

# 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

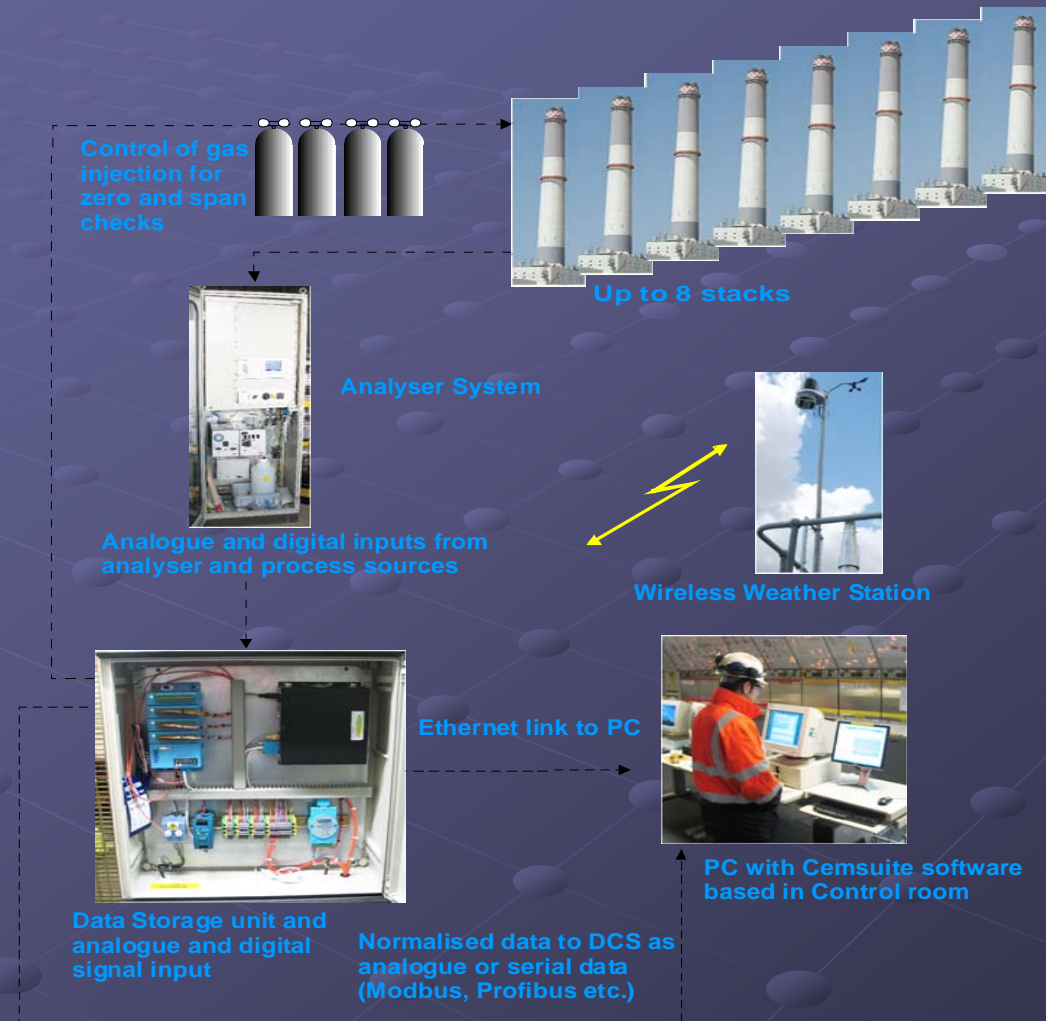
# LCPD /PPC/IPPC requirements

- 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

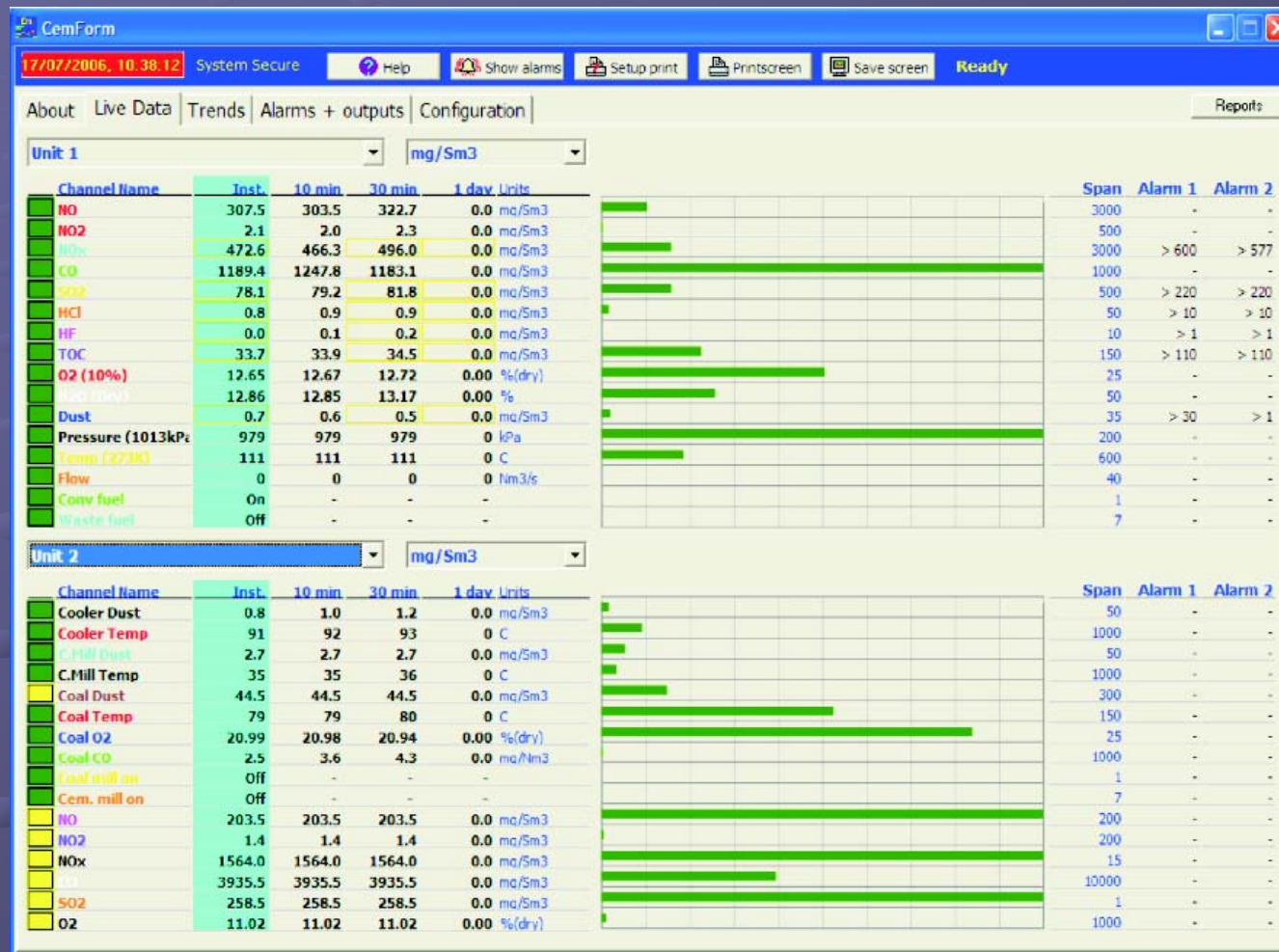
