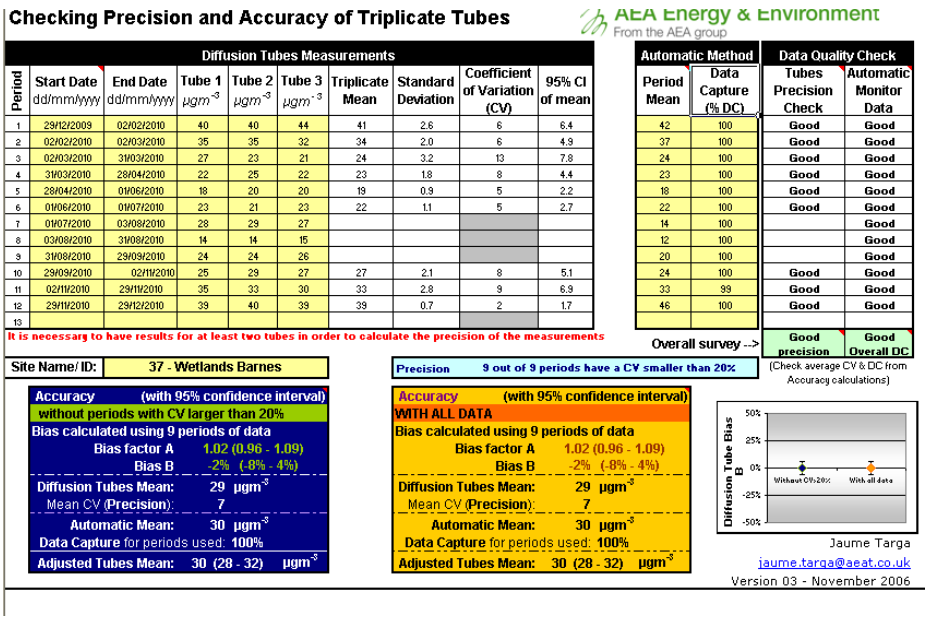
Richmond 2 – Wetlands 2010 results of the roadside co-location study



Checking Precision and Accuracy of Triplicate Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tubes Measurements

Period	Start Date dd/mm/yyyy	End Date dd/mm/yyyy	Tube 1 µgm^{-3}	Tube 2 µgm^{-3}	Tube 3 µgm^{-3}	Triplicate Mean	Standard Deviation	Coefficient of Variation (CV)	95% CI of mean
1	29/12/2009	02/02/2010	40	40	44	41	2.6	6	6.4
2	02/02/2010	02/03/2010	35	35	32	34	2.0	6	4.9
3	02/03/2010	31/03/2010	27	23	21	24	3.2	13	7.8
4	31/03/2010	28/04/2010	22	25	22	23	1.8	8	4.4
5	28/04/2010	01/06/2010	18	20	20	19	0.9	5	2.2
6	01/06/2010	01/07/2010	23	21	23	22	1.1	5	2.7
7	01/07/2010	03/08/2010	28	29	27				
8	03/08/2010	31/08/2010	14	14	15				
9	31/08/2010	29/09/2010	24	24	26				
10	29/09/2010	02/11/2010	25	29	27	27	2.1	8	5.1
11	02/11/2010	29/11/2010	35	33	30	33	2.8	9	6.9
12	29/11/2010	29/12/2010	39	40	39	39	0.7	2	1.7
13									

It is necessary to have results for at least two tubes in order to calculate the precision of the measurements

Automatic Method		Data Quality Check	
Period Mean	Data Capture (% DC)	Tubes Precision Check	Automatic Monitor Data
42	100	Good	Good
37	100	Good	Good
24	100	Good	Good
23	100	Good	Good
18	100	Good	Good
22	100	Good	Good
14	100		Good
12	100		Good
20	100		Good
24	100	Good	Good
33	99	Good	Good
46	100	Good	Good
Overall survey -->		Good precision	Good Overall DC

(Check average CV & DC from Accuracy calculations)

