

# PCME DUST TOOLS

## USER MANUAL

The products described in this manual are subject to continuous development and improvement and it is, therefore, acknowledged that this manual may contain errors or omissions. PCME encourage customer feedback and welcome any comments or suggestions relating to the product or documentation. These should be forwarded to the Technical Department at the address given below.

This manual is intended as a guide to the use and installation of the product and, therefore, PCME Ltd. shall not be liable for any loss or damage whatsoever arising from the use of any information or details therein, or omission or error in, this manual, or any miss-use of the product.

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# 1 INTRODUCTION

## 1.1 Overview of PCME Dust Tools

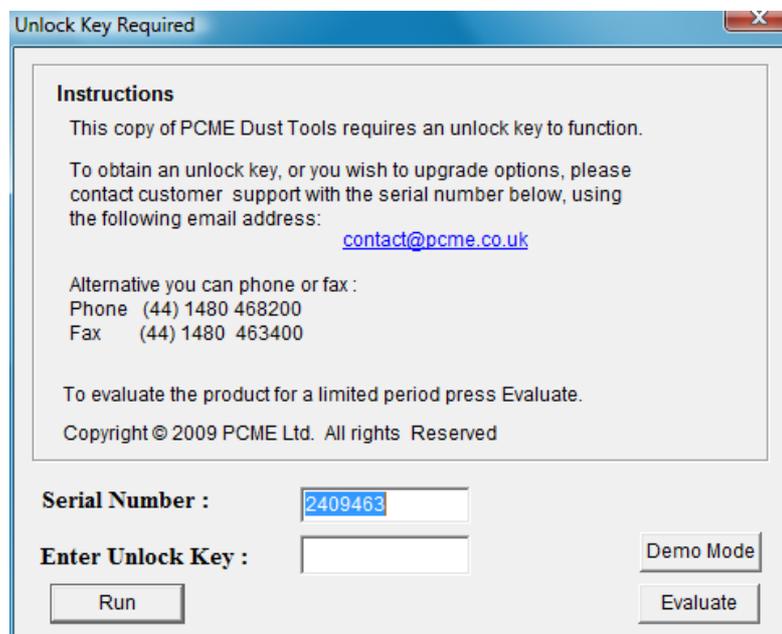
PCME Dust Tools is a combined package of PC software tools for use with PCME Dust Sensors and Controllers. The software options are divided into 3 groups:

- **Configuration Options:** for setup of control units or sensors
- **Real-time Data Options:** for accessing emission and alarms in real-time from control units or sensors.
- **Historical Data Options:** for displaying and reporting logged data from control units.

This manual covers all features supported by PCME Dust Tools. Please note that the features available on a particular copy of the software depend on the software options that have been purchased. PCME Dust Tools can be upgraded to include additional modules at any time.

## 1.2 Installation and Unlock Key

Install PCME Dust tools from the CD provided. On running PCME Dust Tools for the first time (or until the Unlock Key is entered) you will be prompted with a security screen requesting an Unlock Key to be entered. If the Unlock Key is unknown, the software may still be run for up to 30 days after installation (evaluation mode). In such a case the full functionality of the software is provided although this terminates after 30 days. The Run Key may be obtained from PCME (or its local representative); state the Serial Number which appears on the screen. Once the run time code is entered on a particular PC, the user need never enter this again.

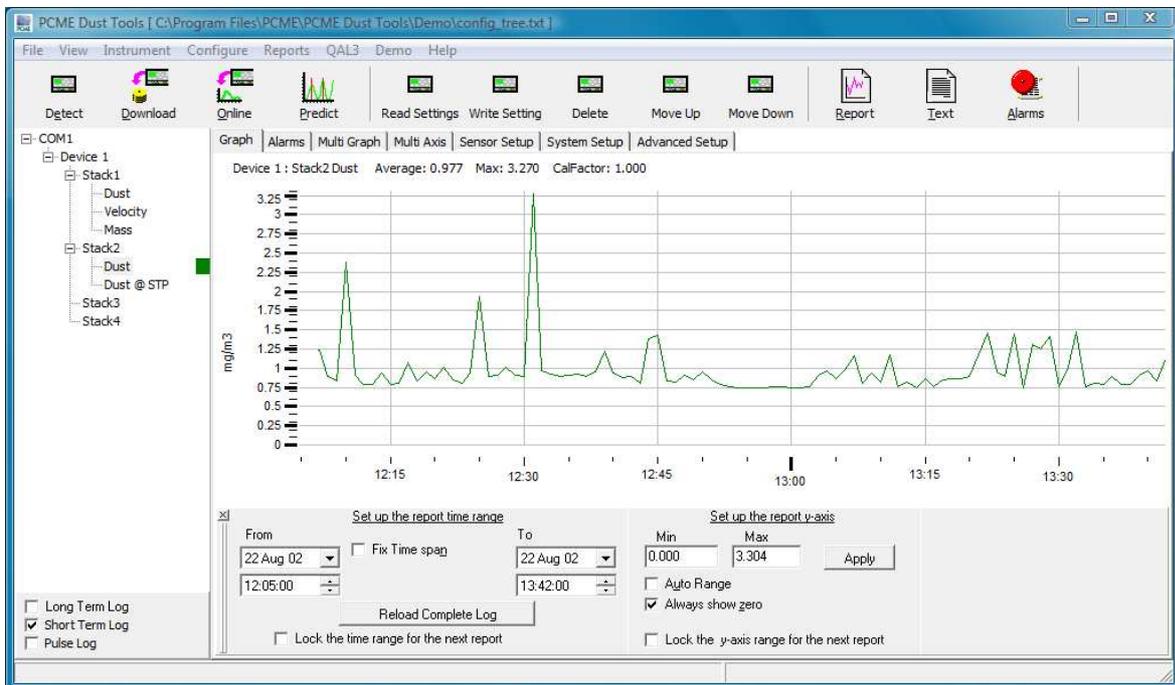


Notes:

- If you load PCME Dust Tools onto multiple PCs it will generate different Security Codes, so you will need to obtain separate Unlock Keys for each PC. Multiple user licenses are available from PCME.
- Upgrading of options: unpurchased options are grayed out. To purchase additional options, go to Help->Upgrade Options. Contact PCME with your Security Code to obtain a new Unlock Key for the additional options.
- Press Demo Mode to demonstrate the software using some sample data. In Demo Mode you are unable to connect to an instrument.

On running the software the PCME Dust Tools Main screen will be displayed (see section 1.3).

### 1.3 Explanation of Main Screen



Once configuration and log data has been downloaded from your instrument a tree showing all your devices is displayed on the left. The view logged data simply click to select a channel from the device tree. Use the log selector at the bottom left of the screen to switch between different log types.

## Main Instrument Functions



Detect

### Detect

To search for control units and sensors connected to your PC. Do this before using the other functions. This will create a device tree at the left of the main screen. If you change your control unit settings from the control unit you need to re-run detect.



Download

### Download

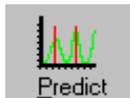
To transfer historical data from the instrument to the PC. Transfer of the Long Term log is normally performed weekly or monthly, as a first step to producing an Emission Report. In addition the Short Term log can be downloaded for trending and the Pulse Log for broken bag diagnostics.



On-Line

### Online

To graph emissions as they occur. This is useful for process control where it is beneficial to view the current emissions directly in the PC. Up to 8 channels can be viewed simultaneously. This is designed to be used in conjunction with the Alarms Overview page.

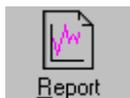


Predict

### Predict

Function for broken bag prediction and location. This works by reading online data or logged data and digital inputs which locate the start of the cleaning cycle.

## Main Report Functions



Report

### Graph Report

This is used to print a graphical report in a form suitable to satisfy regulators. Most process operators use this graphical report (which is often preferred by the regulators) since it displays data in an easy to interpret format.



Text

### Text Report

Used to print a full listing of emission averages against time.



Alarms

### Alarm Report

Used to provide a summary of all alarm conditions. Emission and internal instrument alarms can be analysed together or separately.

## Other Features

**The Device and Channel Selector:** This allows quick selection of the required channel /sensor to be displayed. By holding the CNTRL key down while selecting a channel, it also allows selection of multiple channels.

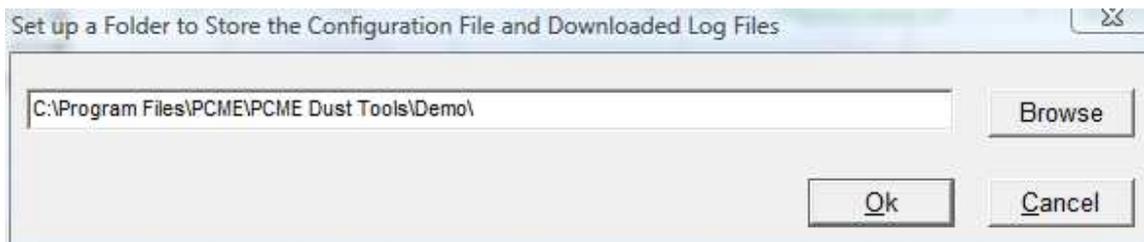
**The Log Type Selector:** Used to select the type of log required: LONG TERM, SHORT TERM, PULSE. By holding the CNTRL key down while selecting, multiple log types can be displayed simultaneously.

**The Display Window, Page Select:** The main display window provides various display pages for display of downloaded data or online data. Depending on the options purchased this includes the Graph Display, Text and Alarm Log displays and the Alarm Overview Page.

## 1.4 Download Directory and File Structure

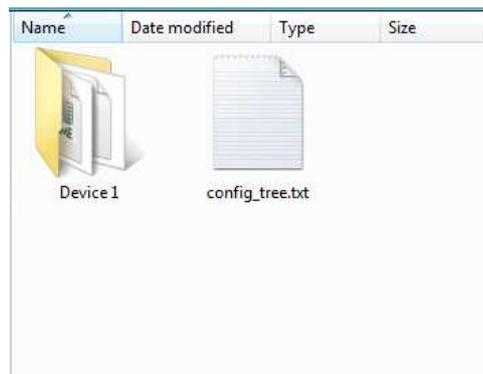
When PCME Dust Tools is launched for the first time, a Download Directory is automatically set up as the install directory (usually C:\Program Files\PCME\PCME Dust Tools). All downloaded configuration and log data is stored in this directory.

To view / modify the download directory, select Set Directory from the File menu.



When new data is downloaded from a control unit it is appended to the data from previous downloads. If you wish to create new log files, change the download directory before performing the download.

It is possible to move your current configuration and log files on block to a new location (using Windows Explore for example). Next time you run PCME it will prompt you to change the Download Directory to the new location. If you do move your log files (typically located in a folder Device 1), it is important also to move the config\_tree.txt file located in the download directory.



## 2 CONFIGURATION FUNCTIONS

### 2.1 Quick Start

This section describes the key steps to using PCME Dust Tools to manage configuration of your control unit or sensors. Details of the configuration functions are given in the next section.

#### 2.1.1 Select a download directory

- The current download directory is displayed at top of the screen in the Title Bar
- To change the download directory go to File->Set Directory.
- Any existing configuration in that directory (in a file called config\_tree.txt) will be loaded and displayed in the device tree.

#### 2.1.2 Reading Settings from Instruments

- Run Detect. This will detect all instruments connected to your computer and then read all the setting from the instruments to the computer.
- Normally Detect will search for instrument connected to your serial port COM1. Use Edit to change the COM Port number.
- Once the Detect function has completed it will automatically save all the detected instruments and their settings to the configuration file in the current download directory (displayed in the title bar). The settings are saved to a file config\_tree.txt.
- Once detect has been run once, use the Read Settings function to read the current settings from the control unit or sensors.

#### 2.1.3 Creating a backup of the configuration settings

- Before making changes you may wish to create a backup of the configuration settings read from the instrument.
- To do this, go to File->Backup Config.
- Enter a name for your backup configuration. This may be stored in the current configuration directory or in a different directory.

#### 2.1.4 Restoring a backup of the configuration settings

- You may need to restore a previous saved backup configuration into your current download directory.
- To do this, go to File->Restore Config

#### 2.1.5 Changing Settings

- Use the Configure functions to edit channels and settings.
- Any changes you make will be automatically saved on your PC (to the current configuration file config\_tree.txt)

#### 2.1.6 Writing Settings back to Instruments

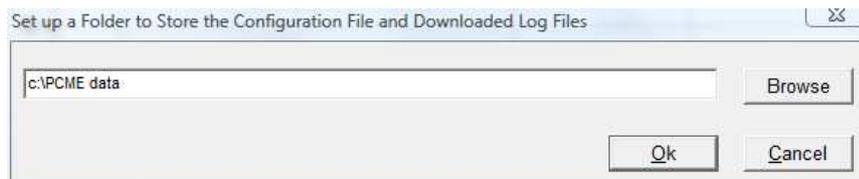
- Once you have made necessary changes to your configuration, use the Write Settings function to write the configuration settings back to the instrument. This will overwrite any existing settings in the instruments.

## 2.2 Configuration Functions

This section describes the configuration functions available to edit your configuration from within PCME Dust Tools.

### 2.2.1 Reading a configuration (Detect, Read Settings)

- On first time use, go to **File->Setup** and setup a new directory on your computer to store your configuration (and any downloaded log data).



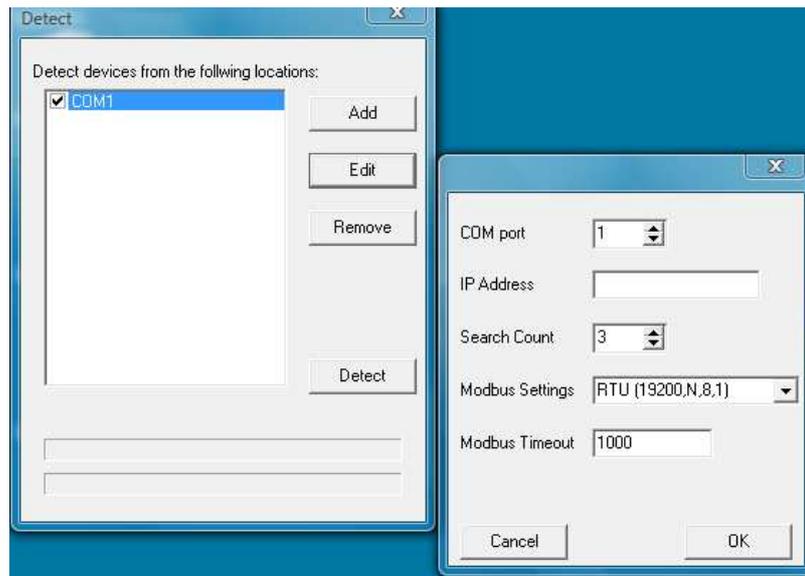
- Run **Detect**. You need to set up the communications to connect to your instrument. Click **Edit** to edit the communication settings. Click **Add** if you wish to connect through more than once communications port, e.g. if you have two controllers on your network at different IP addresses.
- If you are connecting using RS232 through a COM port on your PC, first check your computer to see which COM Port number you are using. To do this (in Windows XP) go to:

Start  
Control Panel  
System  
Hardware tab  
Device Manager  
Ports

- Enter the COM port number in the Edit dialog. Note: the maximum allowed COM Port is COM9. If your computer has allocated a com port number greater than 9, you will need to change this. Click on the Port in Device Manager then go to

Port Settings tab  
Advanced..

- If you are connecting to a control unit with an Ethernet card fitted, enter the IP address of your control unit in the Edit Dialog. The COM port settings will then be ignored.
- Search Count:** normally the Detect function will detect the first 3 modbus addresses (1,2,3). This allows you to connect up to 3 control units or sensors on the same com port using an RS485 network. If you have a larger network, then increase the Search count setting. For a single control unit (with default modbus address 1) you may set the search count to 1. Note: if you have several devices on an RS485 network, they must be allocated different modbus address (check you sensor manual for how to do this).



- **Modbus Settings:** the default modbus settings are for use with PCME Control Units (Multicontroller and Interface Module) : Modbus RTU mode with comms settings of 19200 baud, no parity 8 data bits and 1 stop bit). These settings are also suitable for connecting direct to PCME stand alone sensors using the RS232 port.

To speed up the download of log data for control unit you may use one of the higher baud rate settings RTU(38400,N,8,1) or RTU(56000,N,8,1). You must also adjust the baud rate in the control unit.

An alternative settings ASCII(19200,O,7,2) is provided for connecting direct to PCME stand alone sensors using the RS485 port.

- Once detect has been run once, use **Configure->Read Settings** to obtain the latest settings from your control unit.

## 2.2.2 Changing Individual Sensor/Channel Configuration Settings

- Go to the Sensor Setup Tab to display the list of sensors/channels.
- Double-Click on a channel to show the settings list for the channel.
- Double-Click on the setting you wish to alter
- Enter a value in the New Value field and click OK
- The new value now will be displayed in the settings list. At this stage the changes have not been saved to the configuration file (config\_tree.cfg). Click Save if you wish to save changes to the configuration file, otherwise click Cancel.
- **NOTE:** changing settings does not automatically change any settings in the control unit or sensor. Once you have made all required changes, you need to run **Write settings** to transfer changes to the control unit.

