

## INTRODUCTION

This is a Progress report of air quality in West Lothian.

The report submitted in May 2004 concluded that it would not be necessary for West Lothian to proceed to a detailed assessment for any of the pollutants. The Scottish Environment Protection Agency (SEPA) and the Scottish Executive agreed with the conclusions and that a progress report should be submitted this year.

West Lothian has continued to monitor for Carbon Monoxide (CO), Particulate Matter (PM<sub>10</sub>), and Sulphur Dioxide (SO<sub>2</sub>) using the mobile air-quality monitoring unit (Groundhog). Real-time nitrogen dioxide data is not accurate due to problems encountered with the NOX analyser since October 2003 and the only real-time data included in this report is for February & March 2005, however the NO<sub>2</sub> diffusion tube results for 2004 have been included in this report. Further details of the breakdown of the NOX analyser can be seen in Appendix 1.1 page 27.

Monitoring for Benzene has continued using BTX tubes (Benzene, Toluene & Xylene). The Groundhog was located in Linlithgow High St from 30<sup>th</sup> March 2004 until 29<sup>th</sup> November 2004. It was re-located to Cairnie Place, Whitburn on 31<sup>st</sup> January 2005 to monitor local air-quality at the open cast activities and reclamation of the burning spoil heaps at the former Polkemmet Colliery.

West Lothian submitted a successful bid to the Scottish Executive for a grant to purchase a roadside real-time analyser to replace the PM<sub>10</sub> & NOX analyser, which is now monitoring Polkemmet. It is likely that this equipment will be placed at Linlithgow High Street to replace the groundhog.

Last year West Lothian purchased Streetbox Gold from Learian Environmental Ltd, which monitors PM<sub>10</sub> and Nitrogen Dioxide and is currently co-located with the Groundhog in Whitburn. The Review & Assessment helpdesk recommended that the Streetbox should be co-located with the real-time analyser for a period of six months. After the data has been validated the Streetbox will be located in one of the busy town centres i.e, Broxburn, Linlithgow or Alderstone Road, Livingston.

# CHAPTER 1

## PROGRESS REPORT FOR BENZENE

### INTRODUCTION

West Lothian has continued to monitor for Benzene since the previous progress report was completed in May 2004 using BTX tubes (Benzene, Toluene & Xylene). As mentioned in the previous progress report a new site was added near to the Shell Petrol station at Lizzie Bryce Roundabout, Livingston. The new site was added on 3<sup>rd</sup> February 2004 at Caroline Park, Mid Calder and the results for all four sites can be seen below.

#### Standard and Objective for Benzene

*The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-*

All authorities:

**Running annual mean of 16.25 $\mu\text{g}/\text{m}^3$  to be achieved by 31.12.2003**

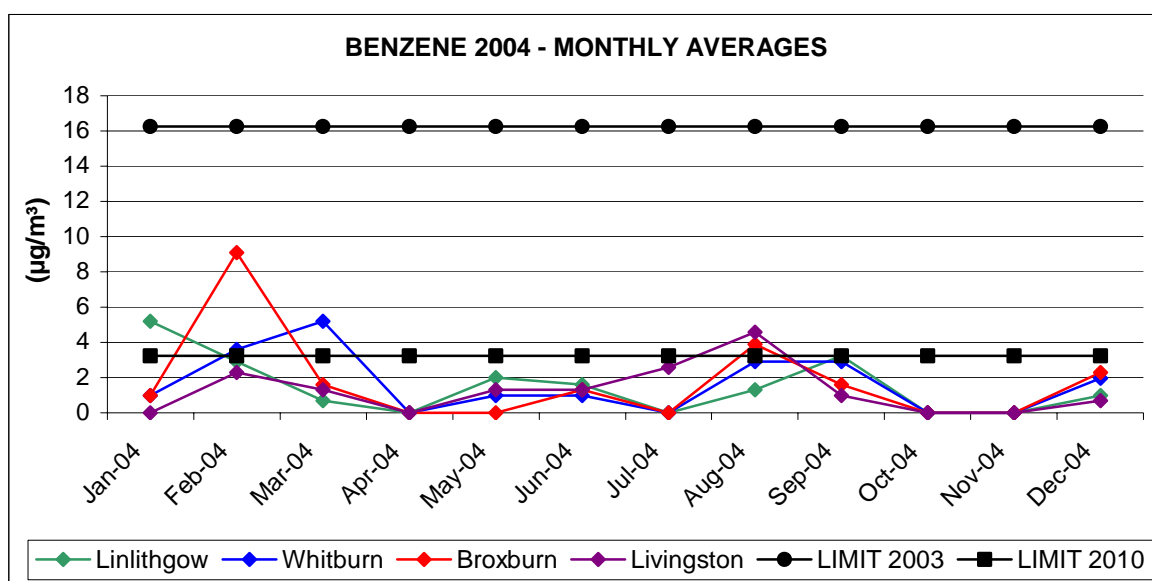
Authorities in Scotland and Northern Ireland only:

**Running annual mean of 3.25 $\mu\text{g}/\text{m}^3$  to be achieved by 31.12.2010**

#### MONITORING RESULTS: 2004

The following graph figure 1.1 shows the monthly benzene results for 2004 for the four sites in West Lothian. The four sites are 212 High St, Linlithgow, 15 East Main St, Whitburn, 18-22 East Main St, Broxburn and 12 Caroline Park, Mid Calder. The following tables 1.1 & 1.2 show the monthly and annual averages for benzene for the four sites as well as the monthly results for toluene and xylene.

**Figure 1.1 – Monthly Benzene Results ( $\mu\text{g}/\text{m}^3$ ) – YEAR 2004**



**Table 1.1 & 1.2 – Results for Benzene, Toluene and Xylene – Year 2004  
(Results are in ppb for toluene & xylene)**

	Linlithgow			Whitburn		
	Benzene	Toluene	Xylene	Benzene	Toluene	Xylene
Jan-04	1.6	3.1	5.2	0.3	1	10.2
Feb-04	0.9	1.1	1.4	1.1	1.1	0.9
Mar-04	0.2	0.8	2	1.6	2.4	31.7
Apr-04	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
May-04	0.6	0.8	1.5	0.3	1	1.1
Jun-04	0.5	0.6	0.8	0.3	0.3	1.8
Jul-04	<0.2	3.2	6.4	<0.2	3.9	9.3
Aug-04	0.4	2.1	3.6	0.9	6.1	6.2
Sep-04	1	5.6	6.3	0.9	6.4	6.8
Oct-04	<0.2	7.6	4.7	<0.2	2.3	2.2
Nov-04	<0.2	0.9	0.8	<0.2	0.6	0.8
Dec-04	0.3	2.5	3.1	0.5	2.5	3.6
<b>Average (ppb)</b>	<b>0.5</b>			<b>0.6</b>		
<b>Average (µg/m³)</b>	<b>1.6</b>			<b>1.95</b>		

	Broxburn			Livingston		
	Benzene	Toluene	Xylene	Benzene	Toluene	Xylene
Jan-04	0.3	0.7	0.9	~	~	~
Feb-04	2.8	0.9	0.9	0.7	1.6	4.6
Mar-04	0.5	0.6	1.3	0.4	2.1	3.2
Apr-04	<0.2	<0.2	0.3	<0.2	0.3	0.2
May-04	<0.2	0.3	0.2	0.4	0.4	0.4
Jun-04	0.4	0.5	0.6	0.4	0.5	0.6
Jul-04	~	~	~	0.8	7.6	6.5
Aug-04	1.2	13.9	4.8	1.4	14.3	6.6
Sep-04	0.5	5.4	6.6	0.3	4.9	4.6
Oct-04	<0.2	0.9	2	<0.2	0.4	0.3
Nov-04	<0.2	0.6	1.2	<0.2	0.7	1.1
Dec-04	0.7	4.3	3.9	0.2	2.8	3.3
<b>Average (ppb)</b>	<b>0.7</b>			<b>0.5</b>		
<b>Average (µg/m³)</b>	<b>2.3</b>			<b>1.6</b>		

## Predictions for Benzene annual mean concentrations in 2010

(Calculation taken from Technical Guidance pg3-6, Box3.4)

**Table 1.3 – Prediction for 2010 using 2004 annual average (see table 1.1)**

Calculation: 2004 Annual Average x 2010 Correction Factor ÷ 2004 Correction Factor

LOCATION	2004 Annual Average	2010 Correction Factor	2004 Correction Factor	2010 Prediction
LINLITHGOW	1.6	0.647	0.817	1.3µg/m <sup>3</sup>
WHITBURN	1.95	0.647	0.817	1.5µg/m <sup>3</sup>
BROXBURN	2.3	0.647	0.817	1.8µg/m <sup>3</sup>
LIVINGSTON	1.6	0.647	0.817	1.3µg/m <sup>3</sup>

## CONCLUSION FOR BENZENE

The Benzene tube results show that in West Lothian the air quality standard and objective of 3.25µg/m<sup>3</sup> for 2010 is currently being achieved for all four sites in West Lothian. The predictions for 2010 based on the 2004 annual average also show that the objective will be achieved as shown in table 1.3 above.

There are no significant industrial sources of benzene located either within West Lothian or neighbouring areas which are likely to adversely affect air quality, therefore, there is no need to proceed to a detailed assessment this year.

The Benzene site located at 12 Caroline Park, Mid Calder, Livingston in February 2004 near to the Shell petrol station at Lizzie Bryce roundabout shows that there were no high benzene readings in 2004 and there was an annual average of 1.6µg/m<sup>3</sup> which is achieving the objective for 2010. Therefore the petrol station is not emitting sufficient benzene to put the 2010 objective at risk of being exceeded.