# CEMSuite System



# CEMSuite

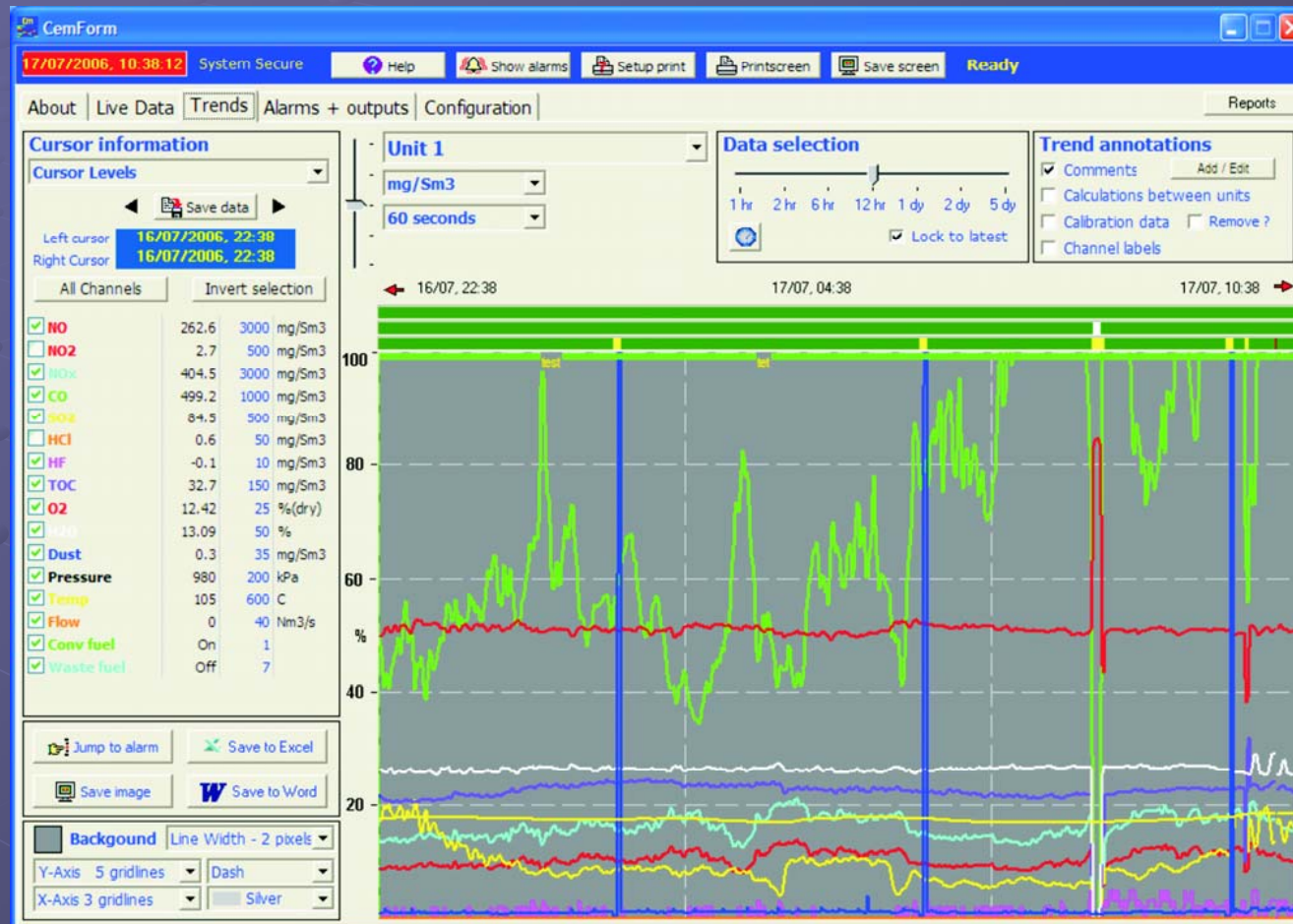
- Real-time emissions display
- User defined averages
- Trends in graphical form
- Pre and post ELV alarms
- User configurable reports
- Up to 8 stacks each with up to 12 measurands
- Measurement units
  - Gaseous species - ppm, mg/m<sup>3</sup>, mg/Nm<sup>3</sup>, kg/hr
  - Particulate - mg/m<sup>3</sup>, mg/Nm<sup>3</sup>, kg/hr, Opacity, Extinction
  - Flow - m/s, m<sup>3</sup>/s, Nm<sup>3</sup>/s

