Software tools for the implementation of EN 14181

Talk given by

Steve Wright

BS EN14181

- BS EN 18141 is a complex quality assurance standard which requires a significant amount of calculation
- The QAL 3 part can involve the operator in a significant amount of work to generate zero and span data and calculating Control Charts
- Envirosoft created CEMQual to reduce all these requirements to a few key strokes.

Envirosoft

CEMSuite CEMQual

- CEMQual is a software package that comes in two forms
  - A stand-alone program that accepts manually entered data
  - As part of CEMSuite Plus, a data logging program compliant with WID Or CEMSuite Power which is compliant with LCPD
- It contains all the tools to perform all EN14181 calculations
- It can be used by Test houses to perform QAL2 and AST calculations and by operators to generate QAL 3 Control charts

CEMSuite CEMQual

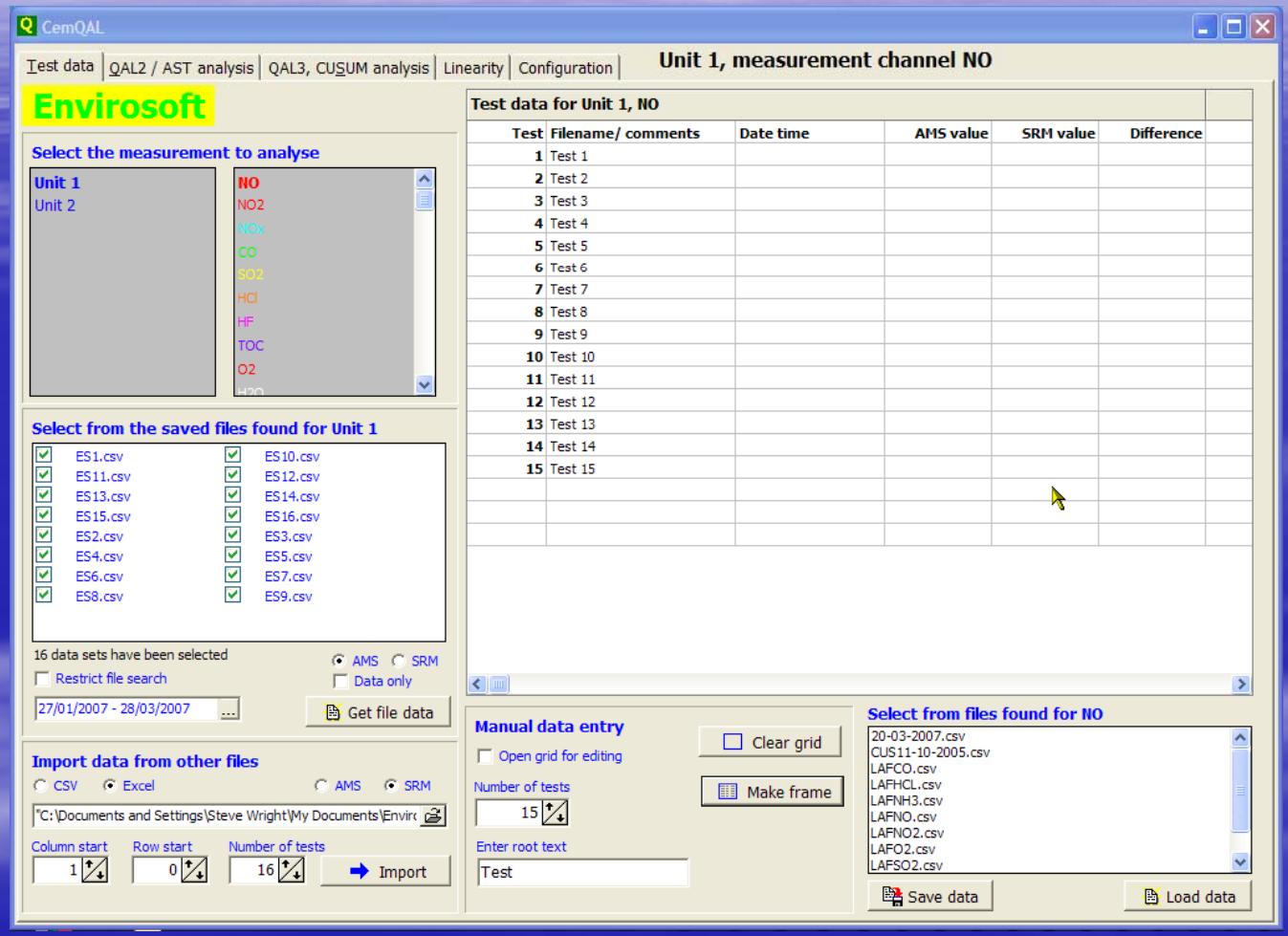
- It accepts data input manually or retrieved from the CEMForm database automatically
- It can perform all the key calculations for QAL2, AST and QAL3 and Linearity
- It can produce CUSUM, CUSUM precision, Shewart and moving median graphs
- All graphs and spreadsheet data can be printed or output as a JPEG picture.
- Fully compliant with EN 14181 and validated by AEA Technology
- With the addition of CEMCAL software and an Envirosoft supplied valve system, automatic zero and span tests can be undertaken at pre-determined intervals.