A recommendation made by SEPA in the last progress report was to investigate a bias correction factor for the benzene tubes as readings can vary by as much as +/-25%. The Review & Assessment help desk advised that to obtain a correction factor, real-time monitoring of benzene should be carried out with a co-located benzene tube. They advised that not many local authorities carry out real-time monitoring as benzene levels are so low. If requested following this report, a bid will be submitted to the Scottish Executive for additional equipment.

## **CHAPTER 2**

### **PROGRESS REPORT FOR 1,3-BUTADIENE**

#### **INTRODUCTION**

No monitoring of 1, 3-Butadiene is carried out in West Lothian. As stated in the previous progress report, there are no significant industrial sources of this pollutant within West Lothian. There have been no new developments in West Lothian that are likely to emit 1, 3-Butadiene in 2004.

#### **Standard and Objective for 1,3-Butadiene**

*The Air Quality (Scotland) Regulations 2000 and amendment regulations set the following objectives:-*

**Running annual mean of 2.25µg/m<sup>3</sup> to be achieved by 31.12.2003**

#### **CONCLUSION FOR 1,3-BUTADIENE**

No monitoring of 1,3-Butadiene is carried out in West Lothian, as it is not considered necessary due to no industrial sources being present within West Lothian.

## CHAPTER 3

# PROGRESS REPORT FOR CARBON MONOXIDE

### INTRODUCTION

Monitoring has continued for carbon monoxide during 2004 and it is measured with the real-time analyser located within the Groundhog (mobile air quality monitoring unit). The Groundhog has been in Linlithgow High St since 30<sup>th</sup> March 2004 until 29<sup>th</sup> November 2004 after which it was located at Cairnie Place, Whitburn on 31<sup>st</sup> January 2005.

### Standard and Objective for Carbon Monoxide

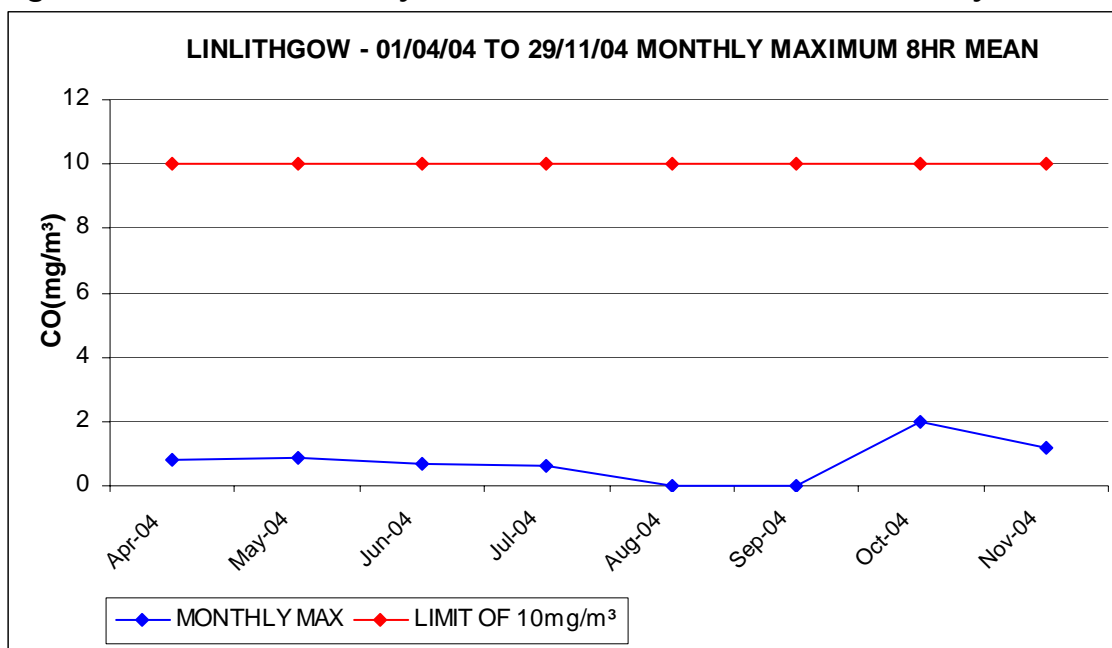
*The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-*

Maximum daily 8-hr mean of 10.0mg/m<sup>3</sup> to be achieved by 31.12.2003

### MONITORING DATA RESULTS: 2004

Figure 3.1 shows the monthly maximum 8hr mean results for carbon monoxide at Linlithgow High St from 1<sup>st</sup> April 2004 to 29<sup>th</sup> November 2004.

**Figure 3.1-Whitburn 1<sup>st</sup> May 2004 to 29<sup>th</sup> November 2004 -monthly max 8hr mean**



## **CONCLUSION FOR CARBON MONOXIDE**

Figure 3.1 shows there have not been any exceedences of the maximum daily 8-hr mean of  $10\text{mg}/\text{m}^3$ . There were no results for August, September and most of October 2004 as the infrared laser was found to be faulty in August and was not replaced on 27th October 2004.

A peak in August of  $10\text{mg}/\text{m}^3$  was observed but this has been excluded from the analysis as this occurred just before the infrared laser was found to be faulty.

The air quality objective of  $10\text{mg}/\text{m}^3$  is being achieved and there is no need to proceed to a detailed assessment for carbon monoxide.

## **CHAPTER 4**

### **PROGRESS REPORT FOR LEAD**

#### **INTRODUCTION**

Monitoring of Lead is not carried out within West Lothian as there are no significant sources of lead and there have been no new industrial sources identified this year.

#### **Standard and Objective for Lead**

*The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-*

**Annual mean of 0.5µg/m<sup>3</sup> to be achieved by 31.12.2004**

**Annual mean of 0.25µg/m<sup>3</sup> to be achieved by 31.12.2008**

#### **Industrial Sources**

As stated previously in the last progress report there are no new industrial sources of lead in West Lothian that are likely to affect the air quality objective.

#### **CONCLUSION FOR LEAD**

No monitoring of lead is carried out in West Lothian and there is no need to proceed to a detailed assessment.



## CHAPTER 5

# PROGRESS REPORT FOR NITROGEN DIOXIDE

### INTRODUCTION

Monitoring of nitrogen dioxide in West Lothian is carried out using a real-time analyser located within the air-quality monitoring unit (groundhog) and also using passive diffusion tubes. There are six sites in West Lothian for diffusion tubes with two tubes co-located at five of the sites and three tubes co-located with the groundhog for comparison with the real-time analyser.

Four of these diffusion tube sites are part of the U.K Nitrogen Dioxide Network and are at 15 East Main St, Whitburn (Roadside site), 212 High St, Linlithgow (Roadside site), 72 Cedric Rise, Livingston (Background site) and 59 High St, Bathgate (Background site).

Severe problems have been encountered with the Nox analyser since October 2003 and a full explanation of this is given on page 27 Appendix 1.1. The only real-time monitoring NOX data included in this report is for February and March 2005.

#### **Standard and Objective for Nitrogen Dioxide**

*The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-*

**1-hour mean of 200µg/m<sup>3</sup> not to be exceeded more than 18 times a year and to be achieved by 31.12.2005**

**Annual mean of 40µg/m<sup>3</sup> to be achieved by 31.12.2005**

### MONITORING DATA RESULTS

The real-time analyser was located at Linlithgow High St from 1<sup>st</sup> April 2004 to 29<sup>th</sup> November 2004. The results from the real-time analyser for 2004 have not been reported, as the results were invalid. The results for the diffusion tubes can be seen below.

The diffusion tubes are prepared and analysed by Analytical & Scientific Services, Edinburgh City Council, 4 Marine Esplanade, Edinburgh. The tubes are prepared using method 1 which is 50% v/v TEA in acetone and the tubes are exposed for 4 or 5 weeks at a time. The tubes are changed on the dates supplied by AEA Technology as four of the sites are on the U.K Nitrogen Dioxide Network.

**Table 5.1- DIFFUSION TUBE RESULTS**

DATE	WL1	WL7	WL3	WL8	WL4	WL9	WL5	WL10	WL6	WL11	WL12	WL13	WL14
JAN 04	17	23	~	21	10	12	24	15	26	27	11	23	18
FEB 04	24	25	21	21	13	18	28	28	23	21	~	~	~
MAR 04	21	22	6	14	15	13	36	32	27	23	~	~	~
APR 04	15	29	14	~	11	20	29	32	~	27	17	21	25
MAY 04	17	19	11	9	8	8	19	32	21	34	~	17	25
JUN 04	16	21	12	10	6	7	20	20	23	23	29	24	29
JULY 04	14	14	12	12	11	9	~	32	27	25	22	19	19
AUG 04	28	27	13	11	~	~	32	43	37	~	23	29	21
SEPT 04	19	21	14	16	12	12	65	30	27	23	24	21	24
OCT 04	41	31	18	11	20	15	34	35	43	38	39	27	33
NOV 04	20	29	78	17	26	15	19	11	30	29	27	23	18
DEC 04	22	14	13	20	26	12	17	25	18	~	~	~	~
<b>AVERAGE</b>	<b>21</b>	<b>25</b>	<b>19</b>	<b>15</b>	<b>14</b>	<b>13</b>	<b>29</b>	<b>26</b>	<b>27</b>	<b>27</b>	<b>24</b>	<b>23</b>	<b>24</b>

*(Results in  $\mu\text{g}/\text{m}^3$ )*

WL 1 & 7 = WHITBURN  
(Roadside site)

WL 5 & 10 = EAST MAIN ST, BROXBURN  
(Roadside site)

