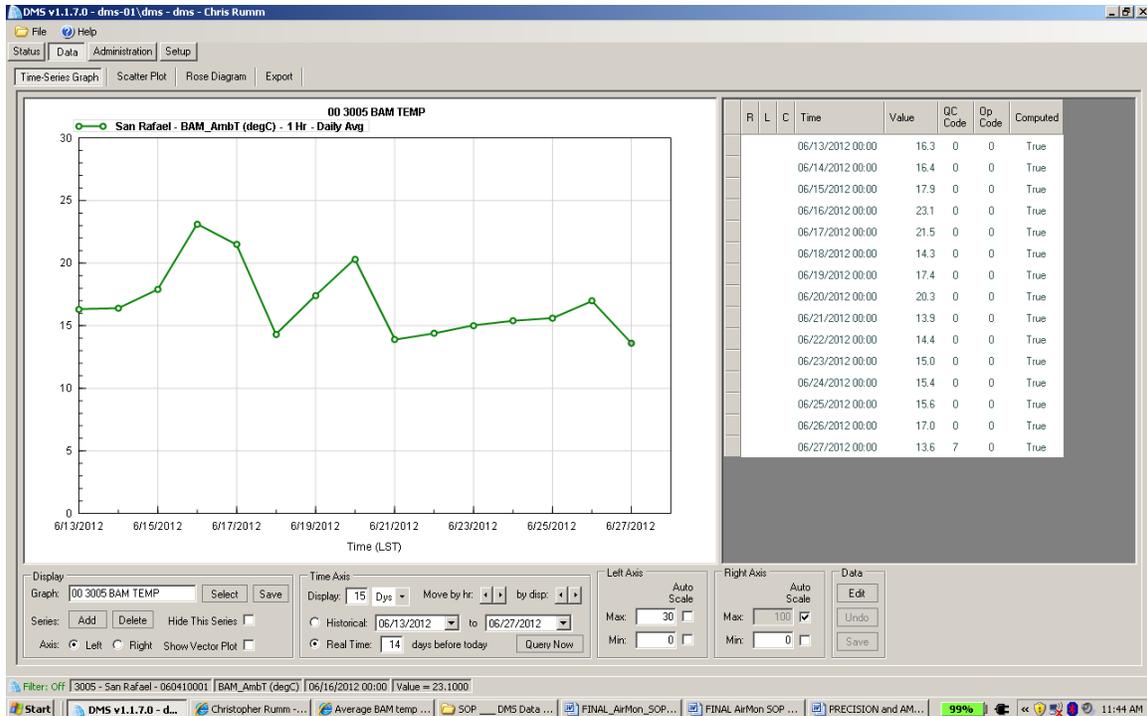


Figure 14: DMS BAM Temperature Time-Series Graph

9.9 TROUBLESHOOTING DMS ISSUES

SYMPTOM: DMS Station/Instrument/Parameter Missing Data

- Review DMS *Status* < *Event Log*
- Check DAS for proper operation including 1-minute, 5-minute, or hourly data updates
- Check DAS serial data files and error logs
- Check station modem and associated hardware for proper operation
- Check instruments and/or data communications hardware
- **NOTE:** efforts should be made to restore or correct missing or invalidated data for ambient parameters for data gaps > 15 minutes in duration; upon completion of any corrective action, the operator may elect to run a manual “DASpush script” (DAS) to update missing data and/or collect data directly from the instrument.

WARNING! DO NOT ATTEMPT DAS PUSH SCRIPT DURING THE STATION DAS'S NORMAL DATAPUSH TIME: between 5 to 10 minutes into the current hour at most stations – request guidance from Sr. AQIS or Supervisor to confirm.

- **NOTE:** Ignore data gaps of less than 15 minutes within an hour when all three criteria listed below are met:
 - 45 minutes of valid data exist for that hour (and a valid hourly average can be generated) **and;**
 - ambient pollutant concentrations have not significantly changed during the gap **and;**
 - ambient pollutant concentrations are well below (up to 75% of NAAQS) CA or EPA AQ standards

If any of the above conditions are not met, data recovery should be conducted if feasible to restore or correct missing or invalidated data for ambient parameters. (see appendix 14.1 and 14.2 of this SOP)

SYMPTOM: Occasional Missing DMS Data Values

- At most BAAQMD air-monitoring stations the operator may observe missing DMS 1-minute data at 1-2 minutes past midnight; this is due to the operation of a DAS program “1-Day DASpush” :

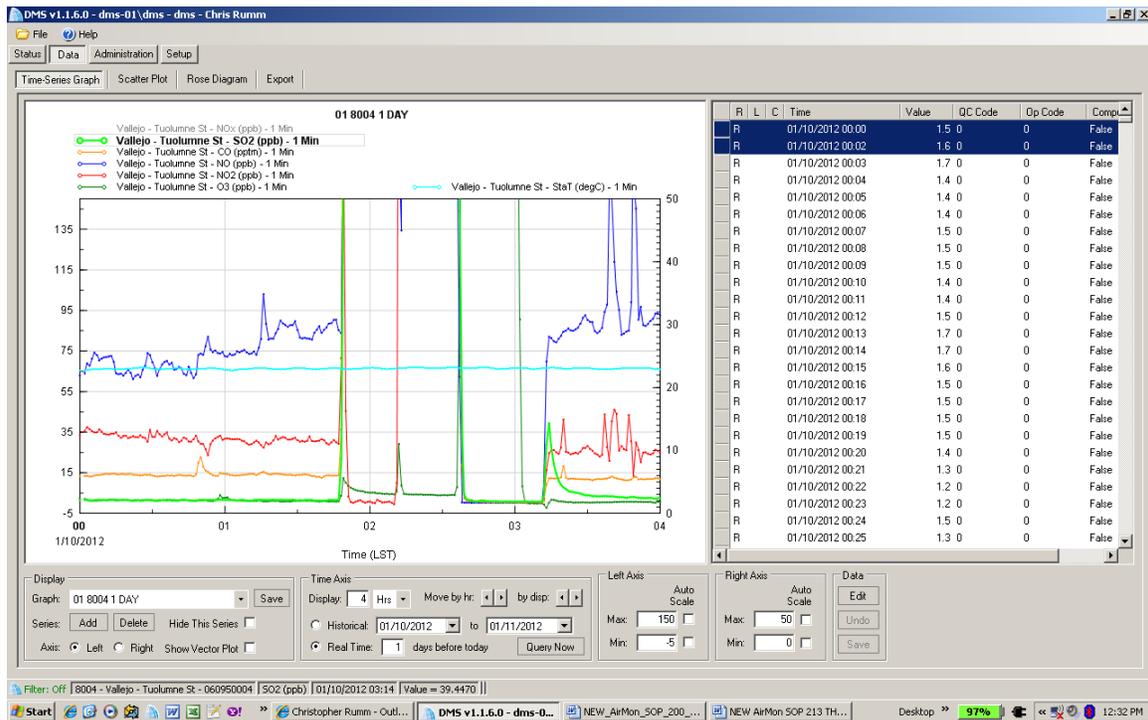


Figure 15: Example of Missing DMS Data at Midnight

- Occasional dropout or outlier data value may be the result of scrambled data input into the DAS serial file; check DAS serial file data values:

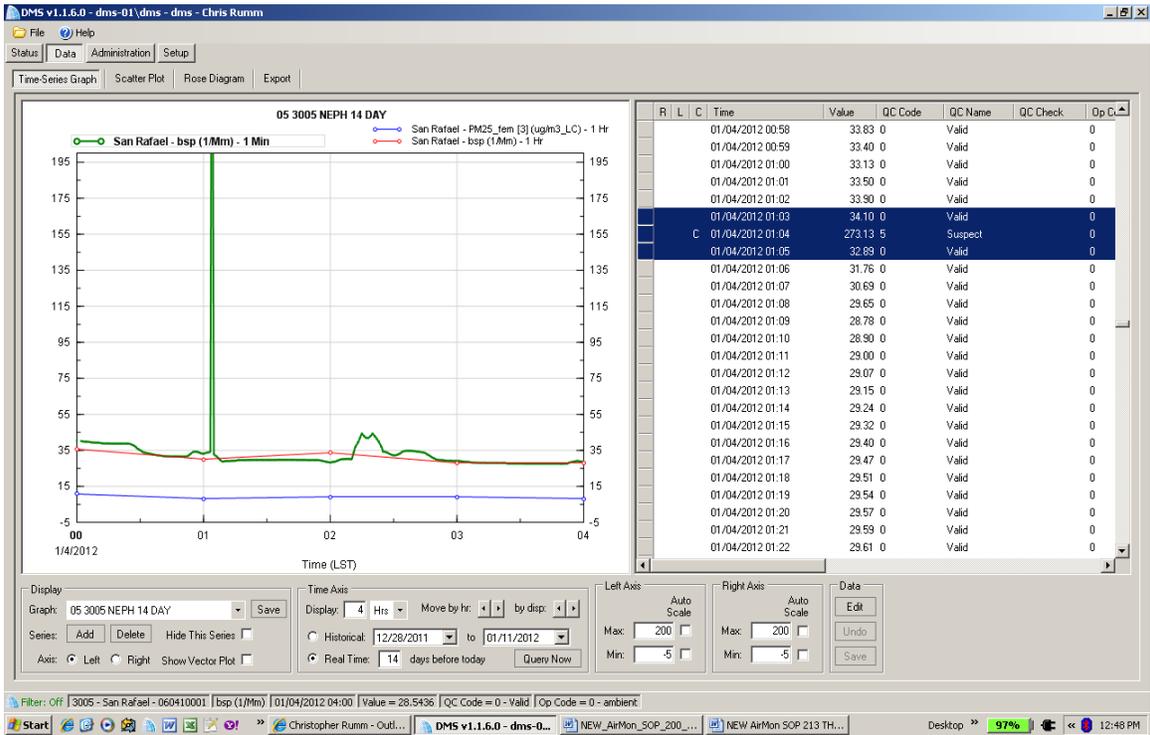


Figure 16: Example of 1-minute DMS Outlier Data Value

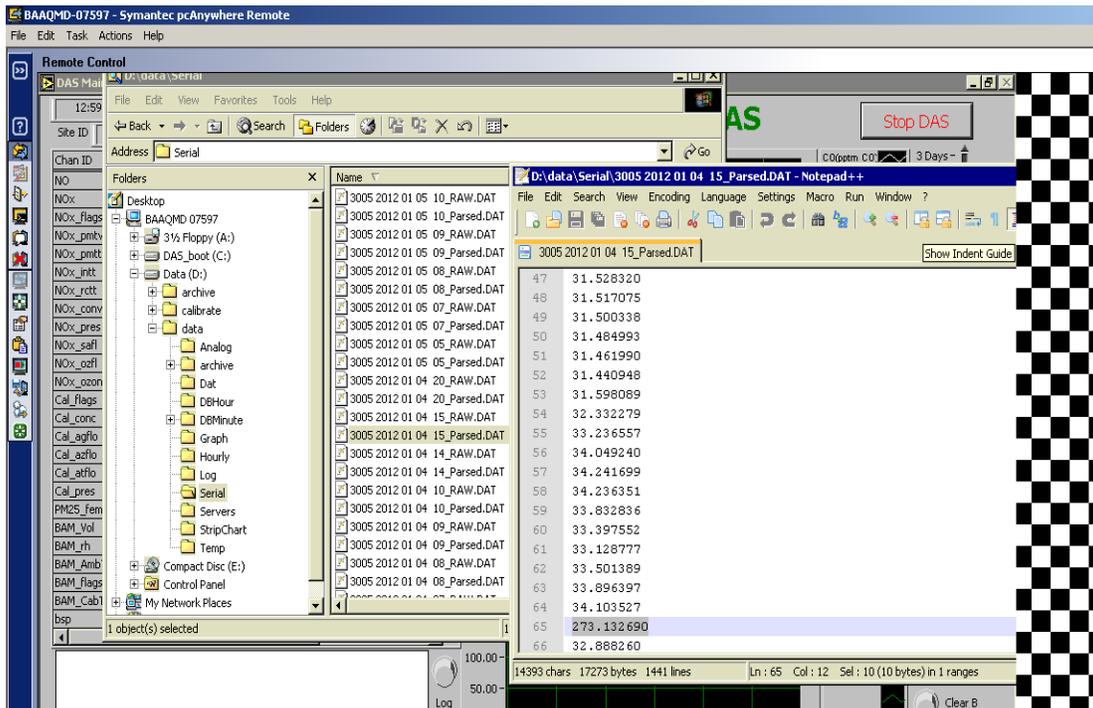


Figure 17: Check of a DAS Serial File

- Operator may elect to check the DAS Data Log to diagnose DAS communication errors:

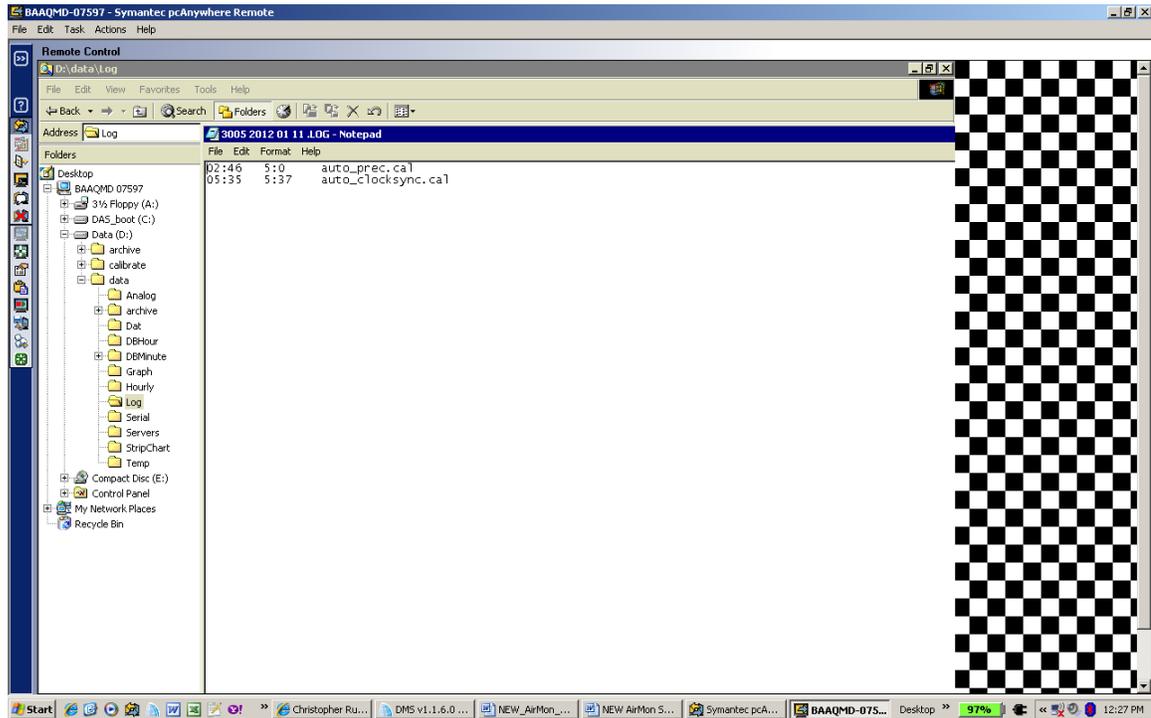


Figure 18: Example of a DAS Data log

- Operator may elect to check the DAS Administrative Tools < Event Viewer > to diagnose DAS communication errors:

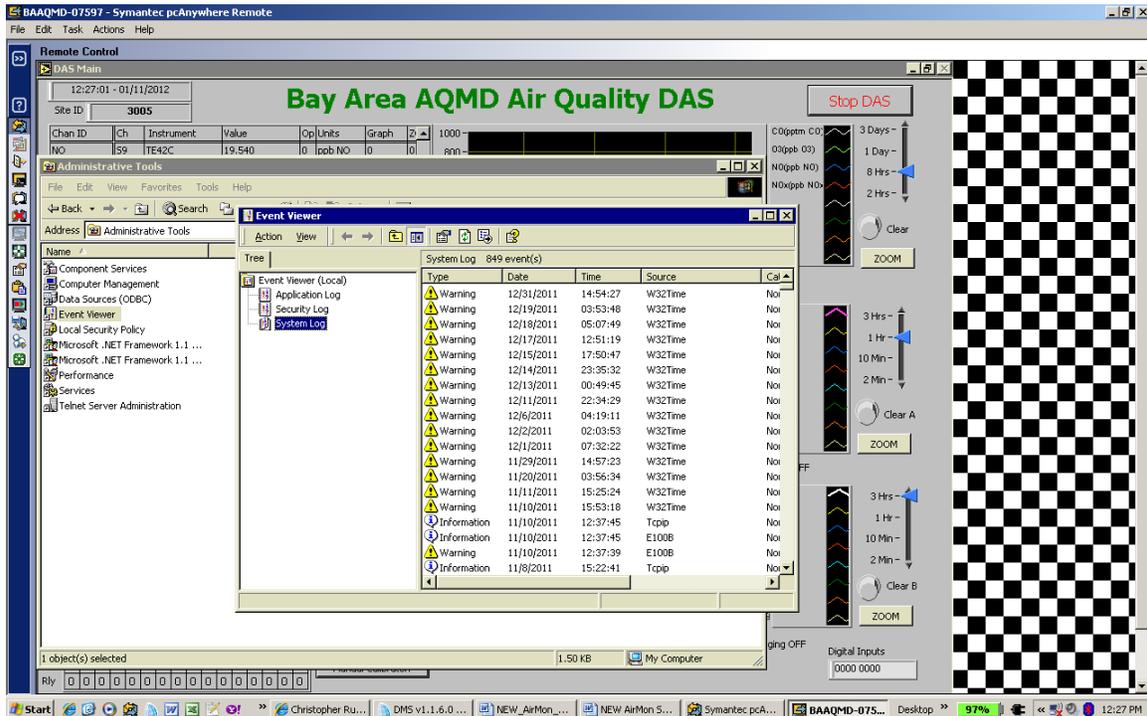


Figure 19: Example of a DAS Event Viewer log

- Check station modem and associated hardware for proper operation
- Check instruments and/or data communications hardware;
- **NOTE:** Ignore data gaps of less than 15 minutes within an hour when:
 - 45 minutes of valid data exist for that hour (and a valid hourly average can be generated)
 - ambient pollutant concentrations have not significantly changed during the gap
 - ambient pollutant concentrations are well below CA or EPA AQ standards
- Periods of data loss other than noted above should be documented by entering appropriate information into the instrument and/or station e-log.

10. DATA AND RECORDS MANAGEMENT

- 1-minute, 5-minute, and hourly concentration data is collected by the station DAS. The station DAS pushes data hourly to the BAAQMD DMS. Data is retained in the BAAQMD DMS for review and analysis by data users.
- 1-minute and 5-minute instrument parametric data are collected by the station DAS. The station DAS pushes data hourly to the BAAQMD DMS. Instrument parametric is retained in the BAAQMD DMS for a period of time for review and analysis by data users and is periodically purged from the DMS data base by the DMS Administrator after all data review has been completed and final data has been exported to the EPA AQS database.
- DMS parametric data may include various instrument operating parameters such as flow rate, pressure, lamp temperature, instrument flags (**NOTE:** The operator is encouraged to use the instrument parametric data as an aid to data review, data validation and for troubleshooting).

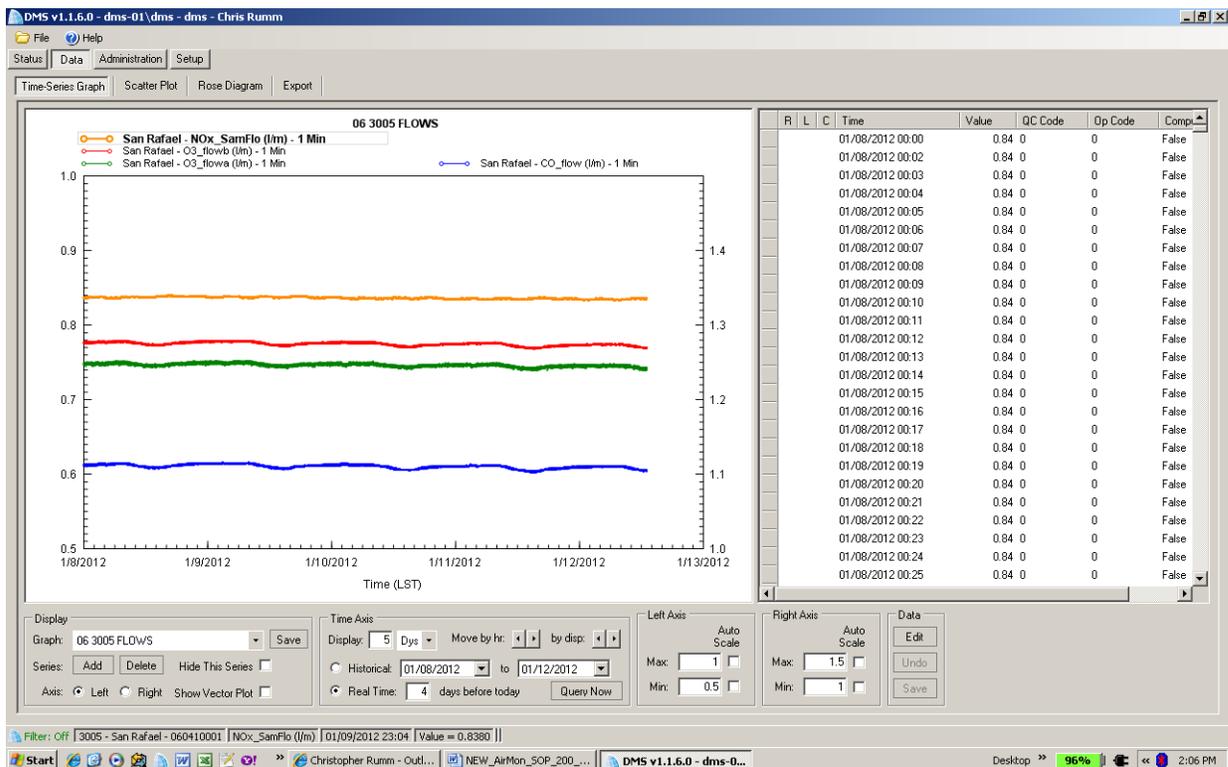


Figure 20: Example of a DMS Time Series Graph for Parametric Data

- District staff are responsible for data and records management including oversight of data capture into a station DAS, data ingestion into the District DMS, data review and validation, and data retention.
- The operator is responsible for the following:

- Review and validate DMS 1-minute and 5-minute gaseous and hourly BAM data
- Review and invalidate DMS data that does not meet BAAQMD MQO's.
- Review and validate or invalidate questionable data flagged by DMS autoQC tests as 'suspect'
- Maintain the appropriate DMS instrument and/or station e-log. The operator must enter the appropriate information after the completion of any repairs, maintenance, or adjustments. The operator should note any data gaps. The operator may be required to manually collect data from the gaseous analyzers and BAMs in the event of a DAS data collection error for subsequent data backfill by MQA.
- It is the operator's responsibility to ensure that review of any backfilled DMS data is completed upon notification by MQA of backfilled data ingest.

11. QUALITY CONTROL AND QUALITY ASSURANCE

Quality Control (QC) procedures include both automated DMS QC checks and verification that all DMS data, including instrument responses to nightly autocalcs or instrument responses to manual calibrations at partial stations meets the District's QC limits. Quality Assurance (QA) procedures include the completion of any required audits.

11.1 QUALITY CONTROL

- All DMS data shall be reviewed, validated/invalidated following the procedures in this SOP
- The operator shall update and maintain all DMS instrument and station e-logs and COC entries
- Automated DMS QC checks may result in the operator receiving DMS generated e-mail notifications. QC checks that generate an e-mail may include a value that is out-of-range, sticking or repeated values, etc. The source of the problem is to be investigated and corrected and the operator shall invalidate all suspect or flagged 1-minute DMS data.
- The operator must check that nightly auto calibration or manual calibration results are within the District's QC limits. If a QC measurement is outside the specified quality control limit, the source of the problem is to be investigated and corrected. **NOTE:** Violation of a QC limit does not require data action as long as an MQO is not also exceeded.
- If any MQO's are exceeded, the source of the problem is to be investigated and corrected and the operator shall invalidate all suspect, flagged or questionable 1-minute DMS data.
- At stations without nightly auto-cals, the station operator will complete weekly manual DAS controlled zero/span or precision calibration of the instrument and validate the appropriate DMS data.
- **NOTE:** Ambient data correction and adjustment will be performed on hourly data only, by MQA, with justification provided by AQIS (i.e. pump pressure shifts,

instrument adjustment, data shift or data drift caused by instrument component failure)

11.2 QUALITY ASSURANCE

Staff may be directed to invalidate any data that doesn't meet the BAAQMD PEG and/or CARB, and/or EPA performance or system's audit criteria

12. AUTHORS

- Original Author: Christopher Rumm, 1/27/2012
- Revised by Christopher Rumm 06/28/2012: updated formatting and added appendixes
- Final editing by Glen Colwell 07/20/2012

13. REFERENCES

- Code of Federal Regulations, Title 40, Part 53
- Code of Federal Regulation, Title 40, Part 58
- Data Mgt SOP 601 Gaseous Pollutants

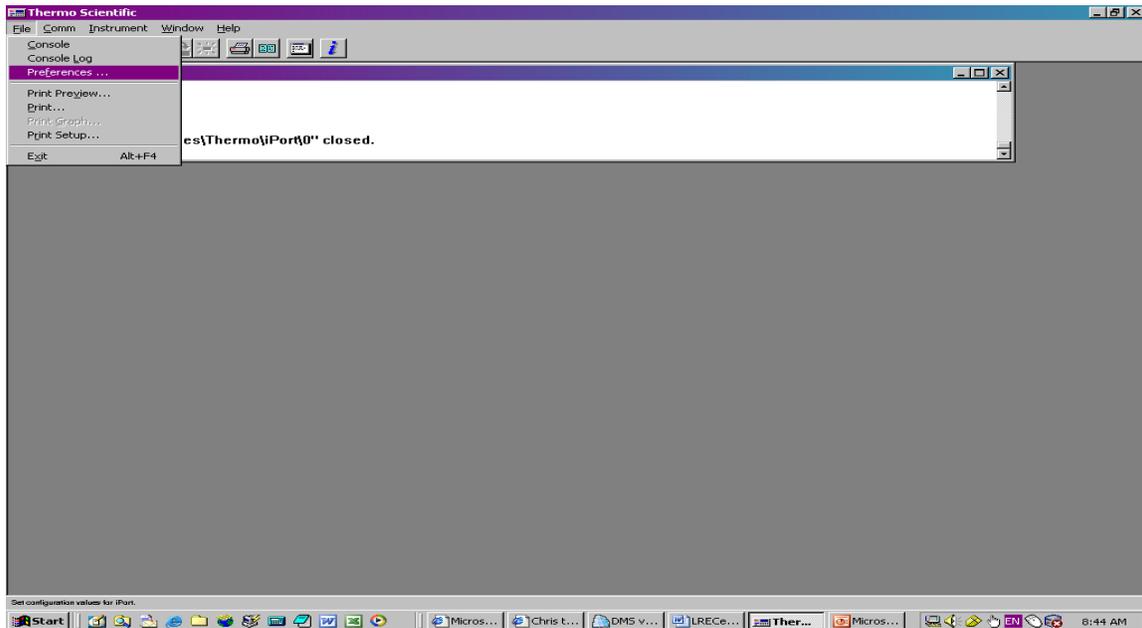
14. APPENDIXES

14.1 APPENDIX A: DATA RECOVERY USING THERMO I-PORT SOFTWARE

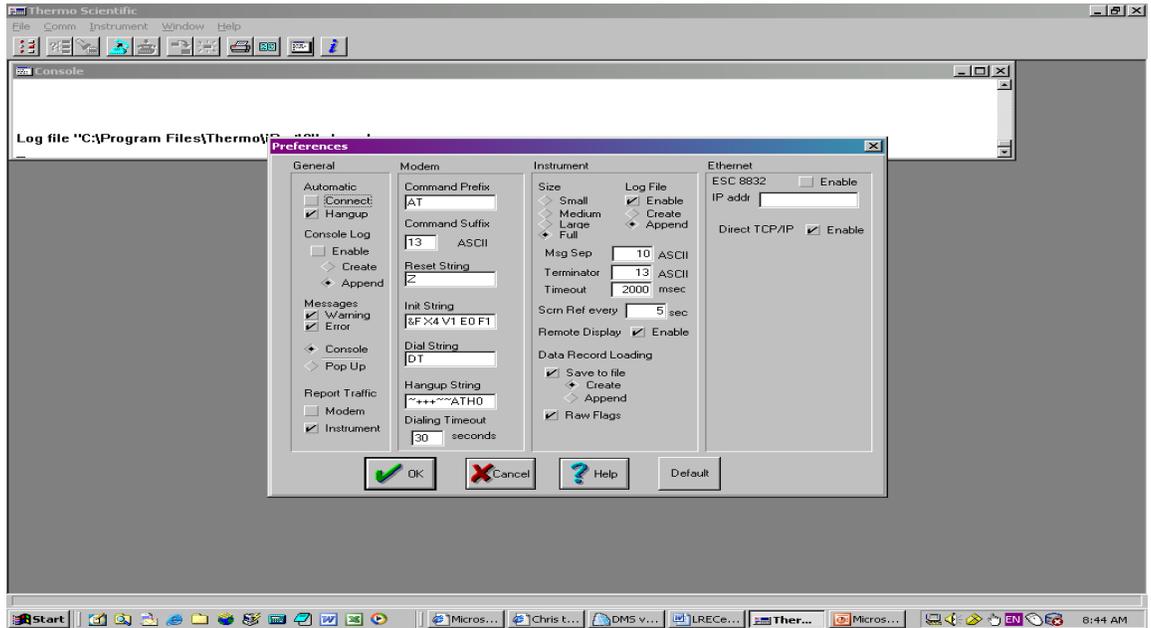
The operator may on occasion use THERMO iPort software in order to complete LREC extraction for replacement of missing DMS data values. The following conditions apply:

- Must have iPort installed
- Analyzer must have correct TCP/IP settings
- Must have cable from Ethernet connection on back of i-models to Station Router

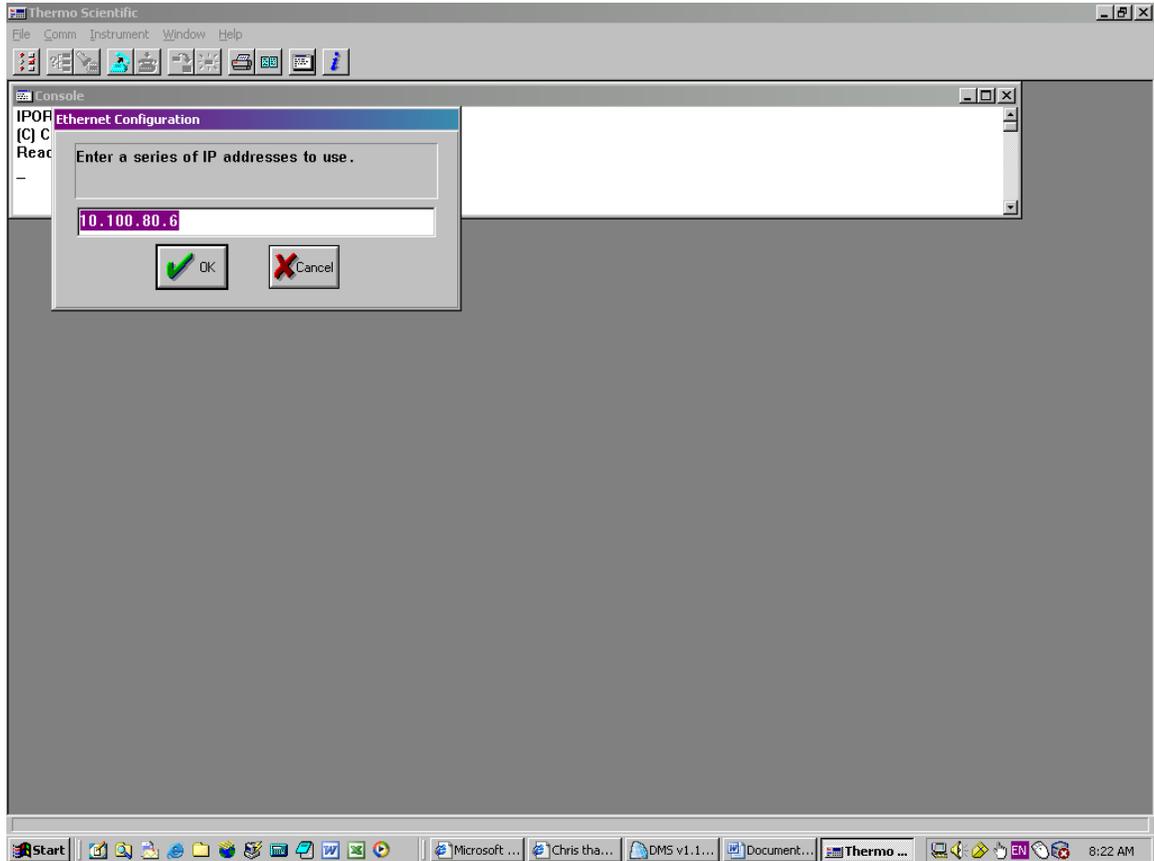
1. Check DMS data Time-Series graph for missing time period
2. Ensure that the analyzer has the appropriate I-Series Analyzer Communication Settings
3. Click on iPort icon
4. Check IPort 'Preferences' setup:



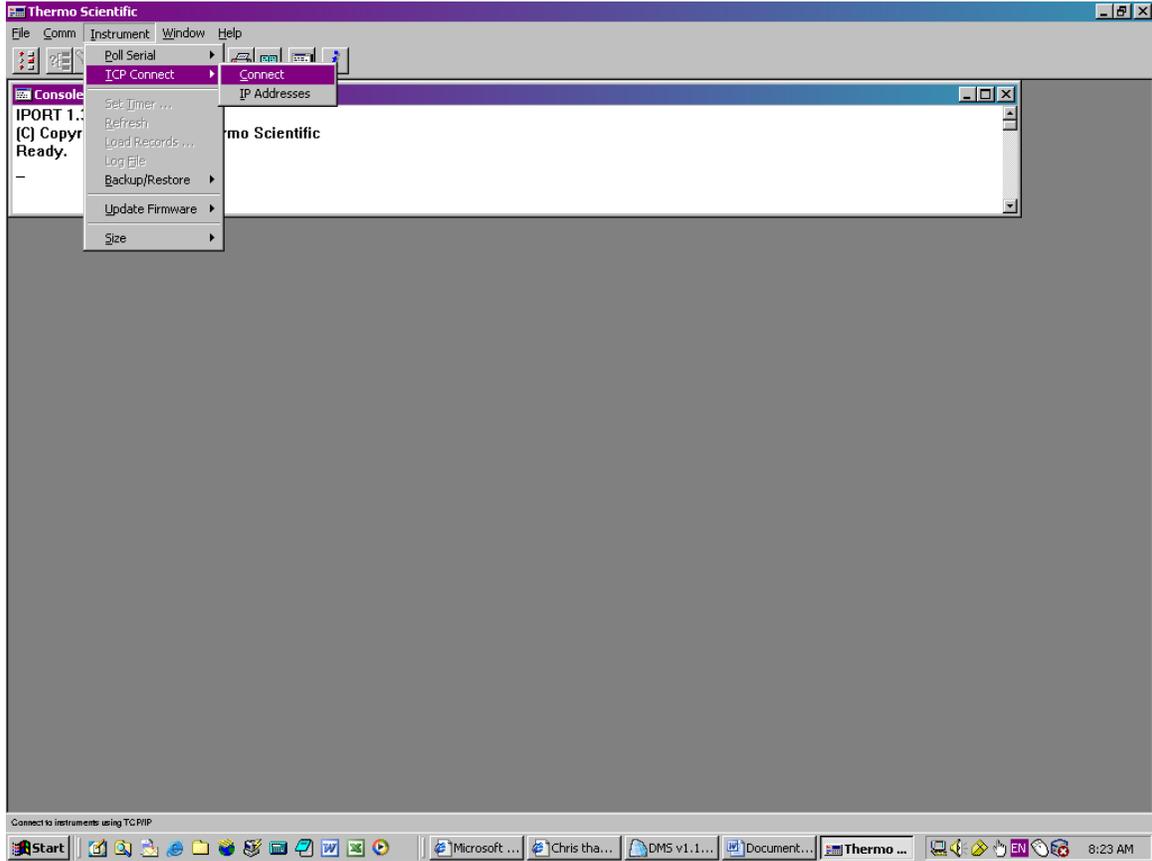
5. Ensure that the **Direct TCP/IP** 'enable' box is checked