Envirosoft

QAL 2 calculations

- The QAL2 module can generate all the functions required such as calibration and variability as well as producing linear regression graphs.
- It also has the capability of bringing in data from Excel to upload SRM and AMS data
- It can be used in a manual mode

QAL2/ AST data entry

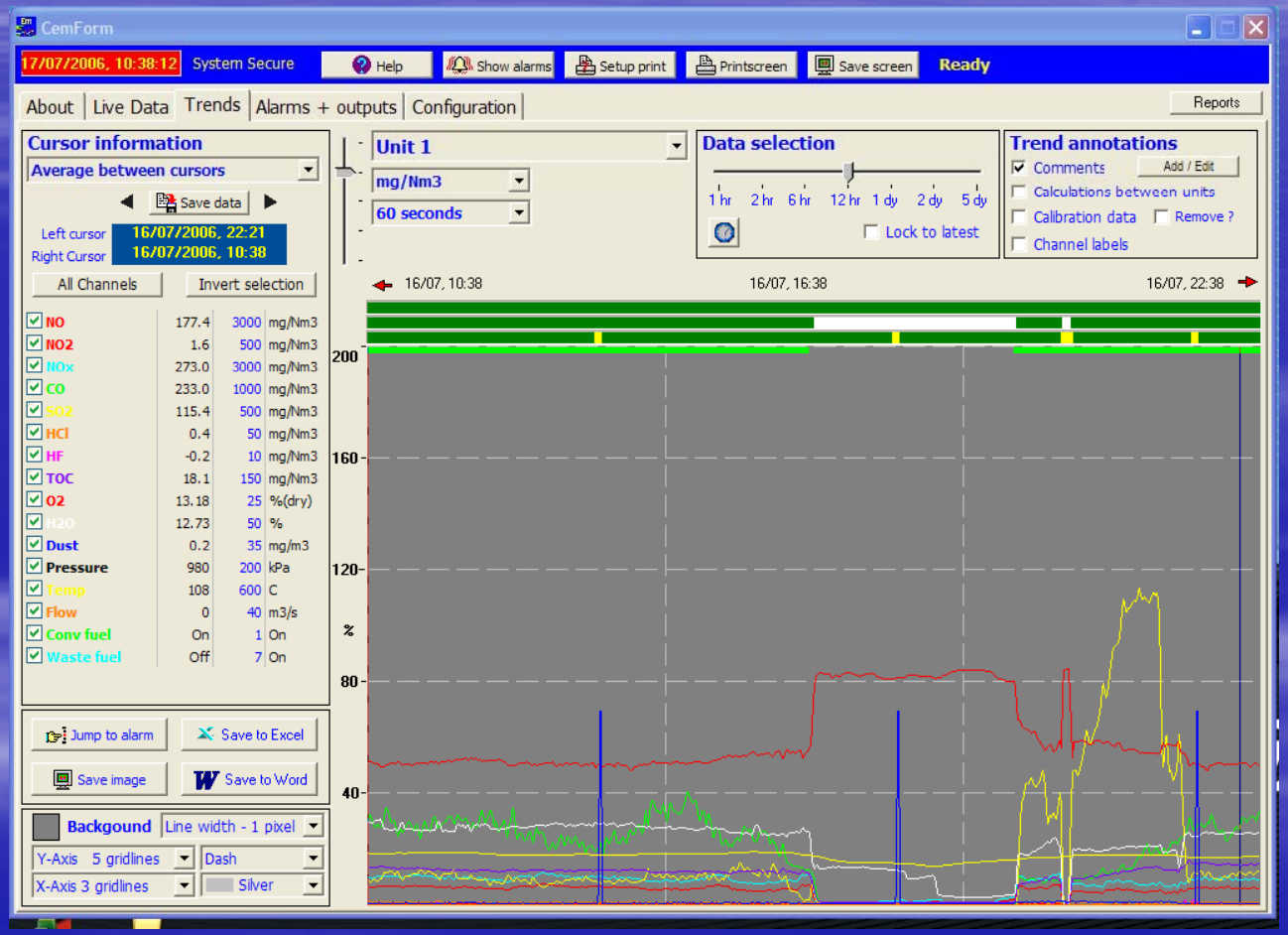