WL 3 & 8 = DEDRIDGE, LIVINGSTON  
(Background site)

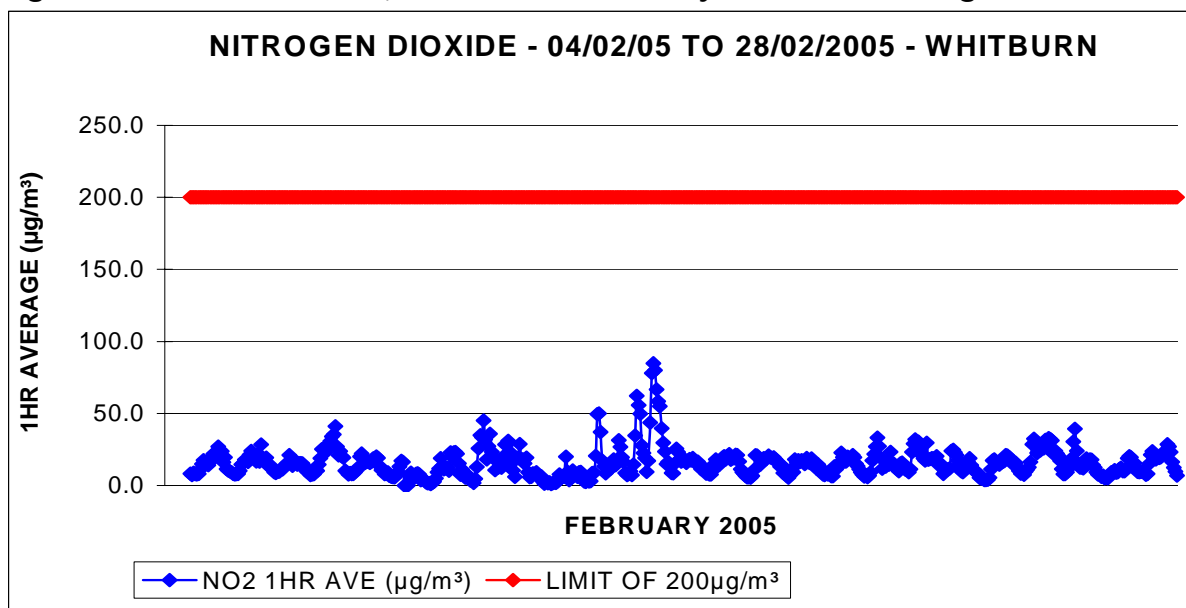
WL 6 & 11 = HIGH ST, LINLITHGOW  
(Roadside site)

WL 4 & 9 = HIGH ST, BATHGATE  
(Background site)

WL 12,13 & 14 = GROUNDHOG, LINLITHGOW  
(Co-located with real-time analyser on roof of groundhog)

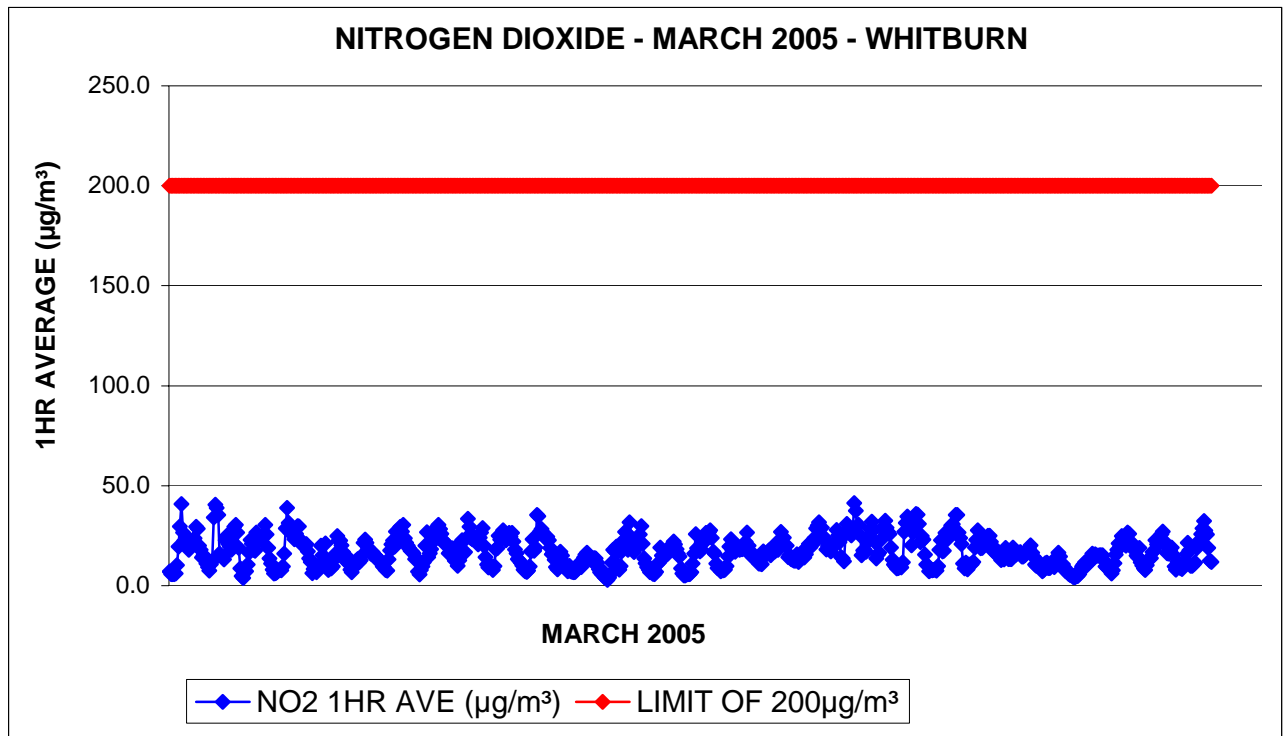
**REAL-TIME MONITORING RESULTS**

**Figure 5.1 – Cairnie Place, Whitburn – February 2005 -1hr average**



The above graph shows that the highest 1hr monthly mean for nitrogen dioxide was  $85\mu\text{g}/\text{m}^3$ . The monthly average for February was  $16\mu\text{g}/\text{m}^3$ .

**Figure 5.2 – Cairnie Place, Whitburn – March 2005 – 1hr average**



From the results on the above graph the highest 1hr monthly mean for nitrogen dioxide was 41.3µg/m<sup>3</sup>. The monthly average for March was 16µg/m<sup>3</sup>.

### **CONCLUSION FOR NITROGEN DIOXIDE**

Unfortunately this year West Lothian has been unable to report on any real-time NOX monitoring data due to the problems encountered with the NOX analyser. The faults were rectified in November 2004 but there was no valid data from October 2003. The groundhog was shutdown at the end of November 2004 to be re-located at Cairnie Place, Whitburn, but was not back on line until 31/01/2005.

The only real-time data reported is for February and March 2005 and there were no exceedences over the two months. The maximum 1hr reading was 85µg/m<sup>3</sup> in February 2005 and 41.3µg/m<sup>3</sup> in March 2005 with a monthly average of 16µg/m<sup>3</sup> for both months.

Attached in Appendix 1.2 is a letter from the managing director at Cassella Eti explaining that the technical faults with the NOX analyser were beyond the control of West Lothian Council.

The NO<sub>2</sub> diffusion tube results showed no exceedences for 2004. Unfortunately it was not possible to calculate a bias factor, as no real-time data was reliable. The previous bias factor calculated and used in the Updating and Screening Assessment 2003(USA page 21) was site specific and there was a significant variance between the sites. As a result it was decided not to apply the previous bias correction to the 2005 data.

It has been concluded that there is no need to proceed to a detailed assessment for nitrogen dioxide and West Lothian will continue to monitor for nitrogen dioxide throughout 2005/2006.

The Streetbox, which measures PM<sub>10</sub> and NOX will be placed in either Broxburn or Linlithgow High Street after a six-month study with the real-time analyser to establish a correction factor.

The grant received from the Scottish Executive will be used to purchase a new PM10/NOX real-time analyser to replace the units that have been located at Polkemmet Colliery.

## CHAPTER 6

### PROGRESS REPORT FOR PM<sub>10</sub>

#### INTRODUCTION

Monitoring for PM<sub>10</sub> has continued during 2004 using the TEOM analyser in the mobile air-quality monitoring unit. It was located at Linlithgow High St from 30<sup>th</sup> March 2004 until 29<sup>th</sup> November 2004.

#### Standard and Objective for PM<sub>10</sub>

*The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-*

**24-hour mean of 50µg/m<sup>3</sup> not to be exceeded more than 35 times a year to be achieved by 31.12.2004**

**Annual mean of 40µg/m<sup>3</sup> to be achieved by 31.12.2004**

**For Local Authorities in Scotland only there are two objectives for 2010:-**

**24-hour mean of 50µg/m<sup>3</sup> not to be exceeded more than 7 times a year to be achieved by 31.12.2010**

**Annual mean of 18µg/m<sup>3</sup> to be achieved by 31.12.2010**

#### MONITORING DATA RESULTS

Figures 6.1 to 6.8 show the results for PM<sub>10</sub> at Linlithgow High St from March 2004 to November 2004 and show the 24-hour mean for each month. The PM<sub>10</sub> results from the TEOM have been converted into gravimetric concentrations by multiplying the results by the 1.3 default factor.