### 2.2.3 Changing Multiple Sensor/Channel Configuration Settings

- Go to the Advanced Setup Tab.
- Select the Quantity you wish to edit.
- Select multiple Sensors/Channel.
- Click **Edit**
- Enter the new value and press ok. This will adjust **ALL** selected channels to the new value.

### 2.2.4 Changing System Settings

- Go to the System Setup Tab.
- Click on the Settings you wish alter.
- Again pressing Save will make changes to the configuration file. Run Write Settings to transfer settings to the control unit.

### 2.2.5 Editing Groups

Go to **Configure->Edit Groups** to edit the organization of channel into groups in the control unit.

The Group/Plant/Stack Setup dialog provides the following functions:

- Add a new group
- Edit a group name
- Delete a group
- Move Up/Move Down functions to change the display order of the groups in the control unit.

### 2.2.6 Deleting Channels

- Go to the Sensor Setup tab.
- Select the channel you wish to delete.
- Go to **Configure->Delete Channel** to delete channels from your configuration file.

**Note:** channel settings will be permanently lost.

### 2.2.7 Changing the channel display order

- Go to the Sensor Setup tab.

- Select the channel you wish to move.
- Use the Move Up and Move Down buttons to change the channel position.

### **2.2.8 Setting up a new control unit configuration from PCME Dust Tools**

- Go to Configure->Add Controller.
- This will add a new controller called Device 1 (with modbus address 1) to the configuration file. You can then proceed to add groups and channels using the functions described above.
- Use Configure->Delete Controller to remove the controller from the configuration file.

## 3 HISTORICAL DATA AND REAL TIME FUNCTIONS

### 3.1 Downloading data from an instrument

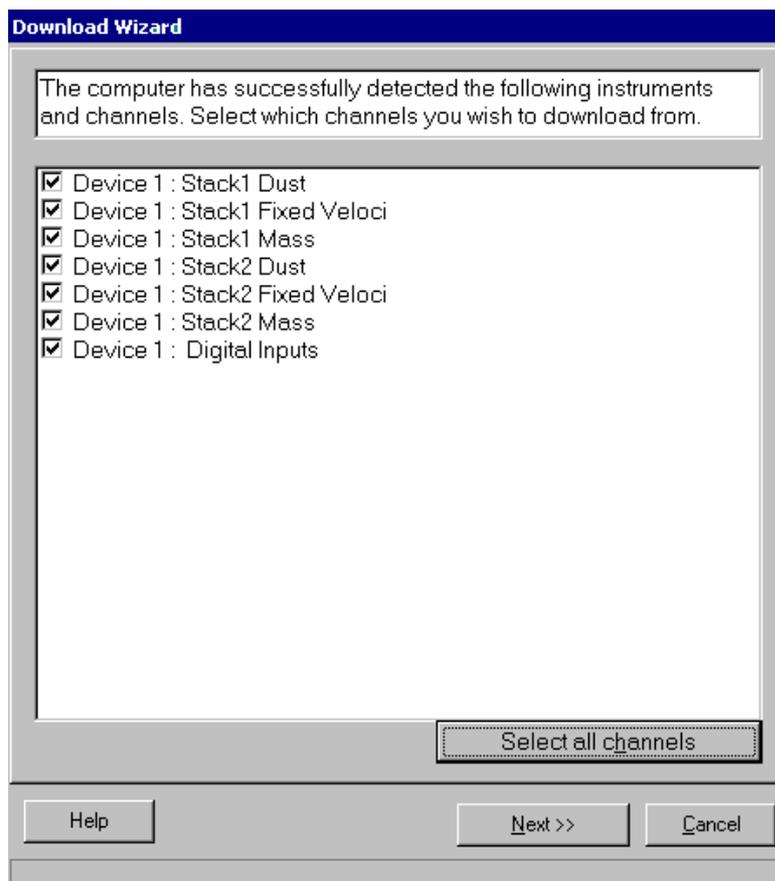


Data may be quickly transferred from the dust monitor memory by using the **Instrument Download tool button**. Click on the button to invoke the Download Wizard that will guide you through the download process.

**Note: You must first run Detect before you can download data.**

#### Selecting Channels

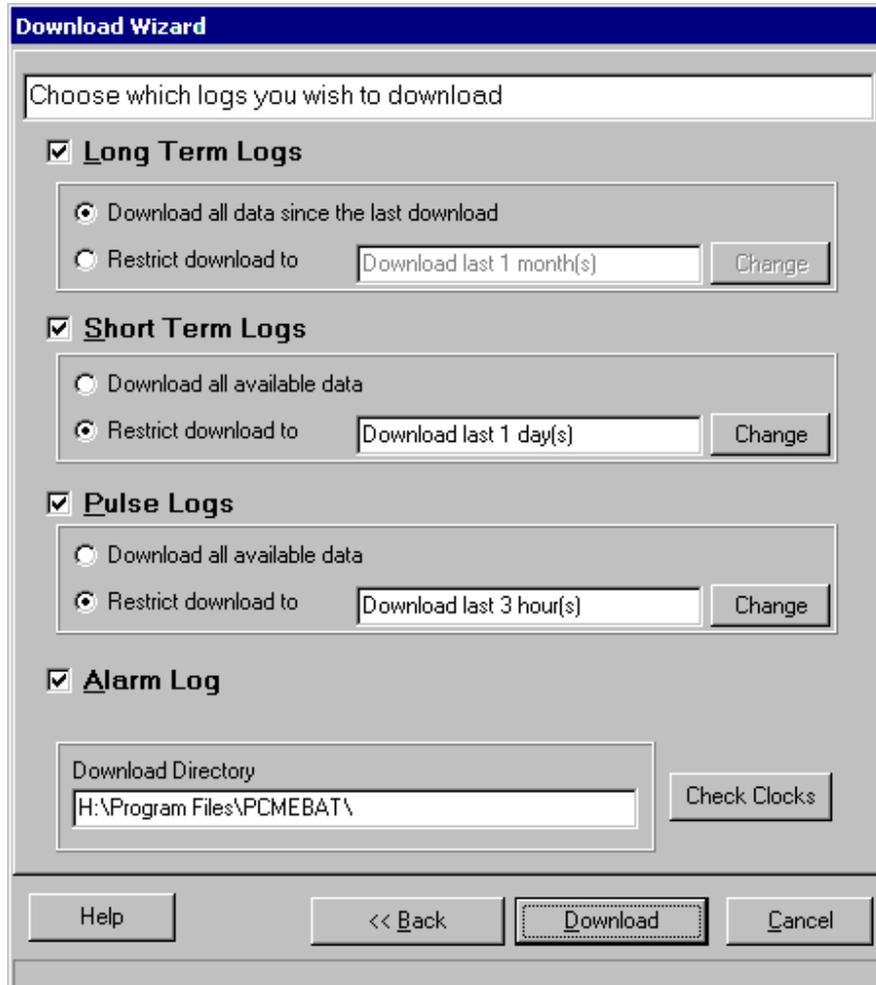
The first Download Wizard window allows you to select channels for downloading:



When all channel selections are made, click the **Next** button.

## Selecting Logs for Downloading

The next Download Wizard window allows you to specify which Log Types to download.



**Download Wizard**

Choose which logs you wish to download

**Long Term Logs**

Download all data since the last download

Restrict download to

**Short Term Logs**

Download all available data

Restrict download to

**Pulse Logs**

Download all available data

Restrict download to

**Alarm Log**

Download Directory

### Log Types

Select/deselect Log Types by clicking on the appropriate Log Type checkbox.

- Long Term Logs**  
 The purpose of the Long Term Log is to create a continuous archive of your data for environmental reporting. Therefore if you set Time Restrictions for the Long Term Log they will only apply to newly created log files. The Long Term memory may be set to log at any interval from 1 to 120 minutes in the control unit.
- Short Term Logs**  
 The Short Term Log logs data at more frequent intervals; the storage rate for the short-term memory may be set to log at any interval between 10 to 240 seconds.
- Pulse Logs**  
 The Pulse Log is logged at the Poll Rate which is specific to individual sensors/channels. (Please refer to your Dust Monitor documentation for further details).

It is recommended that you restrict the Short and Pulse Log downloads to the time period required to speed up the download process.

- **Alarm Logs**

The Alarm Log contains an entry for each alarm that has been active. It lists the channel where the alarm was activated, the alarm type, its start/stop times and duration.

### **Download Directory**

The directory the log files are to be downloaded to is displayed in the Download Directory field. All new log data is added to existing log files in the current Download Directory. To create new logs, select File -> Setup to change the Download Directory and then re-run the Download Wizard. Alternatively, Windows Explore can be used to manually delete or rename existing log files so that the download directory does not have to be changed. The Download Directory cannot be modified directly from this window.

### **Check Clocks**

To ensure correct display of emission timings in PCME Dust Tools, click on **Check Clocks** to check your PC time and instrument time are synchronized before the download.

### **Downloading**

When you are ready to start the download, click on the **Download** button.

As the PCME Dust Tools software transfers data from the instrument, a progress bar will indicate the amount of data transferred. When the download is complete, the download wizard will close. You can then view a graph or text display of the downloaded data by selecting a channel from the tree view to the left of the main display.

### ***Backing Up Log Files***

**It is strongly recommended that you also backup all your log files to another computer or backup drive on a regular basis.**

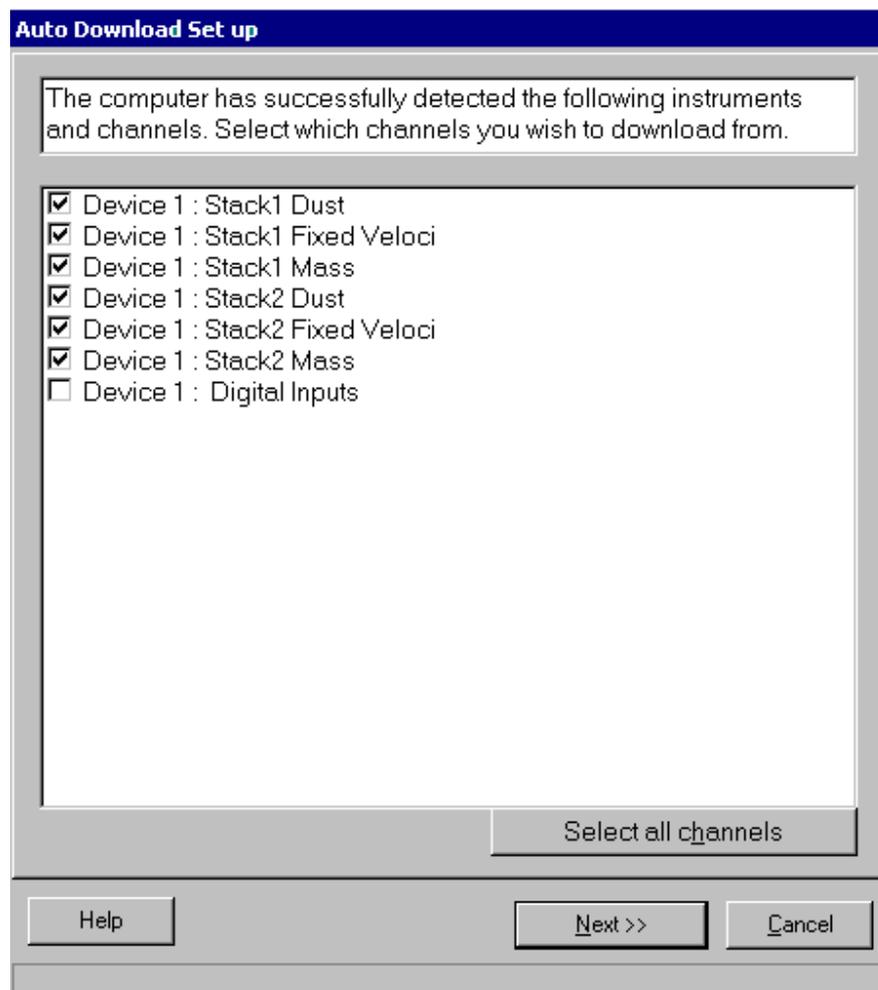
### 3.2 Auto Download

PCME Dust Tools has an Auto Download facility which enables you to automatically perform downloads of specified log file types at pre-specified time intervals.

**Note: you must first run detect before the Auto Download function can be used.**

#### Selecting Channels

The first Auto Download Set up Window allows you to select channels for auto-download. When you have selected the channels you require, click on the **Next** button.



#### Selecting Logs for Downloading

You now need to choose which logs you wish to be automatically downloaded during the auto download. The window below is identical to that in the previous section. (Please refer to section 2.1 Downloading data from an instrument for further details.) Once your log selections have been made, click on the **Next** button.

**Auto Download Set up**

Choose which logs you wish to download

**Long Term Logs**

Download all data since the last download  
 Restrict download to

**Short Term Logs**

Download all available data  
 Restrict download to

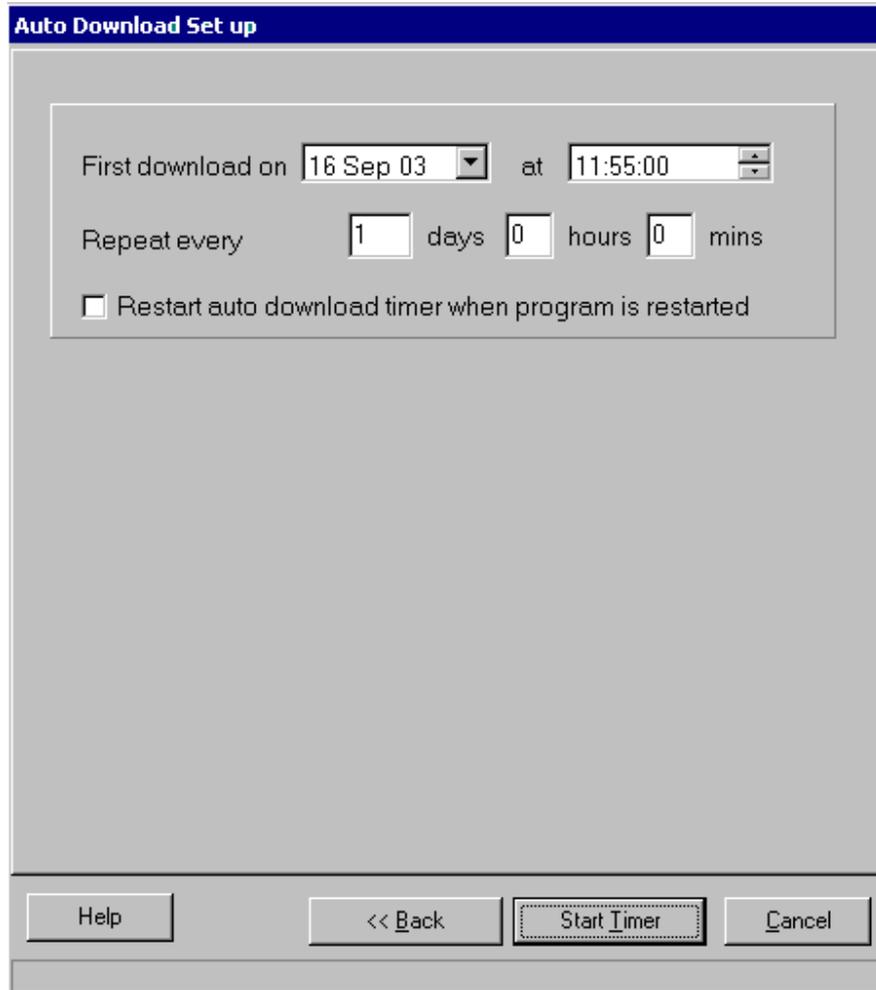
**Pulse Logs**

Download all available data  
 Restrict download to

**Alarm Log**

Download Directory

## Starting the Auto Download

The image shows a dialog box titled "Auto Download Set up" with a blue header bar. The main area is light gray and contains three rows of controls. The first row is "First download on" followed by a date dropdown menu showing "16 Sep 03" and a time spinner showing "11:55:00". The second row is "Repeat every" followed by three input fields: "1" for days, "0" for hours, and "0" for mins. The third row is a checkbox labeled "Restart auto download timer when program is restarted", which is currently unchecked. At the bottom of the dialog, there are four buttons: "Help", "<< Back", "Start Timer" (which is highlighted with a dashed border), and "Cancel".

This window allows you to specify the date and time of the first auto download. To enter a date, click on the down arrow next to the **First Download On** date field and select a date from the calendar. The hour, minute and seconds can be changed by first clicking over the appropriate field and then using the mouse to click the up/down arrows or (probably more conveniently) using the up/down arrow keys on your keyboard.

