United Kingdom Accreditation Service

Commercial in confidence

ASSESSMENT REPORT

Name & Address of Organisation	Aberdeen City Council Accounts Payable Section Aberdeen City Council Woodhill House Westburn Road Aberdeen AB16 5GB United Kingdom	**Type of Assessment**	Accreditation - Surveillance
		UKAS Reference Number	5464 1325
		Date(s) of Assessment	15/03/2018- 16/03/2018
Assessment Location(s)	Aberdeen Scientific Services Laboratory Old Aberdeen House, Dunbar Street Aberdeen AB24 3UJ United Kingdom	**Project references**	212315-02-01
Assessment Standard / Criteria	ISO/IEC 17025:2005 - Testing Laboratory	**Schedule Issue No(s)**	036
Name & Role of UKAS Assessment Team	Eddie Dix (Lead Assessor), Peter Whittle (Technical Assessor), Andrew Jervis (Technical Assessor), Chris Dixon (Technical Assessor)	**Date(s) of Assessment Plan**	16th January 2018
		No. of (M) Findings: Action Mandatory	32
Name of Organisation Representative(s)		**No. of (M) Findings: Require Evidence to UKAS**	31
Report Issued By	Eddie Dix	**No. of (R) Findings: Action Recommended**	3
Report Issued Date	20th March 2018	**Method of Reviewing Evidence**	Remote
Report Acknowledged By		**Quote for Reviewing Evidence**	1.25 Days
Report Acknowledged Date	As email	**Agreed Action Completion Date**	30th April 2018
Report Acknowledged Method	email	Please return evidence to customerservices@ukas.com Quoting the UKAS Ref.No. in the subject field	

AREAS SAMPLED AT ASSESSMENT (*marked as 'X'*)			
ORGANISATION		**IMPARTIALITY & INTEGRITY**	
Legal Status	X	Independence, Impartiality & Integrity	X
Liability Cover (CB / IB only)	N/A	Confidentiality	X
Management of Finances (CB/ IB only)	N/A	**EVALUATION PROCESSES**	
Resources	X	Design & Development of Methods	X
Organisation Structure	X	Enquiries, Tenders, Contracts	X
Responsibility & Authority	X	Planning & Resource Allocation	X
MANAGEMENT		Testing	X
Management System Including Documented Policies & Procedures	X	Reports & Certificates	X
Roles & Responsibilities for Quality	X	Decisions/ Opinions	
Control of Documents and Records	X	Certification & Maintenance of Certification (CB only)	N/A
Management of Sub Contractors and Purchases	X	**TECHNICAL COMPETENCE**	
Service to Clients (Test / Cal only)	X	Personnel	X
Handling of Complaints	X	Methods	X
Control of Non-Conforming Items Dealing with Corrective & Preventive Actions and Improvements	X	Facilities/Equipment/Environmental conditions	X
Internal Audit and Management Review	X	Assurance of Quality of test	X
Supervision & Monitoring of Staff	X	Witnessed Activities	X
Conditions for Granting & Maintaining Certification (CB only)	N/A		

Executive Summary and Recommendation

This was the third surveillance visit in the current 4-year cycle to assess the continuing conformity of Aberdeen Scientific Services Laboratory against the requirements of ISO/IEC 17025:2005 and DWTS as applicable.

The laboratory Quality System is mature and well established. It has been generally well maintained since the last assessment. Internal audits have in general been carried out as per the audit plan, however they had not all been closed out in a timely manner, this had been identified by the laboratory and was extensively covered at the Management Review, a programme of audit update meetings has been implemented, the effectiveness of these meetings will be reviewed at the next visit. The new electronic system for storing audits appears to be working well as records were easily retrieved from the server. The rationalised non-conforming work form also appears to be working well and records indicated that actions appeared appropriate. The records from the Management Review indicated that some of the areas were covered in great detail, however other areas had not been covered to any great depth, actions are identified and listed in a table. The progress is monitored throughout the year, however the minutes from the most recent management review did not include any evidence that the actions from the previous review had been closed out. Due to an issue with a piece of equipment the laboratory had to subcontract some samples for anions, the laboratory had not informed the customer of the need to subcontract the work during this time.

The laboratory has not used the Flexible Scope during the last year, however they are looking to extend the current scope of the procedure to include classical techniques and animal feeds. This was discussed during the assessment and an extension to scope is required to be submitted.