Site Name/ ID: 37 - Wetlands Barnes

Precision: 9 out of 9 periods have a CV smaller than 20%

Accuracy (with 95% confidence interval)
without periods with CV larger than 20%
Bias calculated using 9 periods of data
Bias factor A 1.02 (0.96 - 1.09)
Bias B -2% (-8% - 4%)
Diffusion Tubes Mean: 29 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 30 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 30 (28 - 32) µgm^{-3}

Accuracy (with 95% confidence interval)
WITH ALL DATA
Bias calculated using 9 periods of data
Bias factor A 1.02 (0.96 - 1.09)
Bias B -2% (-8% - 4%)
Diffusion Tubes Mean: 29 µgm^{-3}
Mean CV (Precision): 7
Automatic Mean: 30 µgm^{-3}
Data Capture for periods used: 100%
Adjusted Tubes Mean: 30 (28 - 32) µgm^{-3}

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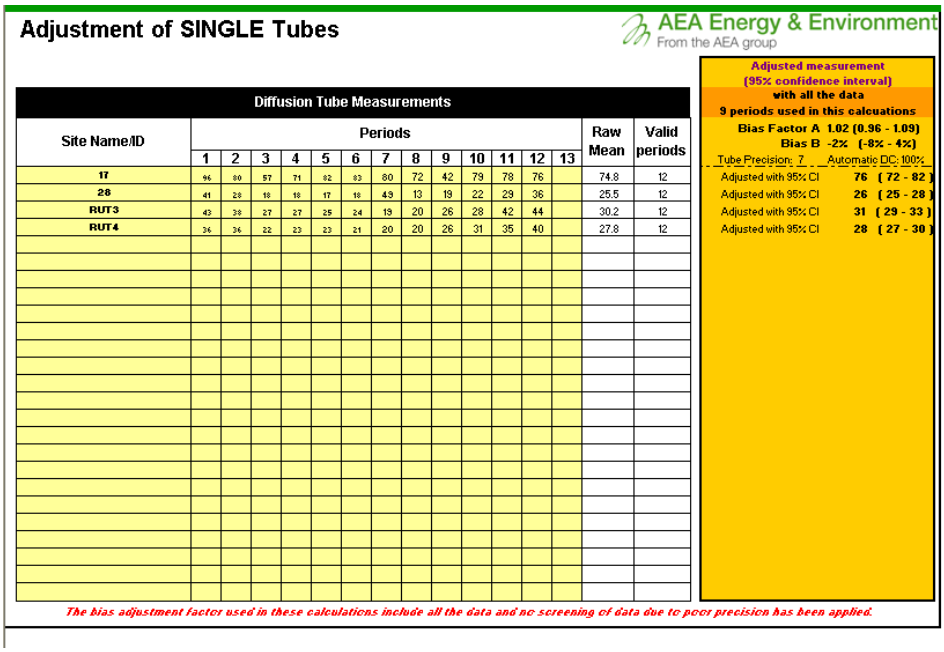
Version 03 - November 2006

Richmond 2 – Wetlands 2010 raw and bias adjusted NO2 diffusion tube results for kerbside and roadside sites 17, 28, RUT 03 and RUT 04.



Adjustment of SINGLE Tubes

AEA Energy & Environment
From the AEA group

Diffusion Tube Measurements

Site Name/ID	Periods 1	2	3	4	5	6	7	8	9	10	11	12	13	Raw Mean	Valid periods
17	96	80	57	71	82	83	80	72	42	79	78	76		74.8	12
28	41	28	18	18	17	18	43	13	19	22	29	36		25.5	12
RUT3	43	38	27	27	25	24	19	20	26	28	42	44		30.2	12
RUT4	36	36	22	23	23	21	20	20	26	31	35	40		27.8	12

Adjusted measurement (95% confidence interval)
with all the data
9 periods used in this calculations
Bias Factor A 1.02 (0.96 - 1.09)
Bias B -2% (-8% - 4%)
Tube Precision: 7 Automatic DC: 100%

Adjusted with 95% CI	76 (72 - 82)
Adjusted with 95% CI	26 (25 - 28)
Adjusted with 95% CI	31 (29 - 33)
Adjusted with 95% CI	28 (27 - 30)

The bias adjustment factor used in these calculations include all the data and no screening of data due to poor precision has been applied.