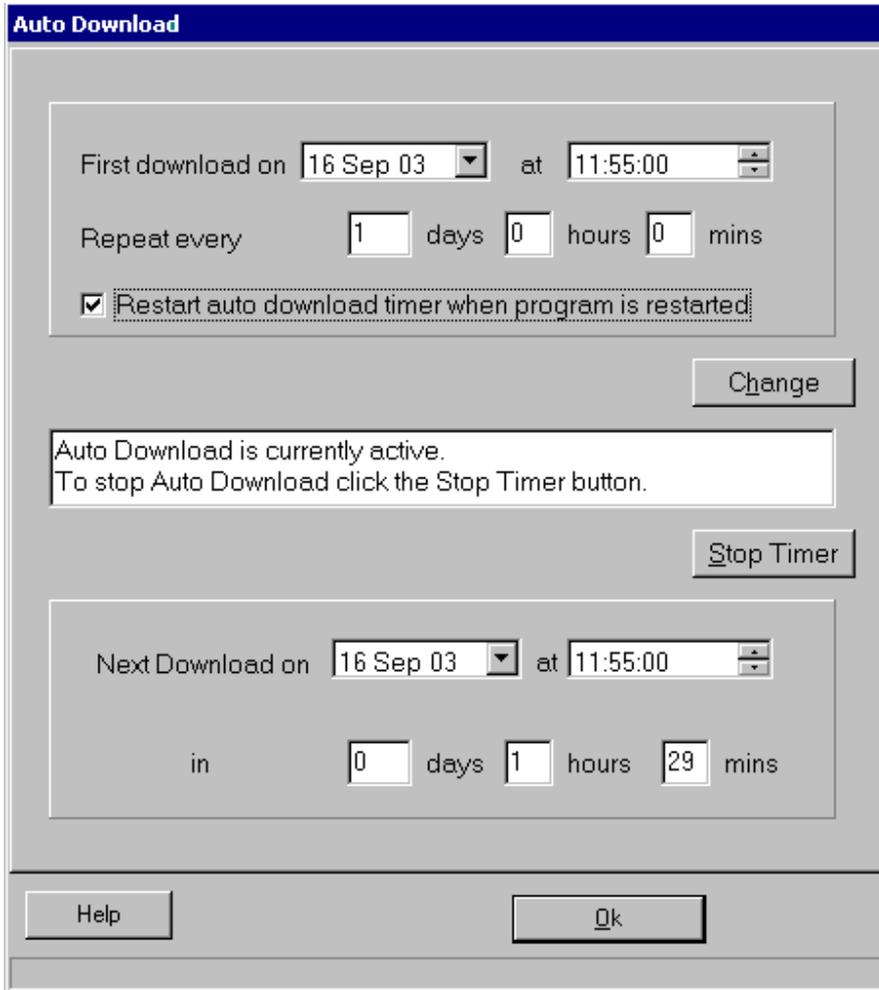
After you have entered the date and time, enter the time period you wish to elapse before each next download in the **Repeat** fields.

If you want the auto download timer to automatically restart when PCME Dust Tools is restarted, make sure the **Restart auto download timer when program is restarted** checkbox is checked.

When you have finished entering the set up details, start the auto download by clicking on the **Start Timer** button. The timer will start and the Auto Download set up window will close.

## Stopping / Adjusting an Auto Download

If you wish to stop or adjust an auto download in progress, select Auto Download from the Instrument menu.



The screenshot shows a dialog box titled "Auto Download". It contains the following fields and controls:

- "First download on" field: 16 Sep 03 (dropdown) at 11:55:00 (time spinner)
- "Repeat every" field: 1 days 0 hours 0 mins (spinners)
- Checkbox:  Restart auto download timer when program is restarted
- "Change" button
- Text box: Auto Download is currently active. To stop Auto Download click the Stop Timer button.
- "Stop Timer" button
- "Next Download on" field: 16 Sep 03 (dropdown) at 11:55:00 (time spinner)
- "in" field: 0 days 1 hours 29 mins (spinners)
- "Help" button
- "Ok" button

If you wish to stop the auto download, click on the **Stop Timer** button.

The top half of the window above displays the date and time of the first download and the download repeat interval. The lower half of the window displays the date and time of the next download based upon the information shown in the upper half.

To change the time of the next download, enter a new date/time and/or Repeat Interval in the fields in the upper half of the window. To implement the changes, click on the **Change** button and the 'Next Download' fields will be automatically updated.

When you have made all the necessary adjustments, click on the **OK** button.

### 3.3 Selecting stored data

The log files generated by PCME Dust Tools must be selected before they can be viewed and reported.

The channel logs can be selected directly by clicking on the Device and Channel selector tree view (use CTRL Click to select multiple channels).

Saved files from other directories on your computer or network may be selected from Open Log in the Reports menu.

- Select the data file that you wish to graphically display.
- Use the controls to select the appropriate folder if necessary.
- Either double-click or select and click 'Open' to select the required file(s).



The following file types may be accessed:

Dust Reporter Files (.drp)	Generated by PCME Dust Tools or former Dust Reporter software.
----------------------------	--

**Note on file names:**

Log file names are constructed from the stack name, channel name and log type. All files from a single instrument are placed in the same sub-directory. So for example if you have two PCME STACK 990 instruments chained together two sub-directories will be created in the Download Directory called Device1 and Device2.

Examples of log filenames:

Stack1 Dust LongTerm.drp : the long term log for the Dust channel in Stack 1.

Stack2 Mass Pulse.drp : the pulse log for the derived Mass channel in Stack 2.

For more information on setting up channels in the instrument refer to your instrument manual.

When the data file(s) have been selected the graphs will be shown in the main display. There are two ways of setting up the graph axes for a report:

- Dynamic zoom controls: see section 2.4
- Graph control panels: see section 2.5

### **Saving a graph**

From the 'File' menu, select 'Save graph as'. This will display a dialog box to allow the currently displayed graph to be saved under a new filename. This may be used to store data while in online mode or may be used to store a backup copy of logged data.

### **Displaying Graphical Data for Multiple Channels**

By holding the CNTRL key down while selecting a channel, you are able to select multiple channels. A different colour is allocated for each channel selected so that data for each channel is easily recognised on the graph.

This feature is useful to compare the output from several channels over the same time period. If you wish to compare outputs over different time periods you may use the Multi Graph page. See below.

### 3.4 Report Setup using Dynamic Zoom Controls

Any graph may be scrolled and zoomed dynamically using the mouse as follows:

**ZOOM IN on a particular section:** Move the mouse pointer to the section of graph that you wish to examine and click the LEFT mouse button. The graph will re-scale the x and y axis to zoom into the chosen section. Continually click to zoom in further.

**ZOOM OUT from a particular section:** Move the mouse pointer to the area that you wish to zoom out from and click with the RIGHT mouse button. The graph will re-scale the x and y axis to zoom out from the chosen section. Continually click to zoom out further.

**DRAG to view a particular section:** Click and Hold the left mouse button down anywhere in the trace area and drag the graph in any direction to display the section that you wish to view. Use in conjunction with the zoom features to locate sections of interest.

**ZOOM the X-axis only:** Position the mouse pointer anywhere in the x-axis value area and click the LEFT mouse button to zoom IN (i.e. display a shorter time span across the graph). Click the RIGHT mouse button to zoom OUT (i.e. display a longer time span across the graph).

**ZOOM the Y-axis only:** Position the mouse pointer anywhere in the y-axis value area and click the LEFT mouse button to zoom IN (i.e. reduce the y axis full scale value). Click on the RIGHT mouse button to zoom OUT (i.e. increase the y axis full scale).

**DRAG the axes individually:** Click and drag with the left mouse button anywhere in the x or y axis value area to dynamically increase or decrease the axis scaling.

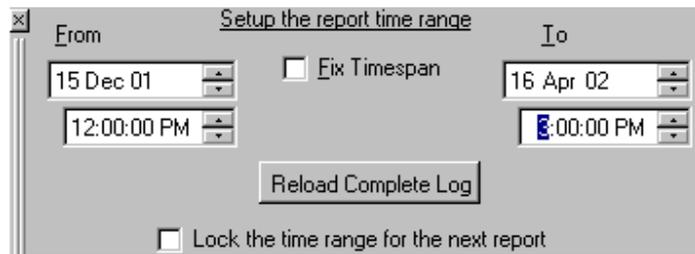
While you are using any of the above functions, you can amplify the effect by holding down the **Shift key**. Holding down the **Alt key** will doubly amplify the effect. Holding down the **Ctrl key** will reduce the effect, allowing more precise control. You may use combinations of Shift, Alt and Ctrl to scroll and zoom at different rates.

The best way to appreciate these dynamic controls is to try them for yourself. With an open graph on the screen, try clicking with the left and right mouse keys in the trace and axes to see the effect. Also try dragging the graph and axes with the left mouse button.

### 3.5 Report Setup using the Control Panels

The Control Panels below the Main Display provide a more precise way to set up ranges for generating a report.

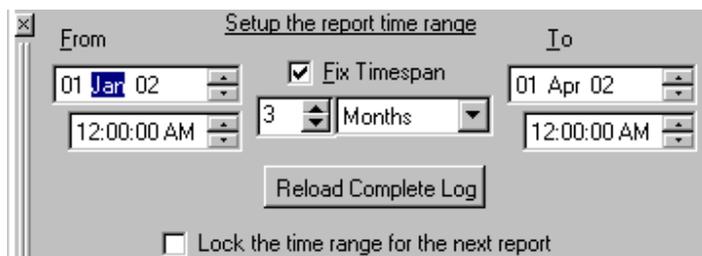
#### Setting the time range



To manually set the precise range of a report you can independently adjust the From and To date and time. The year, month, day, hour, minute and seconds can be changed by first clicking over the appropriate field and then using the mouse to click the up/down arrows or (probably more conveniently) using the up/down arrow keys on your keyboard.

**Note:** the format used to display time is controlled from your own Windows Regional Options. For example you can adjust your Windows settings to choose between 12 hour and 24 hour clock. This is done by going to Start->Settings->Control Panel->Regional Options->Time.

#### Using the Fix Timespan function

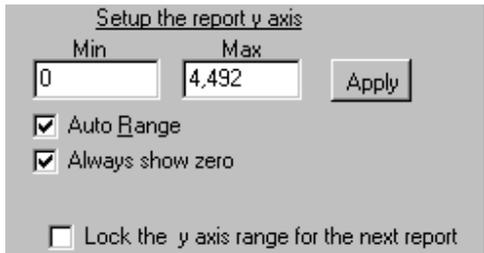


This provides a much more convenient way of setting up a standard time range for a regulatory report. E.g. to set up a three month report for Jan->Mar 2002, click the Fix Timespan checkbox. Then select the timespan to be 3 months as shown below. You can then select the appropriate 3 month period easily by click on the From month field and scrolling until you reach Jan 02. Alternatively you can click on the To month and scroll to Apr 02.

## Using the Reload Complete Log function

When a log is first selected for viewing, it will usually display the complete log range. If you wish to redisplay the complete log click on the 'Reload Complete Log' button.

## Setting the y axis

A screenshot of a software dialog box titled "Setup the report y axis". It contains two input fields: "Min" with the value "0" and "Max" with the value "4,492". To the right of these fields is an "Apply" button. Below the input fields are three checkboxes: "Auto Range" (checked), "Always show zero" (checked), and "Lock the y axis range for the next report" (unchecked).

There is a similar control to set the y-axis range of your graph report. Having adjusted the Min and Max values press the Apply button. If the 'Auto Range' checkbox is checked the range will be set up automatically between the minimum and maximum data values for the time range of the graph. To ensure the axis always starts at 0 check the 'Always show zero' check box.

## Locking the Report Axes

Having set up the report ranges for one log, you will often wish to use the same settings for your next report. To do this click the 'Lock Time Range' and/or 'Lock y axis' check boxes. This will lock the ranges so when you select a new log from the Tree View it will only display data within the previously fixed range.

## 3.6 Creating an Averaged Report

The time period that values are averaged over (Averaging Period) on a PCME Dust Tools graph can be adjusted by selecting Advanced Features from the View menu. A small window will appear to the right of your graph. To apply a different averaging period, check the **Averaging Period** checkbox and enter values in one or more of the time fields. To display the graph again based on the default averaging period, simply uncheck the Averaging period checkbox.

## 3.7 Exporting Graph/Data

To export the data displayed on the currently displayed graph, select **Export Graph** or **Export Data** (depending on version) from the **File** menu.

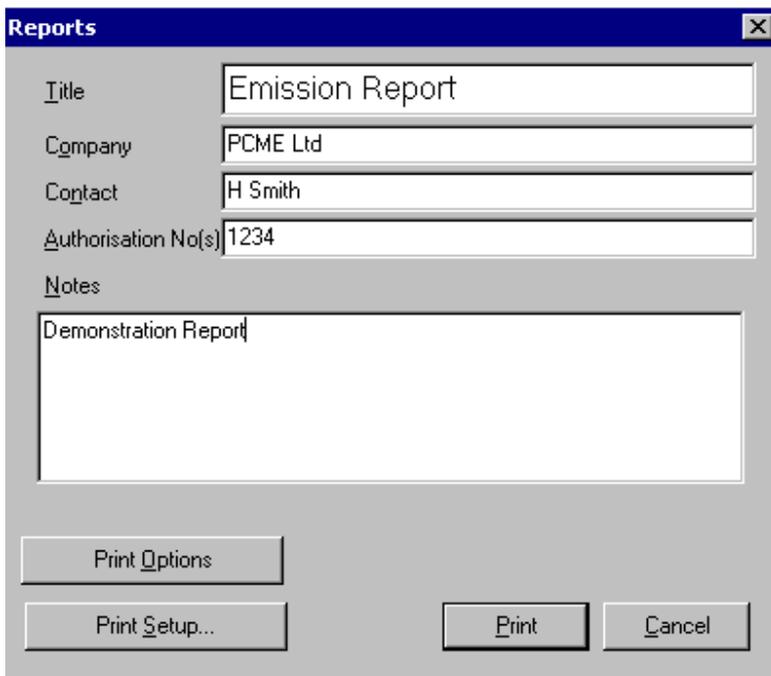
Enter a filename and choose a location for saving the exported data and then click the Save button to save the data in Comma Separated Variable format (.csv). The exported data can be viewed using Microsoft Excel or other spreadsheet software.

### 3.8 Producing a Printed Graphical Report

If a printed graphical report is required, use the graph control tools as described above to select the period of data to be included in the report.

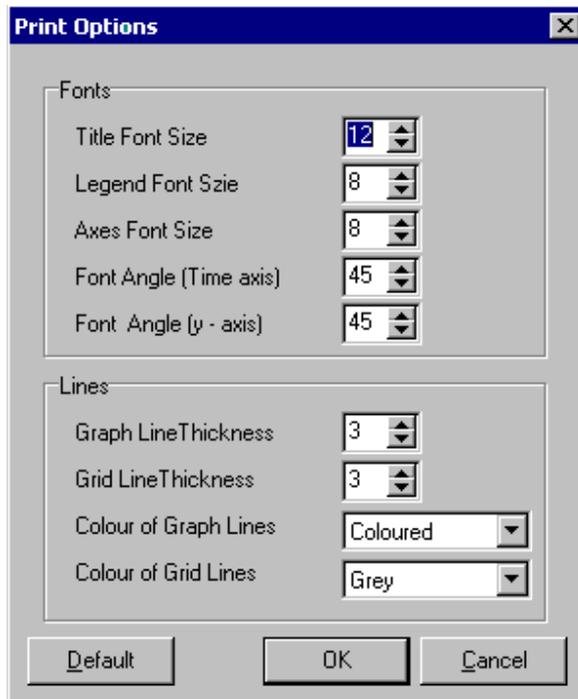


A printed graphical report may be produced by using the **Create Graph Report tool button**. Click on the button to display the set-up window that allows the report to be tailored to your requirements.

A screenshot of a software dialog box titled "Reports". It contains several input fields and buttons. The fields are: "Title" with the text "Emission Report", "Company" with "PCME Ltd", "Contact" with "H Smith", and "Authorisation No(s)" with "1234". Below these is a "Notes" section with a text area containing "Demonstration Report". At the bottom, there are four buttons: "Print Options", "Print Setup...", "Print", and "Cancel".

Title	Emission Report
Company	PCME Ltd
Contact	H Smith
Authorisation No(s)	1234
Notes	Demonstration Report

- Change the **Title**, **Company**, **Contact** and **Authorisation No(s)** fields as required.
- Add any notes that you wish to include in the report in the **Notes** field.
- The printer setup may be adjusted by clicking the **Print Setup** button. The default Windows printer will be used unless the settings are changed.
- You may modify the appearance of your report e.g. Font Size, Graph Line Thickness by clicking on the **Print Options** button. The default settings are automatically displayed. Make any changes you wish and then click OK to save them. Click on the **Default** button if you prefer to keep the default settings.