An area for improvement, identified at the assessment related to change management. This was specifically noted with respect to changes in equipment and updates to referenced standards, that had not been effectively documented. The laboratory is also reminded of the importance of keeping UKAS informed of any changes to the organisation, including changes in equipment and resource that could impact on the laboratories accreditation. This is a requirement of the UKAS agreement.

All areas of the laboratory continue to maintain high technical standards, with competent knowledgeable staff. Overall, good EQA results have been achieved throughout the year across all disciplines, with all DWTS related tests being included. The laboratory benefits from good staff stability. For Water and Environmental Chemistry, there are some gaps in traceability for a few parameters and the new ion chromatograph was introduced into service without full validation.

Recommendation that accreditation to ISO/IEC 17025:2005 and DWTS is maintained for the current schedule of accreditation (issue 036), taking into account the changes identified during the assessment (See below), subject to the satisfactory clearance of the mandatory findings raised within the agreed timescale.

Scope (if not covered elsewhere)

The visit plan was followed as documented, however the Lead Assessor also covered control of external publications as this was an area that had been identified as a weakness.

Schedule Changes

The following changes were identified for Food Chemistry during the assessment.

1. Dietary fibre following procedure PA/VEM/0081 has not been carried out at the laboratory for a number of years and should be removed from the schedule of accreditation.
2. The technique for the chloride procedure PA/IHT/2303 should state ion chromatography and not HPLC.
3. The laboratory procedure for chloride PA/IHT/2303 also includes the calculation of salt from chloride by the application of a constant factor to the chloride result. Salt from chloride should be included on the schedule of accreditation.

4. The laboratory procedure for sodium PA/IHT/2540 also includes the calculation of salt from sodium by the application of a constant factor to the sodium result. Salt from sodium should be included on the schedule of accreditation.

A number of schedule changes were identified for some of the microbiology test methods, notably around dates on stated references, this included BS and ISO standards as well as a number of the Microbiology of Drinking Water methods. Some of these are being addressed as findings, however the change to the Legionella standard is to be submitted as an Extension to Scope. Please refer to the Technical Assessors report and findings for full details.

Organisation

Legal Status

Aberdeen Scientific Services Laboratory (ASSL) is a sub-service within the Communities, Housing and Infrastructure Service of Aberdeen City Council. There have been no changes in the structure within the City Council since the last visit.

Resources

Since the last visit, two members of staff have left, one has been replaced (Scientist) and the laboratory is looking at initiating the recruitment process for the for other post (Assistant Scientist). As such there has been no real change in the level of resources. The Public Analyst has reduced his time down to three days a week and works remotely for the majority of his time, attending the laboratory several times a month as required, this appears to have worked well over the last year. The public Analyst has indicated that he wishes to retire in the latter part of 2018 and as such a replacement will be required to undertake the statutory role of Public Analysts, Agricultural Analyst and Food Examiner. The organisation has identified a potential replacement from another local authority and is due to start the official recruitment process. within the next few weeks. It is anticipated that the new appointment will be made prior to the retirement of the current Public Analyst, thus allowing for a hand over period, the laboratory is reminded that UKAS must be kept informed of these changes.

The laboratory has identified a replacement for the role of Food Examiner and are training her in the requirements for reporting.

There has been no significant change in the workload of the laboratory and current staffing levels appear appropriate. The laboratory is however aware that a large contract which it is currently servicing is due to end in 2018. This may impact on staffing levels if alternative work is not brought in to replace it.

The laboratory is currently located in a former school building over several floors. Access to the laboratory is via a secure door which has a secure entry system. All visitors are required to sign in at the reception on arrival. The laboratory has been approached by the Scottish Environmental Protection Agency (SEPA) who have facilities in the Torry area of Aberdeen, to consider relocating the Aberdeen Scientific Services laboratory into the Inverdee House Facility. The City Council are currently investigating the viability and costs of a relocation. The laboratory Management have been over to the proposed site and established that the area appears appropriate, but will require some works to be undertaken. The laboratory are reminded of the importance of keeping UKAS informed of any relocation plans and that any such relocation will need to be undertaken as an Extension to Scope, which will require some form of site assessment.

There have been two new items of equipment which have been sourced in the last year. A vapodest steam distillation unit and a new Ion Chromatography System. Both have been subject to some verification checks, however they have not been subject to full verifications, this is specifically a concern for the Ion Chromatography system which has been used for determination of Anions in Waters and has been used for DWTS work. Findings have been raised by both the Chemistry Technical Assessors as appropriate. The laboratory is reminded that UKAS must be informed of any changes to key items of equipment as soon as is practicable as per the UKAS agreement.