Envirosoft

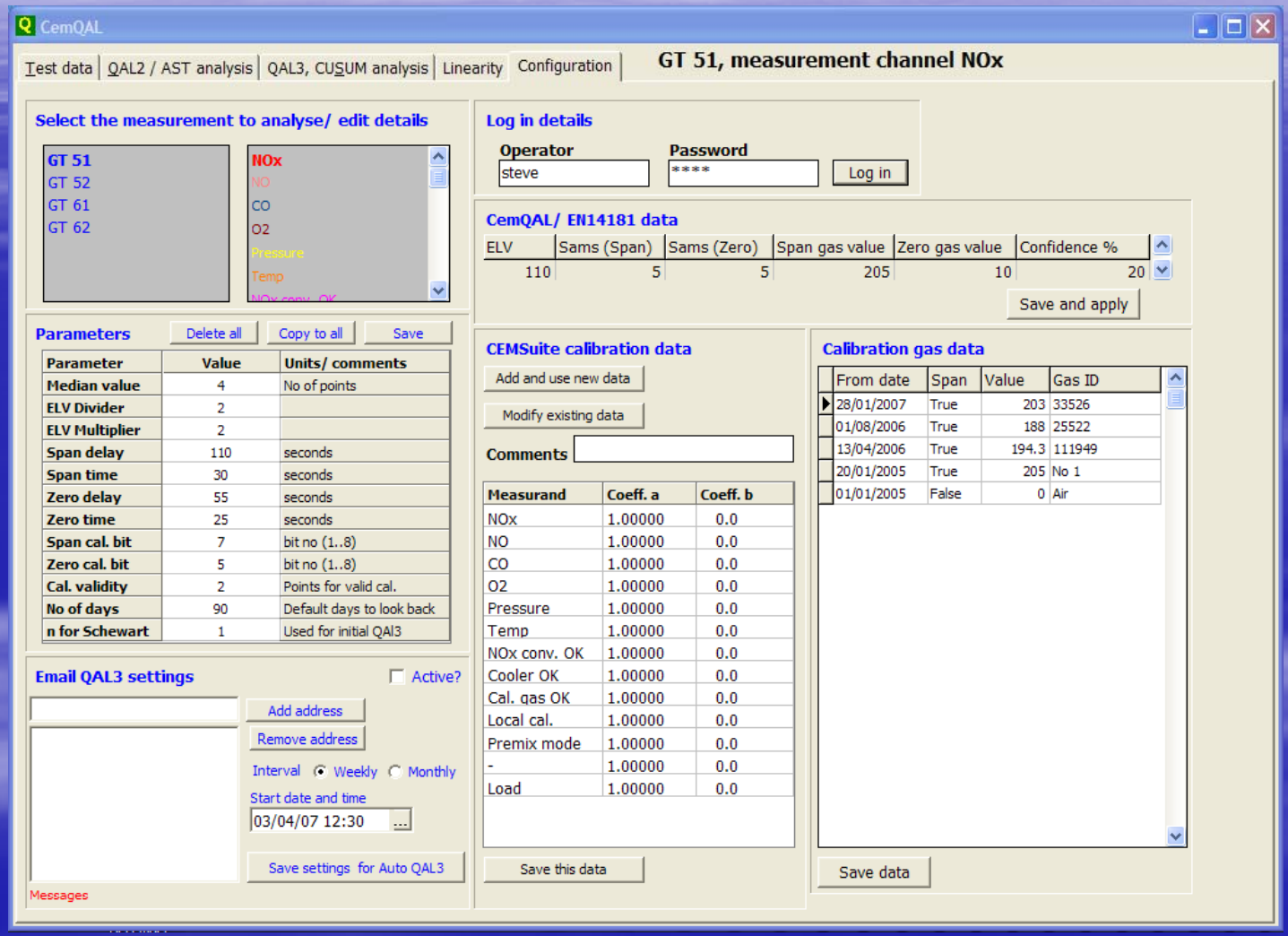
Capturing average AMS data

- CEMSuite Plus and Power have the capability to produce average measurand files between any two recorded points in time to correspond with SRM averages
- The files includes data for the measurands during the specified period
- These excel/csv files can be imported into the CEMqual module

