McIntyre Air Monitoring and Audit Centre

Title: Standard Operating Procedure for AENV EDAS Ambient Data Polling System Operation and Daily Data Evaluation		
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1.   Introduction and Scope

This procedure describes the operation of the Alberta Environment (AENV) EDAS Ambient polling and data collection system. This system is a PC based software system that polls data from the AENV stations described below. The system is the central site for data collection of all the AENV NAPS stations. Once data has been collected via the steps described in this procedure, the system is used to facilitate other data tasks like; data processing, transfer of data files to the R: drive, create and FTP the AQI files to CASA for the AENV AQI website, and collect data for the voice AQI System.

Stations in the Edmonton Area; ECMU, EIMU, ESMU, EMCU

    Edmonton Central
    Edmonton East
    Edmonton South
    Edmonton McIntyre

Stations in the Calgary Area; CCMU, CIMU, CRRU

    Calgary Central 2
    Calgary East
    Calgary Northwest

Other stations in Alberta

    Fort Saskatchewan - FTSK
    Beaverlodge - BVLG
    Red Deer - RDDR
    Lethbridge – LBRG

Most of the tasks described in this procedure are automated and don't require manual attention, however, as stated throughout this procedure, attention is required on a continual basis to ensure all the automated functions are working properly.

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This method adheres to the requirements of the current Air Monitoring Directive (AMD) drafted by Alberta Environment. In some cases the limits and specifications exceed the requirements of the current AMD. It should be considered that the current and any future amendments or drafts of the AMD will be used as the benchmark for requirements and criteria for ambient air monitoring practices conducted in the Province of Alberta. Information used to write this procedure was also taken from sources identified in the reference section.

2.   Principle of the Method

The EDAS Ambient system is a software package that is installed and operates on a PC based computer system at the AENV McIntyre Centre in Edmonton. The system polls each of the stations listed in section 1 and downloads the data directly from the station data logger. All station data loggers are either an ESC 8816 or ESC 8832. This polling routine is scheduled so as not to conflict with the polling routines of the Old Voice AQI system.

Once the data is retrieved from the site data loggers, the following functions take place:

- The data is stored on the local drive as the primary database
- Data is packaged and sent to the AENV AQI website every hour in a format used to provide the hourly AQI for access by the general public.
- Data is packaged as raw data packets and transferred to the R: drive for archiving
- Data is used to calculate the AQI every hour and make available to the CLAIRE voice system.

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3. Measurement Range and Sensitivity

Range and sensitivity do not apply to this procedure

4. Equipment and Apparatus

The data is collected in the field using ESC systems, either model 8816 or 8832. Also listed are some of the peripheral devices that may be used and software programs at the central site or in the field:

- ESC model 8816 Data Acquisition and Control System
- ESC model 8832 Data Acquisition and Control System
- Windows based PC, minimum Pentium 4
- External modem, typically fastest speed available
- EDAS Ambient Configuration and Reporting Software
- Windows Hyperterminal
- Dial PC Modem

This list does not include all available devices that can be used with the ESC systems. Please consult the operations manuals for further information and capabilities.

5. Interferences

As the AQI systems are electronic recording devices, the most common interference is Electromagnetic Interference (EMI). This can come from a variety of sources and can disrupt the voltages signals into or out of the datalogger. There are physical EMI protection measures built in to the ESC systems and cards, however, extreme cases may require a site specific grounding solution. Consult the manufacturer if this is suspected.

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6. Precision and Accuracy

Precision and accuracy don't necessarily apply to this procedure. The central data system collects and transfers raw data generated in the field and conveys this information to various receivers of data through a variety of media. The precision and accuracy of the data collected is governed by the procedures to operate and calibrate the equipment. Refer to those procedures for more details on precision and accuracy.

7. Site Requirements

The central data system is a computer system and is intended to operate in a temperature controlled environment. This system is currently sited at the AENV McIntyre centre in SE Edmonton. The area that this system operates in is maintained at approximately 21 ^{o}C and kept clean.

8. Installation Requirements

The installation of this system has been completed. Requires network connection and modem.

9. Operational Requirements and Procedure

The central data system runs on a PC at the AENV McIntyre centre in Edmonton. The system is mostly automated in that:

The PC runs continuously

The polling every hour is automated

The calculation and storage of interim values is automated

All data transfer tasks are automated; however, any automated system requires routine maintenance and surveillance tasks.

