

Envirosoft

Latest developments in PC based
logging of emissions data

Essential requirements

- A Data Acquisition and Handling System (DAHS) should have the ability to accept data from a wide range of analysers, sensors and process inputs.
- This data may be in analogue (4-20mA, 0-5V etc.) or serial form such as Modbus
- The DAHS must be able to collect data from the complete system within 10 seconds
- The data should be stored as 1 minute averages within a protected database

Essential requirements

- The program should be able to display real time data displays with a variety of timed averages
- There should a number of different alarms available to the operator such as pre-event, event alarms and maintenance alarms
- The software should able to detect, report the plant status
- The DAHs should offer hard copy reports configured to the operators requirements.

Essential requirements

- The DAHS should perform real-time data normalisation for pressure, temperature, oxygen and moisture.
- It should have the capability to capture data from a number of separate stacks, each with a large number of parameters.
- The system should have the capability to store at least five years data
- There should be an independent back-up system for data storage

WID requirements

- Environment agency monthly report for each measurand
- Compliance with WID directive
 - Uncertainty budgets
 - Min, max and mean 30 minute averages
 - Invalid averages (half hourly and daily)
 - Averages greater than ELV
 - Monthly max, mean, minimum
- QAL3 and Control charts

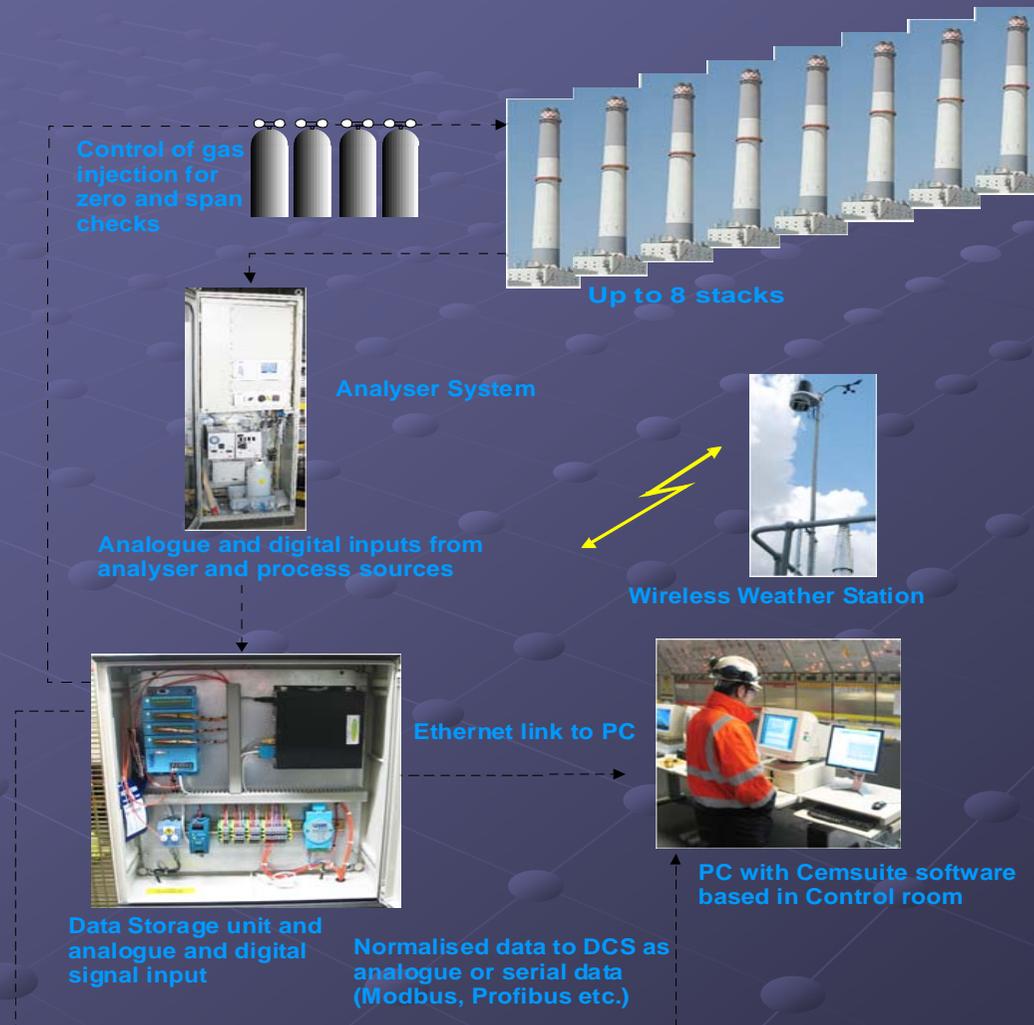
LCPD /PPC/IPPC requirements

- ELV adjusted to fuel type/mix
- Multiple ELV's
- 100% ELV compliance
- 80 or 95% compliance
- Mass release
- Calculated mass release from fuel usage

Envirosoft Data-logging solutions

- We provide 3 key data-logging solutions
- Cemsuite
 - General applications and IPPC/PPC
- CEMSuite Plus
 - Waste Incineration and EN14181
- CEMSuite Power
 - Large Combustion Processes