QAL 2 data capture from CEMForm



QAL 3 Configuration

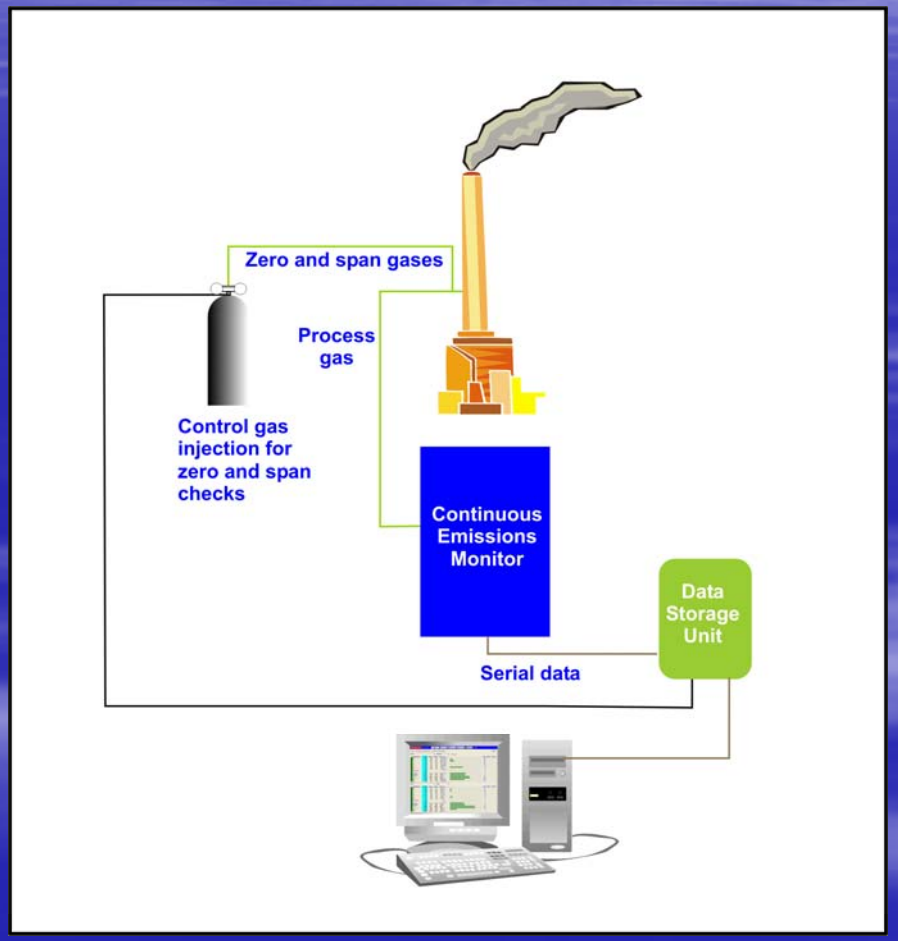


QAL 3 data collection

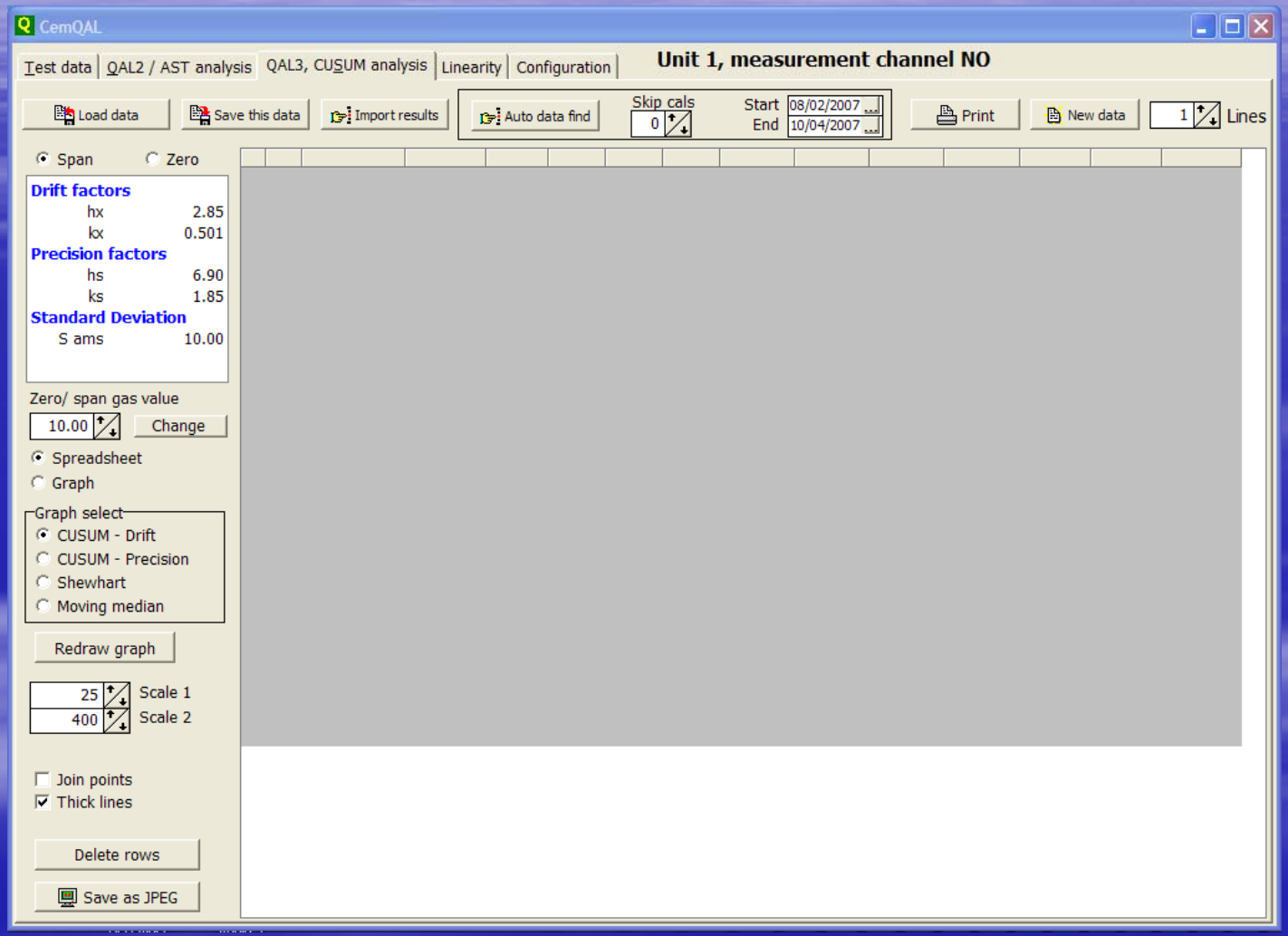
- On many systems, the AMS initiates and collects zero and span data. CEMSuite Plus can usually collect this data via a serial link.
- On systems without these facilities, we can use the CEMCal module which is pre-programmed to open gas valves at pre-selected times.
- CEMCal allows the audit gas time to progress up to the probe and down to the AMS, settle in the measuring cell and then capture the gas concentration.
- The data is then stored in the database and flagged as calibration data.
- The data can then automatically downloaded in to the CEMQual QAL 3 module to create control charts.