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The **scheduled** Polling Tasks on the central system are:

Hourly:

> **AQI**   starts at approximately 2 minutes past the hour and ends about 3 minutes later
> > ➢ to poll all AENV stations and FTSK, BVLG and RDDR to collect data for the CLAIRE voice system

> **AQISND**   starts at approximately 5 minutes past the hour and ends about 1 minute later
> > ➢ to create and FTP AQI files to CASA for the AENV AQI website for all AENV stations

> **M POLL**   starts at approximately 8 minutes past the hour and ends about 10 minutes later
> > ➢ to collect 1 minute average data from all AENV stations

Every 12 Hours:

> **ZIPBKUP**   at 05:45 and 17:45
> > ➢ to backup the data files to R: drive into the EDAS Shared Data file

Daily:

> **HPOLLE**   at 05:20
> > ➢ to poll ECMU, EIMU, ESMU, EMCU and LBRG for hourly averages, calibrations and power failures and automatically print daily reports with calibrations

NOTE: EDAS Ambient Menu and EDAS Ambient Scheduler need to be running at all times for these tasks to be carried out.

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NOTE: Ensure that no ESC manual polling functions are in process during the times that the "old" AQI system is polling – approximately 12 past to 25 past the hour

NOTE: It is not essential to be logged into the EDAS Ambient Menu for the system to function, but you must be logged on to access any functions of the system.

If a restart of the ESC polling computer is required, or it has restarted by itself the "password" screen for E-DAS Ambient will be displayed. To log back into EDAS-Ambient leave the password blank and click "OK". Then check the time on the computer to the "real" time from the AQI system and, if required, adjust the time through the control panel function of the computer.

9.1 Daily Tasks:

The following tasks need to be carried out every morning during regular business hours:

- Check to see that the system has polled and received the most recent hour of data for all the stations listed in section 1.
- Check for hourly files not sent to the AQI website and manually transfer via ftp.
- Check the real-time website for any missing hours.
- Check the voice system.
- Check to ensure that the daily reports have been printed for each station.

If the printout or data for any station is missing, complete the tasks described below as required. Once complete, data for all stations listed in section 1 should be printed out for each station for the previous day and stored in the binder located in the office.

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9.1.1   View or Print the report from the EDAS ambient menu

- select "reports"
- select "daily summary reports"
- select the station/stations required
- select the date (i.e. yesterday or current day if checking if most recent hour has been polled and received)
- select "hly-n-cal" report
- select "validated" data for validated data or "RAW" for unedited data
- select "view" or "print"
- click on "OK" to generate or print report

9.1.2   Manual poll from the EDAS ambient menu for missing data. (Do not perform this task while the automatic polling function is operating)

- select "utilities"
- select "manual poll"
- choose the station/stations you want to poll
- select "hourly data", calibration data" and "power failures"
- choose the starting date you need and set the time for this at 00:00
- click on "poll" and wait for it to happen

9.1.3   Check the status of polling from the EDAS ambient menu. (Do not perform this task while the automatic polling function is operating)

- select "reports"
- select "status reports"
- select "communication log"
- select "purge " and "view"
- check to see if the data transfer was successful

NOTE: *While you are checking the status of polling, purge the communications log file as described below. **If this file is not purged regularly, the file becomes too large.***

9.1.4   Print the power failure report

- select "reports"
- select "status reports"
- select "power failures"
- select "purge" and "print"
- click OK

9.1.5   Check for any unsent hourly files to the CASA data warehouse

- Open window explorer to the "C:\EDAS data" folder.
- Check for the presence of an hourly files and note in the diary.
- Move any files found to "C:\EDAS data\To Send to CASA"
- Manually transfer files in the above folder to the CASA data warehouse via FTP and in 9.1.6
- After transfer is complete, move the files to the corresponding monthly folder in "C:\EDAS data\CASA**YYMM**"

9.1.6   To transfer files via FTP site

- Open the ftp program.
- Login screen will automatically pop up
  - Enter in Host name ftp.casadata.org
  - UserID "AE" (must be capitals)
  - Password "*Mu!rr&ay0"
  You should hear a train sound if successful
- On the local system (left side) change the directory to "C:\EDAS data\To Send to CASA"
- On the remote system (right side) change the directory to "\iqua"
- On the local system, highlight the files to be transferred
- Select the green right arrow between the two windows to transfer the files.
- Close ftp program.

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9.1.7 Check the AQI website for any hours missing data.

- Open internet explorer to the http://www.envinfo.gov.ab.ca/AirQuality/
- Click "Reports" → "Tabular Data"
- Select the Start and End dates, usually the previous 24 hrs.
- Select the Stations you want to view and the AQI parameter.
- Note any missing hours and for which station in the diary.
- Manually transfer any missing hours through the EDAS software

9.1.8 Manually transfer of hourly data files to the CASA data warehouse.

- select "Alberta" → "CASA" →"Data warehouse manual report"
- select "Station", date" and "hour". To choose multiple stations, hold Ctrl key when selecting stations.
- click on "OK" to transfer files.