## PM<sub>10</sub> RESULTS – LINLITHGOW HIGH ST

Figure 6.1 – Linlithgow High St – April 2004

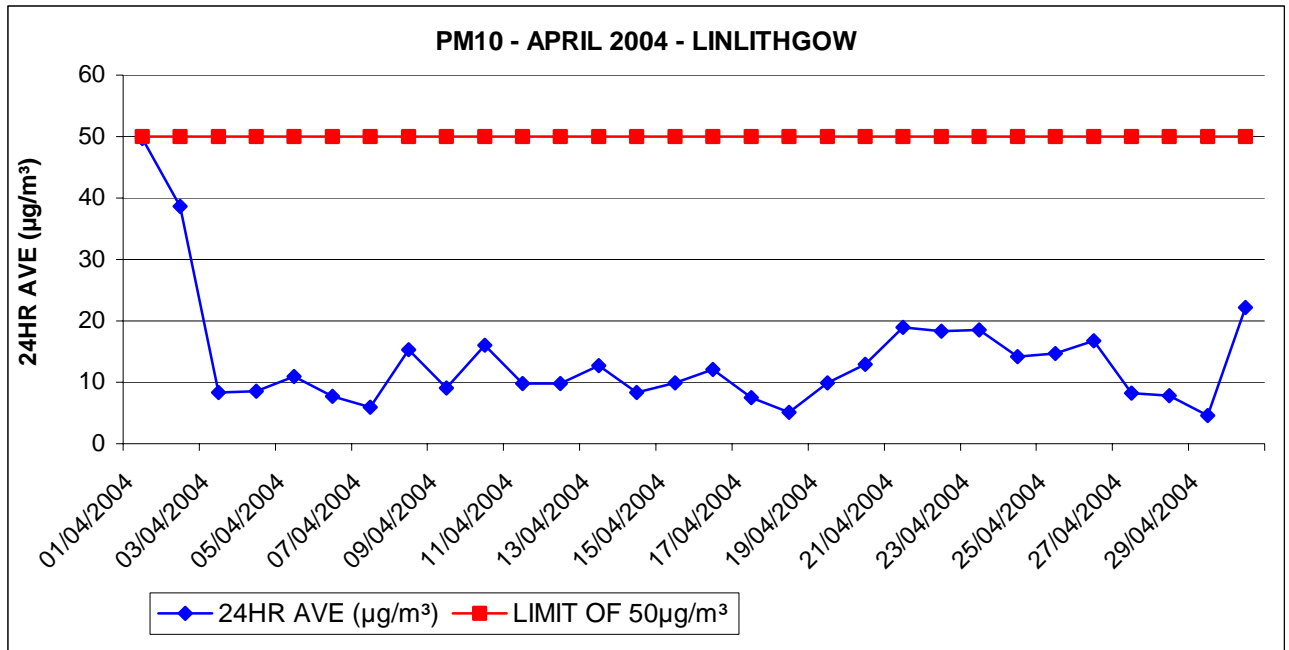
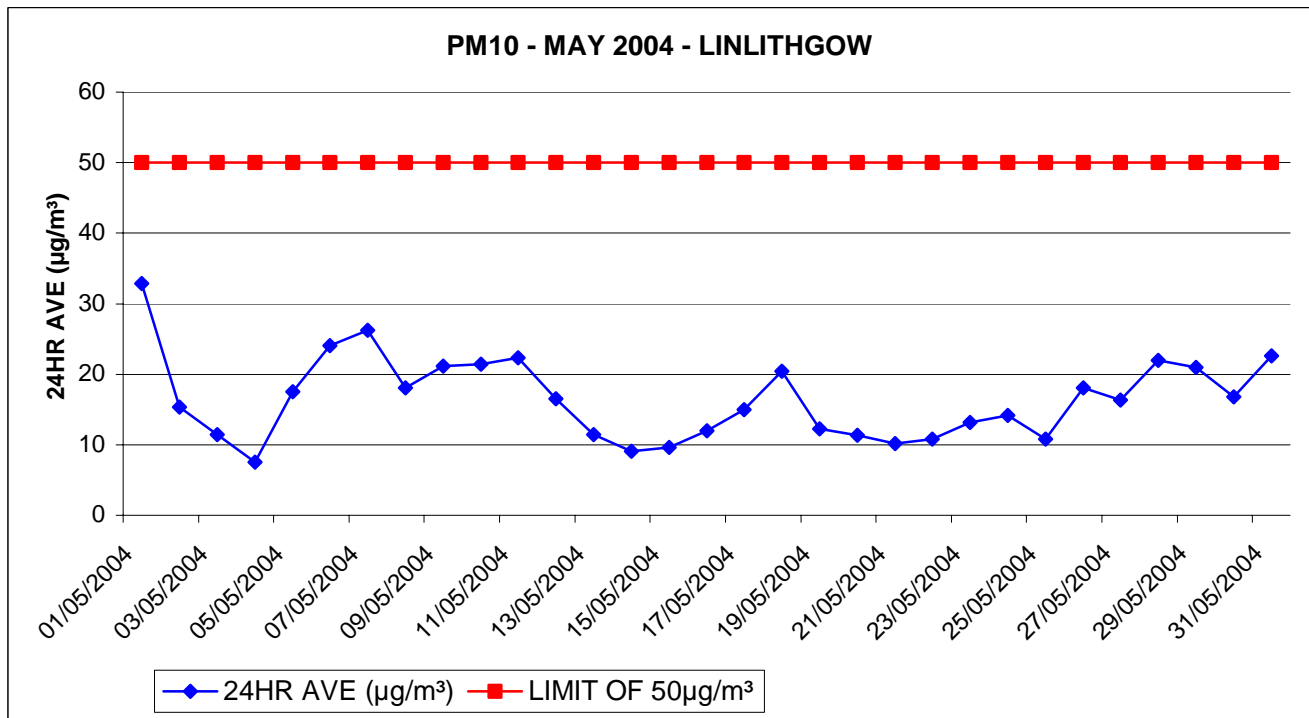
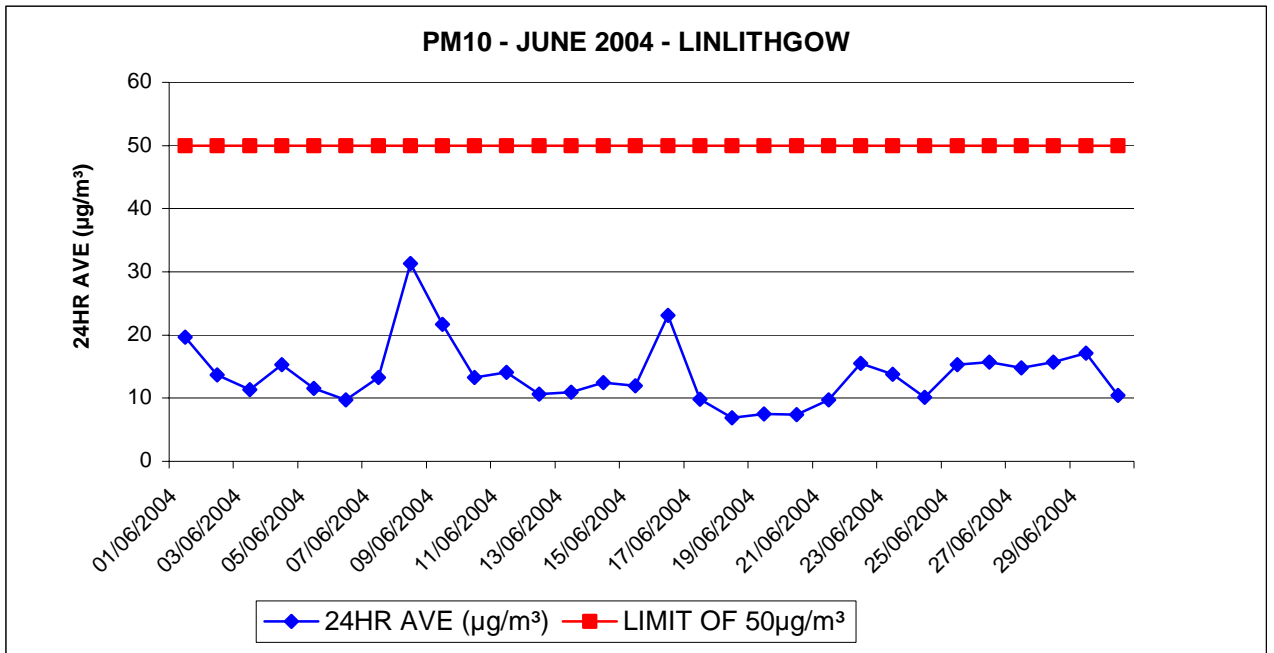