# CEMForm - Real time data





# CEMForm – Trend screen

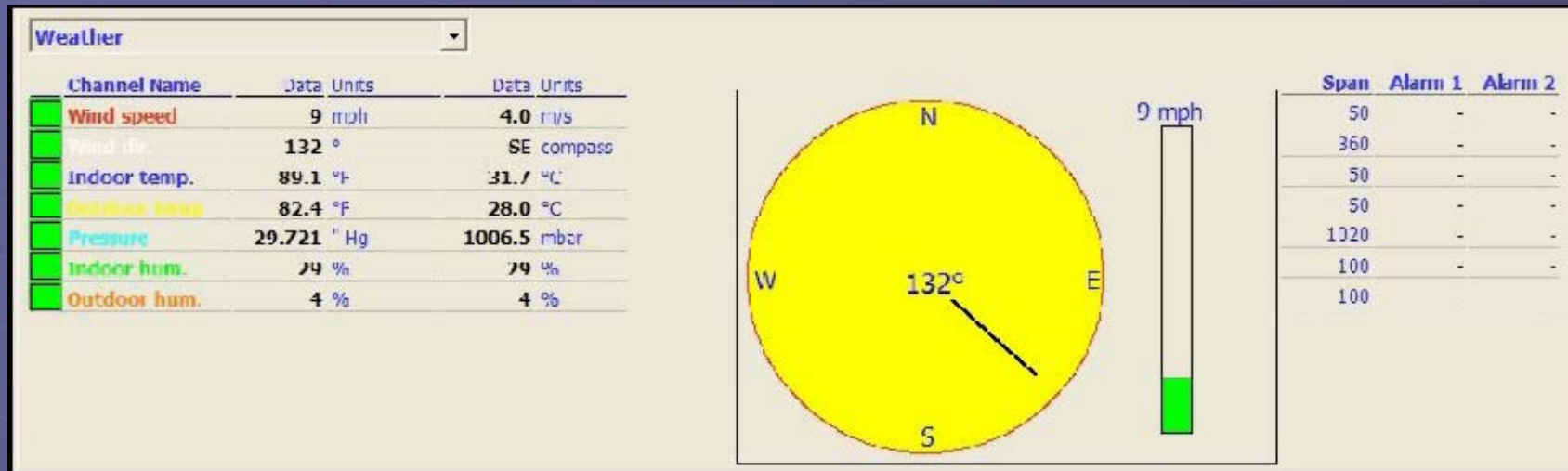




# Trend screen

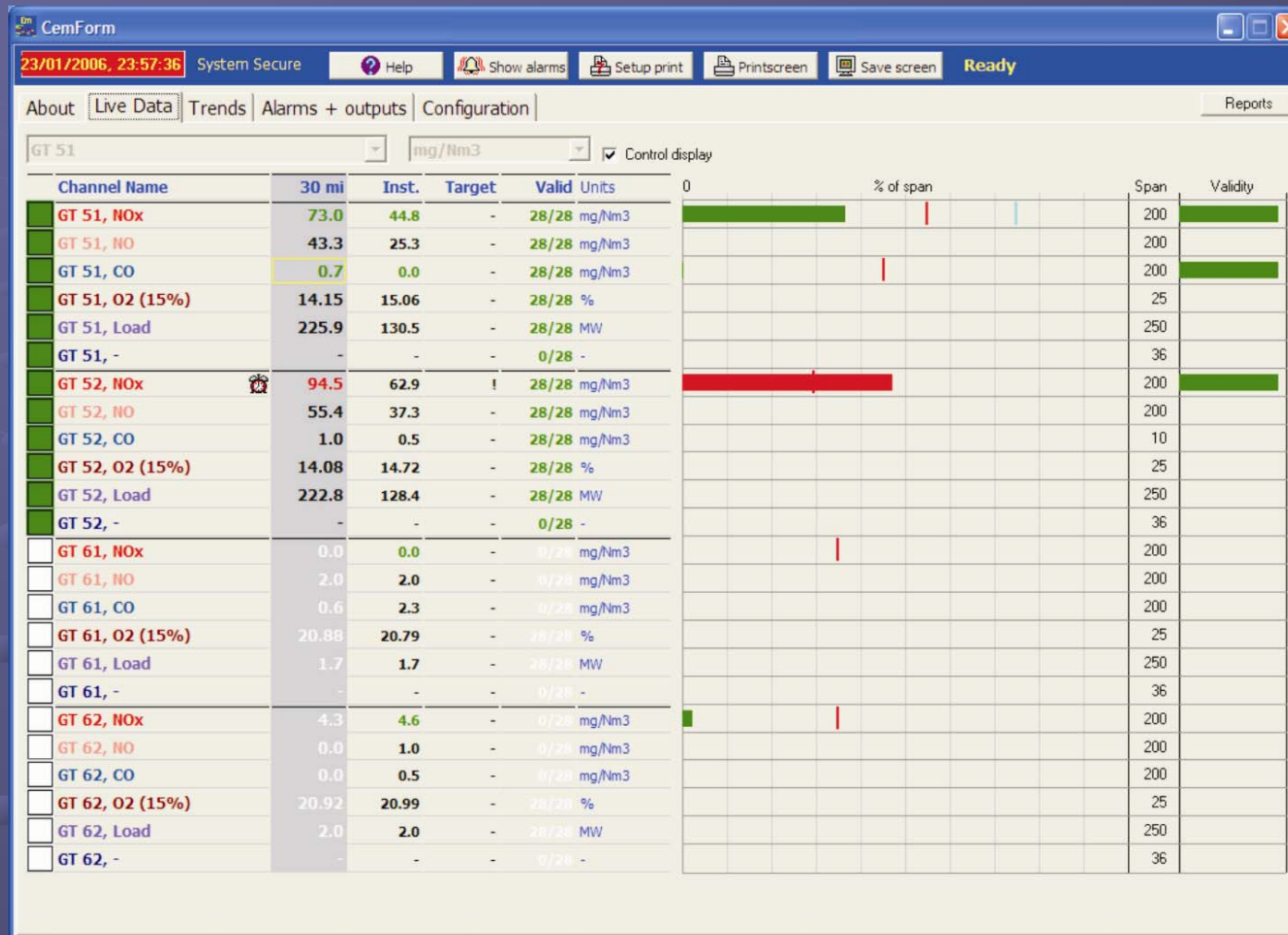
- The user may select which parameters are displayed
- The time range of the displayed may be selected
  - 1 / 2 / 6 / 12 hours or 1 / 2 / 5 days
- Comments can be placed on the trend display to highlight particular data
- The status of the plant is continually displayed to indicate if the plant is on 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  
 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  
 Units: 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

**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  
 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

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

Compilation complete

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

**Unit 1, Average = 10 Minutes**

	NO	NO2	NOx	CO	HCl	HF	TOC	
Date/ time	mg/Sm3	mg/Sm3	mg/Sm3	mg/Sm3	mg/Sm3	mg/Sm3	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

[illegible]