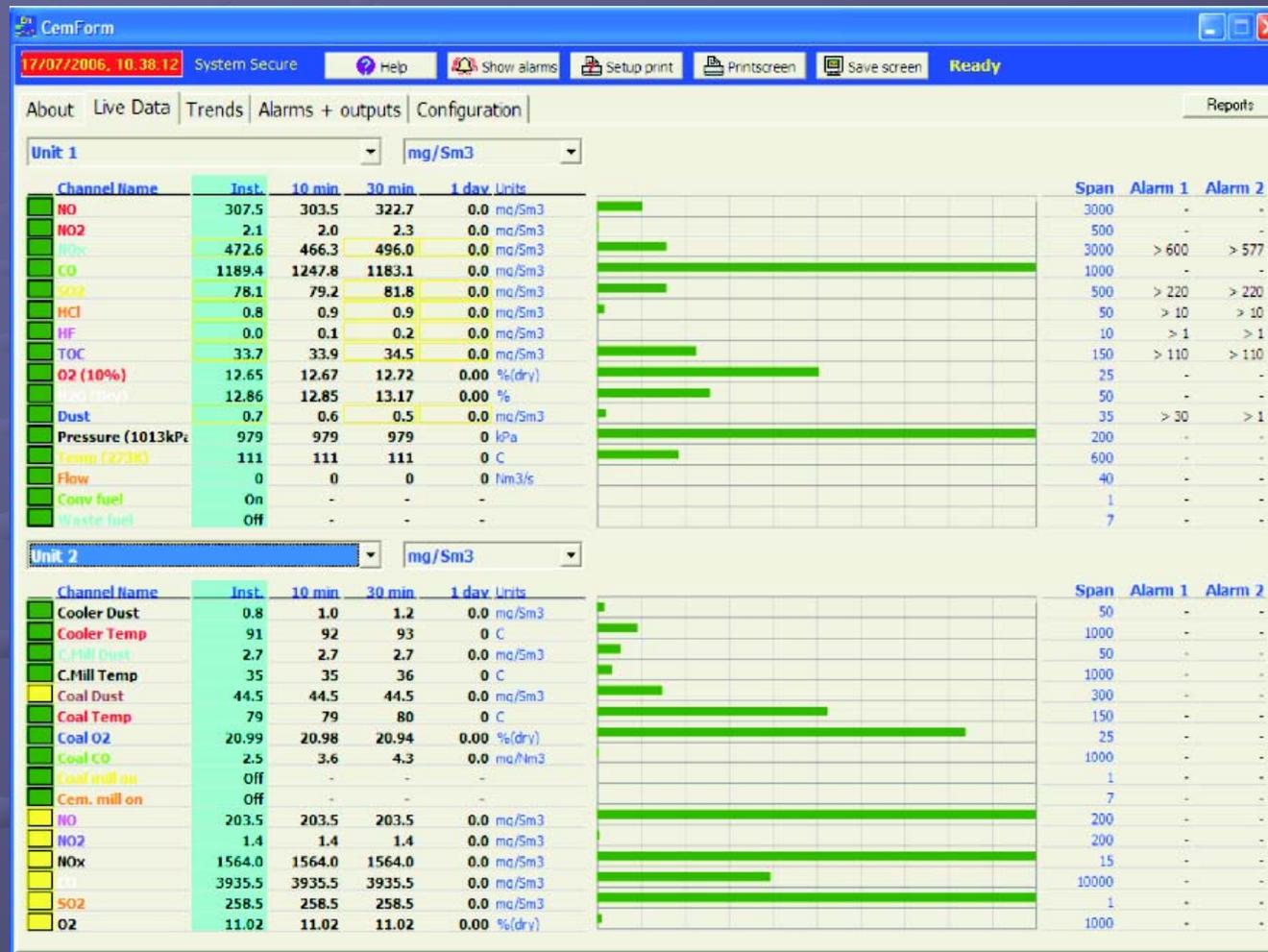
CEMSuite System



CEMSuite

- Real-time emissions display
- User defined averages
- Trends in graphical form
- Pre and post ELV alarms
- User configurable reports
- Up to 8 stacks each with up to 12 measurands
- Measurement units
 - Gaseous species - ppm, mg/m³, mg/Nm³, kg/hr
 - Particulate - mg/m³, mg/Nm³, kg/hr, Opacity, Extinction
 - Flow - m/s, m³/s, Nm³/s