9.1.9 Daily Voice AQI System checks

- Check to see if the system has polled the last hour for all the stations
- Record date, number of calls, QA/QC events, and any problems or actions taken in the log book
- Check to see if time is correct within a couple of minutes

It is advisable to check the system again at the end of the day, if possible, to make sure all is OK.

- If there are any problems with the AQIS system, then reboot the system
    - ctrl W to get out of the main screen
    - if crtl W doesn't work left click on the window
    - ctrl W and wait for the next screen
    - ctrl C to close the program
    - click on start button on the bottom
    - select "shut down"
    - select "restart"

This program polls all AENV stations FTSK, BVLG and RDDR starting at 12 minutes past the hour and should be done polling, barring any problems, at about 28 minutes past the hour.

NOTE: *Do not interfere with the polling by being online to stations when they are being polled.*

NOTE: *The program "AQISPROD" needs to be running at all times for the system to work.*

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Sometimes the system loses the modem on the Procomm Plus program and tries to run on direct-connect, but needs to be running with the Sportster 28800-33600 External modem. If this is the case you need to re-enter the 28800-33600 modem as the connection.

- Start the Programm Plus program
  - Click on the Start button
  - Go to Programs
  - Go to Procomm Plus
  - Click on Procomm Plus
- Change the connection
  - Click on options
  - select system options
  - click on modem options
  - select the 28800-33600 modem from the scroll bar
  - click on "OK"
  - close Procomm Plus

NOTE: *Reboot the computer the first and last days of each week.*

9.2   Data Evaluation Tasks

These tasks are to evaluate the data collected from the previous day. These should to be carried out every day.

9.2.1   Review the daily printouts of the data for all the stations

- note any problems, flags, odd data or high 1-hour readings (CO>5.0, THC>3.0, SO2>0.010, H2S>0.003, PM10 (PMC)>100.0, PM2.5 (PM2, TM2 , FDMS or BM2)>30.0 on the daily summary report printout
- record the above problems, flags, odd data or high 1-hour readings in the dairy
- record any guideline exceedances in the left side of the dairy
- record any high level readings (THC> than 10.0 for 1-hour averages, PM 10> 200 for 1-hour and greater than 100 for 24-hour averages) in the dairy
- verify any guideline exceedances and high level readings by checking the minute data

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To view the minute data from the EDAS Ambient menu
- select "Reports"
- select "Minute summary report"
- select the station you want to view
- select the start & end dates and times of the data you want to view
- select "view"
- click OK
- to exit the minute summary report,click on the "X" at the top of the report

- report any exceedances or high level readings
- record any span value difference greater than 10% (except NO2) in the dairy
- record zero values with excessive drift from previous day/days in the dairy
- **highlight any data that needs to be edited on the printouts and note the editing changes in the dairy**
  - negative corrections CO down to –0.2 go to 0, O3, SO2, H2S, NO, NOx, NO2, NH3 down to –0.002 to 0 (SO2 at BVLG down to –0.0002 to 0), PMC, PM2, TM2, FDMS and BM2 down to –3.0 to 0 and -3.1 and lower get marked as invalid
  - RH readings >100 change to 100
  - WDR at 0 gets changed to 360

- review all data for anomalies and verify whether the data is valid or invalid
- if any instrument appears to be failing mark the data as invalid

9.3   Data Editing Tasks

Required changes to the data identified in section 9.2 above are completed using Matrix Data Editor in the EDAS Ambient program. Any changes should also be noted on the printed report that is stored in the office binder.

NOTE: *In the Matrix Data Editor window a value in **bold** represents data that has been under a flag condition for more than 15 minutes of the hour, indicating insufficient data for the hourly average to be considered valid. Also, different color highlights are used to indicate "flag" conditions.*

To view which conditions or flags the colors represent: In the Matrix data editor window – select "Flags" then select "Set Flag Colors and Null Value Codes" N.B. - the "A" Data Flag has been modified to represent an Audit.

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9.3.1 To edit the data using the Matrix Data Editor

- select "Editors"
- select "Matrix data editor"
- select the "file menu"
- select "load data"
- choose the station
- choose the date range to be edited
- select the parameters you want to edit for that station
- click retrieve data
- maximize the page if you want
- select the edit box
- select the data to be edited, make the change then hit "Enter" to finalize the change
- select "file" then "save" to save the change
- select "file" then "Load Data" to load another station's data for editing
- choose the new station and start again
- to exit editing, save the changes and close the window (x)

NOTE: *To mark a data value as invalid it is necessary to checkmark **both** the appropriate flag box and the "<" flag box.*

9.4 Remote Station Checks

The EDAS ambient system can be used to connect directly to the station datalogger to ensure operations are functioning normally at the station. Once the connection has been made to the station datalogger, the tasks described below can be completed through menu selections from the main menu. These steps, menu commands and additional information can also be found in the ESC 8816 or 8832 manuals.