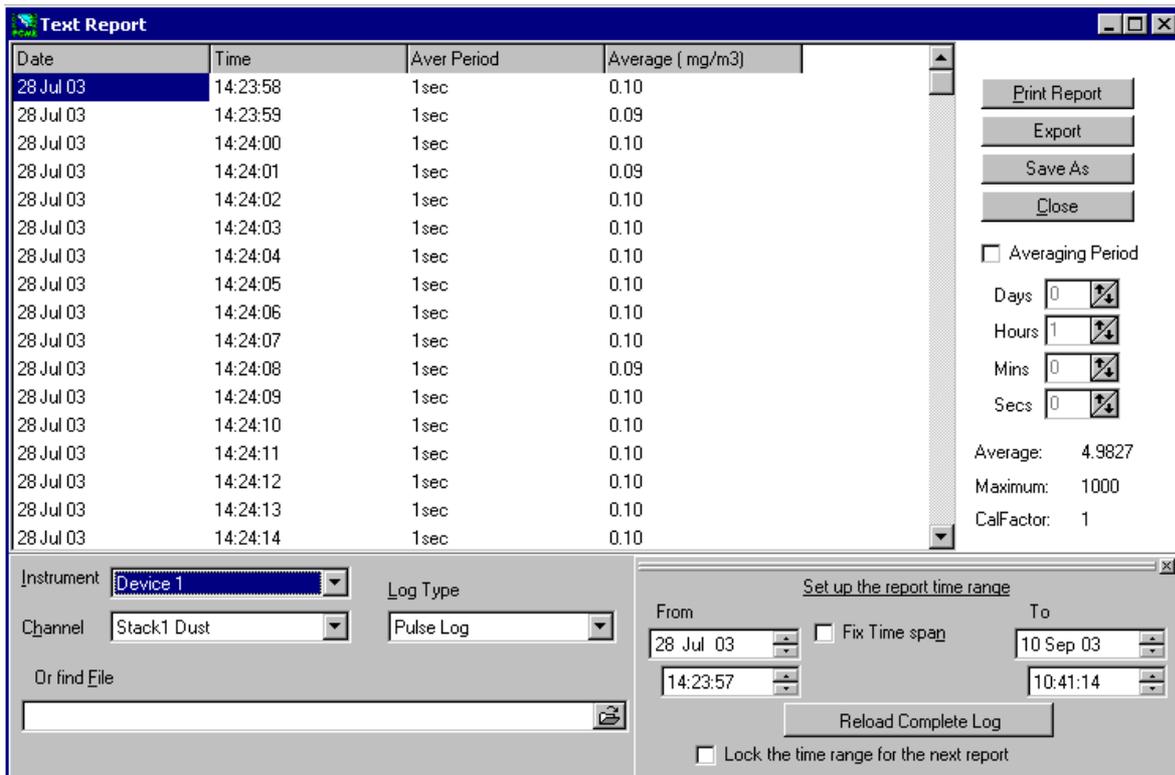


- When the details are as required, click the **Print** button to send the report to the printer.

### 3.9 Producing a Printed Text Report



A printed text report may be produced using the **Create Text Report tool button**. Click on the button to display the set-up window that allows the report to be tailored to your requirements.



Date	Time	Aver Period	Average ( mg/m3)
28 Jul 03	14:23:58	1sec	0.10
28 Jul 03	14:23:59	1sec	0.09
28 Jul 03	14:24:00	1sec	0.10
28 Jul 03	14:24:01	1sec	0.09
28 Jul 03	14:24:02	1sec	0.10
28 Jul 03	14:24:03	1sec	0.10
28 Jul 03	14:24:04	1sec	0.10
28 Jul 03	14:24:05	1sec	0.10
28 Jul 03	14:24:06	1sec	0.10
28 Jul 03	14:24:07	1sec	0.10
28 Jul 03	14:24:08	1sec	0.09
28 Jul 03	14:24:09	1sec	0.10
28 Jul 03	14:24:10	1sec	0.10
28 Jul 03	14:24:11	1sec	0.10
28 Jul 03	14:24:12	1sec	0.10
28 Jul 03	14:24:13	1sec	0.10
28 Jul 03	14:24:14	1sec	0.10

Averaging Period  
 Days: 0  
 Hours: 1  
 Mins: 0  
 Secs: 0  
 Average: 4.9827  
 Maximum: 1000  
 CalFactor: 1

Instrument: Device 1  
 Channel: Stack1 Dust  
 Log Type: Pulse Log  
 Or find File:

Set up the report time range  
 From: 28 Jul 03 14:23:57  
 To: 10 Sep 03 10:41:14  
 Fix Time span  
 Reload Complete Log  
 Lock the time range for the next report

- Click on the **Print Report** button to print a text report of the data displayed. Alternatively, you can select a file to print a text report from by clicking in the **Or Find File** field. You can adjust the report time range using the control panel provided (see section 2.5, Using Control Panels).
- To export the data currently displayed, click on the **Export** button. Enter a filename and choose a location for saving the exported data and then click the Save button to save the data in Comma Separated Variable format (.csv). The exported data can be viewed using Microsoft Excel or other spreadsheet software.



- To save the text report as a PCME Dust Tools file (.drp) that can then be reopened in PCME Dust Tools, click the **Save As** button. Enter a filename and choose a location for saving the report and then click the Save button to save.
- The averaging period can be adjusted by checking the **Averaging Period** checkbox and entering values in one or more of the time fields. To display the report again based on the default averaging period, simply uncheck the Averaging Period checkbox.

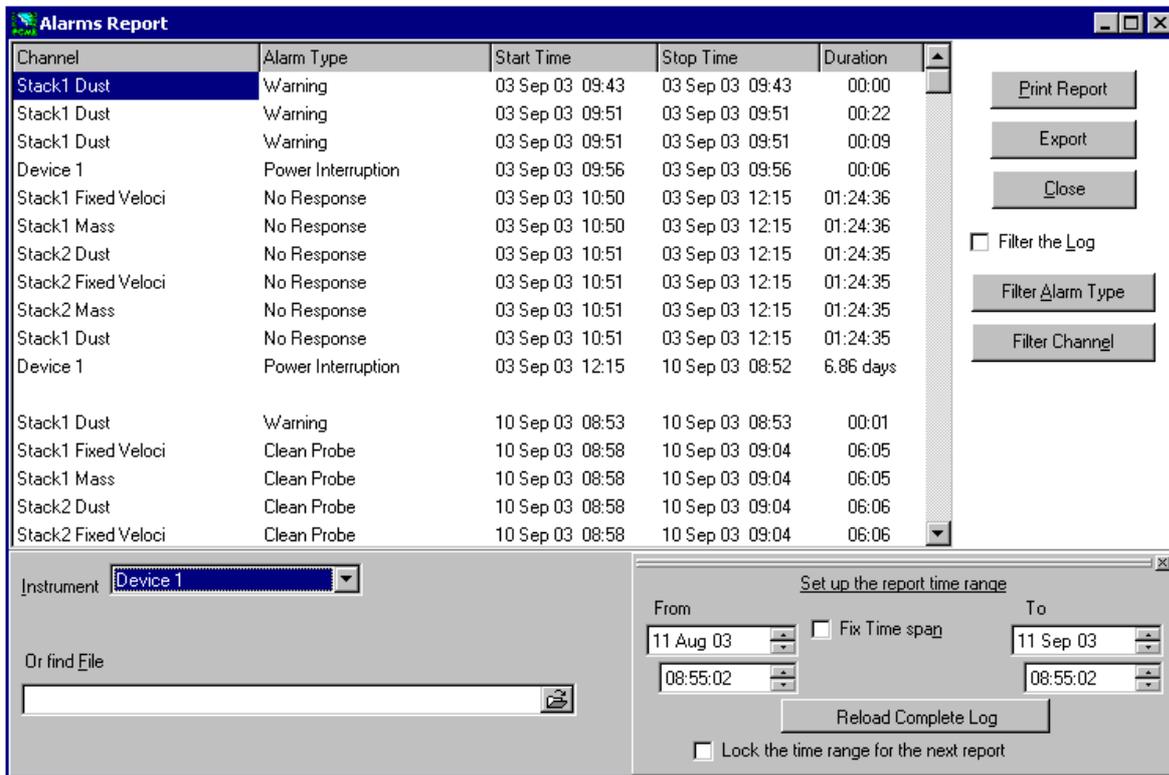
### 3.10 Producing a Printed Alarm Report

To download the alarm log for an instrument to PCME Dust Tools, use the Download Wizard and ensure the Alarm Log box is checked (see 'Downloading data from an instrument', section 2.1).  
 Note: there is only one alarm log per instrument containing alarm events for all channels in the instrument.

To view and print the alarm report, use the **Create Alarm Report tool button**.



A setup window is displayed that allows the report to be tailored to your requirements.

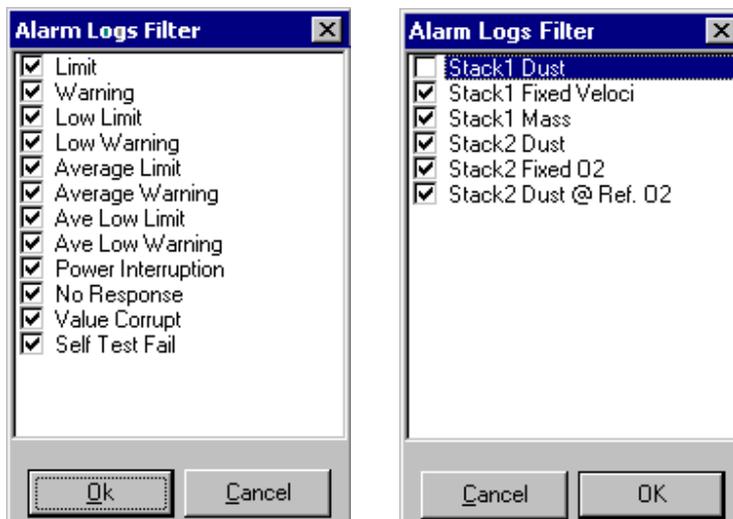


Channel	Alarm Type	Start Time	Stop Time	Duration
Stack1 Dust	Warning	03 Sep 03 09:43	03 Sep 03 09:43	00:00
Stack1 Dust	Warning	03 Sep 03 09:51	03 Sep 03 09:51	00:22
Stack1 Dust	Warning	03 Sep 03 09:51	03 Sep 03 09:51	00:09
Device 1	Power Interruption	03 Sep 03 09:56	03 Sep 03 09:56	00:06
Stack1 Fixed Veloci	No Response	03 Sep 03 10:50	03 Sep 03 12:15	01:24:36
Stack1 Mass	No Response	03 Sep 03 10:50	03 Sep 03 12:15	01:24:36
Stack2 Dust	No Response	03 Sep 03 10:51	03 Sep 03 12:15	01:24:35
Stack2 Fixed Veloci	No Response	03 Sep 03 10:51	03 Sep 03 12:15	01:24:35
Stack2 Mass	No Response	03 Sep 03 10:51	03 Sep 03 12:15	01:24:35
Stack1 Dust	No Response	03 Sep 03 10:51	03 Sep 03 12:15	01:24:35
Device 1	Power Interruption	03 Sep 03 12:15	10 Sep 03 08:52	6.86 days
Stack1 Dust	Warning	10 Sep 03 08:53	10 Sep 03 08:53	00:01
Stack1 Fixed Veloci	Clean Probe	10 Sep 03 08:58	10 Sep 03 09:04	06:05
Stack1 Mass	Clean Probe	10 Sep 03 08:58	10 Sep 03 09:04	06:05
Stack2 Dust	Clean Probe	10 Sep 03 08:58	10 Sep 03 09:04	06:06
Stack2 Fixed Veloci	Clean Probe	10 Sep 03 08:58	10 Sep 03 09:04	06:06

Control Panel: Instrument: Device 1, Or find File: [ ], Set up the report time range: From 11 Aug 03 08:55:02 To 11 Sep 03 08:55:02, Fix Time span: [ ], Reload Complete Log: [ ], Lock the time range for the next report: [ ]

- Click on the **Print Report** button to print a text report of the alarm data displayed. Alternatively, you can select a file to print an alarm report from by clicking in the **Or Find File** field. You can adjust the report time range using the control panel provided (see section 2.5, Using Control Panels).

- To export the data currently displayed, click on the **Export** button. Enter a filename and choose a location for saving the exported data and then click the Save button to save the data in Comma Separated Variable format (.csv). The exported data can be viewed using Microsoft Excel or other spreadsheet software.
- Alarm data can be filtered before an alarm report is printed. To filter alarm data, click the **Filter Alarm Type** or **Filter Channel** button to select the data you want in the report. Then click on the **Filter the Log** checkbox to filter the data. To remove the filter, simply uncheck the 'Filter the Log' checkbox.



### 3.11 Extracting Calibration Data

Dust emission monitors are calibrated by comparison to the results of an isokinetic sample and this calibration menu assists the computation of the instrument average during this isokinetic sampling. This data is used to calculate a new cal factor for the instrument which must then be manually entered back into the instrument.

Instrument calibration information may be calculated from the stored data by selecting the **Calibrate** from the **Instrument** menu.

Referring to the figure below (Calibration Wizard Screen - Step 1.), the Calibration Wizard has the following settings.

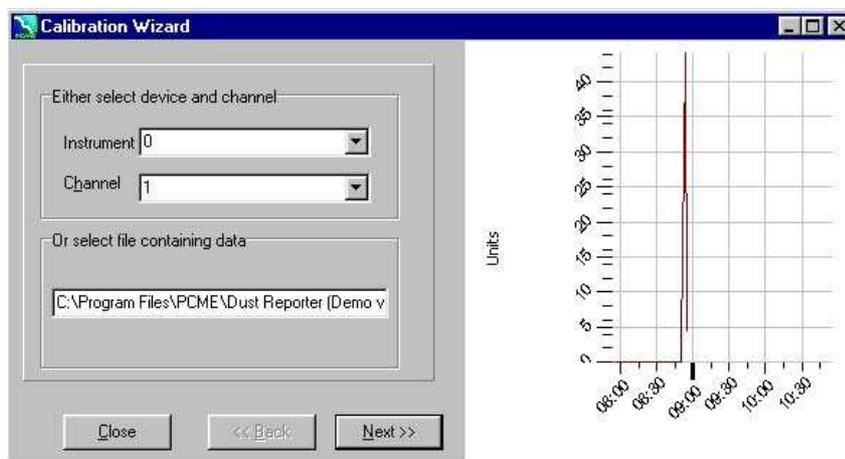
Select the **Instrument** and **Channel** that you wish to calibrate. The instrument is referenced by identification number (ident) and is shown as zero in this example.

The stored data for the selected instrument/channel will be automatically selected.

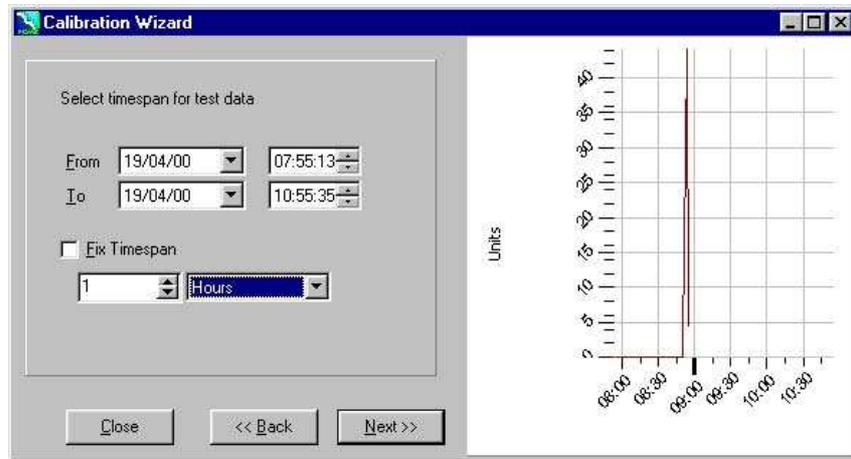
Alternatively, if you know which file holds the data that you wish to use, click on the **select file** box to display a list of available files and then select the required file.

When the data has been selected, click the 'Next' button to move to the next step of the calibration process. If no valid data file is selected, the 'Next' button will be inactive.

#### Calibration Wizard Screen - Step 1.



### Calibration Wizard Screen - Step 2.



Having selected a valid data file for calibration, the next step in the calibration process is to enter the start and end date and times for the stack sample test.

Use the **From** controls to enter the date and time of the beginning of the stack sample test (isokinetic test).

Use the **To** controls to enter the data and time of the end of the stack sample test (isokinetic test).

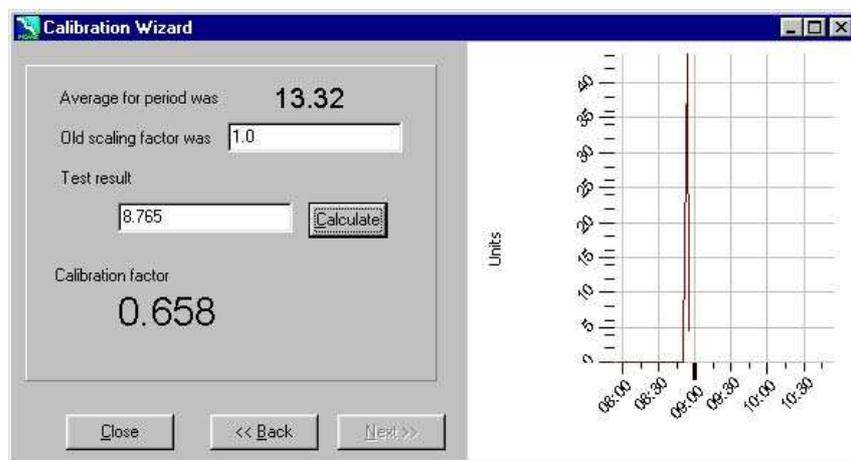
Alternatively, the period may be selected by dynamically scrolling the graph display in the right hand portion of the calibration wizard window. Use the left mouse key to drag the graph, and use left and right mouse clicks to expand or collapse the scaling. (See section 2.4 'Graph Dynamic Zoom Controls' for more information).

You may also select a fixed timespan for the data by checking the **Fix Timespan** control and then selecting the required duration.

If there is no data for the period that you have selected, there will be no trace displayed on the graph within the calibration wizard window.