CEMForm - Real time data



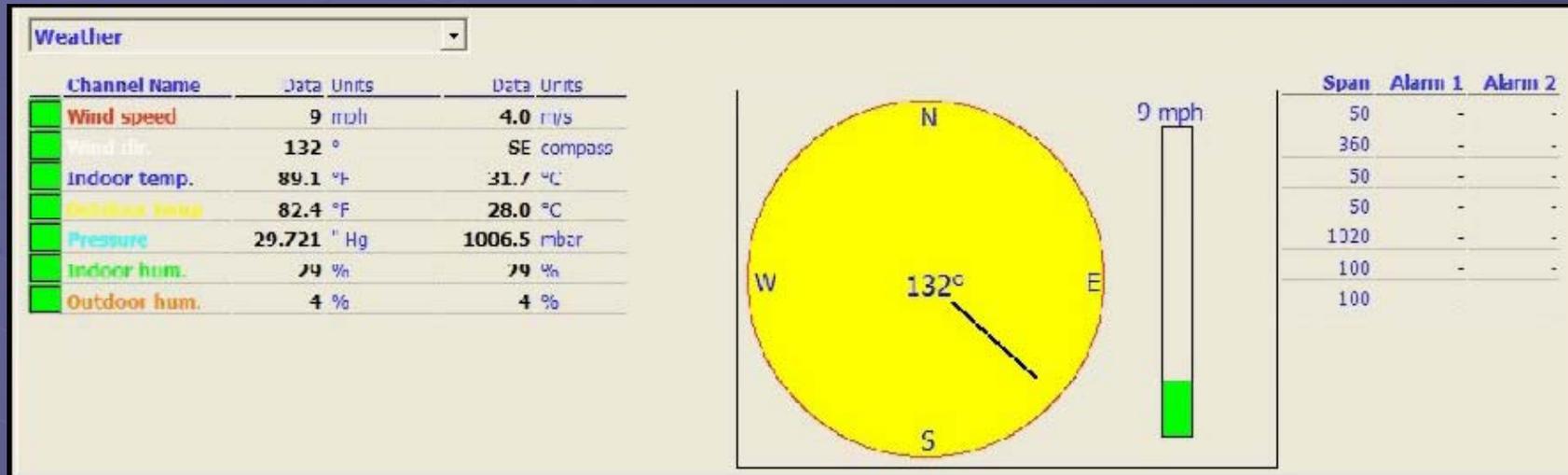
CEMForm – Trend screen



Trend screen

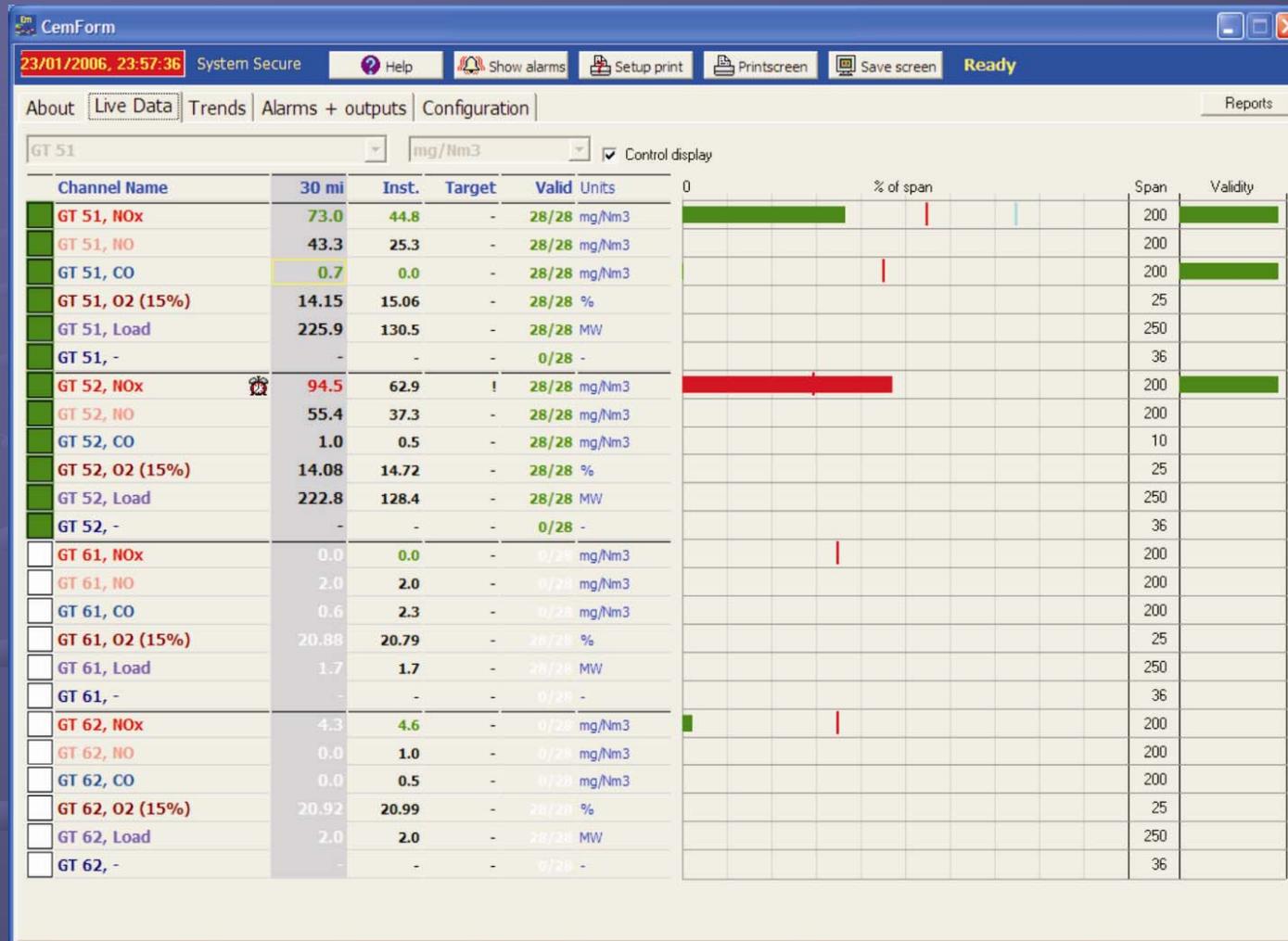
- The user may select which parameters are displayed
- The time range of the displayed may be selected - 1 / 2 / 6 / 12 hours or 1 / 2 / 5 days
- Comments can be placed on the trend display to highlight particular data
- The status of the plant is continually displayed to indicate if the plant is on or off
- The status of the analysers is also displayed to show conditions like off-line, calibrating, normal operation

CEMForm – Weather data



- If a weather station is available, data from it can be captured and displayed
- Alarms may also be configured by the user
- All standard meteorological units are catered for.

Control screen



CEMPort

- CEMPort's main function is to summarise the emission data into a format for submission to the environmental authorities or for internal reporting or analysis.
- CEMPort enables an operator to create professional looking reports that can be output to a printer or saved to file. The program makes full use of Windows embedded printing facilities. Furthermore, data can be exported in CSV, HTML or Excel format to enable users to create their own reports.
- The alarm report can be configured to give an output showing all alarms over a specified period, by measurement point, measurand, duration of the alarm and the maximum value.

Summary report

CemPort

Date and period selection
 Start date: 01/07/2006
 Selection:
 Report period: Month
 Break period: Day
 Number of days: 31
 Start date: 01/07/2006
 End date: 31/07/2006

Report type
 Summary
 Convert
 Alarm

Current settings
 As last set
 Load settings
 Save settings
 Start report
 Help
 Compilation complete

Content settings
 Summary | Convert | Alarm | Measurements | Screen output | Print output | Auto print/ email
 Averaging and units:
 Average time: 5 minutes
 Basis: Change discrete
 ppm
 mg/m3
 mg/Nm3
 mg/Nm3-C
 Break contents:
 Average levels
 Maximum levels
 Percentiles
 95
 Header lines

All groups | Save to Excel | Save to HTML | Save to CSV | Print report | Print all reports

Boston Lime Industries

Summary report for Unit 1. Based on 5 minutes discrete averages
 Start Date 01/07/2006, End Date 31/07/2006
 Plant operating time (hrs) 715:25 - 96.2 (%); System Operating time (hrs) 384:00 - 51.6 (%)

		NO	NO2	NOx	CO	HCl	HF	TOC	O2	Dust
Average	mg/Nm3	204.0	1.6	314.0	279.4	0.7	-0.0	22.3	12.56	0.3
Maxima	mg/Nm3	423.6	3.5	651.6	1156.6	1.3	0.6	34.4	20.03	10.1
Availability	%	50.84	50.81	50.81	50.84	50.84	50.84	50.84	50.84	50.60
Downtime	hrs	365.75	366.00	366.00	365.75	365.75	365.75	365.75	365.75	367.50

Convert Report

CemPort

Date and period selection
 Start date: 01/07/2006
 Report period: Month
 Break period: Day
 Number of days: 31
 Start date: 01/07/2006
 End date: 31/07/2006

Report type
 Summary
 Convert
 Alarm

Current settings
 As last set
 Load settings
 Save settings
 Start report
 Help

Content settings
 Summary | Convert | Alarm | Measurements | Screen output | Print output | Auto print/ email
 Analyser Groups: Unit 1, Unit 2
 Measurements: NO, NO2, HCl, CO, SO2, HF
 Units: 1. ppm, 2. mg/m3, 3. mg/Nm3, 4. mg/Nm3-C
 Selection: Unit 1, Dust