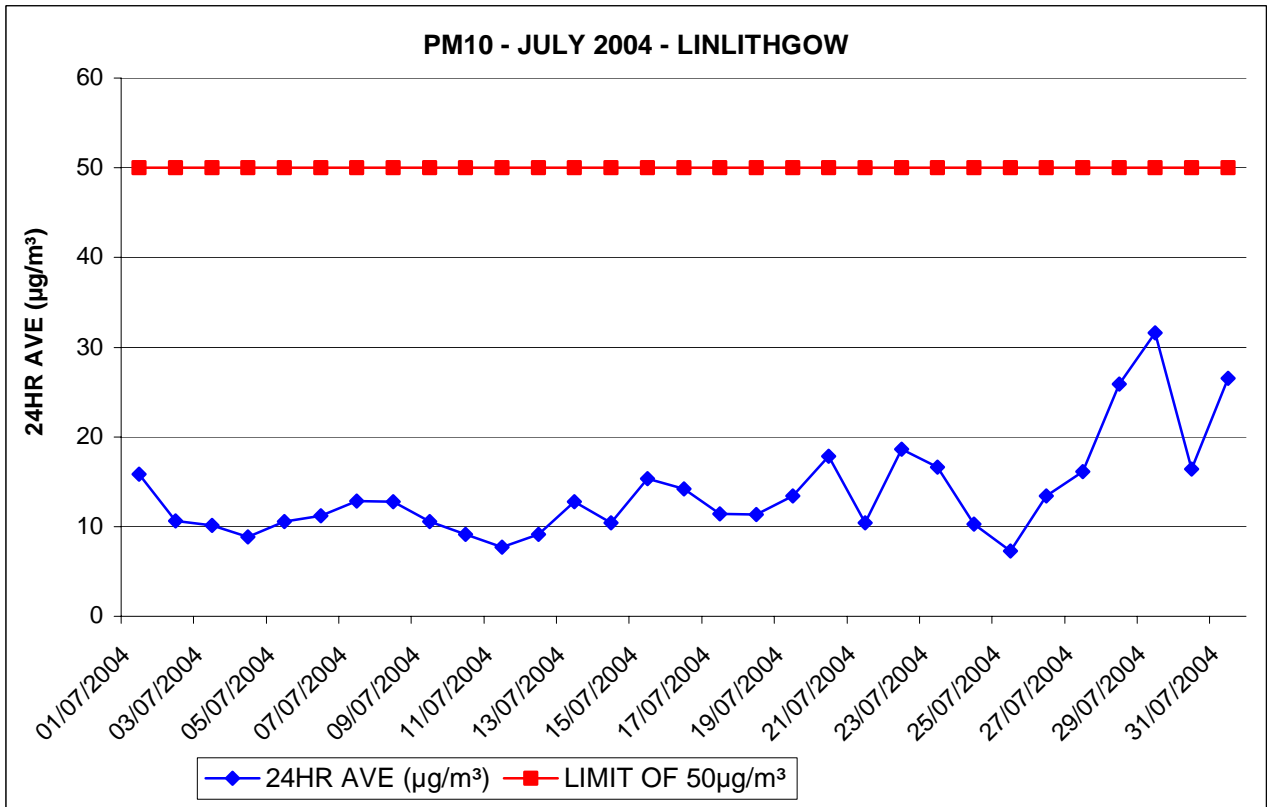
Figure 6.2 – Linlithgow High St – May 2004



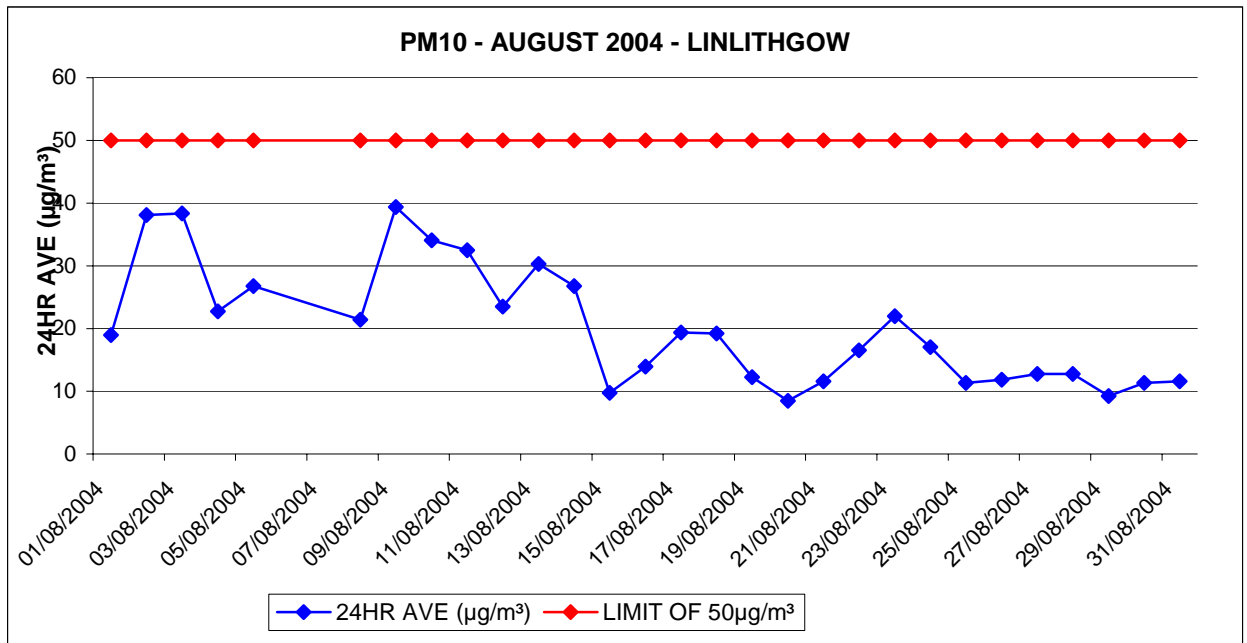
**Figure 6.3 – Linlithgow High St – June 2004**



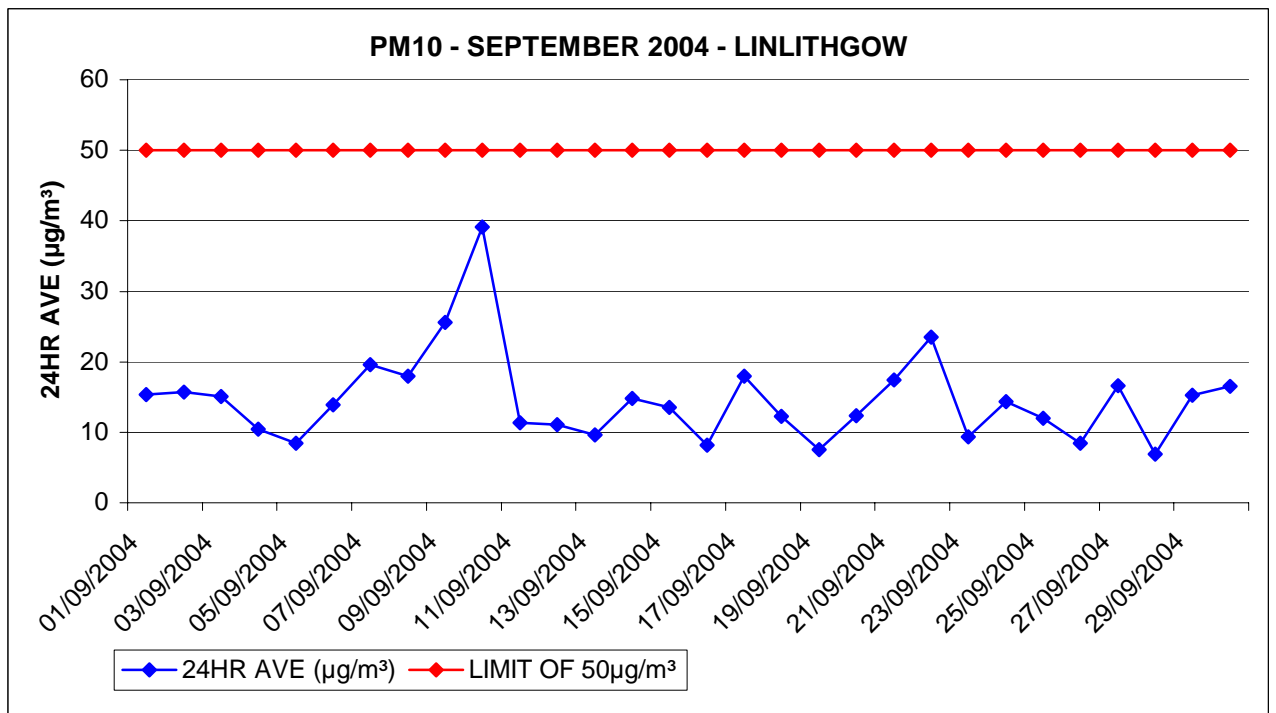
**Figure 6.4 – Linlithgow High St – July 2004**



