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1. INTRODUCTION AND SCOPE

This procedure describes the configuration and operation of the Alberta Environment (AENV) Air Quality Index (AQI) reporting system, often referred to as the "Old Voice System". Throughout the rest of this document, this system will be referred to as the old AQI system. This system is a PC based software system that polls data from the stations described below, calculates an AQI for each station, and then makes the AQI information available to those who call in to the voice system. There are two phone numbers to use to access the AQI information.

780-427-7273 for local Edmonton calls

1-877-247-7333 for all calls outside of Edmonton

Once the person has called in, the following choices are available:

Main Menu

1 – AQI information for the Edmonton Area

     1 – Current AQI values

         AQI values updated at 15 minutes past the hour are given for:

         Edmonton Central

         Edmonton East

         Fort Saskatchewan

     2 – Peak values are given for the current day for the same stations

     3 – Peak values are given for the previous day for the same stations

2 - AQI information for the Calgary Area

     1 – Current AQI values

         AQI values updated at 5 minutes past the hour are given for:
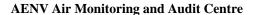
         Calgary Central

         Calgary East

         Calgary Northwest

     2 – Peak values are given for the current day for the same stations

     3 – Peak values are given for the previous day for the same stations

3 - AQI information for the other stations in Alberta

     1 – Current AQI values

         AQI values updated at 5 minutes past the hour are given for:

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Red Deer

Beaverlodge

Lethbridge

2 – Peak values are given for the current day for the same stations

3 – Peak values are given for the previous day for the same stations

4 – This selection provides a description of how the AQI is derived and potential health effects. This AQI is based on the Environment Canada calculations intended to standardize the reporting across Canada. Phone numbers are also provided for further information from the Edmonton Alberta Environment offices. Edmonton – 780-427-0911.

This system only supports information provided on the voice system. Raw data collection is handled by a separate data collection system, which resides in the same office of Alberta Environment.

This method adheres to the requirements of the current Air Monitoring Directive (AMD) drafted by Alberta Environment in 1989. In some cases the limits and specifications exceed the requirements of the current AMD and subsequent amendments. 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 old AQI system polls each of the stations listed in section 1 and downloads the data directly from the station datalogger. All station dataloggers are either an ESC 8816 or ESC 8832. This polling routine is scheduled to start at 12 minutes past the hour and is expected to be completed at 28 minutes past the hour. Once the data is collected on the old AQI system, the program calculates the AQI for each station using the following criteria. The AQI is calculated every hour for each air quality parameter using the formulas indicated below. The highest number calculated for the current hour is used as the AQI for that hour,for that station

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Parameter	Concentration	Units	AQI Formula
Carbon Monoxide	If <= 13	ppm	AQI = (1.47 x concentration) + 5.88
	If > 13		AQI = 1.92 x concentration
Ozone	If <= .05	ppm	AQI = 500 x concentration
	If > .05 <= .08		AQI = (833 x concentration) - 16.67
	If > .08		AQI = (714 x concentration) - 7.14
Sulphur Dioxide	All	ppm	AQI = 147.06 x concentration
Nitrogen Dioxide	If <= 0.21	ppm	AQI = 238.09 x concentration
	If > 0.21		AQI = (156.24 x concentration) + 17.19
Respirable Particulate Matter (PM2.5)	If <= 30	ug/m^3	AQI = 0.8333 x concentration
	If > 30		AQI = (0.5 x concentration) + 10

These values are stored in the system, and linked to the old voice system. When someone calls and requests the AQI for any one station, the voice system retrieves the value for that particular site when requested.

3. MEASUREMENT RANGE AND SENSITIVITY

The AQI is divided into four ranges that relate to increments of air quality.

See the ranges below.

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AQI Rating	Frequency in Alberta	Description
Good (0 – 25)	almost all the time (>90%)	Desirable range: no known harmful effects to soil, water, vegetation, animals, materials, visibility or human health. The long-term goal is for air quality to be in this range all of the time in Canada.
Fair (26 – 50)	occasional - typical when weather conditions inhibit pollutant dispersion (<10%)	Acceptable range: adequate protection against harmful effects to soil, water, vegetation, animals, materials, visibility and human health.
Poor (51 - 100)	seldom (<1%)	Tolerable range: not all aspects of human health or the environment are adequately protected from possible adverse effects. Long-term control action may be necessary, depending on the frequency, duration and circumstances of the readings.
Very Poor (greater than 100)	rare	Intolerable range: in this range, continued high readings could pose a risk to public health.

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

- External modem, typically fastest speed available

- EDAS Ambient Configuration and Reporting Software

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

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may require a site specific grounding solution. Consult the manufacturer if this is suspected.

6. PRECISION AND ACCURACY

Precision and accuracy don't necessarily apply to this procedure. The voice system collects and transfers raw data generated in the field and conveys this information to the general public through the telephone system. The precision and accuracy of the information 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 old voice 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 21 dgrees C and kept clean.

8. INSTALLATION REQUIREMENTS

This section is not applicable as the old voice system will not be installed again. It is expected to be decommissioned when superior communications systems have taken over the task of communicating the AQI to the general public.

9. OPERATIONAL REQUIREMENTS

The Old Voice System runs on a PC at the AENV McIntyre centre in SE 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

When a member of the public calls to request information from the system no human interface is required

However, any automated system requires routine maintenance and surveillance tasks.

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

1. Check to see that the system has polled and received the most recent hour of data for all the stations listed in section 1

2. Check the system to ensure there are no unnecessary programs running

3. Record the date, number of calls, QA/QC events, and any problems or actions taken in the log book

4. Check to ensure the system time is correct within two minutes

5. Check items 1 to 4 at the end of the day to ensure the system is operating properly.

If problems are encountered with the software system that cannot be resolved through manual changes or selections, reboot the system by following the steps below:

- Press 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
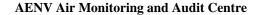- select "shut down"
- select "restart"

Sometimes the system fails to recognize the modem on the Procomm Plus program and tries to run on direct-connect. The system needs to be configured to recognize the Sportster 28800-33600 External modem. If this happens, reconfigure the system to use the 28800-33600 modem as the connection by following the steps below.

Start the Procomm 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

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NOTE: *This system no longer sends the AQI data to CASA*

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.*

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

10. CALIBRATION

The Voice System does not require any calibration procedures.

11. Applicable Documents

- Air Quality Index System – User and System Guide

- Air Monitoring Cover off – AENV document – August 2006

- **EM-003a** ESC model 8816 Data Acquisition and Control System Operations Manual

- **EM-003b** ESC model 8832 Data Acquisition and Control System Operations Manual

- Alberta Environment AMD – 1989 & 2006

12. LITERATURE REFERENCES

None

13. REVISION HISTORY

Revision 0 (new document)

Revision 1.0 – Added documents reference

Changed Team Leader to Manager, removed reference to a Calgary AENV office and telephone number

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14. APPROVAL

Harry Benders

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Approved by:	**Harry Benders**	**Date: January 27, 2011**
Title:	**Air Monitoring Manager**	