1. Unit 1 | Save to Excel | Save to HTML | V,V, Save to CSV | Print report | Print all reports

Unit 1, Average = 10 Minutes

Date/ time	NO mg/Sm3	NO2 mg/Sm3	NOx mg/Sm3	CO mg/Sm3	HCl mg/Sm3	HF mg/Sm3	TOC mg/Sm3	Plant
01/07/06, 00:09	335.7	2.9	516.6	243.9	1.2	0.2	32.8	ON
01/07/06, 00:19	339.6	2.5	522.1	248.8	1.1	0.2	33.1	ON
01/07/06, 00:29	342.1	3.0	526.4	241.4	1.1	0.2	33.1	ON
01/07/06, 00:39	338.6	2.7	520.7	246.2	1.1	0.2	33.4	ON
01/07/06, 00:49	334.4	2.8	514.6	258.2	1.0	0.2	33.7	ON
01/07/06, 00:59	319.4	2.6	491.2	273.0	1.1	0.2	33.7	ON
01/07/06, 01:09	330.3	2.5	507.9	278.1	1.1	0.1	34.1	ON
01/07/06, 01:19	328.5	2.4	505.0	283.2	1.1	0.1	34.3	ON
01/07/06, 01:29	322.6	2.4	496.0	281.8	1.0	0.1	34.5	ON
01/07/06, 01:39	323.5	2.5	497.5	277.7	1.0	0.1	34.5	ON
01/07/06, 01:49	320.3	2.6	492.7	289.2	1.2	0.0	33.8	ON
01/07/06, 01:59	344.1	2.4	528.9	332.6	1.1	0.0	33.4	ON
01/07/06, 02:09	344.2	2.5	529.1	347.2	1.0	0.0	33.6	ON
01/07/06, 02:19	340.8	2.4	523.9	383.9	1.0	0.0	33.6	ON
01/07/06, 02:29	341.2	2.6	524.6	340.6	1.0	0.0	33.5	ON
01/07/06, 02:39	335.4	2.5	515.7	344.4	1.0	0.0	33.7	ON
01/07/06, 02:49	348.2	3.1	535.9	348.0	1.0	0.0	33.2	ON
01/07/06, 02:59	342.8	2.6	527.1	357.8	1.0	0.0	33.0	ON
01/07/06, 03:09	340.7	2.9	524.2	315.8	1.0	0.0	33.6	ON
01/07/06, 03:19	342.6	2.7	526.9	262.0	1.1	0.1	33.9	ON
01/07/06, 03:29	336.2	2.4	516.9	268.8	1.0	0.0	33.7	ON
01/07/06, 03:39	342.3	2.5	526.2	315.2	1.0	0.0	33.0	ON
01/07/06, 03:49	335.3	2.7	515.7	330.4	1.0	0.1	33.0	ON

Alarm report

CemPort

Date and period selection
 Start date: 01/07/2006
 Report period: Month
 Break period: Day
 Number of days: 31
 Start date: 01/07/2006
 End date: 31/07/2006

Report type
 Summary
 Convert
 Alarm

Current settings
 As last set
 Load settings
 Save settings
 Start report
 Help

Content settings
 Summary | Convert | Alarm | Measurements | Screen output | Print output | Auto print/ email

1. ppm
 2. mg/m3
 3. mg/Nm3
 4. mg/Nm3-C
 Suppress short alarms
 30 minutes

Use alarm 1
 Use alarm 2
 60 seconds
 10 minutes
 30 mins
 1 day

Unit 1 NOx Alarm 1 550
 Unit 1 NOx Alarm 2 577
 Unit 1 SO2 Alarm 1 220
 Unit 1 SO2 Alarm 2 220
 Unit 1 HCl Alarm 1 10
 Unit 1 HCl Alarm 2 10
 Unit 1 HF Alarm 1 1
 Unit 1 HF Alarm 2 1
 Unit 1 TOC Alarm 1 110

1. Unit 1 | Save to Excel | Save to HTML | v,v, Save to CSV | Print report | Print all reports

Alarm report for Unit 1. Based on 30 mins rolling average
 Start Date 01/07/2006, End Date 31/07/2006
 Plant operating time (hrs) 715:25 - 96.2 (%); System Operating time (hrs) 384:00 - 51.6 (%)

		NOx (mg/Sm3)		HCl (mg/Sm3)		HF (mg/Sm3)		TOC (mg/Sm3)	
		Alarm 1 - 550mg/Sm3		Alarm 1 - 10mg/Sm3		Alarm 1 - 1mg/Sm3		Alarm 1 - 110mg/Sm3	
		Alarm 2 - 577mg/Sm3		Alarm 2 - 10mg/Sm3		Alarm 2 - 1mg/Sm3		Alarm 2 - 110mg/Sm3	
		h:m	%	h:m	%	h:m	%	h:m	%
Overall period	Alarm 1	27:5	7.6	00:00	0.0	00:00	0.0	00:00	0.0
Overall period	Alarm 2	01:40	0.5	00:00	0.0	00:00	0.0	00:00	0.0

CEMSuite Plus

- All the features of CEMSuite
- EA Specified WID reports
- EN14181
 - QAL 2/AST calculations
 - QAL 3 Zero and span checks
 - Control charts – CUSUM, Shewhart, Moving median
 - Remote control of QAL 3 sample injections
 - Calibration functions

WID Report

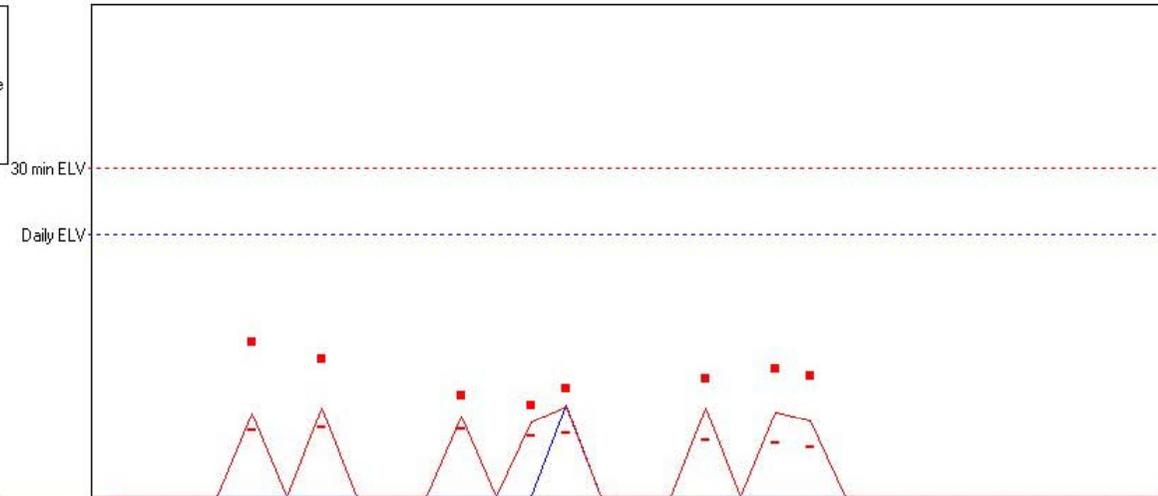
Anywhere Ltd
 Anytown, Anyshire
 11 hours/ day, and < 6 invalid points req'd
 Release point: Incinerator

Municipal Waste Incinerator

Measurand: NOx, conf. corrected 20%

Permit: EA 4567
 Operator: Burnit Co.
 Burn signal used, normal logic.
 July, 2006

Key	
-----	Daily average ELV
- - - - -	30 min. average ELV
—	Mean 30 min. average
■	Max. 30 min. average
-	Min. 30 min. average
—	Daily average



Month summary	
30 min ELV	
Monthly max.	235
Monthly mean	128
Monthly min.	75
Total invalid	384
Sum > ELV	0
Daily ELV	
Monthly max.	138
No. invalid days	8
Sum > ELV	0