Organisation Structure

The laboratory organisational structure is detailed in Appendix 2 of the Quality Manual, the organogram identifies the roles and does not include the names of the individuals in those roles. The names of the individuals filling the roles are listed separately within Appendix 2. The list of staff in post still includes (Senior Scientist) and (Assistant Scientist), these staff have left the laboratory, the list has also not been updated to include a more recent appointment. (See Finding E01490-005).

Responsibility & Authority

Responsibilities and Authorities have been assigned within the Quality Manual and supporting procedures, including specific responsibilities for Reporting and management of the Generic Protocol. Appendix 6 covers specific procedures to meet DWTS requirements and includes the names of staff deemed Competent Persons, the list of names still includes who has since left the laboratory (See Finding E01490-005).

Management

Management System Including Documented Policies & Procedures

The Quality System is documented in the Control Manual and a series of policy manuals which are held as hard copy documents. The Quality Manual includes cross references to the Policy Manuals as appropriate. The Control Manual has a number of appendices which include additional information, it was noted that Appendix 3 of the control manual, lists the PT schemes which are used by the laboratory, the list is however not up to date as it does not include the LGC Quality in Dairy Chemistry Scheme (QDCS) or the LGC Quality in Food Chemistry Scheme (QFCS) (See Finding E01490-004).

Technical Procedures are held in Technical Manuals, these are available at the points of use.

The Laboratory records are held as a combination of hardcopy and electronic, there is a gradual migration of hard copy records into electronic systems and the Control Manual has been updated to identify the use of both types of record system as appropriate.

Roles & Responsibilities for Quality

The Laboratory Manager, undertakes the role of Quality Manager for all of the sections within the laboratory. The Public Analyst undertakes the role of Technical Manager. Deputies have been identified for the key roles, with the Public Analyst deputising for the Laboratory Manager, some of the responsibilities may be undertaken by the two Principal Scientists as appropriate. In the absence of the Public Analyst, his duties as Technical Manager are undertaken by the Principal Scientist (Food Chemistry).

Control of External Publications

The Public Analyst is responsible for identifying updates to external publications, via a range of systems, including use of IHS Technical Indexes as well as searching through the publications websites. Where new or replacement documents are identified, the Public Analyst will inform the relevant Principal Scientist who will review the updated publication against the laboratory method. Whilst this has been done for some documents there is no formal process in place which details how the review is conducted and how the review is recorded (See Finding E01490-013).

Management of Sub Contractors

There is a list of approved suppliers which is maintained in LIMS, the list includes approved subcontractors. Subcontractors are approved based on their accreditation status where applicable. Only accredited subcontractors are used and where required the subcontractor is also accredited against the DWTS requirements.

The laboratory routinely subcontracts some metals, for which is it not accredited to Scottish Water who are UKAS accredited for these metals (Arsenic, Antimony and Selenium) to DWTS requirements.

Some testing for Anions was subcontracted to Derwentside Environmental Testing Services (DETS) during the period that the Dionex Ion Chromatography system was out of action

(November 2017). DETS is UKAS accredited for Anions in Waters, but does not hold accreditation for DWTS requirements. See Finding raised by Peter Whittle regarding subcontracting of any work which may have been done under drinking water inspectorate.

The laboratory did not inform customers of the need to subcontract the Anions Testing during the period that the work was subcontracted, as per the requirements of ISO/IEC 17025:2005 and their own Quality Manual (See Finding E01490-012).

Service to Clients
The laboratory has carried out a customer feedback survey in early 2018. Approximately 120 survey emails were sent out with a response rate of approximately 50%. The overall feedback was very positive with very little negative feedback noted. The survey included sections where customers could leave comments. Of the customer responses approximately 50% were from private customers. The laboratory has considered the comments and those areas where negative feedback was made and looked at implementing improvements as appropriate.

In addition to the Annual Customer Feedback survey, the laboratory meets quarterly with representatives from the Local Authority partners to discuss work being undertaken. This is used to discuss any specific requirements and provides a forum for obtaining feedback on the laboratories performance.

Handling of Complaints, Control of Non-Conforming Items Dealing with Corrective & Preventive Actions and Improvements
The laboratory has rationalised a number of different forms which were used for recording different types of non-conformance into a single form. The form has a tick box which is used to identify the type of non-conformance, including complaint, non-conforming work, preventive action or "Other Anomaly".

There have been no formal complaints received by the laboratory in the last year.

