

**NPL REPORT**  
**DQL-AS 021**

**UK Heavy Metals Network**  
**Audit Report For 2005**

**David Butterfield**

**NOT RESTRICTED**

**NOVEMBER 2005**

## UK Heavy Metals Network Audit Report For 2005

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Quality of Life Division

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Approved on behalf of the Managing Director, NPL, by Dr S Windsor,  
authorised by the Director, Quality of Life Division.

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## Introduction

NPL visited all of the sites in the Heavy Metals Network to audit their performance. The aim of these audits was to calibrate the analysers using a common flow calibrator, to help ensure intercomparability of data from the monitoring sites. The other purpose of the audits is to ensure that the local Site Operators are performing their tasks correctly and to allow them to feed back into the running of the network.

### 1.0 Audit Results

The following table details the dates of the audits, what equipment and which LSO's were audited.

| Site                              | Date       | Partisol 2000<br>Serial Numbers | Mercury Vapour<br>Serial Numbers | LSO audited              |
|-----------------------------------|------------|---------------------------------|----------------------------------|--------------------------|
| Avesta Steel, Sheffield           | 19/10/2005 | 2000A204719901                  | Not Measured                     | Andy Hawkins             |
| Brookside Metals,<br>Bilston Lane | 21/09/2005 | 2000A204649811                  | 404949                           | Liz Riley,<br>Mick Clews |
| BZL Ltd, Avonmouth                | 29/06/2005 | 2000A205009902                  | Not Measured                     | -                        |
| BZL Ltd, Hallen                   | 29/06/2005 | 200A205049902                   | Not Measured                     | -                        |
| Cardiff, Waungron Road            | 28/06/2005 | 2000A204919902                  | 733232                           | -                        |
| Elswick 6,<br>Newcastle Upon Tyne | 31/08/2005 | 2000A205069902                  | 508289                           | David Donnelly           |
| Eskdalemuir                       | 31/08/2005 | 2000A204909902                  | 508290                           | Ian Dawson               |
| Glasgow, St Annes                 | 30/08/2005 | 2000A204899902                  | 404948                           | Dominic Callahan         |
| ICI Weston Point                  | 18/10/2005 | 2000A205079902                  | 404947                           | John Carrington          |
| IMI Refiners Ltd,<br>Walsall      | 21/09/2005 | 2000A204989902                  | 508291                           | Liz Riley, Mick<br>Clews |
| INCO Europe                       | 28/06/2005 | 2000A205089902                  | Not Measured                     | -                        |
| Leeds,<br>Old Market Buildings    | 18/10/2005 | 2000A204739901                  | 508289                           | April Wood               |
| London Brent                      | 23/09/2005 | 2000A204999902                  | 508774                           | Dharsheni<br>Velumylyum  |
| London Cromwell Road              | 04/10/2005 | 2000A205059902                  | 672736                           | Colin Gilham             |
| London Horseferry Road            | 04/10/2005 | 2000A204969902                  | 508775                           | Colin Gilham             |
| Manchester M56, Jn 4              | 18/10/2005 | 2000A204959902                  | 404946                           | Mike Concannon           |
| Motherwell, Civic Centre          | 31/08/2005 | 2000A204979902                  | 404950                           | Pat Docherty             |

LSOs for Avonmouth, Hallen, INCO and Cardiff were unavailable at the time of audit, but were audited last year.

#### 1.1 Site Infrastructure

The site infrastructure was assessed at all sites and no problems were found. All of the sites are currently being inspected for the electrical safety of the installation, after the problems found at Hallen earlier in the year. Defra is aware of the faults found at the

Hallen site. The findings of the electrical inspection will be presented in a separate report.

## 1.2 Results Of The Partisol 2000 Audits

The sample flow for each sampler was measured using a BIOS Flow Calibrator, which was previously calibrated at NPL against a Brooks Vol-U-Meter. The Vol-U-Meter is traceable to national standards. The reported flow is measured and reported at ambient conditions. A leak test was also performed on each sampler.