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
30 min ELV	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
Max.	-	-	-	-	235	-	209	-	-	-	153	-	140	165	-	-	-	180	-	194	184	-	-	-	-	-	-	-	-	-	-
Mean	-	-	-	-	127	-	135	-	-	-	123	-	115	138	-	-	-	134	-	128	116	-	-	-	-	-	-	-	-	-	-
Min.	-	-	-	-	100	-	105	-	-	-	103	-	93	96	-	-	-	85	-	82	75	-	-	-	-	-	-	-	-	-	-
No invalid	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	48	48	48	48	48	48	48
No > ELV	-	-	-	-	0	-	0	-	-	-	0	-	0	0	-	-	-	0	-	0	0	-	-	-	-	-	-	-	-	-	-
Daily ELV	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
Daily average	-	-	-	-	-	-	-	-	-	-	-	-	-	138	-	-	-	135	-	-	-	-	-	-	-	-	-	-	-	-	-
Valid day?	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	N	N	N
> ELV	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

QAL 3 data entry

CemQAL

Test data | QAL2 / AST analysis | QAL3, CUSUM analysis | Linearity | Configuration | **GT 51, measurement channel NOx**

Skip calcs:
 Start:
 End:

 Lines

Span
 Zero

Drift factors
 hx 2.85
 lx 0.501

Precision factors
 hs 6.90
 ks 1.85

Standard Deviation
 S ams 3.00

Zero/ span gas value:

Spreadsheet
 Graph

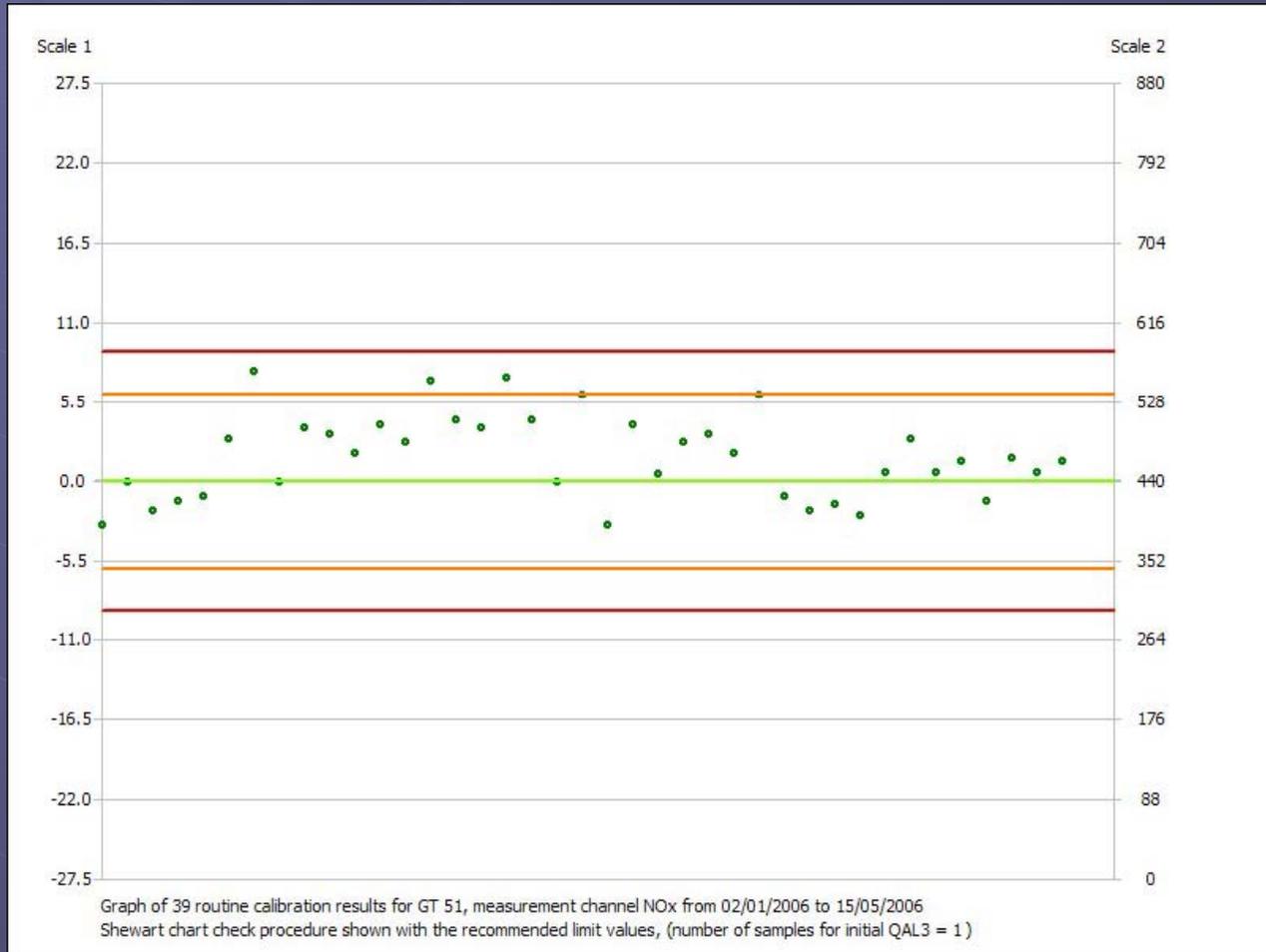
Graph select:
 CUSUM - Drift
 CUSUM - Precision
 Shewhart
 Moving median