9.4.1 To connect to a station

- select "utilities"
- select "link to logger"
- choose the station to poll
- click "OK"

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when the logon screen appears

- press the "L" key
- enter the password "env" to review data or "escpriv" to make changes or mark channels down or up (this can be either caps or lower case).

9.4.2   To unfragment a logger (this should be done weekly)

- log into the logger with "escpriv"
- select "S" for status menu
- select "U" to unfragment the logger
- wait until the login menu reappears on the screen
- log back into the logger

9.4.3   To see power failures

- hit "S" then "P" then "V"
- if there are power failures, note them in the diary and clear the log
- to clear the power failure log escape to the previous menu
- hit "C"
- type "Y"
- escape back to home menu

9.4.4   To see the last zero/span values

- "R" then "L"
- use down arrow to get to the bottom of the list
- escape back to home menu

9.4.5   To see hourly averages

- hit "R" then "A"
- use "enter" or arrow key to get down to decimal positioner
- change "N" to "Y" and hit enter
- choose the report length (I use current hour mst +1) and hit enter
- use the right arrow key to see the rest of the parameters
- escape back to the home menu

NOTE: *Any problems noted with data from the Airshed stations (As outlined in section 1) contact the appropriate operator*

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9.4.6 To see continuous updated data with flags

- hit "D" the "F"
- escape back to home menu

9.4.7 To mark down a parameter

- hit "C" then "D" then "M"
- use the down arrow key to highlight the parameter
- hit enter
- escape back to home menu

9.4.8 To mark a channel back up

- hit "C" then "D" then "E"
- use the down arrow key to highlight the parameter
- hit enter
- escape back to home menu

9.4.9 To log out, to get out, to go to the next station or quit all polling

- hit "O"
- click on the "exit" tab
- click on "exit"

Note: Always ensure that you have disconnected from the stations before leaving the EDAS computer.

Note: Restart the E-DAS Ambient computers and ensure that E-DAS Ambient backup computer (the one hooked up to the scanner) is turned on every week to capture any patches are picked up by the computers.

Note: Always ensure that the E-DAS Ambient Menu and E-DAS Ambient Schedulers are running.

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Note: On occasion the logger at EDMU (ECMU logger 11) may run out of memory and the following message may appear.

Remote Control Error Not enough memory

Returning to original interface

To avoid this situation, unfragment the ESC logger at EDMU occasionally (weekly) or both the EDAS and "old" AQI computers could develop problems. To unfragment the logger see the steps in section 9.4.2 above.

If the message listed above is displayed you will have to "warm start" the logger by sending it the following command string.

Type in   *@11!CM&$*   you should then see a response from the logger.

> *You must be very careful to type in the correct command string, as an error in the command string may cause the logger to lose all programming.*

Then you need to verify that the warm start has occurred by logging onto the logger. This is done by hitting the "Esc" key and typing in   *11AQM*   - you should then be logged on normally.

10.   Calibration Procedure

The EDAS Ambient System does not require any calibration procedures.

11.   Applicable Documents

- Air Monitoring Cover off – AENV document – August 2006

- ESC model 8816 Data Acquisition and Control System Operations Manual

- ESC model 8832 Data Acquisition and Control System Operations Manual

- EDAS Ambient Configuration and Reporting Software Operations Manual

- ESC DigiTrend software Operations Manual

- Alberta Environment AMD – 1989 & 2006

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12.   Literature References

None

13.   Revision History

Revision 1.0

Modified section 1 - Removed Telus website and replaced with AENV AQI website

Modified section 9 - Operational Requirements - Scheduled polling Tasks

Modified section 9.1 - Daily Tasks and associated procedures 9.1.1 to 9.1.9.

Added:

- Check for hourly files not sent to the AQI website and manually transfer via ftp.
- Check the real-time website for any missing hours.
- Check the voice system.

Modified section 9.2.1 – wording for clarity

Modified section 9.4 – minor changes to order of tasks

Revision 1.1

Replaced Team Leader with Manager

14.   Approval
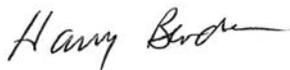
Harry Benders

Approved by: Harry Benders   Date: January 27, 2011

Title: Air Monitoring Manager

Deleted: Manager