**Figure 6.5 – Linlithgow High St – August 2004**

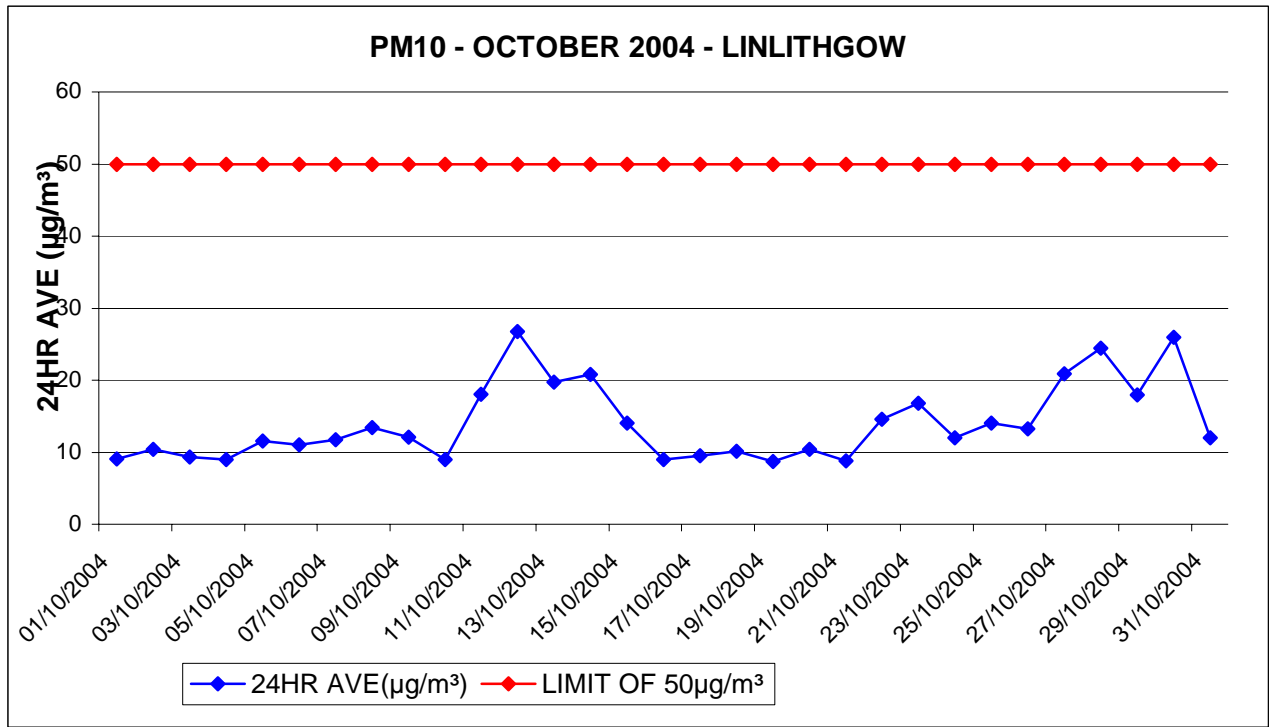


**Figure 6.6 – Linlithgow High St – September 2004**

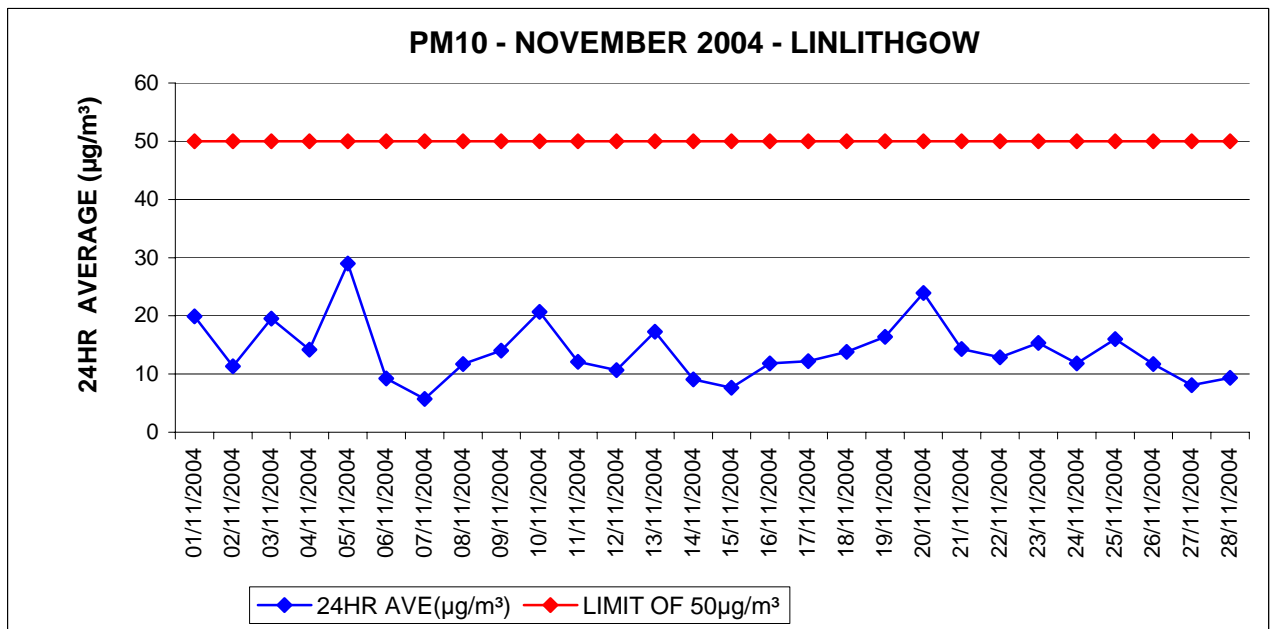




**Figure 6.7 – Linlithgow High St – October 2004**



**Figure 6.8 – Linlithgow High St – November 2004**



### **PM<sub>10</sub> – Linlithgow – April 2004 to November 2004 – Monthly & Annual Average**

As the graphs show there was only one peak on 01/04/04 of 50µg/m<sup>3</sup> (fig 6.1). However, this peak was also observed at the PM<sub>10</sub> Osiris unit located at Polkemmet Primary School, Whitburn (see graph page 29, Appendix 1.3). It is likely that this peak was due to secondary PM<sub>10</sub> and not due to localised PM<sub>10</sub> from traffic. There was a breakdown at the Groundhog on the 6<sup>th</sup> and 7<sup>th</sup> August 2004 and no data has been reported for these two days. There were no other exceedences of the 24-hour objective and therefore the objective for 2010 is unlikely to be exceeded.

**Table 6.1 – monthly and annual averages for PM<sub>10</sub> – April to November 2004**

<b>MONTHLY AVERAGE</b>	<b>PM<sub>10</sub> (µg/m<sup>3</sup>)</b>
April 2004	14
May 2004	16
June 2004	14
July 2004	13
Aug 2004	19
Sept 2004	15
Oct 2004	14
Nov 2004	14
<b>Annual Average</b>	<b>15</b>

Table 6.1 shows an annual average of 15µg/m<sup>3</sup> which meets the standard of 18µg/m<sup>3</sup> for 2010. However, at the end of November 2004 the groundhog was shutdown as it was due to be re-located at Cairnie Place, Whitburn. The Groundhog was re-located on 31<sup>st</sup> January 2005. No real-time monitoring was carried out over the winter months. This is unlikely to significantly increase the annual PM<sub>10</sub> average.

### **ANNUAL MEAN PREDICTIONS FOR 2010**

Calculation taken from Box 8.6, page 8-10 of Technical Guidance (TG03)  
(Approach to correcting measured PM<sub>10</sub> concentrations to 2004 & 2010)

#### ***Predictions for 2010 at Linlithgow High St***

Step 1: CG<sub>2004</sub> = **15µg/m<sup>3</sup>**

Step 2: C<sub>sec2001</sub> = **3.86**

Step 3: C<sub>sec2004</sub> = C<sub>sec2001</sub> x 0.932  
= 3.86 x 0.932  
= **3.60**

$$\begin{aligned}\text{Step 4: } C_{\text{prim2004}} &= 15 - [C_{\text{sec2004}}] - 10.5 \\ &= 15 - 3.60 - 10.5 \\ &= \mathbf{0.9}\end{aligned}$$

$$\begin{aligned}\text{Step 5: } C_{\text{prim2010}} &= [C_{\text{prim2004}}] \times 0.815/0.930 \\ &= 0.9 \times 0.876 \\ &= \mathbf{0.79}\end{aligned}$$

$$\begin{aligned}\text{Step 6: } C_{\text{sec2010}} &= [C_{\text{sec2004}}] \times 0.795/0.932 \\ &= 3.60 \times 0.85 \\ &= \mathbf{3.06\mu\text{g}/\text{m}^3}\end{aligned}$$

$$\begin{aligned}\text{Step 7: } CG_{2004} &= C_{\text{prim2010}} + C_{\text{sec2010}} + 10.5 \\ &= 0.79 + 3.06 + 10.5 \\ &= \mathbf{14.4\mu\text{g}/\text{m}^3}\end{aligned}$$

### **CONCLUSIONS FOR PM<sub>10</sub>**

The real-time monitoring data results for PM<sub>10</sub> from April 2004 to November 2004 indicate that the 2010 objectives will be achieved. There was only one exceedence over this period but this was due to background PM<sub>10</sub>. There were no other exceedences over this period for either the 24-hour objective or annual mean objective. The predictions for 2010 for Linlithgow High St (page 17) for the annual mean objective also indicate that PM<sub>10</sub> levels will be achieved by 2010.

During 2004/2005 there have not been any new developments that would increase traffic flows to impact on air quality. Development has been proposed at Linlithgow Bridge, which may affect Linlithgow High Street, and the developers have been asked to submit air-modelling information.

It is concluded that it is unnecessary to proceed to a detailed assessment for PM<sub>10</sub>. However West Lothian Council will continue to monitor real-time for PM<sub>10</sub>.

## CHAPTER 7

### PROGRESS REPORT FOR SULPHUR DIOXIDE

#### INTRODUCTION

Monitoring for sulphur dioxide has continued using the real-time analyser located in the mobile air-monitoring unit and with three 8-port bubblers used for measuring daily levels of sulphur dioxide. The 8-port bubblers are located at Atlas Cottages, Armadale, Brucefield Church, Whitburn and Netherton Place, Whitburn. Atlas Cottages and Brucefield Church are both on the national air-quality network.

The results for the real-time analyser are shown in figures 7.1 to 7.3 which also show the 15min monthly max, 1hr monthly max and 24hr monthly max from April 2004 to November 2004.

The results for the 8-port bubblers are shown on figures 7.4 and 7.5 and show the monthly maximum 24hr level from March 2004 to February 2005.