Scale 1
 Scale 2

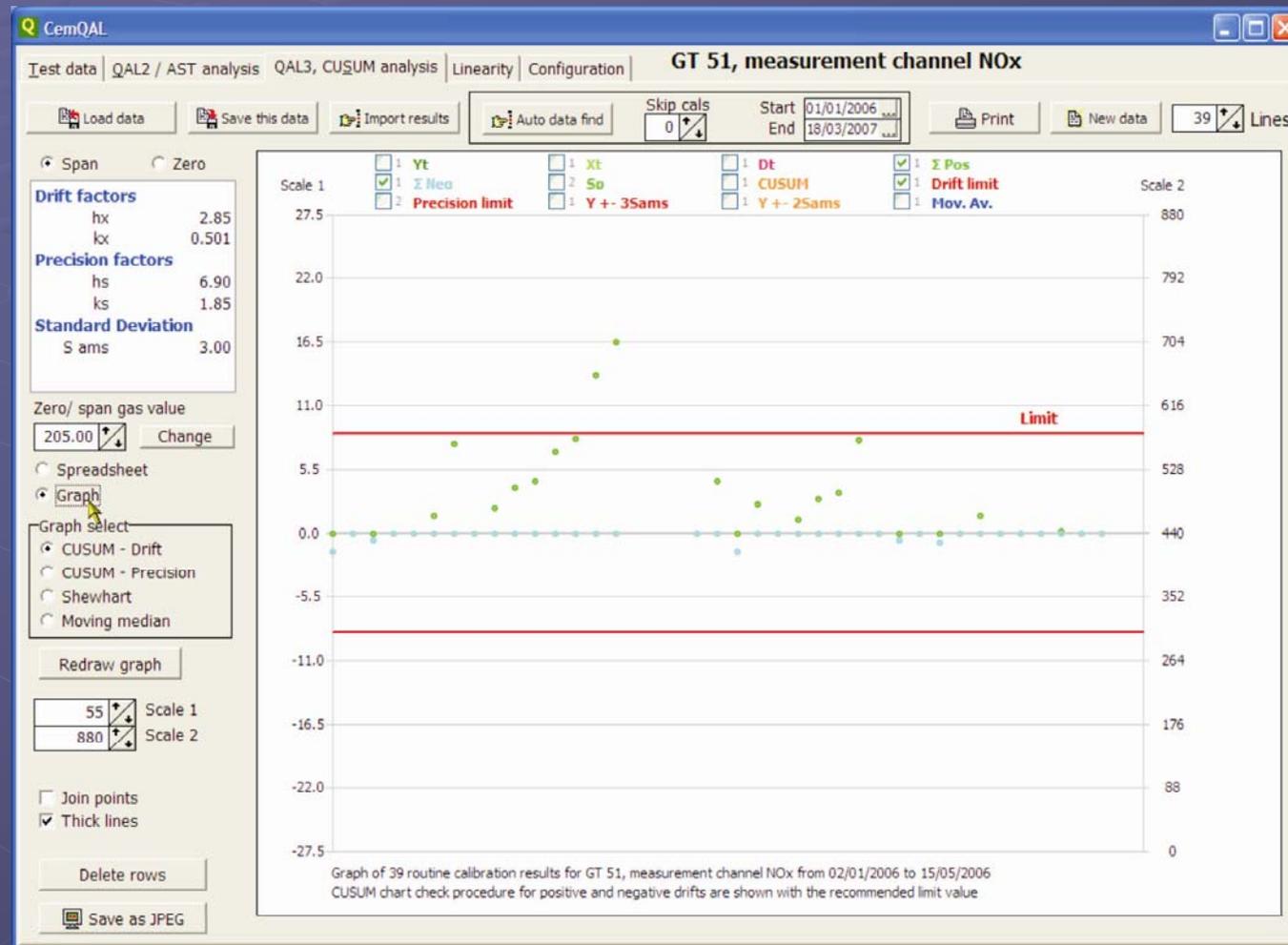
Join points
 Thick lines

No.	Name	Date	Time	y t	x t	d t	ΣPos	ΣNeg	So	CUSUM	+D Adi.	-D Adi.	Mov. Av.
1	No 1 (3)	02/01/2006	07:59:09	202.0	205.0	-3.00	0.00	1.50	0.00	-3.00	-	-1.40	-
2	No 1 (3)	05/01/2006	19:59:12	205.0	205.0	0.00	0.00	0.00	0.00	-3.00	-	-	-
3	No 1 (3)	09/01/2006	07:59:16	203.0	205.0	-2.00	0.00	0.50	0.00	-5.00	-	-0.70	-
4	No 1 (3)	12/01/2006	19:59:17	203.7	205.0	-1.30	0.00	0.00	0.00	-6.30	-	-	203.43
5	No 1 (4)	16/01/2006	07:59:17	204.0	205.0	-1.00	0.00	0.00	0.00	-7.30	-	-	203.93
6	(3)	19/01/2006	19:59:16	204.0	201.0	3.00	1.50	0.00	0.00	-4.30	1.40	-	203.68
7	(3)	23/01/2006	07:59:17	208.7	201.0	7.70	7.69	0.00	0.00	3.40	3.04	-	205.10
8	(3)	26/01/2006	19:59:18	201.0	201.0	0.00	0.00	0.00	12.99	3.40	-	-	204.43
9	(3)	30/01/2006	07:59:14	204.7	201.0	3.70	2.20	0.00	0.00	7.10	1.89	-	204.60
10	(3)	02/02/2006	19:59:20	204.3	201.0	3.30	3.99	0.00	0.00	10.40	1.75	-	204.68
11	(2)	06/02/2006	07:59:16	203.0	201.0	2.00	4.49	0.00	0.00	12.40	1.40	-	203.25
12	(3)	09/02/2006	19:59:08	205.0	201.0	4.00	6.99	0.00	0.00	16.40	1.57	-	204.25
13	(3)	13/02/2006	07:59:18	203.7	201.0	2.70	8.18	0.00	0.00	19.10	1.50	-	204.00
14	(2)	16/02/2006	19:59:11	208.0	201.0	7.00	13.68	0.00	0.00	26.10	1.95	-	204.93
15	(3)	20/02/2006	07:59:17	205.3	201.0	4.30	16.48	0.00	0.00	30.40	2.00	-	205.50
16	(3)	23/02/2006	19:59:14	204.7	201.0	3.70	18.68	0.00	0.00	34.10	1.98	-	205.43
17	(3)	27/02/2006	07:59:17	208.3	201.0	7.30	24.47	0.00	0.00	41.40	2.25	-	206.57
18	(3)	02/03/2006	19:59:09	205.3	201.0	4.30	27.27	0.00	0.00	45.70	2.26	-	205.90
19	(2)	06/03/2006	07:59:18	201.0	201.0	0.00	0.00	0.00	0.00	45.70	-	-	204.82
20	(4)	09/03/2006	19:59:09	207.0	201.0	6.00	4.50	0.00	1.35	51.70	3.50	-	205.40
21	(3)	13/03/2006	07:59:17	198.0	201.0	-3.00	0.00	1.50	25.20	48.70	-	-1.40	202.82
22	(2)	16/03/2006	19:59:11	205.0	201.0	4.00	2.50	0.00	33.05	52.70	2.10	-	202.75
23	(2)	20/03/2006	07:59:12	201.5	201.0	0.50	0.00	0.00	0.00	53.20	-	-	202.88
24	(3)	23/03/2006	19:59:14	203.7	201.0	2.70	1.20	0.00	0.00	55.90	1.19	-	202.05
25	(3)	27/03/2006	07:59:09	204.3	201.0	3.30	2.99	0.00	0.00	59.20	1.40	-	203.63
26	(3)	30/03/2006	19:59:09	203.0	201.0	2.00	3.49	0.00	0.00	61.20	1.17	-	203.13
27	(3)	03/04/2006	07:59:19	207.0	201.0	6.00	7.99	0.00	0.00	67.20	1.75	-	204.50
28	(3)	06/04/2006	19:59:09	200.0	201.0	-1.00	0.00	0.00	7.85	66.20	-	-	203.57
29	(3)	10/04/2006	07:59:19	199.0	201.0	-2.00	0.00	0.50	0.00	64.20	-	-0.70	202.25
30	111949 (4)	13/04/2006	19:59:17	192.8	194.3	-1.50	0.00	0.00	0.00	62.70	-	-	199.70
31	111949 (3)	17/04/2006	07:59:20	192.0	194.3	-2.30	0.00	0.80	0.00	60.40	-	-0.91	195.95
32	111949 (3)	20/04/2006	19:59:12	195.0	194.3	0.70	0.00	0.00	0.00	61.10	-	-	194.70
33	111949 (3)	24/04/2006	07:59:14	197.3	194.3	3.00	1.50	0.00	0.00	64.10	1.40	-	194.27
34	111949 (3)	27/04/2006	19:59:17	195.0	194.3	0.70	0.00	0.00	0.00	64.80	-	-	194.82
35	111949 (3)	01/05/2006	07:59:09	195.7	194.3	1.40	0.00	0.00	0.00	66.20	-	-	195.75
36	111949 (3)	04/05/2006	19:59:08	193.0	194.3	-1.30	0.00	0.00	0.00	64.90	-	-	195.25
37	111949 (3)	08/05/2006	07:59:12	196.0	194.3	1.70	0.20	0.00	0.00	66.60	0.49	-	194.93
38	111949 (4)	11/05/2006	19:59:17	195.0	194.3	0.70	0.00	0.00	0.00	67.30	-	-	194.93
39	111949 (3)	15/05/2006	07:59:08	195.7	194.3	1.40	0.00	0.00	0.00	68.70	-	-	194.93