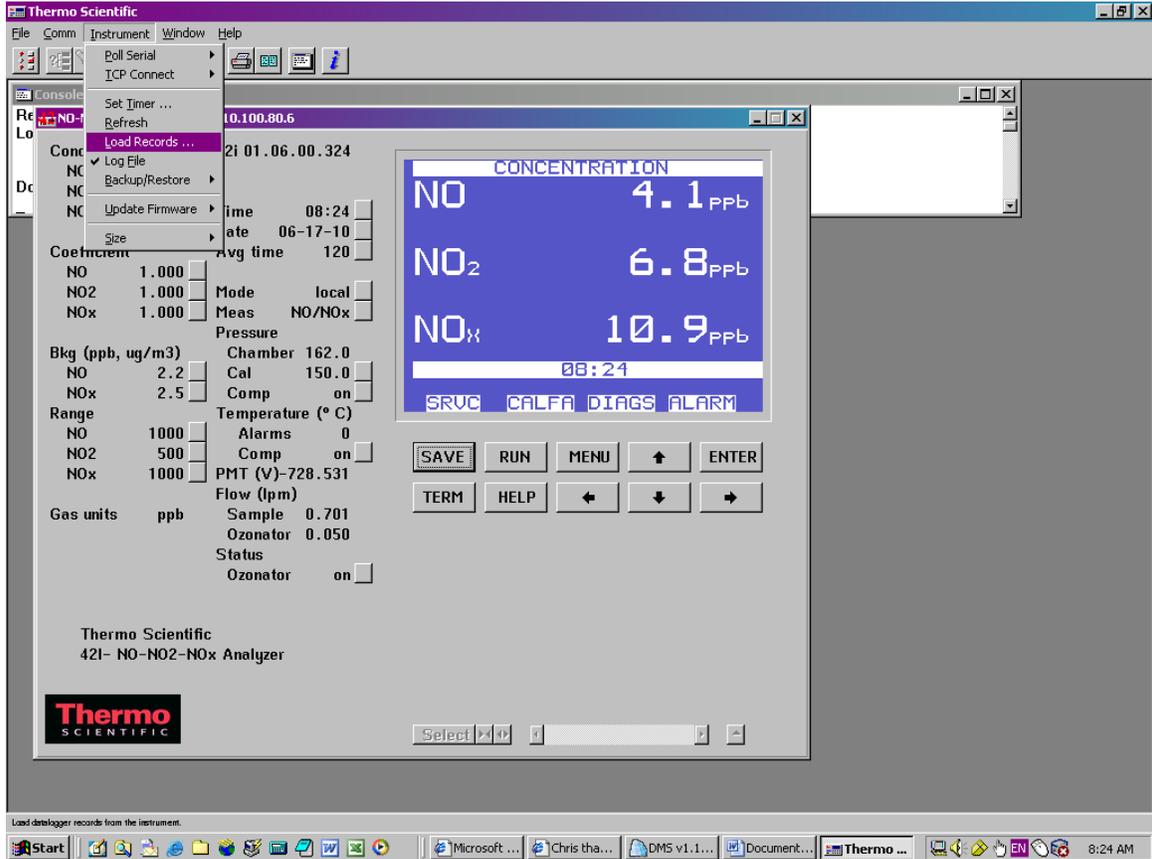
6. Use the following protocol for addressing: address **10.100.x.xx**
 - a. 10.100 = first and second octet = used for all District AM locations
 - b. x = 3rd octet = station address
 - c. xx = 4th octet = instrument
7. Set the IP address:



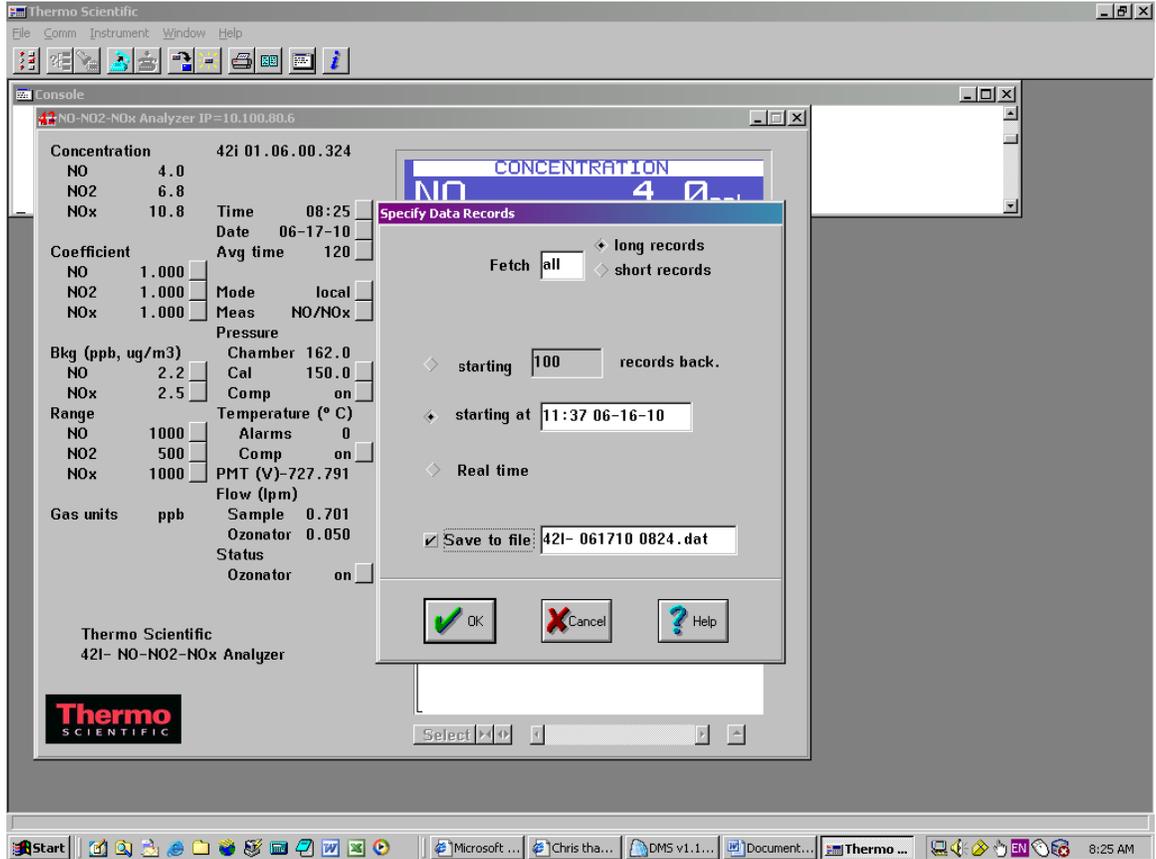
8. Connect to analyzer:



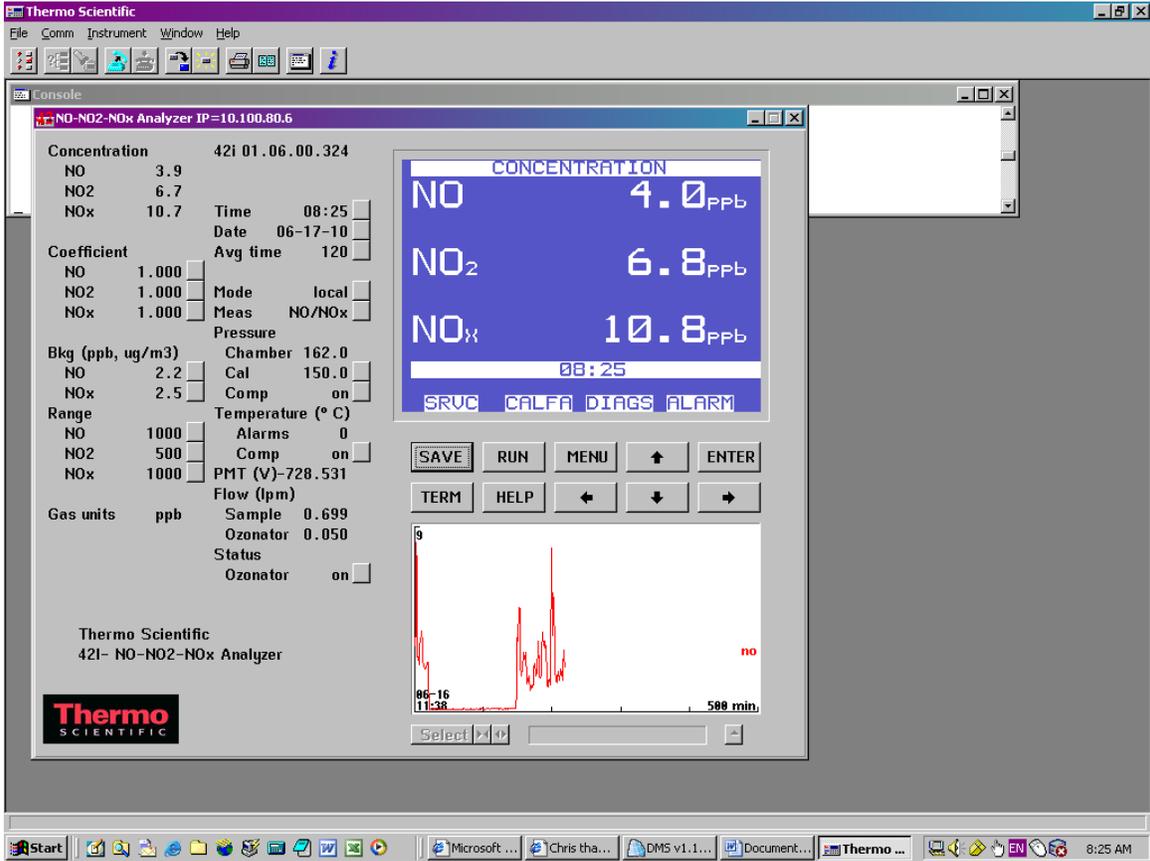
9. To Download data, select “Load records’ from Instrument pull-down menu:



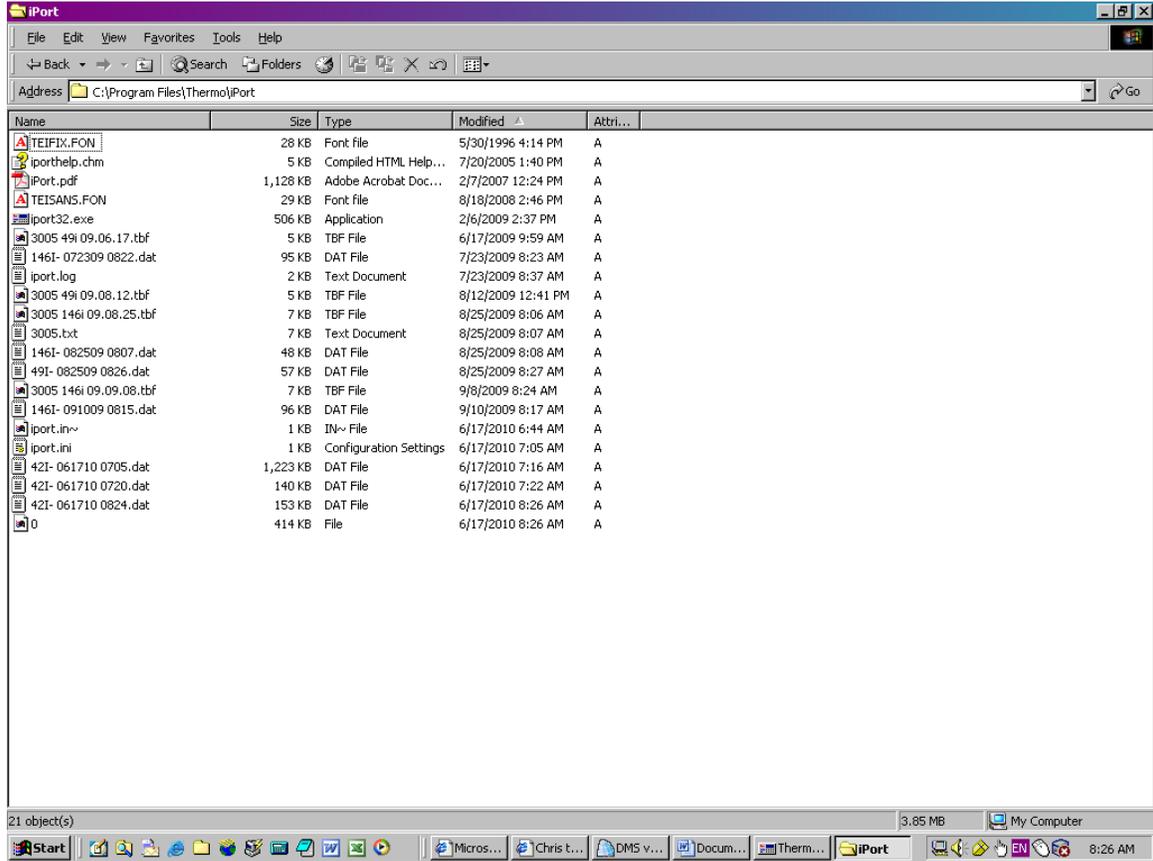
10. Set load records parameters, select 'OK':