Since the new form has been introduced there have been 16 instances recorded, of these 16, one was recorded as a preventive action, one as an "Other" and the remainder were recorded a Non-conforming work, and in general related to AQC failures. Investigations appeared appropriate for those records reviewed.

The "other" non-conformance identified that there was a member of staff who appeared to be demonstrating a low bias for one of the tests. This triggered an audit of the method in question and it was identified via the audit that there was some poor practice with respect to use of autopipettes. This was addressed with refresher training and results have been monitored, indicating that this had been effective.

Any corrective actions arising from non-conformances are closed out promptly.

Proficiency Test failures are recorded on a different form. Investigations into PT failures have been assessed by the Technical Assessors.

Internal Audit
Audits are carried out according to procedure PA/IHP/0005, there are audit plans in place covering system audits, method performance audits, method audits and vertical audits, including specific audits covering DWTS work. The method audits are effectively method reviews and do not include any witnessing of the tests. Method performance audits have a dual purpose, they are used for auditing the test method and systems around each method as well as providing a check on competence of the staff being witnessed.

In general system audits have been carried out as planned, as have the majority of method performance audits, however there was some slippage identified resulting in not all staff members having been witnessed as required (See finding raised by Technical Assessor). There has been some slippage in the vertical audit plan and the laboratory have identified that there has been slow progress with close outs. As a consequence of this, audit update meetings have been set up to

take place at the end of each month to monitor progress of audits, this is a recently implemented improvement and will need a period of time before its effective implementation can be fully assessed, this will be followed up at next years' assessment.

There is a team of auditors and this has been recently expanded to include three additional auditors. They have all completed the Internal QMS Auditor training course run by QMI Scotland, however the list of auditors which is maintained in PA/LOG/1101 has not been amended to include the three additional auditors (See Finding E01490-007). It was also noted that lists of staff who can do method performance and method audits needs updating.

A selection of the different audit types was reviewed. Audits are recorded on an audit "Check List". Dependent on the type of audit this may be a free text form or a more formal check list. The level of detail being recorded was good, with clear objective evidence recorded as appropriate. It was noted that in some audits, where a finding has been raised it has been recorded in bold type, but in others this is not the case. Audit findings are documented on "Audit Reports", these are individually numbered for each finding raised. There is also an audit summary which lists all of the audit findings. The laboratory may wish to standardise the practice of using bold type within the audit process for identifying audits and consider linking the audit finding in the audit checklist to the specific audit report, this may be by use of the individual finding number or hyperlinking to the audit report, this has been raised as a recommended finding (See E01490-008).

The laboratory audit report form, which is used for recording the audit finding, investigation and corrective action does not currently include a section for impact assessment, where this may be required (See Finding E01490-009). Where no audit findings are raised an audit report is still generated.

Audit reports and checklists are completed electronically and the audit records are now held electronically on the server in a specific location. The records were well maintained and easily retrieved.

Management Review

The Management Review was held on the 16th February 2018 and was attended by (Public Analyst) and (Quality Manager).

The minutes covered the key areas required in ISO/IEC 17025:2005, clause 4.15 and included a good level of detail around certain key areas, including internal audits, staff training, resource and future plans. The section on Internal audits was particularly well detailed and identified a number of areas for improvement within the audit process, these had been raised as actions. Other areas were covered but there was little evidence of any real discussion, the areas concerned included complaints and anomalies (no evidence of discussion on any trends or common root cause) (See Finding E01490-001).

The section covering proficiency testing included a list of the current schemes that are used, but there was no evidence to indicate whether the current coverage is sufficient to cover all accredited test methods, whether the schemes undertaken are suitable or review of trends and bias (TPS 47, 4.3 and 4.8) (See Finding E01490-002).

The minutes did not include discussion on use of the Generic Protocol other than that identified within the internal audit section, it is noted that the Generic Protocol has not been used in the last year. (LAB 39, 4.2e), (See Finding E01490-006).

Actions arising from the Management Review are compiled into a table which includes the owner and the timescales. There was no evidence in the minutes from the meeting in February 2018 whether those actions arising from the Management Review in 2017 had all been closed out (See Finding E01490-003).

Confidentiality, Impartiality & Integrity

This is covered in contracts of employment as well as within policies detailed in the Control Manual. The laboratory undertakes both enforcement work for the local authorities and private

work for businesses. Where a potential conflict of interest may arise as a result of enforcement action the laboratory will not undertake any work which could compromise their impartiality and integrity. If the laboratory is asked to test samples from private companies that are subject to an enforcement issue, then the laboratory will direct the private company to another laboratory, which may be another Public Analyst laboratory or Private contract lab as appropriate.