CEMCAL automatic gas injection system

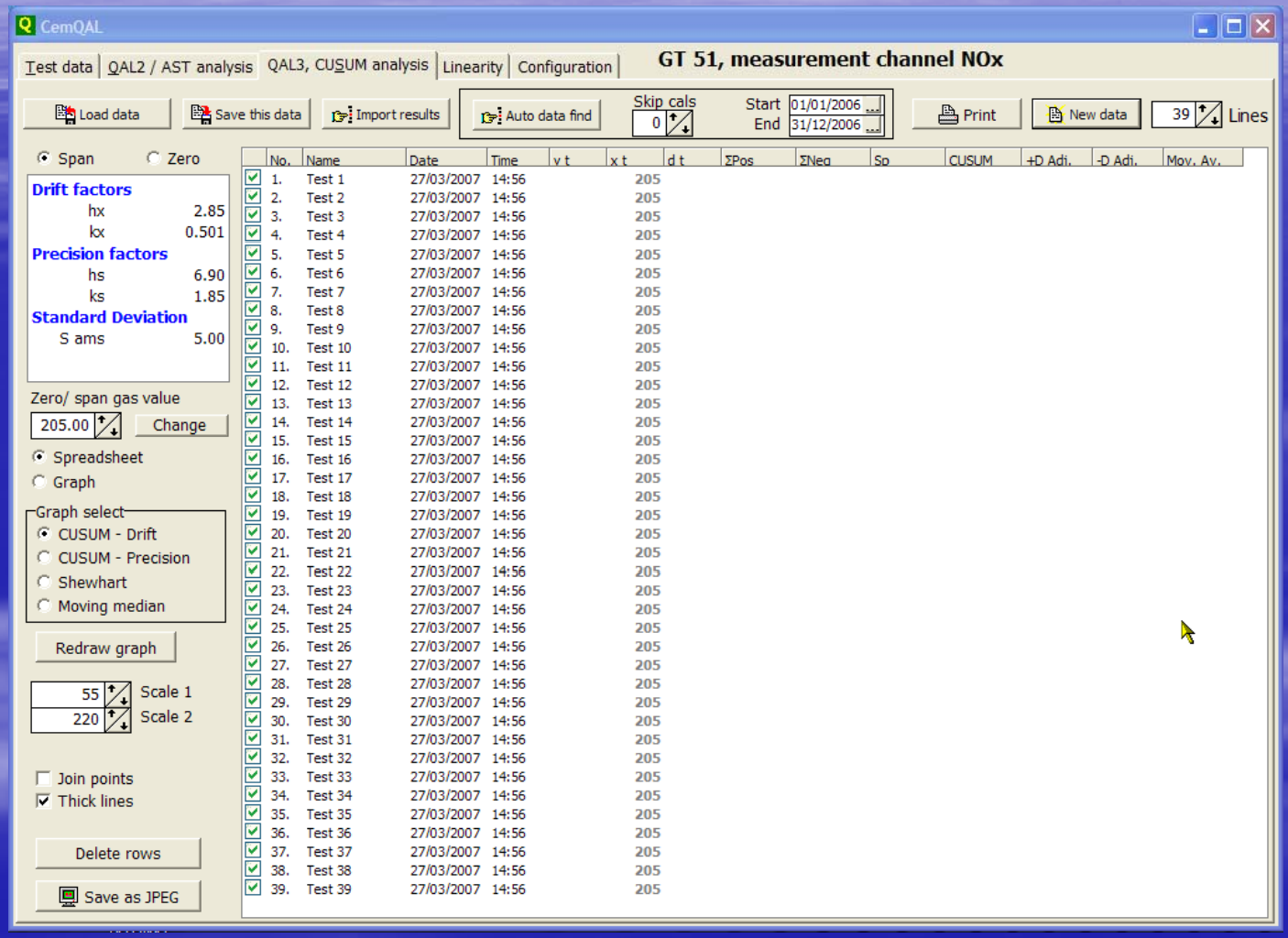
- CEMCal module initiates routine at pre-determined time .
- Opens relevant gas bottle valve via a relay signal
- Gas travels up to probe and down to analyser.
- DSU waits until reading settles and then stores it. Flagged as a cal value.
- CEMQal module can then download the data into QAL module