11. Successful download!



12. When completed, locate and open data capture file in iPort folder:



13. Check data file for completeness:

```
42I- 061710 0824.dat Thu Jun 17 08:25:11 2010
Model 42I- (prog iSeries 42i 01.06.00.324)

Time   Date   Flags   no      no2     nox     intt    rctt    pmtt
11:38  06-16-10 cc000000 3.24331 5.40686 8.65018 31.0148 50.1398 -2.8465
11:39  06-16-10 cc000000 4.0494  5.16168 9.21107 31.0387 50.4977 -2.7154
11:40  06-16-10 cc000000 8.24455 0.945944 9.19049 31.0626 50.6278 -2.6885
11:41  06-16-10 cc000000 6.96771 2.19171 9.15942 31.0864 50.2374 -2.6808
11:42  06-16-10 cc000000 2.69178 5.57659 8.26837 31.0864 50.2049 -2.7077
11:43  06-16-10 cc000000 2.67904 4.40736 7.0864  31.0864 50.6929 -2.885
11:44  06-16-10 cc000000 2.31629 5.445  7.76129 31.1819 50.5953 -2.9666
11:45  06-16-10 cc000000 3.13357 5.84786 8.98142 31.1819 50.2049 -3.0385
11:46  06-16-10 cc000000 3.5238  5.6393  9.16311 31.1819 50.3676 -3.0274
11:47  06-16-10 cc000000 3.67309 8.41683 12.0899 31.2775 50.6929 -2.8735
11:48  06-16-10 cc000000 3.91985 10.1219 14.0417 31.2297 50.4326 -2.6885
11:49  06-16-10 cc000000 3.32683 7.57336 10.9002 31.3013 50.1398 -2.9084
11:50  06-16-10 cc000000 2.51735 5.6977  8.21504 31.3013 50.4652 -3.0385
11:51  06-16-10 cc000000 2.23853 5.11575 7.35427 31.2297 50.6604 -2.9472
11:52  06-16-10 cc000000 2.05612 5.26573 7.32185 31.3252 50.3025 -2.7577
11:53  06-16-10 cc000000 2.07289 5.72826 7.80115 31.4207 50.1398 -2.7038
11:54  06-16-10 cc000000 2.12041 5.78444 7.90485 31.4446 50.5953 -3.0459
11:55  06-16-10 cc000000 2.12686 5.30194 7.42879 31.373  50.5628 -3.0052
11:56  06-16-10 cc000000 2.41377 5.69866 8.11242 31.4207 50.2374 -2.746
11:57  06-16-10 cc000000 2.40424 6.80707 9.21131 31.4207 50.2699 -2.9084
11:58  06-16-10 cc000000 1.42463 4.49218 5.9168  31.4924 50.6929 -2.9977
11:59  06-16-10 cc000000 0.366044 0.842588 1.20863 31.4446 50.4977 -2.738
12:00  06-16-10 cc000000 0.123218 -0.077714 0.0455039 31.4446 50.1398 -2.7
12:01  06-16-10 cc000000 0.11694 -0.0823181 0.0346218 31.4446 50.4326 -3.0
12:02  06-16-10 cc000000 0.127078 -0.0959936 0.0310843 31.4207 50.6929 -2.
12:03  06-16-10 cc000000 0.135 -0.123426 0.0115743 31.4446 50.3676 -2.71
```

- 14. Send captured data to MQA staff. Request that an e-mail notification be sent upon completion of the DMS data upload so that data can be reviewed. It is the operator's responsibility to ensure that review of backfilled DMS data is completed upon notification by MQA of backfilled data ingest.
- 15. Document in the appropriate DMS e-log(s)

14.2 APPENDIX B: BAM DATA RECOVERY

The BAM-1020 data can be easily downloaded through the serial ports using HyperTerminal® or other simple terminal programs. Nearly all PCs have the HyperTerminal program already included. The following describes how to set up the program with the BAM-1020:

1. Connect the RS-232 or REPORT port on the back of the BAM to your computer or laptop using the appropriate cable. Connect to the COM1 serial port if available.
2. Open HyperTerminal. (Usually located in the Programs\Accessories\Communications directory). The program will ask you to type a name for the connection. Type “BAM-1020” or a name of your choice, then click “OK”.
3. The “Connect To” window will open. Select COM1 (or another port if used) from the drop-down menu in the “Connect Using” field. Click “OK”. Note: You can also set up the program to dial the BAM through a modem in this window.
4. The “COM1 Properties” window will open. Set the following values in the drop-down menus, then click “Apply” and “OK”.
 - Bits per second: 9600
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
5. The main HyperTerminal connection window should now be open. Press the ENTER key three times. The window should respond with an asterisk (*) indicating that the program has established communication with the BAM-1020.
6. Once communication is established, press the h key. This should cause the BAM-1020 System Menu to appear on the window as shown below. You can now send any of the ASCII characters in the menu to retrieve the desired files. The menu options are described in the following section.
7. HyperTerminal will only display 100 lines of data in the window. To capture larger files (such as All Data), first select Transfer > Capture Text from the drop-down menu. Select a location for the file, and then click the “Start” button. Retrieve the desired files, and HyperTerminal will automatically store them to the text file. Anything that comes through the terminal window will be saved to the file. Click the “Stop” button to stop capturing the text.
8. When you exit HyperTerminal, it will ask if you want to save your connection. Click “Yes” and a file named BAM-1020.ht will be created in the HyperTerminal folder, which will have all of the settings saved. Use this for future communications with the BAM. Once a serial connection between a terminal program and the BAM-1020 has been established, access the main BAM-1020 System Menu. Each number 0-9 represents a different data file you can download from the unit. Each file is described below. To get the desired file, select the appropriate number. **NOTE:** After a few minutes, the BAM will stop waiting for a command and you will have to press ENTER three times to reestablish the asterisk command prompt, and then send another “h” to refresh the menu. If you already know the number of the file you want, you can skip the H menu altogether.

9. **WARNING:** The BAM 1020 RS-232 serial ports may have to be re-set to communicate with the DAS: **NOTE:** The BAM 1020 display must be on the Main Menu in order to establish communications.
 - a. Press the **h** key. The **> BAM 1020 < System** menu should appear;
 - b. Press the **8** key. The **> BAM 1020 < Utility Commands** menu should appear;
 - c. Press the **'a'** key. **NOTE:** This command is NOT shown in the BAM 1020 Utility Commands menu. The **RS-232 Port #2 Function Select** menu should appear;
 - d. Press the **'4'** key. The message "RS-232 set as Comma Separated Data Port" should appear;
 - e. Next, again press the **'H'** key. The **> BAM 1020 < System Menu** should appear.
 - f. Press the **'8'** key to re-enter the **> BAM 1020 < Utility Commands** menu.
 - g. Press the **'z'** key. This enables the Printer port it to output a fixed-width concentration report at the end of the sample period, which can be used to interface to a serial data logger.
 - h. The message "Concentration report enabled" should appear;
 - i. Next, again press the **'H'** key. The **> BAM 1020 < System Menu** should appear. Select Transfer > Capture Text from the HyperTerminal drop-down menu. Select a location for the file, and then click the "Start" button.
 - j. Next, press the **'4'** key. **File 4: Display System Configuration.** This file will contain a list of most of the BAM 1020 settings and calibration values as shown on the next page. This is useful for verifying the setup on a remote BAM 1020, and to send to the factory if service is required. The setting report has been updated and reformatted.

NOTE: For DMS data ingest files, send BAM downloads using the CSV report format. From the Main Menu, select '6' first, then '2'. The command sequence and BAM response would look like the following from page 76 of the **femBAM 1020-9800 Rev G Manual**:

* 6

CSV Type Reports

2 - Display All Data

3 - Display New Data

4 - Display Last Data

5 - Display All Flow Stats

6 - Display New Flow Stats

7 - Display All 5-Min Flow

8 - Display New 5-Min Flow

>3 - Display CSV Data

Station, 5

Time,Conc(mg/m3),Qtot(m3),WS(MPS),WD(DEG),BP(mm),RH(%),Delta(C),AT(C),E,U,M,I,L,R,N,
F,P,D,C,T

10/02/07 17:45, 0.001, 0.700, 0.110,0,0,36,1.3,23.0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,

10/02/07 18:00, 0.001, 0.700, 0.127,0,0,38,1.4,23.2,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,

k. Retrieve the desired files, and HyperTerminal will automatically store them to the text file.

l. When completed, exit HyperTerminal.

m. Reconnect the DAS serial connection.