The laboratory will need to consider the changes within the new version of ISO/IEC 17025 with respect to identifying and managing risks to impartiality.

Evaluation Processes

Enquiries, Tenders, Contracts

The laboratory uses a combination of service level and agreements and quotations as part of the contract review process. The service level agreements exist between the laboratory and the three local authority partners. These are long standing agreements and are renewed on an annual rolling basis. Regular meetings are held with the Partner authorities where sampling plans are discussed and agreed. As such the laboratory has first-hand information about the main projects to be undertaken and when the work will take place, as such they are able to ensure suitable resource is available.

Quotations are generated for ad-hoc work, which is mainly from private customers. The Quotation template includes the UKAS symbol and laboratory number in the footer. A selection of quotations was assessed during the visit. Where tests are to be subcontracted the * is used and there is a note explaining this, where non-accredited tests are included on the quotation a # is used with an accompanying note. The quotations reviewed included the correct symbols as applicable. Quotations also identify the sample type and where appropriate additional information may be included to assist the customer.

Quotation ASSL066-17 was for a series of tests on samples of surface water, the quotation included PAHs which are subcontracted, the * was used to identify this on the quotation. The quotation also included additional information for the customer regarding the types of sample bottles to use and stability times of samples.

QuotationASSL021-18 was for samples of Potable Water covering both Chemistry and Microbiology work. All tests are covered by the laboratories accreditation.

The laboratory is not set up to do one off tests and where such a request is received, unless the work can be batched with other samples that are being tested, the work is turned down. Whilst this inhibits the laboratories commercial capability it ensures that it is capable of effectively resourcing the workload.

Flexible Scope

The procedure for Flexible Scope is detailed in PA/IHT/3000 and PA/IHP/0030. Procedure PA/IHT/3000 details the general policy and procedure for management of the process and includes the scope of the "Generic Protocol", the current scope is limited to development or modification of methods using GC, HPLC, AAS, ICP-OES, UV/Vis Spectroscopy and Microscopy in Foods and Foodstuffs. The laboratory wishes to extend the scope to cover classical techniques and Animal Feeds. They are aware that this will require an Extension to Scope, with a number of worked examples being submitted as evidence of the use and application. Procedure PA/IHT/3000 also covers the competence/pre-training requirements for the person who supervises the development or modification of a method for use under the Generic Protocol, it does not however define the minimum competence requirements for those staff who are involved in the validation (See Finding E01490-010). Approval to implement the Generic Protocol/Flexible Scope is given by the Public Analyst, who is also responsible for the final approval and reporting under the Generic Protocol. The procedure PA/IHT/3000 states that staff who are competent and authorised to develop or modify methods must be identified in training records, a review of the training records held in LIMS for the procedure did not include the Principal Scientist (Food Chemistry) (See Finding E01490-011). The procedure details the process for the selection of the appropriate conditions for the test method based on the technique to be used, these are detailed as flow diagrams within the

appendices. Whilst the procedure has been updated to include classical techniques it was noted that the appendices did not include anything that covered classical techniques.

Procedure PA/IHP/0030 details the process for validation of the selected method and includes the record form. The laboratory has not used the Generic Protocol in the last year, but will be submitting examples as part of the application to extend the scope of the Generic Protocol.

If, following grant of the accreditation for the extension to scope, the laboratory wishes for any of those worked examples to be added to the fixed scope they will need to inform UKAS of this as part of the application.

The audit plan includes an audit of the Generic Protocol, however the management review does not currently include a section for review of Generic Protocol/Flexible Scope, usages, (See Finding E01490-006).

Reports & Certificates
A selection of reports was assessed throughout the visit. Reports contained appropriate disclaimers where non-accredited results were reported and results from subcontractors were included on test reports. Reports also included a disclaimer regarding reporting of opinions and interpretations as being outside the scope of accreditation.

The UKAS symbol was displayed on test reports along with the laboratory number in accordance with the requirements of the current BEIS publication regarding Accreditation Logo and Symbols (February 2017).

Technical Competence – Water and Environmental Chemical Testing (Peter Whittle)

Personnel

(Scientist and Audit Officer) left ASSL in May 2017 She was replaced in October 2017 by a highly experienced ex-member of staff from the now closed Durham Public Analyst Laboratory.

Competence
Tests were competently demonstrated and the staff had good knowledge of the methods and techniques used.