Shewhart Chart



CUSUM Chart



CEMSuite Power

- Specialist reporting module
- Fuel weighted and multiple ELV's
- Single/multi fuel usage
- Mass release calculations
- Percentile compliance
- Printed daily summary and monthly reports
- 100% ,95% or 85% compliance
- Calculated mss release from fuel usage

LCPD report module

13, Feb, 2007 **Report start date** **Report type**
 Daily Monthly

v,v, Save to csv

Configuration **Show results** 1. Unit 1

Daily report | Month report | Fuel/ firing modes | ELV set up

Measurement point

- Unit 1
- Unit 2
- Unit 3
- Unit 4
- Unit 5
- Unit 6
- Unit 7

Measurand/ ELV

Channel	ELV 1	ELV 2
NOx	60	100
CO	0	0
O2	0	0
Opacity	0	0
Load	0	0
Flame	0	0

Fuel 1
 Fuel 2
 Fuel 3

Anytown power station
Monthly report

Unit 1
13/02/2007 to 13/02/2007

Nat. gas
Operating time (hours): 0

Measurand	Units	Average of			ELV2
		hourly averages	Hourly ELV.	Hours>ELV	
NOx	mg/Nm3	-	800	0 hrs, %	1200
CO	mg/Nm3	-	-	-	-
O2	% (dry)	-	-	-	-
Temp	C	-	-	-	-
Smoke	%	-	-	-	-

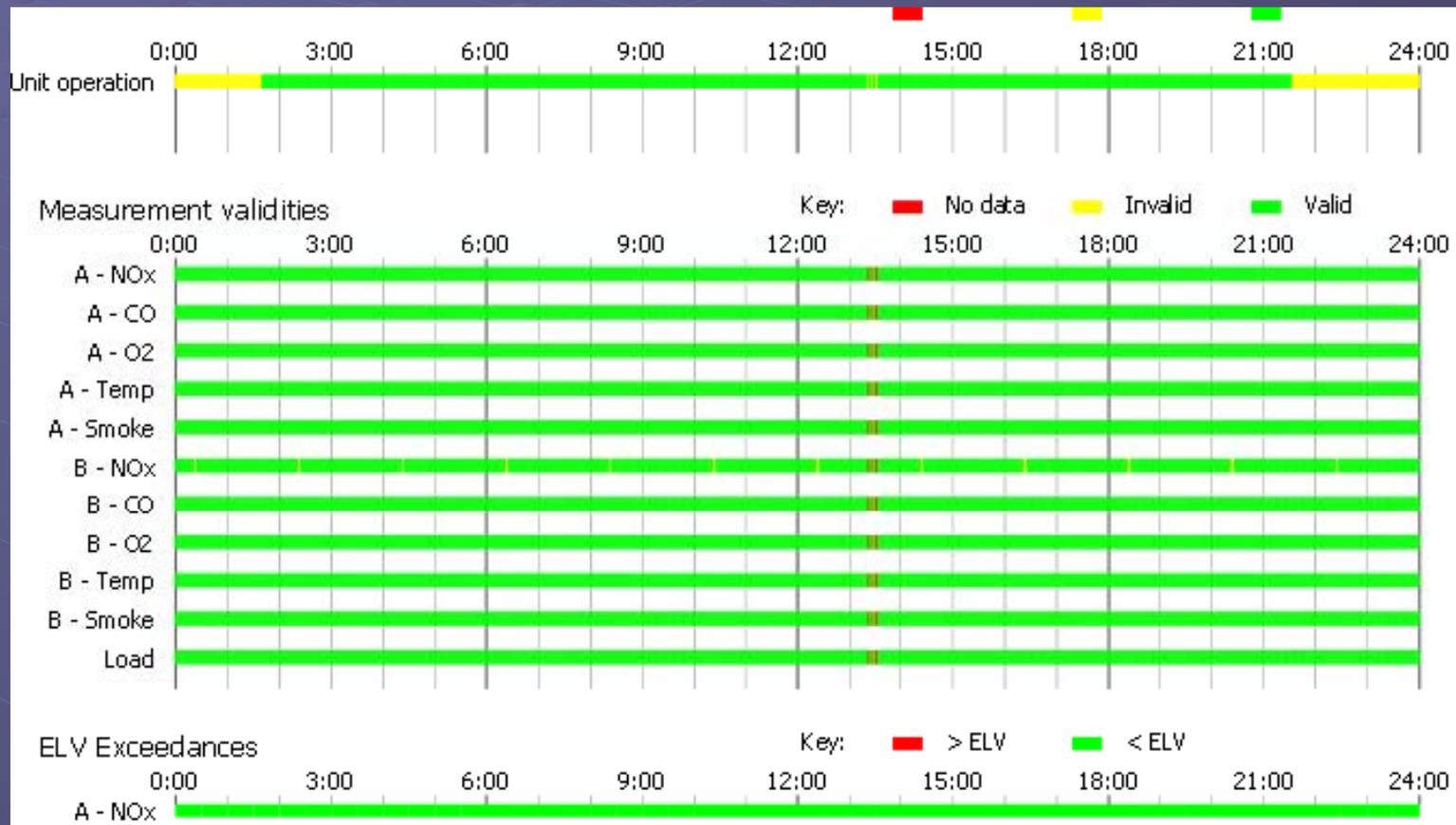
HFO
Operating time (hours): 0

Measurand	Units	Average of			ELV2
		hourly averages	Hourly ELV.	Hours>ELV	
NOx	mg/Nm3	-	1200	0 hrs, %	1800
CO	mg/Nm3	-	-	-	-
O2	% (dry)	-	-	-	-
Temp	C	-	-	-	-
Smoke	%	-	-	-	-