When the required period has been selected, click on the 'Next' button to move to the final step of the calibration process.

### Calibration Wizard Screen - Step 3.



The final step in the calibration process allows the entry of the existing calibration factor and the isokinetic test result to calculate the new calibration factor for the instrument.

Enter the existing calibration factor (**Old scaling factor**).

Enter the isokinetic **test result**.

Click the **Calculate** button and the new calibration factor is calculated and displayed.

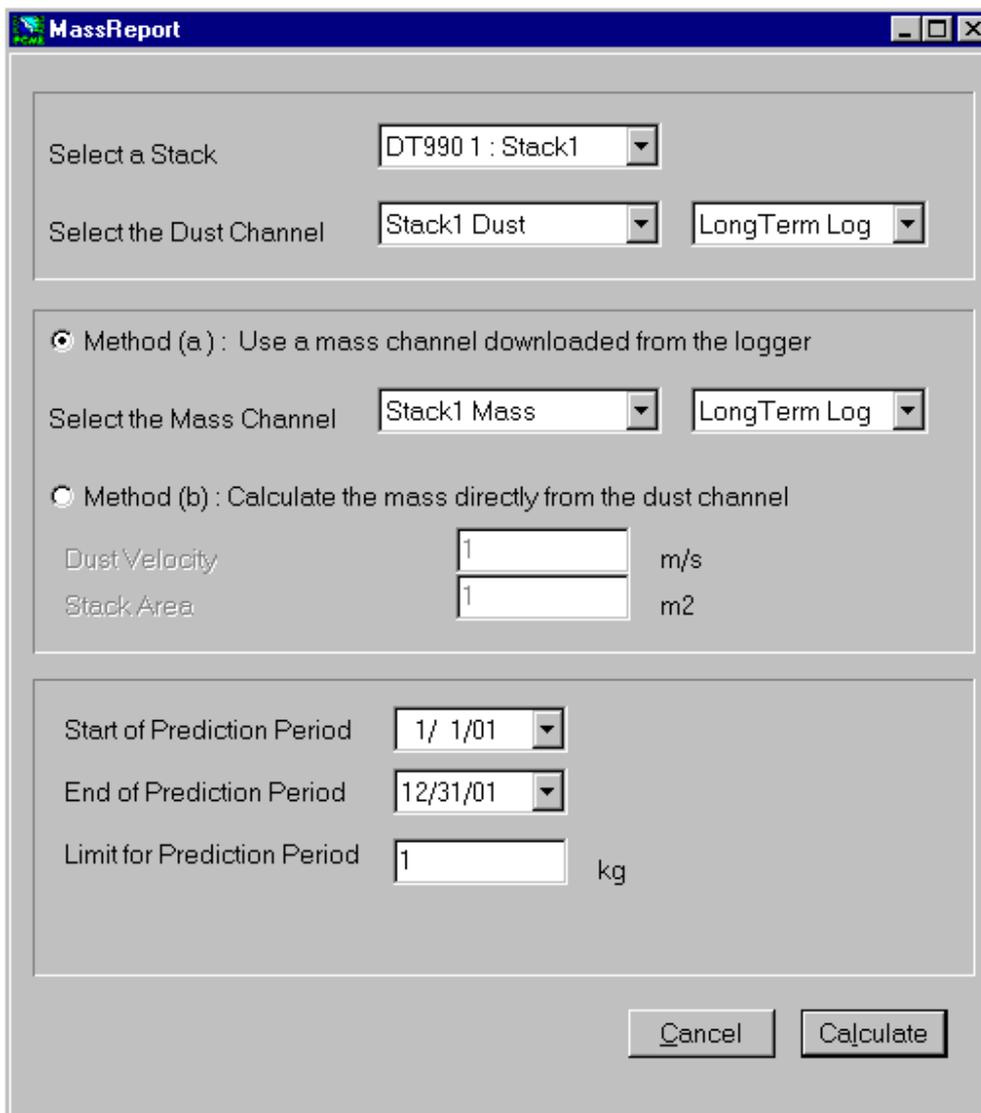
***Important Note: The new calibration factor must be manually entered into the dust monitor; it is not possible to perform remote calibration.***

Make a note of the new calibration factor and click the **Close** button to quit from the Calibration Wizard.

### 3.12 Producing a Mass Report

Go to **Mass Report** in the **Report** menu to create a textual mass report. This will display your mass emissions for the year to date and can also display your predicted emissions for the year and compare it with your target emissions.

The first page of the Mass Report wizard is used to input all the information required to create a mass report.



The screenshot shows the 'MassReport' dialog box with the following fields and options:

- Select a Stack:** DT990 1 : Stack1
- Select the Dust Channel:** Stack1 Dust
- Log Type:** LongTerm Log
- Method (a):** Use a mass channel downloaded from the logger (selected)
  - Select the Mass Channel:** Stack1 Mass
  - Log Type:** LongTerm Log
- Method (b):** Calculate the mass directly from the dust channel (unselected)
  - Dust Velocity:** 1 m/s
  - Stack Area:** 1 m<sup>2</sup>
- Start of Prediction Period:** 1/ 1/01
- End of Prediction Period:** 12/31/01
- Limit for Prediction Period:** 1 kg
- Buttons:** Cancel, Calculate

The mass emissions within a stack is calculated by the formula:

Stack Mass Emission = Stack Dust Emission x Stack Emission Velocity x Stack Area.

The Mass Report Wizard provides two different ways to create a mass report:

- a. Use logged data from a Mass channel which has been set up in your instrument. This will contain mass emissions information derived from a dust channel and a velocity channel in the instrument. To learn how to set up Mass channels within your instrument refer to the instrument manual.
- b. Use logged data from a Dust channel in your instrument and calculate the mass emission manually from the formula above assuming a fixed Velocity.

To create a mass report:

1. Select which stack/plant you wish to make a report for. The wizard will automatically find the Dust channel for this stack. The wizard will also find the Mass channel if one has been downloaded to PCME Dust Tools for the stack selected.
2. If no mass channel is available from the instrument (method (a)) then select method (b) and manually enter a constant velocity and stack area.
3. Enter the time period for the mass report. This will default to the current year but you can adjust it to a shorter or longer period. The Mass Report wizard will then search for all available data within that period.
4. (Optional) Enter the emission limit for the specified time period, then the Mass Report Wizard will calculate whether you are likely to be within the target limit at the end of the period.

Press **Calculate** then the Mass Report Wizard will display the results as shown below. This information may then be printed.

**MassReport**
\_ □ ×

Results YTD

Average Dust Concentration	5.701	mg/m <sup>3</sup>
Average Emission Rate	202.631	g/hr
Totalling Period	0.292	days
Total Mass	1.418	kg

Predicted Results

Predicted Emissions	1775.045	kg
Prediction Period	365.000	days
Emissions Limit	2000.000	kg
Predicted Emissions as % of limit	89	%

Report

<<Back

Finish

The first part of the report shows actual results using data found from the logs.  
 The second part of the report does a prediction for the total period based on the results from part 1.

### 3.13 Graphing real-time data (Online mode)



Emissions may be displayed in real time on the PC screen by using the **Online Mode tool button**. Click on the button to start the Online Mode. Then select which channel you wish to view from the channel selector tree view.

If the instrument is communicating properly a graph will start to appear which scrolls to the left as new data is read. Also a red 'Online' message will appear at the top right of the screen. If communication fails, a 'Loss of Connection' message will appear instead.

To stop online polling, press the Online button again. The 'Online' message should disappear.

**Note:** in online mode, the downloaded data is not saved to a file (except manually using Save Graph As). Therefore the online mode in PCME Dust Tools cannot be used as a data-logging tool.

#### Online Options

The source of the data displayed online can be specified by selecting Options from the File menu and clicking on the Online tab. Select one of the following radio button choices (Instantaneous Value is the default):

- |                        |   |  |
|------------------------|---|--|
| Instantaneous Value    | - | instant bar graph value (used for instant alarms)                          |
| Average Value          | - | average bar graph (used for average alarms)                                |
| Pulse Log Value        | - | value used to generate pulse log (this usually equals instantaneous value) |
| Raw Uncalibrated Value | - | raw sensor reading, before being multiplied by the calibration factor.     |



### 3.14 Alarm Overview Mode

The Alarm Overview page provides online alarm information about all channels/sensors on your network.

To initiate this mode, simply select the Overview page by clicking on the Overview tab. PCME Dust Tools will then automatically try to read alarm status information from the dust monitor for each configured Stack/Plant/Channel. To stop the online alarm mode simply switch back to another page.

Graph		Overview		Reset Latched Alarms	
Stack1		D11 Average Limit Alarm 233.87 mg/m3		Stack2 D2 Average Warning Alarm 183.76 mg/m3	
Stack3 OK 183.76 mg/m3		Stack4 OK 217.92 mg/m3			
Stack5 OK 233.87 mg/m3		Stack6 OK 183.76 mg/m3			
Stack7 OK 201.77 mg/m3		Stack8 OK 233.87 mg/m3			

- If no alarm conditions are found for any of the channels in a Stack, then an OK message will appear in the Overview box.
- If an alarm condition is found for a Stack, that stack will turn red and the type of alarm found will be displayed.
- If connectivity is lost between the PC and the control unit then all Stacks will turn red with a No Connections message.

On observing an alarm, you can investigate the alarm condition further in the following ways:

1. Do a download of the alarm log from your dust monitor (see Downloading Data from an instrument, section 2.1). This will provide information about when the alarm started.
2. Do a download of the Pulse or Trend log for the stack/channel in alarm (see Downloading Data from an instrument, section 2.1).
3. Go to the Graph page and start Online mode for the stack/channel in alarm (see Graphing Real-time data, section 2.13).

### **Minimized Online Alarm Mode**

It is possible to leave PCME Dust Tools minimized in Alarm Overview mode so you can use your PC for other activities. When an alarm condition is detected, PCME Dust Tools will return to its normal display size so alerting you of the alarm.

### **Overview Page Options**

The following Overview Page options can be set:

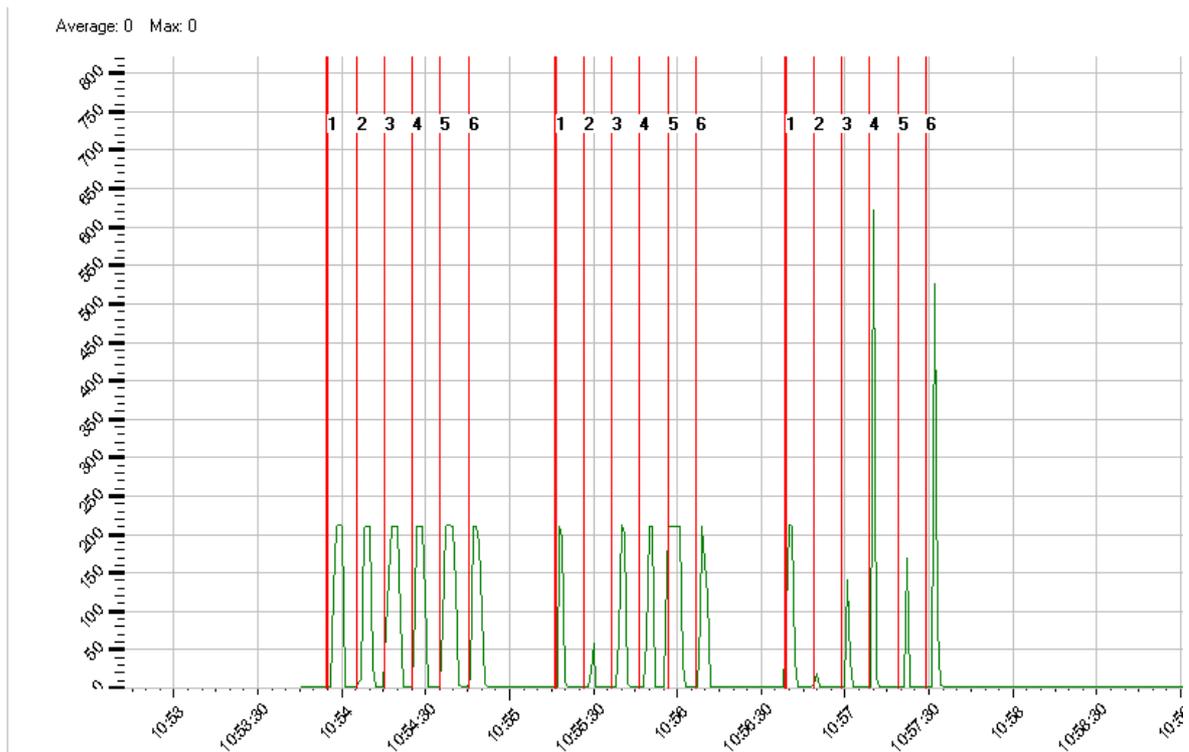
- Arrangement of Overview Page
- Alarm Latching
- Alarm Buzzer

Please refer to section 2.16 PCME Dust Tools Options for details.

### 3.15 Predict Function

The Predict Function allows you to analyse the cleaning pulses generated by your dust sensors to check whether any of the bag filters are damaged. It works by reading emission data showing the size of dust pulses generated as bags are cleaned and digital 'marker pulse' inputs which indicate the timing and sequence of bag cleaning.

The figure below shows a typical output from running the Predict Software:



In this example, the bag house has 6 rows. The graph shows the output during three complete cleaning cycles.

The green graph displays the dust pulses generated as each bag row is cleaned.

The red vertical lines display the timing of the bag cleaning. In this example the bags are cleaned **sequentially** in the order row1,row2,row3,row4,row5,row6. This means just a single digital input was required to mark the start of the complete cleaning cycle (the bold red line).

If the cleaning order is **non-sequential** then you will need to set up separate digital inputs for each bag or bag row cleaned, so you can independently time the start of each bag cleaning.

The Predict Setup Wizard (described below) allows you to set up both Sequential Cleaning (using a single marker input) and Non-Sequential Cleaning (using multiple marker inputs).

## How to detect a faulty bag

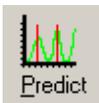
As a bag starts to leak you would expect a large pulse to be generated as the bag is cleaned. This will show up on the graph as a repeated larger pulse in comparison with the other bags or bag rows. For example in the picture above, it is seen that rows 4 and 6 have higher pulses in the third cleaning cycle. If this pattern repeats it suggests some of the bags in rows 4 and 6 may need changing.

## How to set up the marker inputs

Your control unit has four internal digital inputs which may be used as marker inputs for use with the Predict Software. Where only a single input is required it is recommended to use Input 4 (since the other inputs are generally used for other functions). The internal digital inputs appear as a separate channel in the PCME Dust Tools download (labeled **Digital Inputs**).

If you require more than 4 inputs, PCME provide additional external digital input devices. These may be added so they appear as additional channels in your control unit alongside your dust sensor channels.

## Setting up the Predict Function



To set up the Predict Function, click on the **Predict tool button** and select the instrument and sensor channel required from the dropdown lists and click on Next.

Then select which type of cleaning (sequential or non-sequential) is being used:

### Sequential Cleaning (Cleaning is performed in a regular cycle)

1. Enter the **Number of cleaning pulses** in a complete cycle. If the rows are cleaned individually, this will probably be the number of rows in a compartment. If rows are cleaned in pairs, it will be the number of rows divided by two etc. (i.e. it is the number of cleaning pulses from one marker pulse to the next.)
2. If required, edit the **bag cleaning sequence**. (The marker pulse is associated with the first cleaning pulse in the list.)
3. Select the **marker input source** from the dropdown list and click on Next.
4. If the sequential cleaning pulses occur at fixed time intervals, you can set up timing information so the program generates additional markers at the expected times of the cleaning pulses, starting from the 'start of cycle' marker. To do this, check the **Regular Cleaning** checkbox and enter the **Time Between Pulses** in seconds.

5. There may be a delay between the occurrence of the marker pulse and the arrival of the first dust pulse. If you wish, enter a delay time in seconds in the **Marker pulse to dust pulse delay** field so the program displays the marker pulses at a later time.

6. Click on Finish and PCME Dust Tools will be in Predict Mode. ('PREDICT MODE' should be displayed in red in the top right of screen.)

### **Non-Sequential Cleaning (Each bag row is cleaned independently)**

1. Enter the **Number of Cleaning Pulses**. If the rows are cleaned individually, this will probably be the number of rows in a compartment. If rows are cleaned in pairs, it will be the number of rows divided by two etc. You will need to set up a separate digital marker input for each cleaning pulse you wish to monitor.

2. Next assign a marker input to each cleaning pulse by selecting a digital input from the dropdown list. This will depend on how you have connected up your bag cleaning system to the digital inputs in your control unit or additional input devices.

3. There may be a delay between the occurrence of each marker pulse and the arrival of the corresponding dust pulse. If you wish, enter a **Marker pulse to dust pulse delay** (in seconds) so the program displays the marker pulses at a later time. Note: all marker pulses will be given the same delay.

4. Click on Finish and PCME Dust Tools will be in Predict Mode. ('PREDICT MODE' should be displayed in red in the top right of screen.)

## **Using the Predict Function**

Once you have set up PCME Dust Tools in Predict Mode, the next stage is to read your pulse data and marker pulses into PCME Dust Tools. There are two ways to do this:

- Download: use the normal download function to download data previously logged in your control unit. This method allows you to look back at historical data.
- Online: use the normal online graphing function to bring real time data into PCME Dust Tools.

