SCOTTISH EXECUTIVE

Environment Group

Drinking Water Quality Unit
Victoria Quay
Edinburgh EH6 6QQ

Telephone: 0131-244 -0184
Fax: 0131-244 -0259
tim.hooton@scotland.gsi.gov.uk
http://www.scotland.gov.uk

Mr George Ponton
Regulation & Strategy
Scottish Water
Castle House
6 Castle Drive
Dunfermline
KY11 8GG

Our ref: 2DWE/25/1

28 January 2003

Information Letter 1/2003

Dear George

THE SUITABILITY OF ANALYTICAL METHODS USED FOR LEAD ANALYSIS

1. **Purpose**

The purpose of this letter is to advise Scottish Water of an audit that is being carried out on the suitability of methods currently being used for the analysis of lead. Details are also given of the information to be provided to DWQU for the audit.

2. **Background**

On 26 June 2001 regulation 36 of the Water Supply (Water Quality)(Scotland) Regulations 2001 (the new Regulations) came into effect in Scotland. The regulation made specific amendments to the Water Supply (Water Quality)(Scotland) Regulations 1990, including the insertion of regulation 21A. This set out additional performance requirements for the method of analysis for particular parameters and substances, including lead.

The Drinking Water Unit has recently become aware of a study that suggests certain methodologies currently used by some UK water laboratories for lead analysis will not meet the performance criteria required by the new regulation 21A. These concerns principally relate to methods using graphite furnace atomic absorption spectrophotometry (GFAAS), also known as electrothermal atomisation atomic absorption spectrophotometry (ETA-AAS), and some types of inductively coupled plasma emission instruments using optical emission spectroscopy,

Scottish Water need to be satisfied that the analytical data collected in support of their plumbosolvency and lead pipe replacement strategies is "fit for purpose" and that the Drinking Water Quality Unit can continue to have confidence in this data during future assessments. Methods used for this purpose which meet the performance requirements for regulatory analysis should be capable of providing satisfactory data as part of an optimisation/replacement strategy.

The quality of this data will be crucial in the assessment of compliance with both the interim and the final lead standard. Details of the required analytical performance are given in Table 4B of Schedule 5 of the new Regulations.

3. **Information requirements**

Scottish Water is requested to provide, for each analytical method used since 1 January 2001 for lead analysis for compliance purposes or for plumbosolvency optimisation/lead pipe replacement assessment in each laboratory, details of the analytical method, instrumentation, method performance and quality control.

Attached at ANNEX 1 is a form giving further details of the information required. One copy of this form should be completed, with a full set of the supporting information listed in ANNEX 1, for each combination of laboratory, analytical method and instrumentation.

The information should be sent to Dr Reid, Drinking Water Quality Unit, 1-H, Victoria Quay, Edinburgh, EH6 6QQ by 7 March 2003.

4. **Further Information**

A copy of this letter is being sent to Willie Rowbottom, Chief Scientist and Allan Conner, General Manager – Laboratories and Sampling.

Enquiries about this letter should be addressed to Donald Reid (Tel No: 0131-244-0278 or Email: donald.reid@scotland.gsi.gov.uk. Please acknowledge receipt of this letter using the attached form.

Yours sincerely

TIM HOOTON
Drinking Water Quality Regulator for Scotland

ANNEX 1

ANALYSING LABORATORY	
INSTRUMENT	

PROCEDURE USED

Technique used	Wavelength (nm) or lead isotopes used	Details of background correction wavelength(s) and/or any correction algorithm	Internal standard element and concentration (if used)	Ultrasonic nebuliser used (Yes/No)	Any other relevant comments
ICP-OES radial					
ICP-OES axial					
ICP-MS					
	Wavelength (nm)	Type of background correction used	Matrix Modifier used	Method of Measurement (peak area/peak height)	Platform used (Yes/No)
GFAAS(ETA-AAS)					
	Indicate if used with brief details				
Electrochemical					
Other					

METHOD REFERENCE*

_____

METHOD USED FOR compliance samples/plumbsolvency control Samples/both**

METHOD CURRENTLY IN USE/USE OF METHOD CEASED ON __/__/__**

NAME OF PERSON ABLE
TO PROVIDE FURTHER INFORMATION

_____

CONTACT DETAILS: Tel. _____

FAX. _____

E-MAIL. _____

*Required only if two or more identical methods are used by the same laboratory

**Delete as appropriate

Information required

1. Full written copy of the analytical method used for lead analysis, together with any supplementary operating procedures on instrument set up, sample preservation and pre-treatment, sample preparation and system suitability checks.

2. Most recent performance data – this must include the raw data obtained from the instrument, a table of the performance data used to compile the Annex 2 form attached (including date of testing and all data excluded from calculations), and a completed copy of Annex 2.

3. If not included in the method – specific details on the instrumentation used and all relevant accessories such as ultrasonic nebulisers. (Manufacturer /Model /Age of instrument).

4. Copies of all service contracts/installation/service/repair records relating to the relevant instruments and accessories from Jan 2001 to date.

5. Copy of manufacturers expected performance characteristics for lead analysis in potable water for that instrumentation (where available).

6. Details of and results of participation in external AQC schemes for lead from 1 January 2001 to date. Include commentary on any apparently unsatisfactory performance and any correction action subsequently taken.

7. Internal AQC charts since most recent performance tests. Include commentary on any deterioration in performance and any corrective action taken.

ANNEX 2

LABORATORY	
PROCEDURE USED	
METHOD REFERENCE*	
Calibrated Rande (eg 0 to 20 µg/l)	

*If required (see Annex 1)

Performance testing programme

Date testing commenced	
Date testing completed	
Number of standards tested	
Concentrations of standards	
Number of water types tested	
Sample spiking level	
Solution used for limit of detection determination	
Method used for calculating limit of detection	
Number of batches	
Number of replicates per batch	

Types of water performance tested (source type, calcium, magnesium, electrical conductivity, alkalinity, total organic carbon, other relevant properties, and reference number in data summary below).

Type 1

Type 2

Type 3

Summary of performance testing data

Solution	Nominal Value/spike added	Mean	Trueness	Within Batch sd	Between Batch sd	Total sd	Precision	% recovery
Standard 1								
Standard 2								
PCV std								
Sample 1								
Spiked Sample 1								
Sample 2								
Spiked Sample 2								
Sample 3								
Spiked Sample 3								
Blank								
Other (specify)								
Limit of detection								
Units of measurement								

Please complete the acknowledgement below and return it to:

Ewan Young
The Scottish Executive
Drinking Water Quality Unit
1-H
Victoria Quay
EDINBURGH
EH6 6QQ

I acknowledge receipt of Information Letter 2/2003:
THE SUSITABILITY OF ANALYTICAL METHODS USED FOR LEAD ANALYSIS

Signed _____

Name _____

Position _____

Authority _____

Address _____

_____

_____

Date _____