Multi fuel
Operating time (hours): 0

Measurand	Units	Average of			ELV2
		hourly averages	Hourly ELV.	Hours>ELV	
NOx	mg/Nm3	-	Fuel Weighted	-	Fuel Weighted
CO	mg/Nm3	-	Fuel Weighted	-	Fuel Weighted
O2	% (dry)	-	Fuel Weighted	-	Fuel Weighted
Temp	C	-	Fuel Weighted	-	Fuel Weighted

Daily validity graphic



LCPD Monthly report

Anytown power station

Permit xxxx

Monthly report

Variation:

Unit 5

01/03/2007 to 31/03/2007

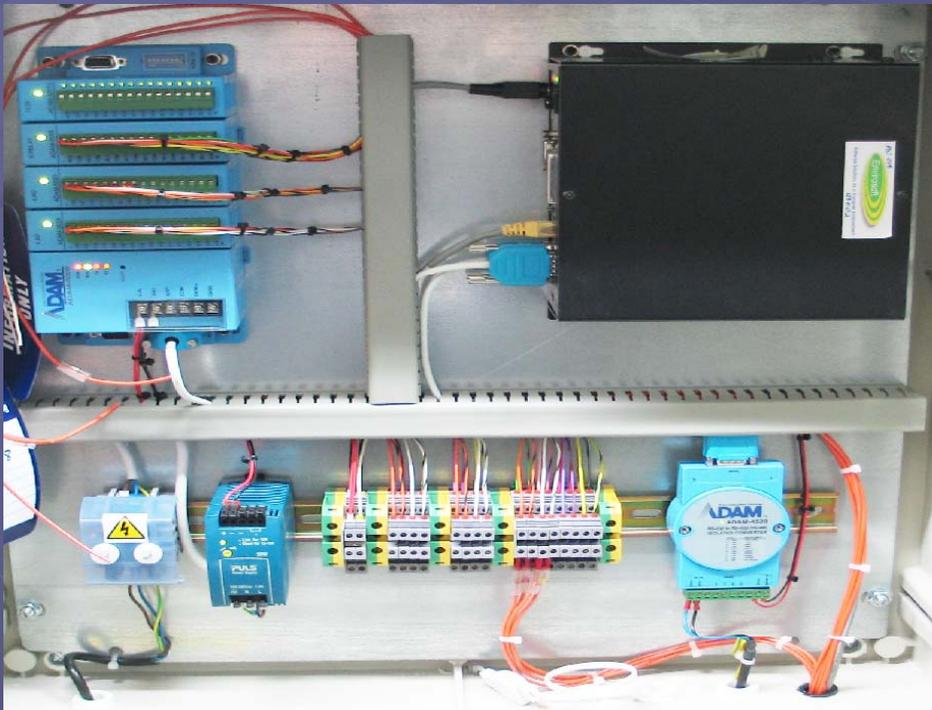
Nat. gas

Operating time (hours): 52

Measurand	Units	Average of hourly averages	Hourly ELV.	Hours>ELV	ELV2	hrs>ELV2	Hourly max.	Max time	Number of invalid hours	Number of invalid days
NOx	mg/Nm ³	37.86	60	0 hrs, 0.0%	100	0 hrs, 0.0%	54.70	13/03, 15:29	832	18
CO	mg/Nm ³	0.64	-	-	-	-	3.10	12/03, 23:29	832	18
O2	%(dry)	14.21	-	-	-	-	14.55	12/03, 16:29	832	18
Opacity	mg/Nm ³	3.00	-	-	-	-	3.50	12/03, 18:59	832	18
Load	MW	249.71	-	-	-	-	266.90	13/03, 23:29	832	18

Data acquisition hardware

Data acquisition hardware

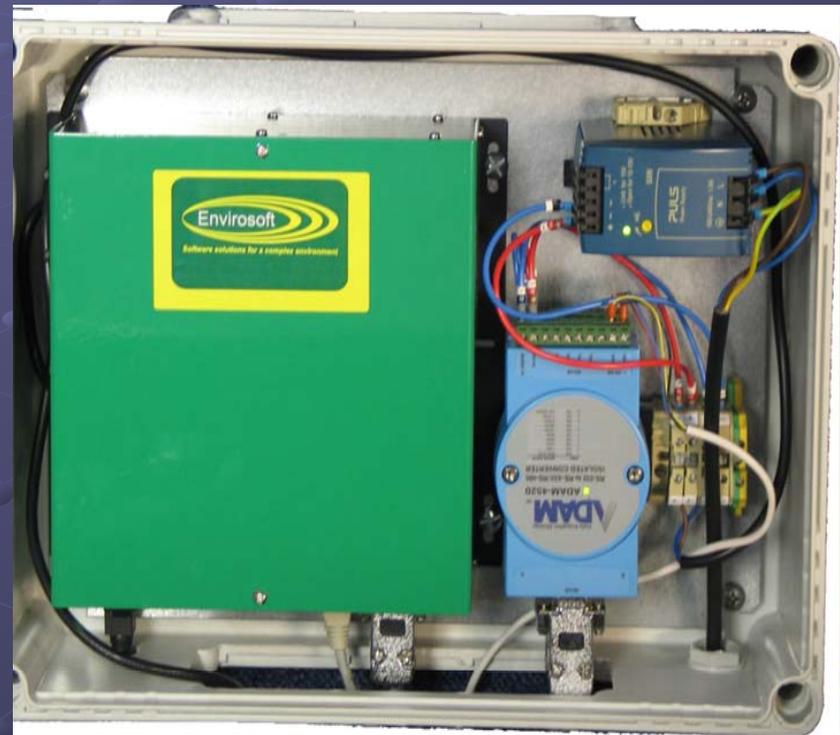


● Typical data acquisition system comprising

- Analogue to digital converter
- Data retransmission to DCS system
- RS232 to485 converter
- 12VDC power supply
- Data Storage Unit

Data Storage Unit

- The DSU provides long term raw data storage (40Gb)
- It carries out high speed data communications
- It can provide data re-transmission from serial to analogue
- It automatically updates the host PC if it is turned off for any period



CEMSuite

- **We believe that CEMSuite offers new levels of reliability and ease of use to operators of all kinds of regulated processes.**
- **The program is easy to navigate and can be configured to cover most requirements.**
- **Envirosoft is a specialist company that only creates data logging packages for environmental monitoring systems.**
- **We offer packages that meet all the requirements of WID, LCPD, IPPC and PPC**
- **We offer peace of mind to operators of all processes because we can provide the expertise and service that they require to ensure they meet their regulatory obligations.**