### **Download Method [requires PREDICT VIEW OPTION (OPT\_PREDVIEW)]**

- Set up Predict Mode using the setup wizard as described above.
- Run the download wizard.
  - select both your sensor channel and also the Digital Input channel.
  - select to download the Pulse log.

Note: for non-sequential cleaning you will also need to download data from additional digital input devices.

- Once the download is complete, click on the tree view to display the Pulse Log for your sensor channel in the usual way. Marker pulses will be automatically added to the graph (as shown in the picture above).

**Online Method [requires PREDICT OPTION (OPT\_PREDICT)]**

- Set up Predict Mode using the setup wizard as described above.
- Click on the Online button.
- Select your sensor channel from the tree view, to start the online graphing.
- As new marker pulses arrive they will be automatically displayed on the graph (as shown in the picture above).
- Leave the program running for several cleaning cycles, then you can observe which bag rows are causing problems.

Note: if you wish to analyse a large amount of data it is recommended to use the Download Method, not the Online Method.

**Stopping Predict Mode**

To stop Predict Mode, click on the Predict Tool Button.

### 3.16 Option settings

PCME Dust Tools has several options which can be set and these are accessed by selecting Options from the File menu.

- **Alarms page**

#### **Latch Alarms**

With the Alarm Latching option enabled, when alarms are found they will stay displayed on the Overview Page until the user acknowledges them. To acknowledge all latched alarms, click the **Reset Latched Alarm** button at the top right of the Overview Page. If any stacks/channels are still in alarm they will immediately reappear on the Overview Page.

#### **Enable Alarm Buzzer**

If the Alarm Buzzer option is enabled then an audible alarm will be generated from your PC whenever an alarm condition is detected. For the alarm buzzer to work you will need a sound card in your PC and some speakers attached.

You can also choose when you wish the buzzer to be heard by selecting either the **On Overview page Only** or **Overview Page and During Online Graphing** radio button.

#### **Pause Buzzer**

This option causes the buzzer to pause. It will start again as soon as a *new* alarm is found.

#### **Overview Page arranged by Group/Plant/Stack**

This option allows the Overview Page to be viewed in two different ways; either by Group/Plant/Stack or by each individual channel.

- **Online page**

#### **Source of Online Data**

The source of the data displayed when in Online Mode can be specified by selecting one of the following radio button choices:

Instantaneous Value	-	instant bar graph value (used for instant alarms)
Average Value	-	average bar graph (used for average alarms)
Pulse Log Value	-	value used to generate pulse log (this usually equals instantaneous value)
Raw Uncalibrated Value	-	raw sensor reading, before being multiplied by the calibration factor.

### 3.17 Changing the Language

PCME Dust Tools supports the following languages:

- English
- French
- German
- Spanish

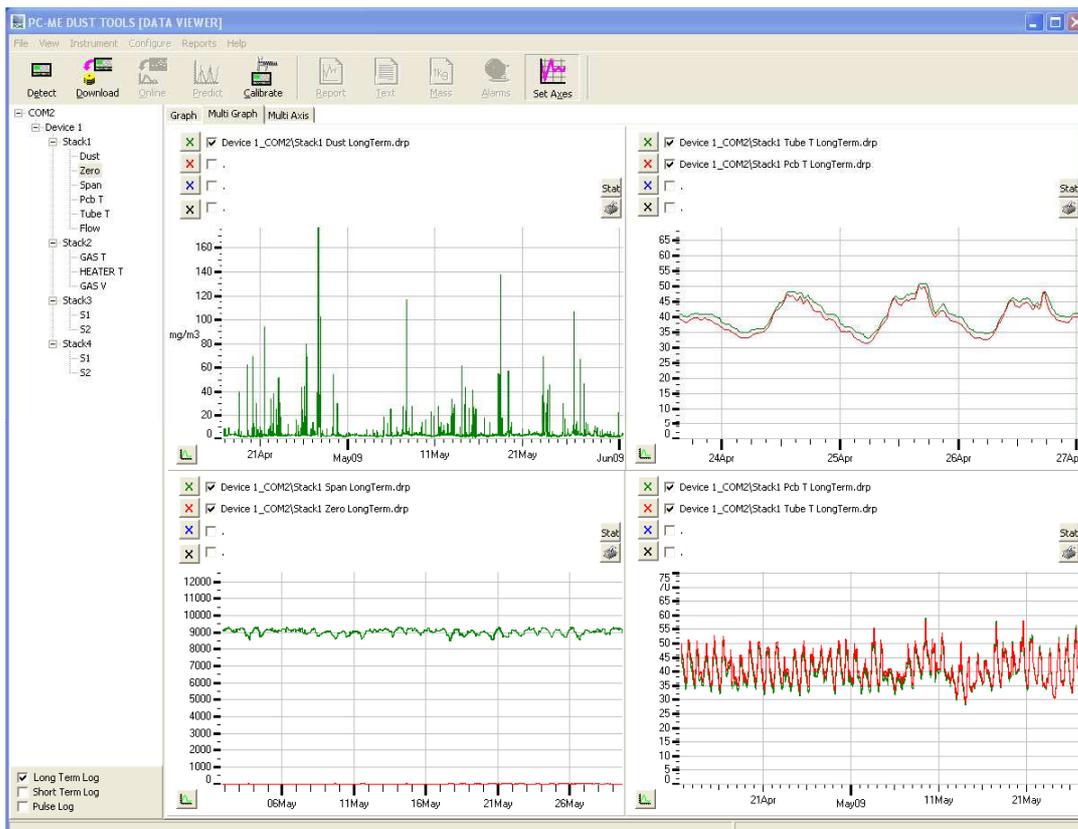
To change the language, select Language from the File menu and click on the language required.

## 4 ADVANCED DATA ANALYSIS

PCME Dust Tools has been extended from the previous Dust Reporter software to aid analysis of data. The section describes these functions.

### 4.1 Multi Graph Page

The Multi Graph Page allows you to different graphs of historical data side by side.



To add a graph to one of the 4 multi-graph displays:

#### **METHOD A (Drag and Drop from Device Tree):**

- Select the Log Selector at the bottom right of the screen to choose Long Term, Short Term or Pulse Log.
- Hold down the mouse over a channel in the Device Tree then drag and drop into one of the 4 graphs.

#### **METHOD B (Drag and Drop from Windows Folder):**

- From Windows open a directory containing log files (.drp files). This is usually in a sub-directory **Device 1** of the download directory.
- Drag a file from the Windows folder and drop into one of the 4 graphs.



**METHOD C (Double click on .drp file)**

- From Windows double click on a .drp file.
- On the first attempt, Windows will ask which program you wish to associate with this file type.
- Select the PCME Dust Tools program.
- In future all .drp files will appear with the PCME logo and can be opened by double clicking.

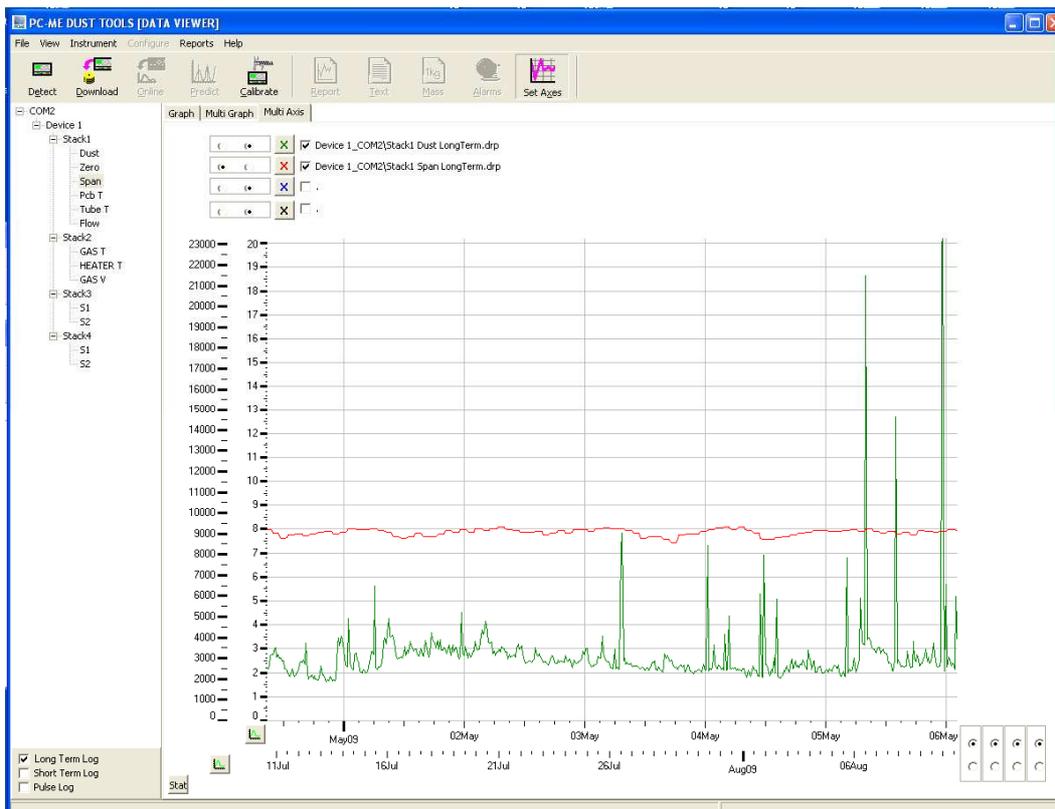
**Notes**

- To **remove** graphs, click on the colored crosses (X) next to the graph names at the top of the graph.
- To access advanced **graph control** functions click on the graph button at the bottom-left of the appropriate graph.
- To view statistics for the displayed graphs (average, maximum, calibration factor) click on the **stat** button at the top right of the appropriate graph.
- To **print** a graph click on the print button at the top right of the appropriate graph.

**4.2 Multi Axis Page**

The Multi Axis page is very convenient when you wish to either:

- Compare data with very different scales (e.g. Comparing Dust Readings and Span Test Readings on the same graph)
- Compare data from the same graph at different time period e.g. compare last month's readings with this month's readings.



The Multi-Axis Page functions in a similar way to the Multi-Graph Page. Refer to the previous section for details.

Once a graph has been added to a graph, use the axis selectors at the top-left and bottom-right of the Page. These allow you to associate each of a maximum of 4 graphs with one of two axes.

Tips for using the multi-axis page:

- By default each axis is forced to Show Zero. This limits the ability to zoom into a small section of the y-axis. To over-come this click on the appropriate Graph Control button at the bottom left of the page. Then un-check the **Always Show Zero** setting.
- Having set up the ranges of the axis, you often want these ranges to be fixed when drag new data onto the graph. To achieve this again click on the Graph Control button at the bottom left of the page and check **Lock the Time Range** and/or **Lock the y-axis range**.

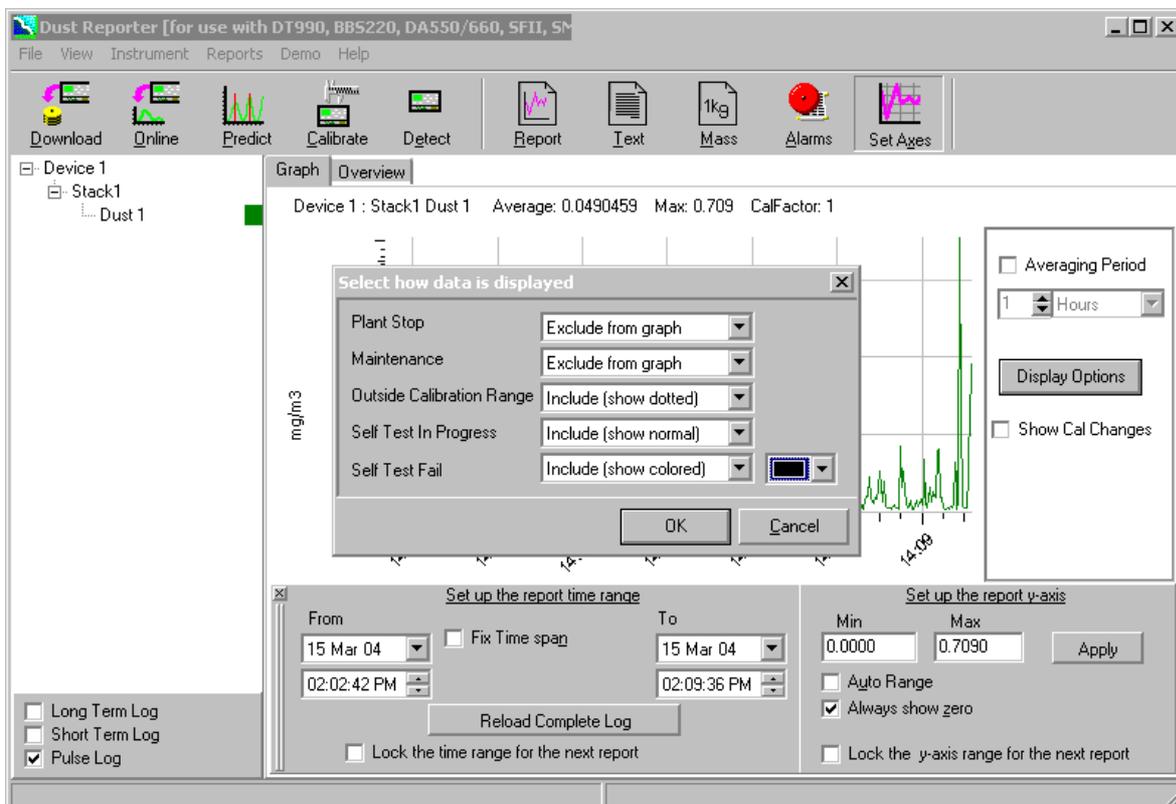
## 5 ADVANCED REPORTING

### 3.1 Data Validity

Data logs downloaded from your control unit include additional data validity information. Display Options within PCME Dust Tools allow you to control:

- which types of invalid data are excluded from reports
- special displaying of invalid data (using either coloured or dashed lines)

To enter the Display Options menu Select **Advanced Features** from the **View Menu** then Click on **Display Options**.



The Display Options menu controls how various types of data are displayed:

		Default display method
Plant Stop	Data is marked as plant stop. Use in conjunction with Plant Run Input in control unit	exclude
Maintenance	Data is marked as in maintenance mode. Use in conjunction with Maintenance Mode menu in control unit.	exclude
Outside Calibration Range	Data is marked as being outside the specified valid calibration range. Use in conjunction with Cal Range setting in the control unit	show dotted
Self Test In Progress	Sensor was running a self test. This means the sensor operation is probably disabled and the reading displayed is the last valid reading before the self test started.	show normal
Self Test Fail	A sensor self test has failed. This indicates the reading may be inaccurate. Consult your sensor manual for the cause of the self test fail.	show coloured black

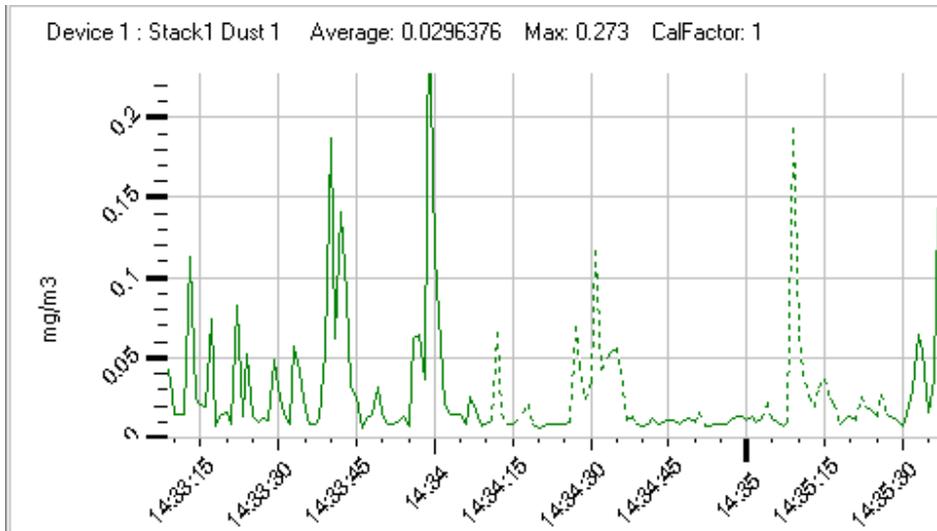
For each data type you can select the way data is displayed on PCME Dust Tools graphs and reports.

Show Normal	Display in same color as normal valid data
Show Dotted	Show same color as normal, but with dotted line. Data is still included in average calculations.
Show Coloured	Show in different color, specified by user. Data is still included in average calculations.
Exclude from graph	Exclude data from graph. Data is also excluded from average calculations.

Notes:

- these settings are also used to control the output of text report. i.e. excluded data will also be excluded from text reports.
- the Save Graph As function saves all available data but includes the additional valid data information in the saved log.
- the Export Graph function also saves all available data in a .csv file. Additional columns display information about Maintenance and Plant Stop state so this data may be manually excluded from the spread sheet.