#### **Standard and Objective for Sulphur Dioxide**

*The Air Quality (Scotland) Regulations 2000 and amendment regulations 2002 set the following objectives:-*

**1-hour mean of 350µg/m<sup>3</sup> not to be exceeded more than 24 times a year**

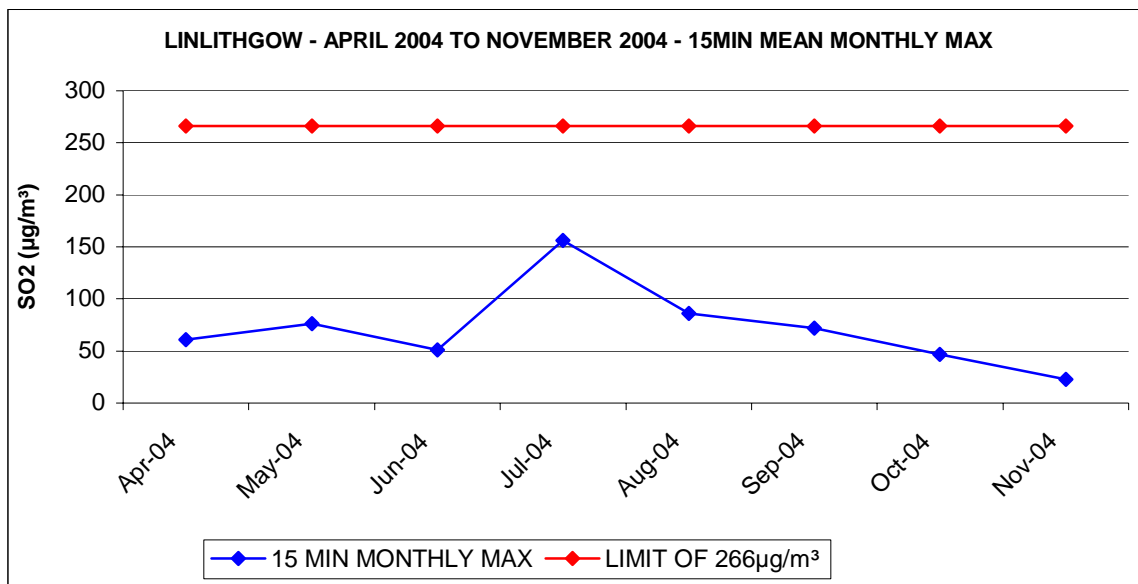
**24-hour mean of 125µg/m<sup>3</sup> not to be exceeded more than 3 times a year**

**15-minute mean of 266µg/m<sup>3</sup> not to be exceeded more than 35 times a year**

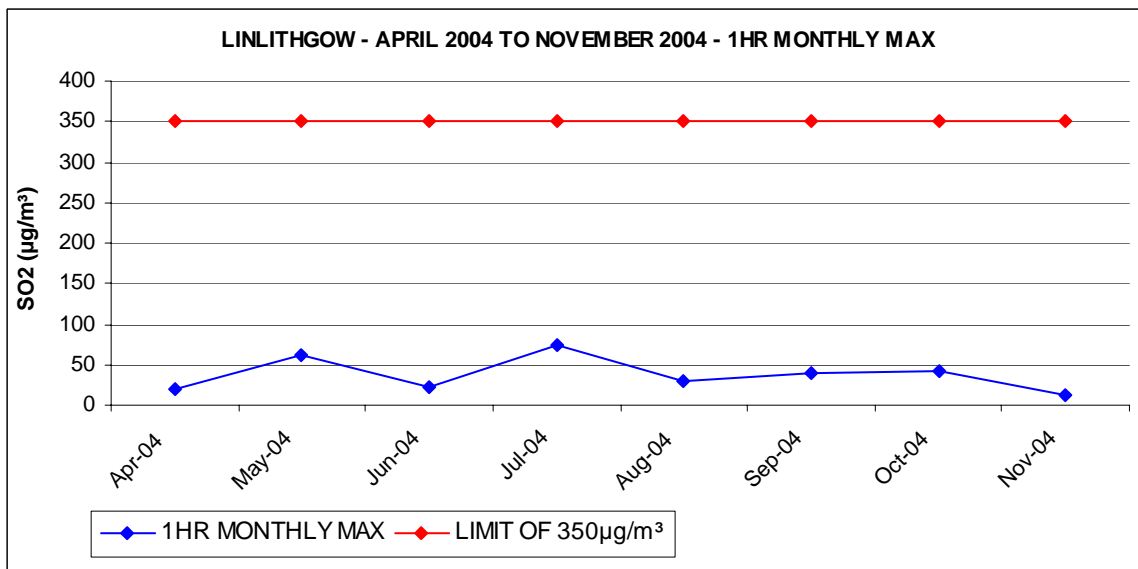
#### **MONITORING DATA RESULTS**

Figures 7.1 to 7.3 show the 15-min mean, 1-hr mean and 24-hr mean for sulphur dioxide from March 2004 to November 2004 when the Groundhog was located at Linlithgow High St.

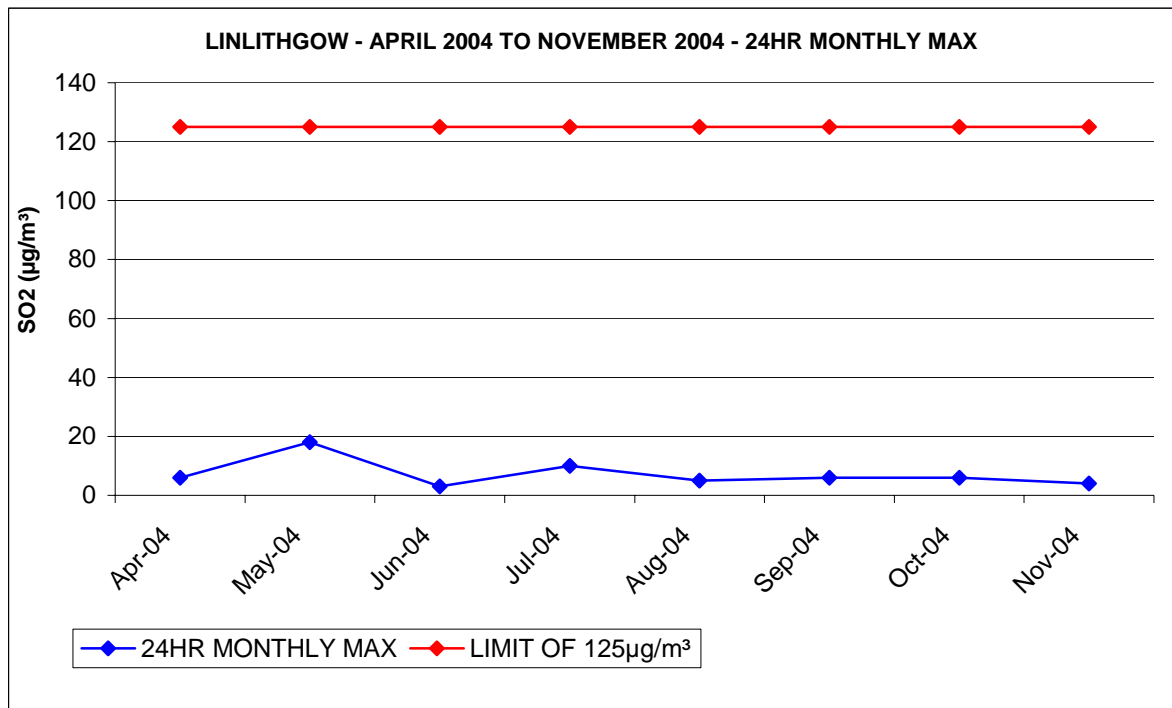
**Figure 7.1 – Linlithgow – April 2004 to November 2004 – 15min mean monthly max**



**Figure 7.2 – Linlithgow – April 2004 to November 2004 – 1hr mean monthly max**



**Figure 7.3 – Linlithgow – April 2004 to November 2004 – 24hr mean monthly max**

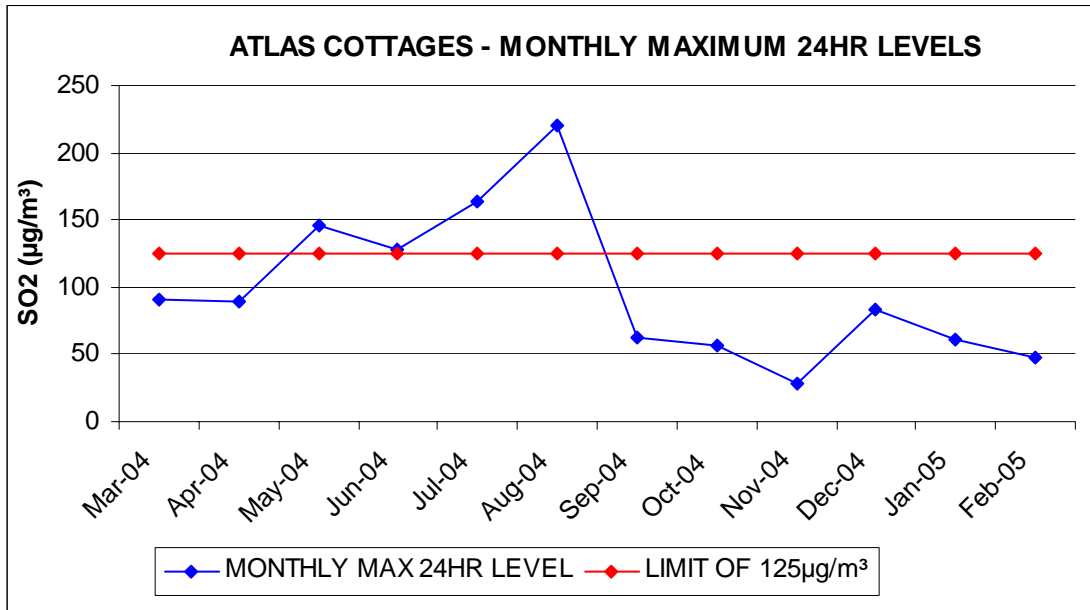


It can be seen from the graphs (figs 7.1 to 7.3) that from April 2004 to November 2004 there have been no exceedences for any of the three objectives for sulphur dioxide.