# 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

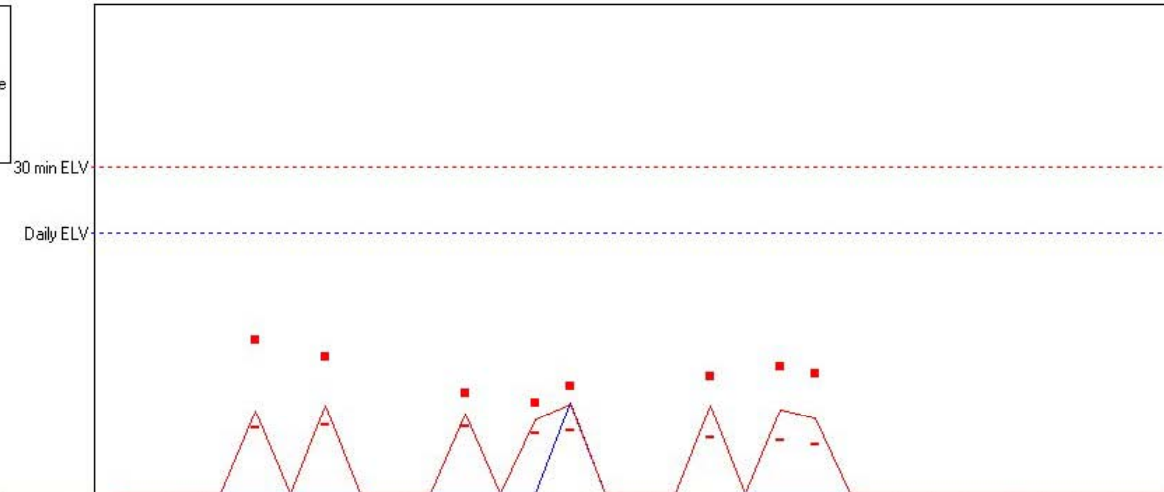
# WID Report

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	
<b>30 min ELV</b>	
Monthly max.	235
Monthly mean	128
Monthly min.	75
Total invalid	384
Sum > ELV	0
<b>Daily ELV</b>	
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	48	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: 


 39 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

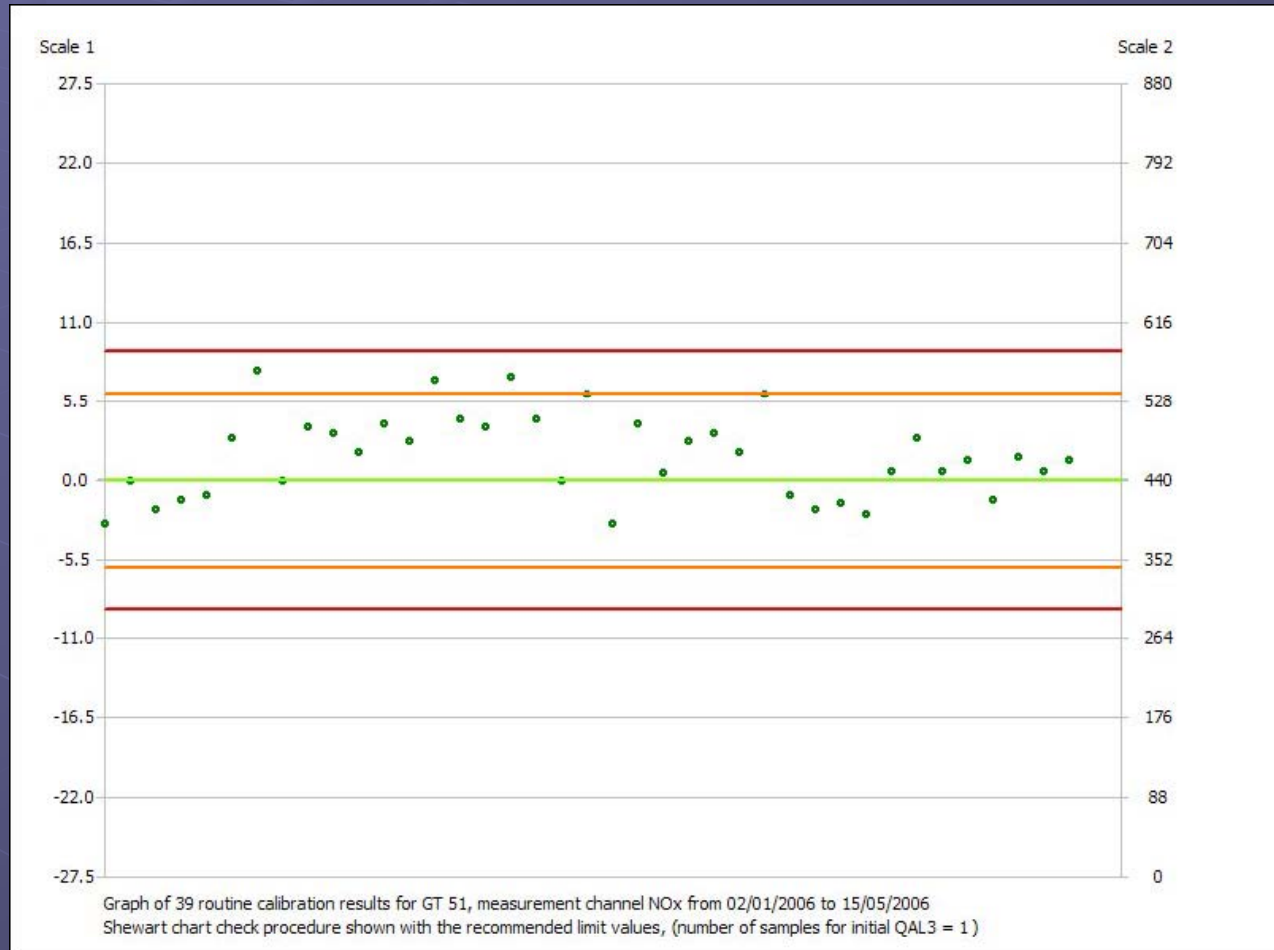
Graph select  
☒ CUSUM - Drift  
☐ CUSUM - Precision  
☐ Shewhart  
☐ Moving median