Example of data display:



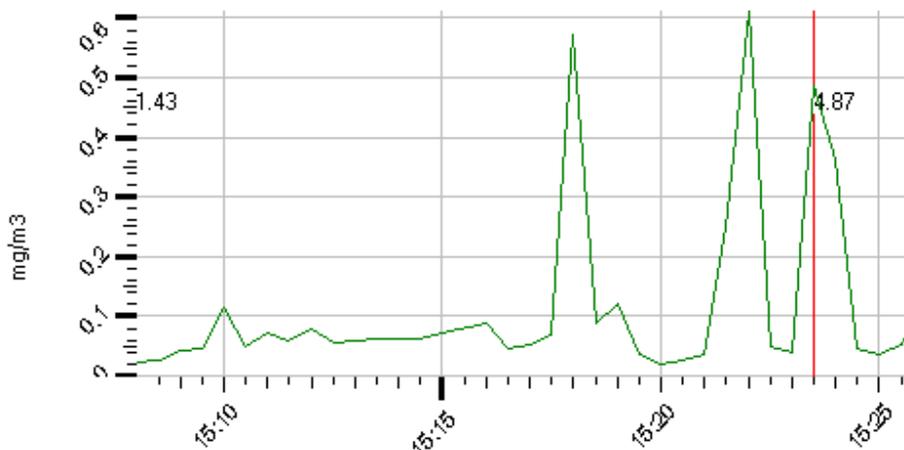
### 3.2 Calibration History

When a sensor calibration factor is adjusted within the control unit, the control unit stores a record of the time and date at which the change occurred (note: only the most recent 3 changes are stored). When data is downloaded using PCME Dust Tools this information is automatically read and stored in your log files.

It is required to display the Calibration Factor on regulatory emission reports. The calibration factor used for the display period of a report is displayed above the graph. If the calibration has changed during the displayed time period, then a message 'Cal Factor Not Constant' appears.

For service use, you can view the times at which the calibration factors have been changed. To do this open up the graph in PCME Dust Tools, select **Advanced Features** from the **View menu** then check **Show Cal Changes**.

Device 1 : Stack1 Dust 1    Average: 0.116784    Max: 0.611067    CalFactor: Not constant



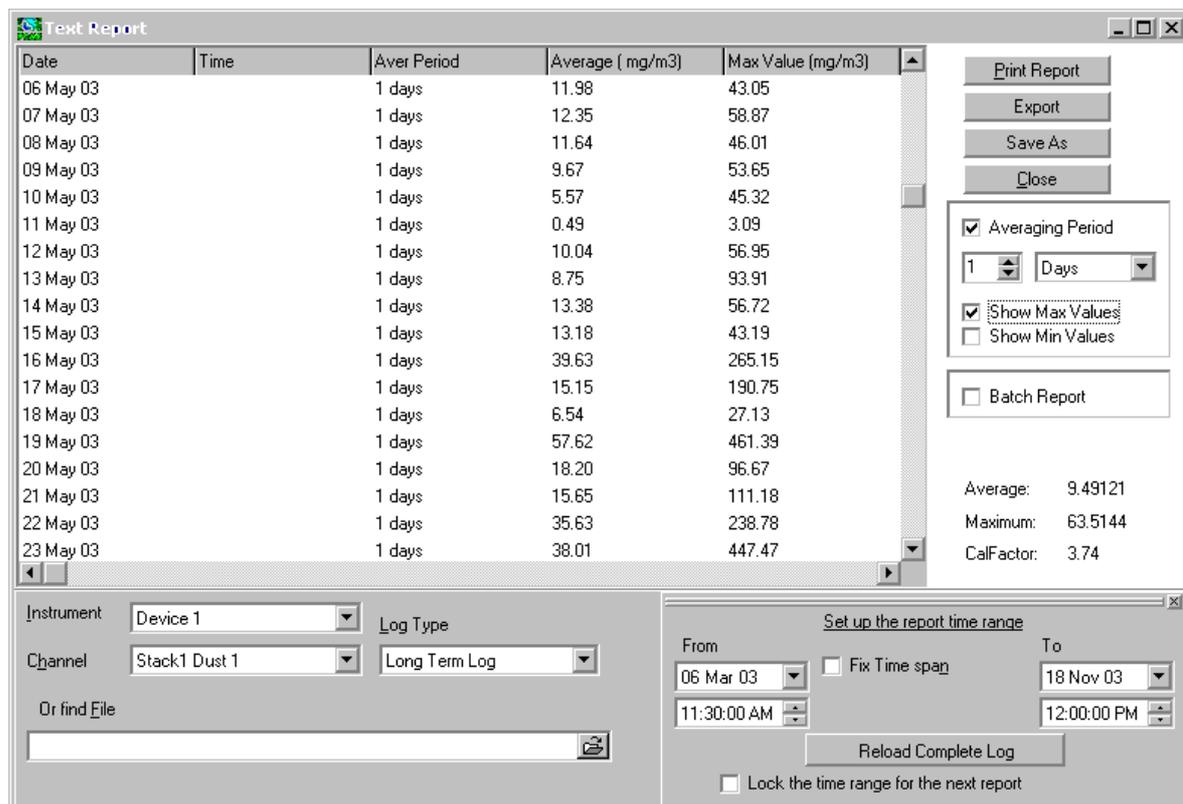
### 3.3 Text Report Options

The Text Report in PCME Dust Tools has a number of advanced features to allow for the creation of special reports specified by your environmental regulator. Consider for example the following reporting requirement:

*these records shall be in tabular form, giving the maximum 30-minute average and daily average for each day during the previous month*

To achieve this:

- Set up your control unit logging with 30 min averages.
- Download data and open your text report and select a time period of 1 month ( using the 'set up report time range window')
- Check Averaging Period and select 1 day averages
- Check Show Max Values: this will display the maximum 30 min data point for each day.



Date	Time	Aver Period	Average ( mg/m3)	Max Value (mg/m3)
06 May 03		1 days	11.98	43.05
07 May 03		1 days	12.35	58.87
08 May 03		1 days	11.64	46.01
09 May 03		1 days	9.67	53.65
10 May 03		1 days	5.57	45.32
11 May 03		1 days	0.49	3.09
12 May 03		1 days	10.04	56.95
13 May 03		1 days	8.75	93.91
14 May 03		1 days	13.38	56.72
15 May 03		1 days	13.18	43.19
16 May 03		1 days	39.63	265.15
17 May 03		1 days	15.15	190.75
18 May 03		1 days	6.54	27.13
19 May 03		1 days	57.62	461.39
20 May 03		1 days	18.20	96.67
21 May 03		1 days	15.65	111.18
22 May 03		1 days	35.63	238.78
23 May 03		1 days	38.01	447.47

Averaging Period  
 1 Days  
 Show Max Values  
 Show Min Values  
 Batch Report  
 Average: 9.49121  
 Maximum: 63.5144  
 CalFactor: 3.74

Instrument: Device 1  
 Channel: Stack1 Dust 1  
 Log Type: Long Term Log  
 Or find File:

Set up the report time range  
 From: 06 Mar 03 11:30:00 AM  
 To: 18 Nov 03 12:00:00 PM  
 Fix Time span  
 Lock the time range for the next report

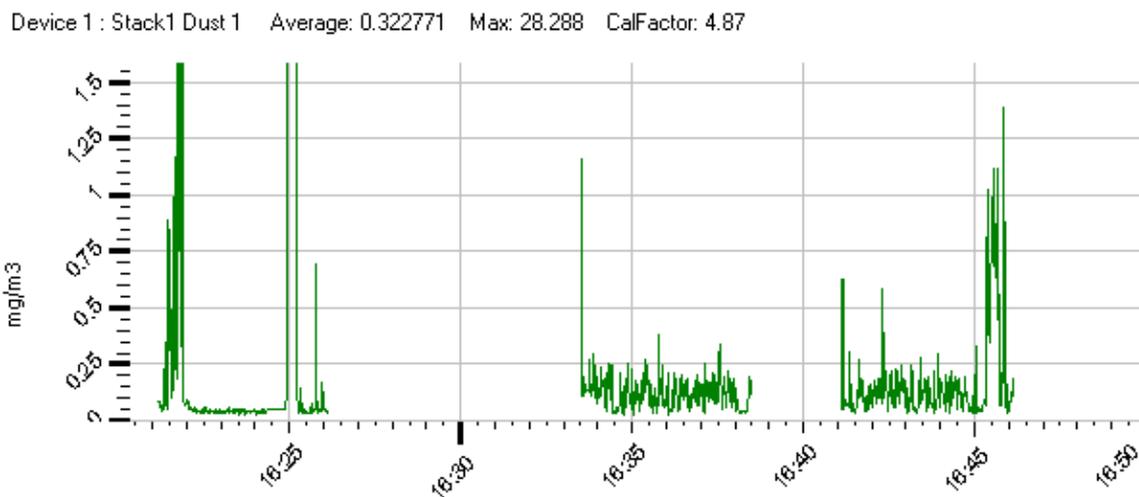
### 3.4 Batch Report

The Batch Report function is design to report emission averages for a batch process.

The time period for each batch is marked in the log using the Plant Run/ Plant Stop feature in your control unit. You need to set up digital inputs so that data during the running of each batch is marked PlantRun and the data between the batches is marked PlantStop.

To generate a batch report:

- download the log data
- view the required reporting period. Make sure your Display Options (View->Advanced Features) are set so Plant Stop data is excluded from the graph. You should then see a graph as below:



- Now enter the Text Report and select Batch Report. This should generate a report as shown below:

**Text Report**
\_ □ ×

Batch Start	Batch End	Average ( mg/m3)
15 Mar 04 16:21:10	15 Mar 04 16:26:10	0.67
15 Mar 04 16:33:32	15 Mar 04 16:38:30	0.13
15 Mar 04 16:41:09	15 Mar 04 16:46:09	0.17
DAY AVERAGE		0.32
16 Mar 04 10:51:34	16 Mar 04 10:56:34	0.14
16 Mar 04 10:56:59	16 Mar 04 11:01:59	0.16
DAY AVERAGE		0.15

Instrument
Device 1
Log Type

Channel
Stack1 Dust 1
Pulse Log

Or find File

Set up the report time range

From
 Fix Time span
To

15 Mar 04
16 Mar 04

04:20:52 PM
11:05:07 AM

Lock the time range for the next report

Averaging Period  

1
Hours

Show Max Values
  Show Min Values

Batch Report

Average: 0.253338  
 Maximum: 0  
 CalFactor: 4.87

**Obtaining compliance information for your batch report**

The batch report displays additional compliance information. Consider for example creating a report to satisfy the following guidance note:

- a. no more than 5% of all batch average emissions should exceed the specified emission limit
- b. no batch average emission should exceed twice the specified emission limit

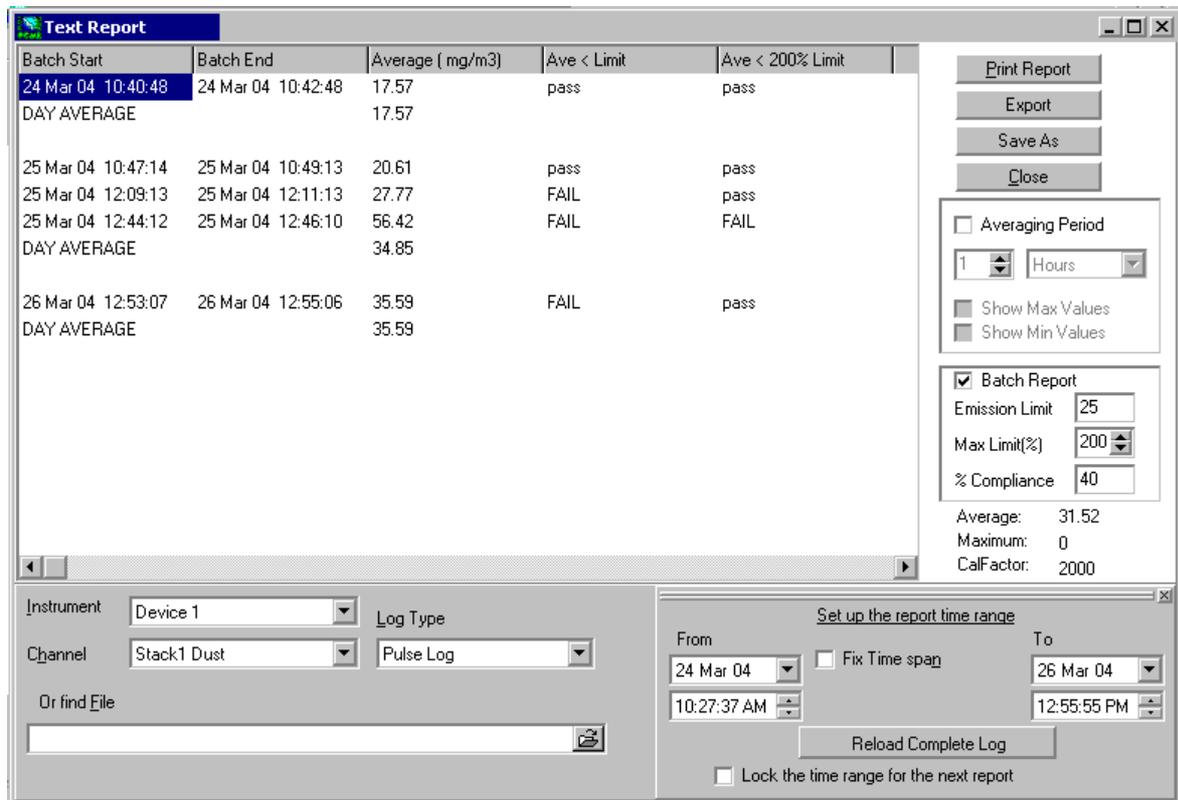
To Create this report:

- check Batch Report
- enter your emission limit (25mg/m3 in example below)
- set Max Limit = 200%

The report shows for each batch whether the average is:

- a. with the emission limit
- b. within 200% of the emission limit.

It also calculates the percentage compliance for all batches (60% in example below). This is less than the 95% compliance required by the standard.



Batch Start	Batch End	Average ( mg/m3)	Ave < Limit	Ave < 200% Limit
24 Mar 04 10:40:48	24 Mar 04 10:42:48	17.57	pass	pass
DAY AVERAGE		17.57		
25 Mar 04 10:47:14	25 Mar 04 10:49:13	20.61	pass	pass
25 Mar 04 12:09:13	25 Mar 04 12:11:13	27.77	FAIL	pass
25 Mar 04 12:44:12	25 Mar 04 12:46:10	56.42	FAIL	FAIL
DAY AVERAGE		34.85		
26 Mar 04 12:53:07	26 Mar 04 12:55:06	35.59	FAIL	pass
DAY AVERAGE		35.59		

**Control Panels:**

- Buttons:** Print Report, Export, Save As, Close
- Averaging Period:** 1 Hours
- Show Max Values:**
- Show Min Values:**
- Batch Report:** 
  - Emission Limit: 25
  - Max Limit(%): 200
  - % Compliance: 40
- Summary:** Average: 31.52, Maximum: 0, CalFactor: 2000
- Instrument:** Device 1, Log Type: Pulse Log, Channel: Stack1 Dust
- Set up the report time range:** From 24 Mar 04 10:27:37 AM To 26 Mar 04 12:55:55 PM
- Buttons:** Reload Complete Log, Lock the time range for the next report

### 3.5 Compliance Report

The Compliance Report (accessible for Report Menu) is provided to test for emissions compliance according to the following Process Guidance Note and similar Guidance Notes for other industries.

Refer to section 4.2.5 ii of Process Guidance Note IPR 4/16 (Chemical Fertilisers)

Where continuous monitoring is used the release limit values are complied with if 95% of the hourly average readings for each rolling 24 hour period do not exceed the release limit values, and the maximum does not exceed 1.5 x these limit values.

To create a compliance report for standard specified in the example above:

- Set up your control unit logging at a sensible rate (e.g. 15 min log rate)
- Download your data and select Compliance Report from the Report menu.
- Select a Reporting Period of 1 day
- Select an averaging period of 1 hour
- Select the % compliance = 95%
- Set your emission limit (50mg/m<sup>3</sup> in the example below)

This will generate a report (as shown below) with the following information:

- Number of Failures: this is the number of hourly averages in the given day above the emission limit.
- 95% compliance: the software checks all rolling 24-hour periods ending within the specified day and checks for each 24-hour block whether at least 95% of all hourly averages are within the emission limit. If so the test passes; otherwise fail.
- Max < 150% Limit: the other requirement is that the max hourly average is always less than 1.5 x the emission limit. This is indicated here as pass/fail.

The total number of failures of the two criteria of the standard is displayed at the bottom of the screen.