### **8-port Bubbler Sulphur Dioxide Results – National Network Sites**

Figures 7.4 & 7.5 show the monthly maximum daily 24-hour levels for the two 8-port bubblers. The maximum daily mean concentration for readings over 100µg/m<sup>3</sup> has been multiplied by 1.25 to take account of a tendency for the bubblers to under-read at high concentrations as recommended by the review and assessment help desk. The bubblers are located at Atlas Cottages, Armadale & Brucefield Church, Whitburn. The results shown are from March 2004 to February 2005.

**Figure 7.4 – Atlas Cottages, Armadale – monthly maximum 24-hour level**



**Figure 7.5 – Brucefield Church, Whitburn – monthly maximum 24-hour level**

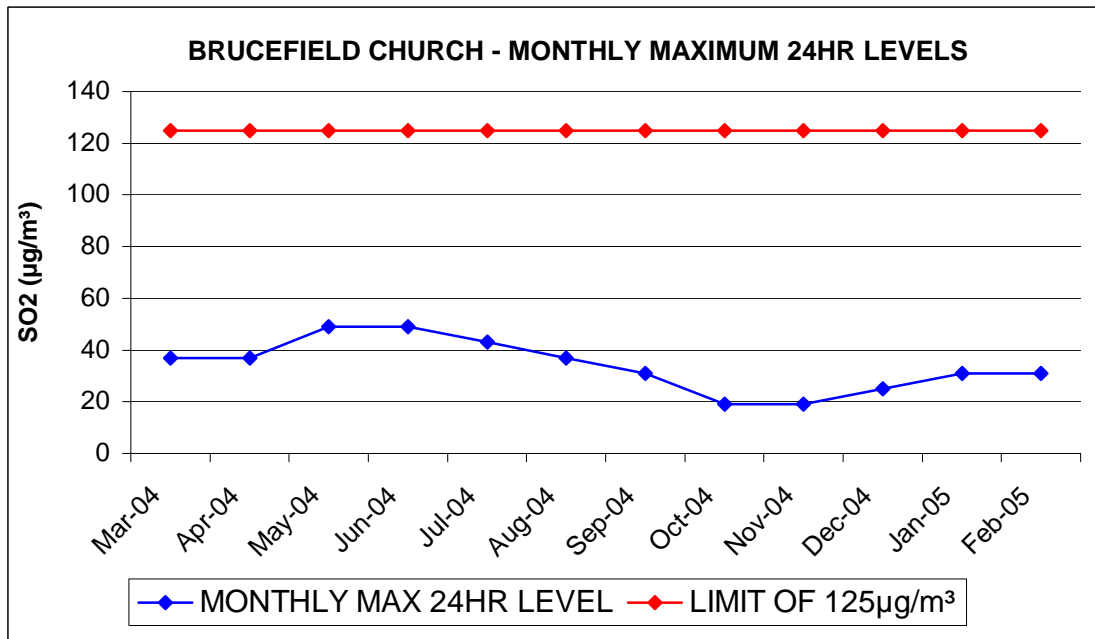


Figure 7.4 shows a number of exceedences in May, June, July and August 2004. SEPA were notified of these exceedences, which were possibly due to emissions from Caradale Brickworks located next to Atlas Cottages. There have been no exceedences since August 2004. Sepa recently installed a real-time analyser at Atlas Cottages, Armadale on 04/03/2005 and the results from this will be monitored to identify if these exceedences are linked to the brickworks.

Table 7.1 shows the maximum daily 24hr average at Atlas Cottages and Brucefield Church from March 2004 to February 2005. The 1hr means and 15min means have been calculated using a calculation taken from page 7-3 of the Technical guidance (TG03).

### Calculations

15min mean = 1.8962 x 24hr maximum daily value

1hr mean = 1.3961 x 24hr maximum daily value

**Table 7.1**

SITE	YEAR	24HR MAX DAILY VALUE ( $\mu\text{g}/\text{m}^3$ )	15min mean ( $\mu\text{g}/\text{m}^3$ )	1hr mean ( $\mu\text{g}/\text{m}^3$ )	Exceedences (Yes/No)
Atlas Cottages	2004 to 2005	220	417	307	YES (15 min exceedence)
Brucefield Church	2004 to 2005	61	115	85	NO

### CONCLUSION FOR SULPHUR DIOXIDE

The real-time monitoring data from March 2004 to November 2004 indicates that there is not a problem with this pollutant in West Lothian as there have been no exceedences of the 15min objective, 1hr objective or 24hr objective. There is no need to proceed to a detailed assessment this year.

The 8-port bubbler located at Atlas Cottages, Armadale next to Caradale Brick Works (Part B process) has had a number of 24-hr exceedences between March 2004 and August 2004. West Lothian Environmental Health were concerned that there may be a problem and a meeting with SEPA was held in August 2004. SEPA advised that during March and August 2004 they had not been doing anything different at the Brickworks and therefore could not explain the high readings. It was difficult to establish if the high readings were due to emissions from the brickworks or if it was due to the 8-port bubbler not working properly. A newly serviced 8-port bubbler was put into Atlas Cottages on 1<sup>st</sup> September 2004 and there have not been any further exceedences, which would suggest a faulty bubbler. Further discussion with SEPA looked at the possibility of real-time monitoring at Atlas Cottages. Unfortunately SEPA still did not have equipment available that could be used for this purpose.

A real-time analyser did become available in March 2005 and was installed by SEPA at Atlas Cottages on 04/03/2005. SEPA have informed West Lothian Council Environmental Health of some operational and setup difficulties with the new analyser.



SEPA have now agreed to send all data to West Lothian Council Environmental Health. West Lothian was unable to use the existing real-time analyser as it is now being used to monitor emissions from the rehabilitation and open cast mining site at the former Polkemmet Colliery. West Lothian will continue monitoring sulphur dioxide with both the 8-port bubblers and real-time analyser.

## RECOMMENDATIONS

West Lothian Council Environmental Health will continue to monitor for Carbon monoxide, particulate matter, Sulphur dioxide and Nitrogen dioxide using the mobile air-quality monitoring unit. For the foreseeable future the Groundhog will be located at Cairnie Place, Whitburn to monitor local air-quality at the open cast and remediation activities at the former Polkemmet Colliery. West Lothian Council will also continue to monitor at the existing sites for Benzene using BTX tubes and for Nitrogen dioxide using diffusion tubes.

Since no real-time monitoring of NO<sub>2</sub> or PM<sub>10</sub> has been carried out in Broxburn it is intended to locate the Streetbox Gold PM<sub>10</sub> and NOX analyser in Broxburn town centre. In the response to the last progress report both SEPA and the Scottish Executive suggested that real-time monitoring should be carried out at this location. Once the co-location study with the real-time analyser is complete and a suitable site has been found the Streetbox will be located in Broxburn.

West Lothian council intend to purchase a roadside real-time analyser within the next two months with money received from the grant given by the Scottish Executive. It is likely that this analyser will be located at Linlithgow High Street.

Since the last Progress report West Lothian Council in partnership with Falkirk, East Lothian and Mid Lothian has employed a Vehicle Emissions Officer. This primarily has been in an educational role to provide advice, information and free vehicle emission testing for all motorists. No enforcement action has been undertaken so far but it is intended to develop this area. Two days of non - voluntary testing are proposed this year in conjunction with the Police and Vehicle & Operator Services Agency (VOSA). A programme of education and enforcement of the idling provisions is also being implemented later in the year mainly in busy town centres.

## **APPENDIX 1.1**

### **Explanation of problems encountered with NOX analyser**

Unfortunately there have been numerous problems with the real-time NOX analyser since October 2003 when the readings began to drop off & there were very low readings.

The Cassella Eti engineer advised West Lothian Council Environmental Health that the analyser was working properly and the QA/QC system did not indicate that there was a fault with the analyser. The zero and span checks carried out on the analyser were within limits and did not indicate any faults.

Regular maintenance procedures were also followed with services carried out every six months but local knowledge and historical data showed that there should be peaks in the morning, lunchtime and evening but the readings were flat lining and were not showing any peaks during these times. The low readings continued and a call-out was requested to have the analyser checked.

The engineer could not find any faults with the analyser but after a number of calls to Cassella the analyser was removed on 02/06/04 for testing at the service centre in Bedford. It was found that the analyser was under reading and there was a fault with the analyser.

After numerous laboratory tests the analyser was put back in on 25/08/2004. However it would not stabilize and so was sent back for further tests. Eventually a spare analyser was put into the Groundhog on 30/09/2004 but this created further problems giving very high readings over a 1hr average of over 100ppb. The engineer was instructed to visit to adjust the analyser but this was not necessary as the original NOX analyser was returned on 12/10/2004. Very low readings were observed via the Enview software although the analyser appeared to be operating normally.

A Software engineer was contacted at Cassella to check the Enview configurations, which, were found to be correct, which suggested a fault existed with the analyser. The engineer visited again on 25/10/2004 and the analyser was zeroed and calibrated. However the readings were still incorrect and on 10/11/2004 another engineer from Cassella visited and the analyser was calibrated and adjusted. The analyser has been performing normally since then and is checked frequently to make sure the readings are valid.

## **APPENDIX 1.2**

Letter from Casella Eti regarding Service Contract with NOX analyser

## APPENDIX 1.3

OSIRIS PM<sub>10</sub> unit:  
Polkemet Primary School, Whitburn – April 2004

Figure 1.3.1 – Polkemet Primary School, Whitburn – April 2004