Scale 1  
 Scale 2

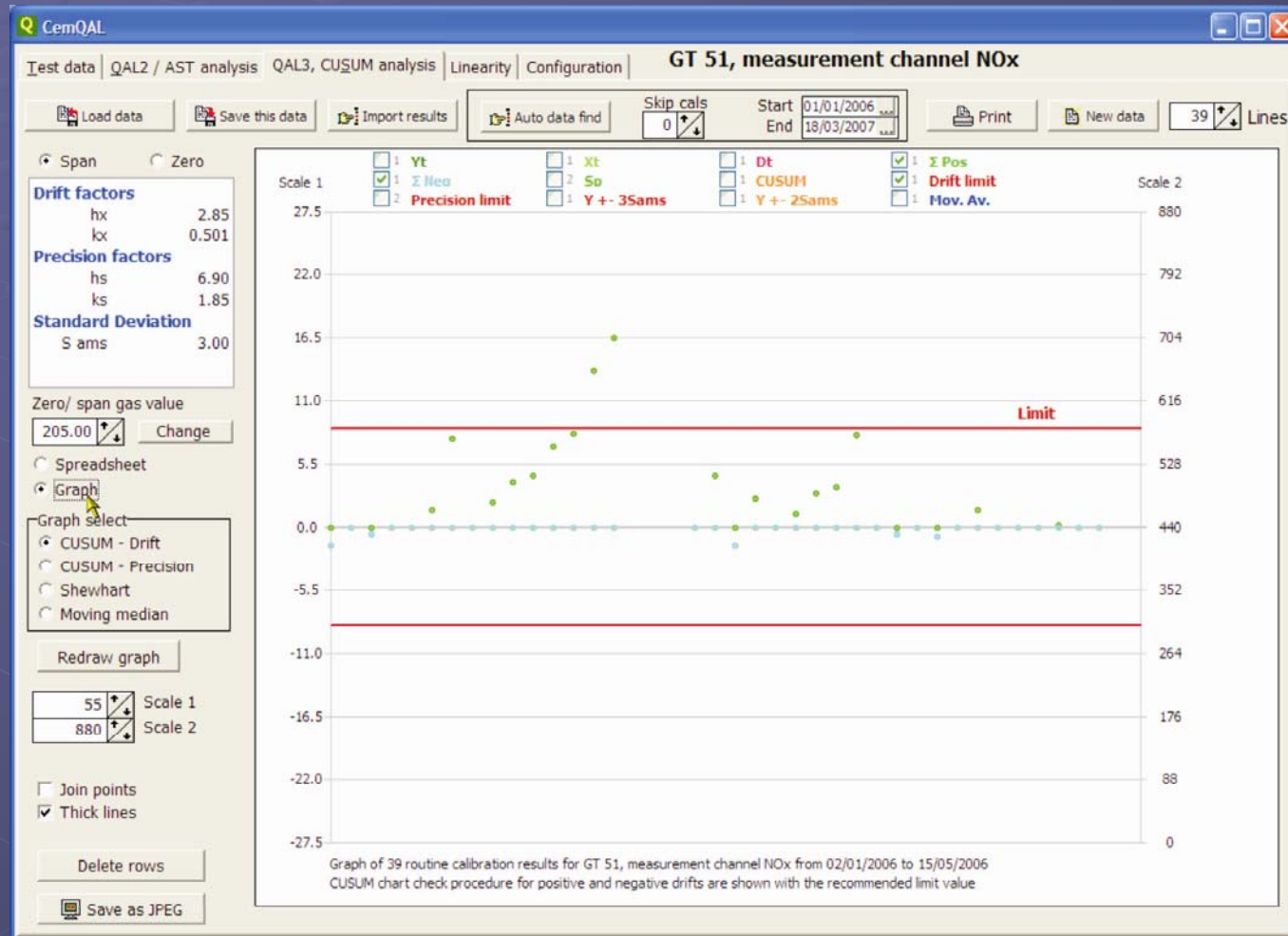
☐ Join points  
☒ Thick lines

No.	Name	Date	Time	v t	x t	d t	SPos	SNeg	So	CUSUM	+D Adj.	-D Adj.	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 mass release from fuel usage