**Compliance Report**
[-] [x]

Date	Max Value (mg/m3)	Number of failures	95% Compliance	Max < 150% Limit
03 May 03	17.92	0	pass	pass
04 May 03	19.22	0	pass	pass
05 May 03	8.90	0	pass	pass
06 May 03	43.05	0	pass	pass
07 May 03	58.87	1	pass	pass
08 May 03	46.01	0	pass	pass
09 May 03	53.65	1	pass	pass
10 May 03	45.32	0	pass	pass
11 May 03	3.09	0	pass	pass
12 May 03	56.95	1	pass	pass
13 May 03	93.91	1	pass	FAIL
14 May 03	56.72	2	FAIL	pass
15 May 03	43.19	0	pass	pass
16 May 03	265.15	6	FAIL	FAIL
17 May 03	190.75	2	FAIL	FAIL
18 May 03	27.13	0	pass	pass
19 May 03	461.39	8	FAIL	FAIL
20 May 03	96.67	3	FAIL	FAIL

Instrument: Device 1

Channel: Stack1 Dust 1 Long Term Log

Or find File:

Set up the report time range

From: 06 Mar 03  Fix Time span To: 18 Nov 03

11:30:00 AM 12:00:00 PM

Reload Complete Log

Lock the time range for the next report

Print Report

Reporting Period: 1 Days

Averaging Period: 1 Hours

Emission Limit:

% Compliance: 95

Refresh

Failures: 194

Only show failure periods

## 6 QAL REPORTER

### 6.1 Introduction

This chapter explains the use of the QAL Reporter option of the PCME Dust Tools software.

### 6.2 QAL3 SETUP: PCME QAL 991

#### Logging of Automatic QAL3 Self Checks

The PCME QAL 991 sensors run 3 automatic self checks: Zero, Span and Short Circuit checks. Within the Control Unit you may set up additional logging channel to automatically record the results of these checks. The logged readings may then be downloaded to a PC using PCME Dust Tools (QAL Reporter option) for analysis. Alternatively the self-check results may be read directly into your own PLC using the modbus (RS232 or Ethernet) interface.

#### Adding QAL3 channels



Available Channel Types

Go to the Configure Screen, Sensor Configuration then Add a new device. You will see the range of QAL3 991 channel types available. Select each one in turn, and edit:

- The modbus address: set the same as the sensor's modbus address
- Group/Plant/Stack: set the same as the sensor's group name e.g. Stack1, Stack2. Alternatively you could setup a separate QAL3 group.
- Note: Autodetect will automatically add these channels.

### Viewing QAL3 channels

Once the QAL3 channels have been added they may be viewed in the same way as your sensor channels. The figure below shows the multi-channel display page for a 2-sensor system (change from Bars to Text by selecting the Text button).

BAR	Stack1	Dust	7.23	mg/m3
	Stack2	Dust	3.17	mg/m3
	Stack1	Zero	2	
	Stack1	Span	9855	
	Stack1	Short Circ	11300	
	Stack2	Zero	9	
	Stack2	Span	9905	
	Stack2	Short Circ	10800	

### Downloading QAL3 data using PCME Dust Tools software

Run the Download Wizard from PCME Dust Tools as explained in previous chapters. This will automatically detect all the channels you have set up on your control unit (Sensor channels and QAL3 channels).

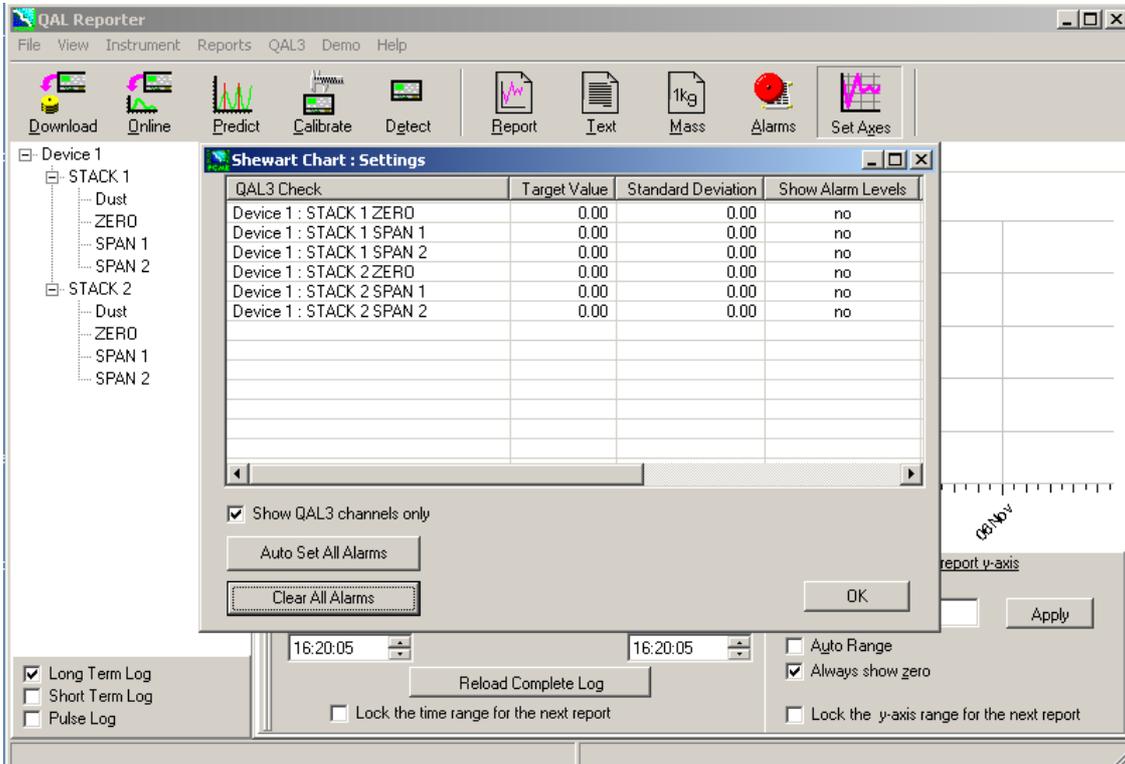
Note: the QAL3 results are stored in the Long-term log only; a data entry is added each time the self-check is run. By default the checks are run alternately every 30mins (so each of the 3 tests is performed in a 1.5 hr cycle). This rate can be adjusted by changing the Self Test Rate setting in the 991 device settings.

### QAL3 Setup: PCME QAL 181

Set up the QAL3 channels for the PCME QAL 181 in a similar way as described above for the PCME QAL 991. The appropriate QAL3 channels are QAL3 181: Zero and QAL3 181: Span.

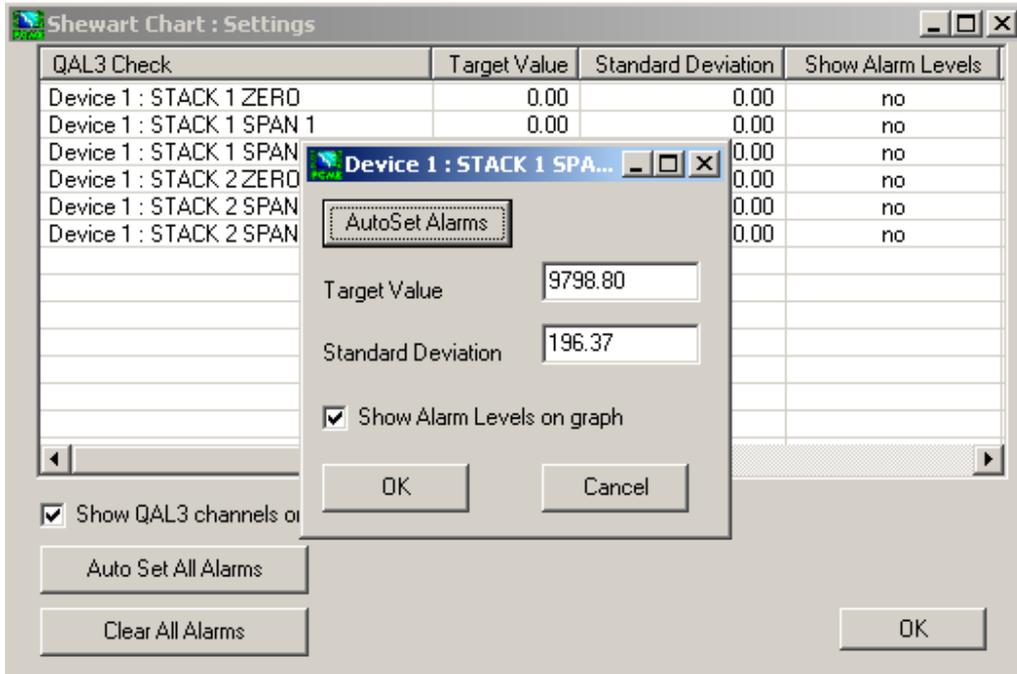
## 6.3 Using the Shewart Chart Function

### 6.3.1 Setting up Shewart Chart alarm levels



- Go to the QAL3 menu and select Shewart Chart.
- The Shewart Chart Settings form is displayed listing all the QAL3 channel available in the control unit. Note: uncheck 'Show QAL3 channels only' to set alarm levels for non-QAL3 channels.
- To clear existing alarms click on 'Clear All Alarms'

### 6.3.2 Manual Set alarm levels



To manual set alarm levels for a QAL3 channel:

- click on the required channel
- enter the Target Value and Standard Deviation as required (see meaning below)
- check Show Alarm Levels on graph

Target Value is the ideal normal value of the QAL3 check

Standard Deviation is the expected normal variation of the QAL3 check

Alarm levels are then calculated following the EN14181 standard:

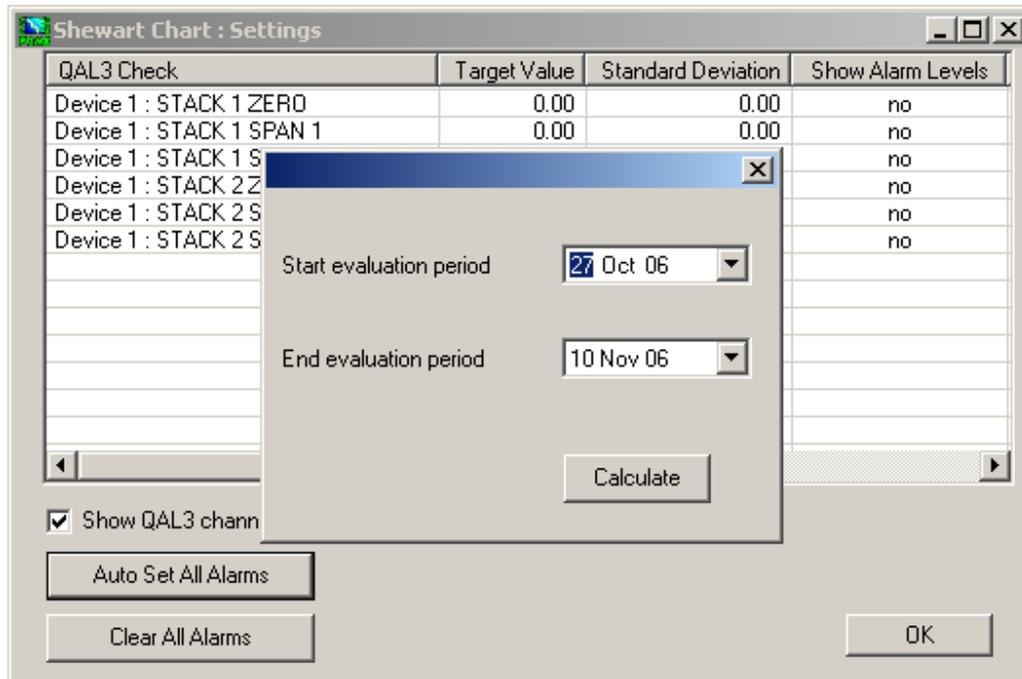
Upper Limit = Target Value + 3 x Standard Deviation

Upper Warning = Target Value + 2 x Standard Deviation

Lower Warning = Target Value – 2 x Standard Deviation

Lower Limit = Target Value- 3 x Standard Deviation

### 6.3.3 Auto Set alarm levels



The recommended method to assess appropriate Target Value and Standard Deviation values is to collect sample QAL3 data from the instrument for a given reference period after first installation of the instrument.

First download the sample data from the control unit to the QAL Reporter software using the Download Wizard.

To auto set alarm levels for a single QAL3 channel:

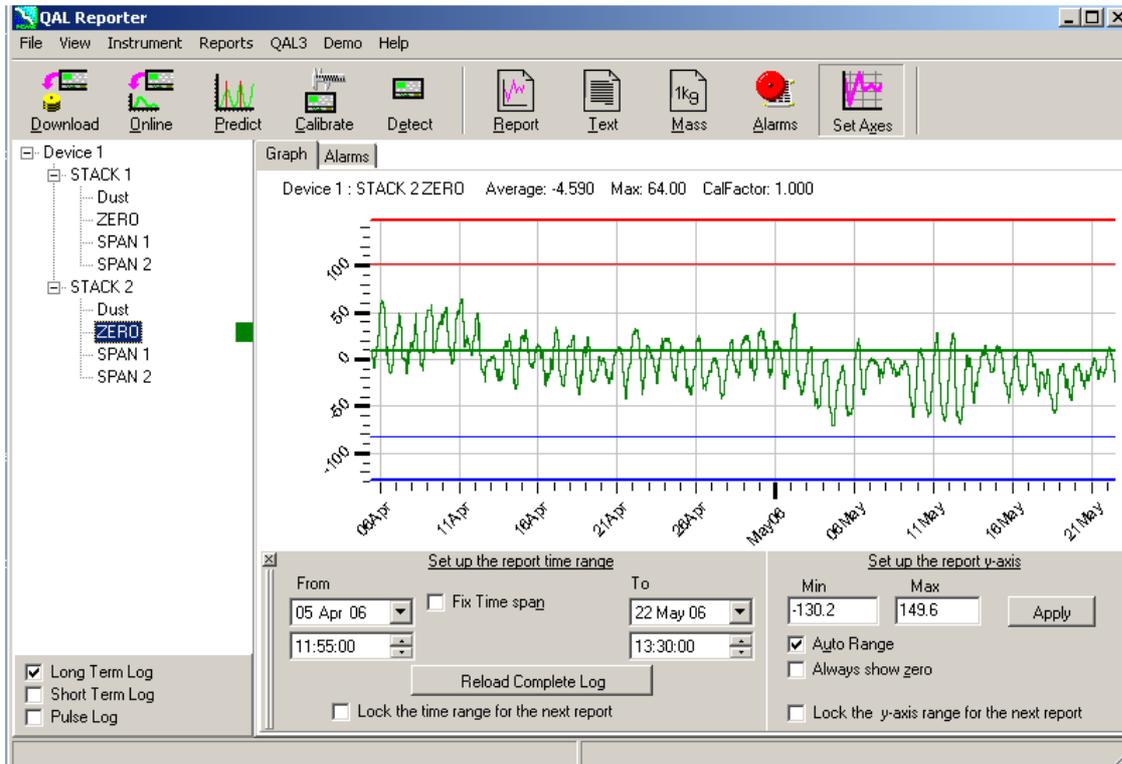
- click on the required channel
- click the Auto Set Alarms button
- choose the required evaluation period used to Auto Set the alarms

To auto set alarm levels for ALL QAL3 channels using the same evaluation period:

- click the Auto Set All Alarms button
- choose the required evaluation period used to Auto Set the alarms

Note: if no data is available for the evaluation period then the alarm levels will be cleared.

### 6.3.4 Viewing the Shewart Chart on the PC



Once the Alarms levels have been setup as described in the section above, Click on the QAL3 channel in the Tree View at the left of the main screen. A graph of the Check results is displayed with the Alarm Levels.

### 6.4 Generating a paper report

To print the currently viewed Shewart Chart to a printer simply press the Graph Report button.

### 6.5 Exporting QAL3 data

If you wish to use the QAL3 raw data to generate your own reports use the File->Export Graph function.

### 6.6 QAL3 Demo Data

Demo data is available to demonstrate the use the Shewart Charts. Select either QAL3->Demo: 991 or QAL3->Demo: 181 and then follow the instruction given in section 4 above.

## 7 APPENDIX

### 7.1 System Requirements

The PCME Dust Tools software requires the following system specification as a minimum:

- Windows 2000 or higher
- 16Mb RAM.
- 10Mb free hard disk space (for program files and data storage).
- One free serial port (for connection to instrument(s)).
- 256 colour graphics (or better).

### 7.2 Hardware Details

#### *Instrument communication settings*

The PC Communications setting within a PCME control unit (Multicontroller or Interface Module) will default to the correct settings to work directly with PCME Dust Tools and should not need adjusting. You may alter the baud rate if required from the 'Other Functions' menu and select 'PC Communications'.

#### *Serial cable connection details*

Table A: PCME Fly-lead details. This is the serial flying lead that is fitted to the control unit

<i>Name (control unit)</i>	<i>CON61A pin number (control unit)</i>	<i>Colour used</i>	<i>In-Line connector pin number</i>
RS232 OUT	1	YELLOW	4
RS232 INPUT	2	RED	2
RS232 GND	3	GREEN	5

Table B: PCME RS232 lead details. This is the supplied serial lead (1.5M, 9 way in-line to 9 way 'D')

<i>Name</i>	<i>In-Line connector pin number</i>	<i>Colour used</i>	<i>9 way 'D' female pin number</i>
RS232 OUT	4	YELLOW	2
RS232 INPUT	2	RED	3
RS232 GND	5	BLACK	5

Table C: Direct serial connection details. How to connect direct from instrument to the PC

<i>Name</i>	<i>Instrument CON61A pin no.</i>	<i>Colour Recommended</i>	<i>PC 9 way 'D' female</i>	<i>PC 25 way 'D' female</i>
RS232 OUT	1	YELLOW	2	3
RS232 INPUT	2	RED	3	2
RS232 GND	3	GREEN	5	7