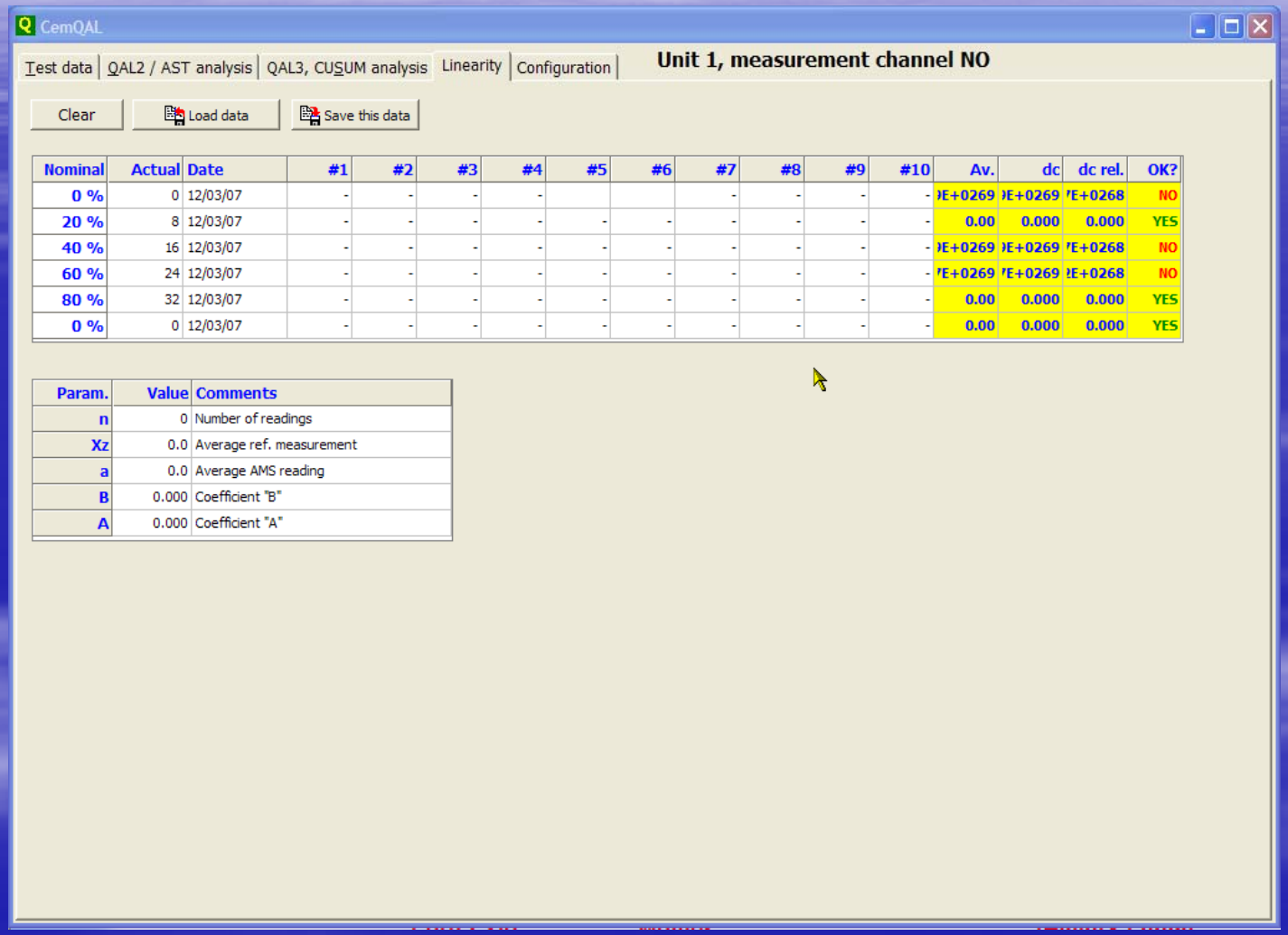
Control Chart manual data entry



QAL3 analysis



Linearity check



Nominal	Actual	Date	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	Av.	dc	dc rel.	OK?
0 %	0	12/03/07	-	-	-	-			-	-	-	-	)E+0269	)E+0269	'E+0268	NO
20 %	8	12/03/07	-	-	-	-	-	-	-	-	-	-	0.00	0.000	0.000	YES
40 %	16	12/03/07	-	-	-	-	-	-	-	-	-	-	)E+0269	)E+0269	'E+0268	NO
60 %	24	12/03/07	-	-	-	-	-	-	-	-	-	-	'E+0269	'E+0269	)E+0268	NO
80 %	32	12/03/07	-	-	-	-	-	-	-	-	-	-	0.00	0.000	0.000	YES
0 %	0	12/03/07	-	-	-	-	-	-	-	-	-	-	0.00	0.000	0.000	YES

Param.	Value	Comments
n	0	Number of readings
Xz	0.0	Average ref. measurement
a	0.0	Average AMS reading
B	0.000	Coefficient "B"
A	0.000	Coefficient "A"