The following table details the results of the Partisol 2000 audits.

| Site                      | Measured flow, litres per minute | Difference from set point, % | Leak Test |
|---------------------------|----------------------------------|------------------------------|-----------|
| Brookside Metals, Walsall | 17.14                            | 2.6                          | Passed    |
| BZL Avonmouth             | 16.91                            | 1.9                          | Passed    |
| BZL Hallen                | 16.72                            | 0.7                          | Passed    |
| Cardiff                   | 17.11                            | 3.1                          | Passed    |
| Eskdalemuir               | 16.72                            | 0.1                          | Passed    |
| Glasgow                   | 16.84                            | 1.4                          | Passed    |
| ICI Weston Point          | 16.81                            | 0.7                          | Passed    |
| IMI Refiners Ltd, Walsall | 16.71                            | 0.7                          | Passed    |
| Leeds                     | 16.85                            | 0.9                          | Passed    |
| London Brent              | 16.86                            | 0.4                          | Passed    |
| London Cromwell Road      | 16.54                            | -0.9                         | Passed    |
| London Horseferry Road    | 16.99                            | 2.3                          | Passed    |
| Manchester                | 16.83                            | 0.8                          | Passed    |
| Motherwell                | 16.30                            | -2.4                         | Passed    |
| Newcastle                 | 16.82                            | 1.3                          | Passed    |
| Sheffield                 | 16.69                            | -0.1                         | Passed    |
| Swansea INCO              | 18.18                            | 8.8                          | Passed    |

The uncertainty in the flow measurements, expressed with a level of uncertainty of 95%, is 5.8%.

The difference from set point determined from the audits of the Partisol 2000s is used at ratification to adjust the volume recorded by the Partisol for each sample. If the difference from set point is greater than 10% then remedial action would be taken, for example calling out the equipment support unit.

### 1.3 Results Of The Mercury Vapour Sampler Audits

The sample flow for each sampler was measured using a BIOS Flow Calibrator, which was previously calibrated at NPL against a Brooks Vol-U-Meter. The Vol-U-Meter is traceable to national standards. The reported flow is measured and reported at ambient conditions. A leak test was also performed on each sampler.

| Site                      | Set point,<br>ml per minute | Measured flow,<br>ml per minute | Difference from set point,<br>% | Leak Test |
|---------------------------|-----------------------------|---------------------------------|---------------------------------|-----------|
| Brookside Metals, Walsall | 100                         | 95.48                           | -4.5                            | Passed    |
| Cardiff                   | 90                          | 98.15                           | 9.1                             | Passed    |
| Eskdalemuir               | N/A                         | -                               | -                               | Passed    |
| Glasgow                   | 100                         | 97.46                           | -2.5                            | Passed    |
| ICI Weston Point          | N/A                         | -                               | -                               | Passed    |
| IMI Refiners Ltd, Walsall | 100                         | 98.94                           | -1.1                            | Passed    |
| Leeds                     | 100                         | 107.46                          | 7.5                             | Passed    |
| London Brent              | 100                         | 95.18                           | -4.8                            | Passed    |
| London Cromwell Road      | 100                         | 100.63                          | 0.6                             | Passed    |
| London Horseferry Road    | 100                         | 98.84                           | -1.2                            | Passed    |
| Manchester                | 100                         | 134.90                          | 34.9                            | Passed    |
| Motherwell                | 108                         | 111.32                          | 3.1                             | Passed    |
| Newcastle                 | 100                         | 130.34                          | 30.3                            | Passed    |

The uncertainty in the measured flow rates, expressed with a level of uncertainty of 95%, is 5.8%

The difference from set point determined from the audits of the mercury vapour samplers is used at ratification to adjust the volume recorded by the LSO for each sample. There is no threshold for remedial action on the mercury vapour samplers as the flow is adjusted by the LSO on a weekly basis and the flow can drift by more than 10% in one week.

### 1.4 Results Of Local Site Operator (LSO) Audits

Nearly all of the LSOs audited were carrying out all of their functions correctly.

There were a couple of cases where the flow through the mercury vapour adsorption tube was measured and adjusted at the end of a sampling period and was not rechecked when a new adsorption tube was inserted in to the sampling system. It cannot be assumed that the new tube will have the same flow rate as the old tube. All of the LSOs who made this error have been instructed in the correct procedure.



### **1.5 Comparison of Flow Calibrations Performed by the ESU and NPL**

A comparison between the ESU flow calibrator and the NPL flow calibrator was performed at NPL and it was found that both calibrators agreed with each other to within 2% at ambient conditions and better than 1% at standard temperature and pressure.

## **2.0 Conclusions**

All of the sites have been audited and are performing well.

There are no issues with site infrastructure

The Local Site Operators are performing their duties to a good standard of performance.