# LCPD report module

13, Feb, 2007
Report start date

Report type  
☒ Daily
☐ Monthly

Compile

Print
Setup

JPEG
v,v, Save to csv

Show results
1. Unit 1

Configuration

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

Save

Anytown power station  
Monthly report

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

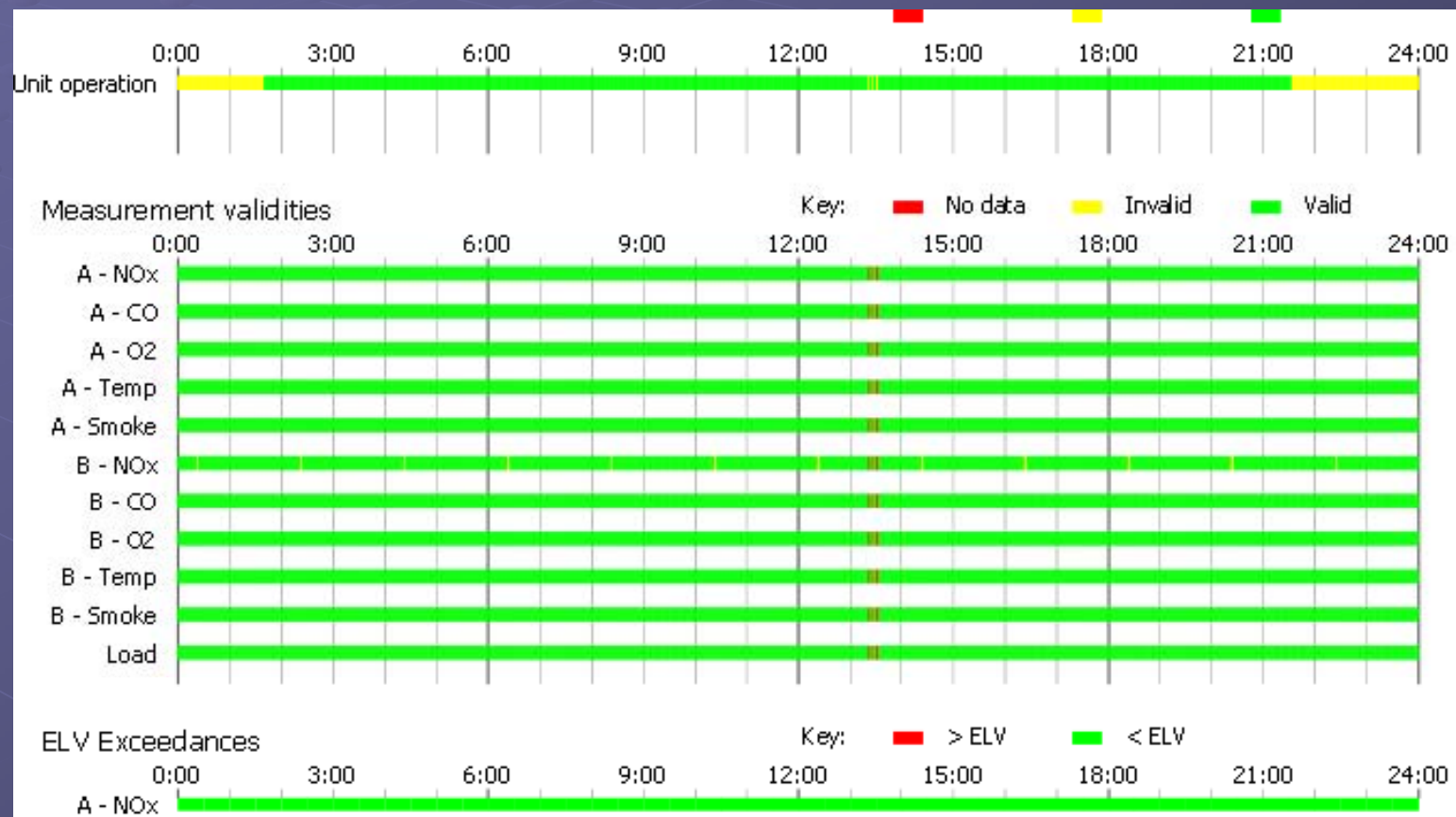
Nat. gas  
Operating time (hours): 0

HFO  
Operating time (hours): 0

Multi fuel  
Operating time (hours): 0



# Daily validity graphic



# LCPD Monthly report

Anytown power station

Permit xxxx

Monthly report

Variation:

Unit 5

01/03/2007 to 31/03/2007

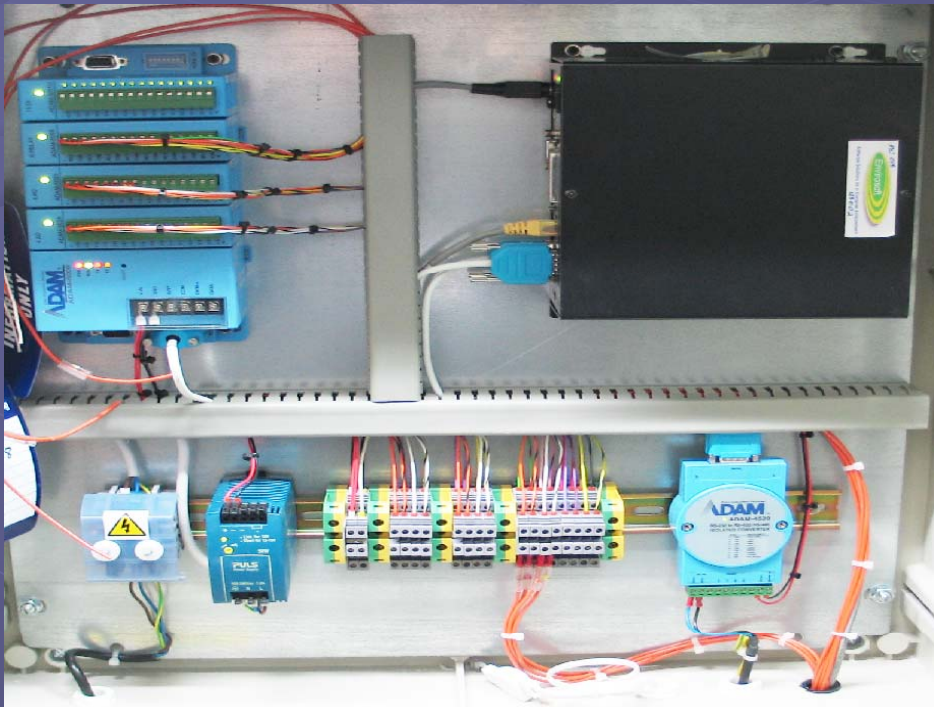
Nat. gas

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/Nm3	37.86	60	0 hrs, 0.0%	100	0 hrs, 0.0%	54.70	13/03, 15:29	832	18
CO	mg/Nm3	0.64	-	-	-	-	3.10	12/03, 23:29	832	18
O2	%(dry)	14.21	-	-	-	-	14.55	12/03, 16:29	832	18
Opacity	mg/Nm3	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

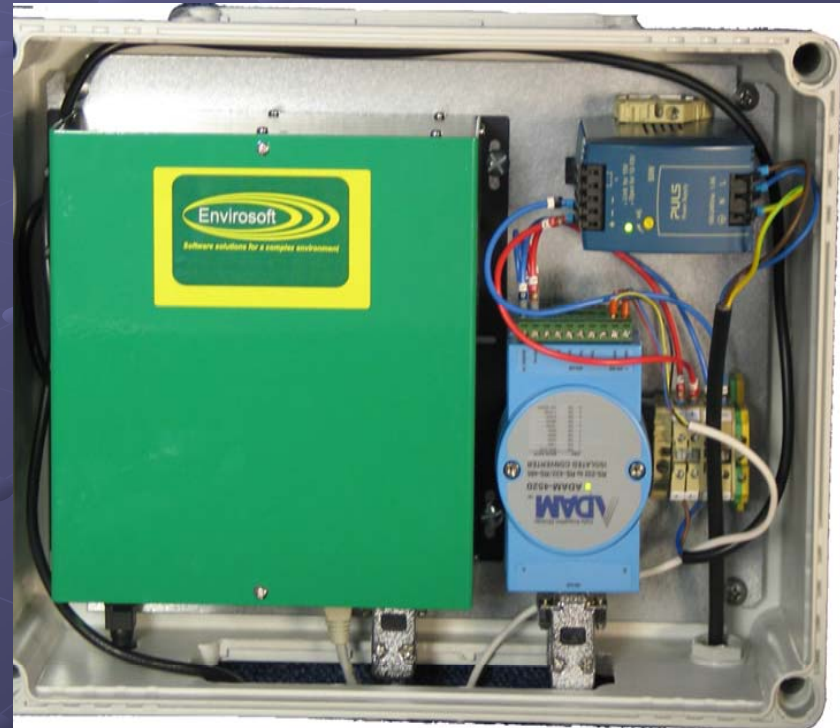


## ● Typical data acquisition system comprising

- 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.**