Training
Training is clearly thorough and effective and the computerised training records contain adequate objective evidence of competency and links to the supporting data files. A recent staff appraisal identified that who started in November 2016, and two others, didn't have electronic training records, and this is being addressed.

All staff trained in a method test the Aquacheck PT samples received if they are available and there is sufficient sample available. The Z-scores are all summarised on a spreadsheet as an aid to identifying any trends or problems.

CPD: See DWTS below.

Methods

Written Procedures
The methods are long established, most of the water testing methods dating back to 1996, well documented and based on the SCA MEWAM 'Blue Book' methods. Appropriate tolerances are specified where required and there is sufficient detail to enable consistent application, and the methods are appropriate to the testing undertake.

The ion chromatography method (PA/IHT/4102) was rewritten as a general IC procedure following the total failure of a Dionex IC and its replacement by a new Metrohm IC.

Validation

The laboratory applied for DWTS in 2014 and all the drinking water chemical testing methods were reviewed to ensure compliance with DWTS and revalidated if not compliant.

The new IC method for anions was put into service with minimal verification that didn't meet DWTS requirements and will require full validation. The initial verification undertaken by the laboratory, included running the same calibration and check solutions as used on the previous instrument and comparing the results. An Aquacheck sample that had been tested on the Dionex was also used in the first few batches run on the new instrument, all the results gave similar and acceptable Z-scores. The on-going performance has been closely monitored and appears very similar to the Dionex performance. See also section covering DWTS below.

Re-evaluation of methods and performance: See DWTS below.

Estimation of Uncertainty

The laboratory has a long-established procedure (PA/IHP/0025) based on the Eurachem Guide and VAM Project 3.2.1, and accompanying spreadsheet for the estimation of uncertainty. The procedure was not assessed at this visit.

Accommodation and Environmental Conditions

The chemical laboratories are not air-conditioned, but have very high ceilings and very high temperatures are not likely to be a problem. Adequate working space appears to be rather limited with a lot of instrumentation on the benches. The facilities are spread over several rooms allowing separation of instrumentation and techniques.

Technical Records

Record keeping was very good and all the records requested were found very quickly. Worksheets are printed off the AIS LIMS and most results entered manually although the ICP-AES has electronic transfer. Many records, including calibration checks, are stored in laboratory notebooks; were easily found and stored beyond the 6-year storage time for other records.

Equipment

The laboratory is well equipped, although much of the instrumentation is quite old, and there are good records of internal maintenance and external service and repair. Each instrument has a maintenance log. A new Ion Chromatograph was purchased in November 2017 as an urgent replacement for the irreparable Dionex.

Calibration

Balances are calibrated annually by Precisa (UKAS 0428), and are checked before service, then calibrated after the service. This year's calibrations were on 23/01/18. The calibration of balance PA0899 was checked and it adequately covered the working range (0 – 220g with the lowest calibration at 0.2g) and the uncertainty was acceptable at ±0.00041g. There is a daily check weight at 100g and additional checks on Mondays to cover a wider range.

The reference thermometer (PA0854) was calibrated externally by Trescal on 27/04/16. Calibrations are 5-yearly and were satisfactory. The oven used for metals digestion was due to be temperature profiled on 24/05/17, but this had been overlooked and not done.

Pipettor PA1168 (10 ml variable volume) is checked every 3 months by means of 5 replicate weighings at 2.0, 5.0 and 10.0 ml, and the last check was in January this year.

Pipettor PA11315 (1.0 ml variable volume) was also checked in January at 0.1, 0.5 and 1.0 ml.

The ICP-OES is calibrated by three reference solutions plus a blank, but doesn't have any acceptability requirements for the metals calibrations, although the instrument software does have pass/fail criteria, but these don't appear to be understood.

System Suitability

System suitability requirements are well established and usually documented in the written procedure. Acceptability criteria were set appropriately. The new IC method will also include chromatographic requirements when sufficient data has been collected to assess the performance.

Maintenance

There is an instrument log for each instrument that includes details of calibration procedures, and internal maintenance and external service, repair and calibration. The Hach service reports for hot blocks, turbidity meter and colorimeters have details of calibrations undertaken by the service engineer and include reference numbers for the calibration sets used to enable full traceability.

Measurement Traceability

The laboratory has largely addressed the requirements for traceability with reference materials generally purchased from external sources and certificates of analysis from suitably accredited suppliers are on file e.g. Certificates from Sigma-Aldrich for turbidity, Inorganic Ventures for metals stocks. However there were a couple of methods witnessed, ammonia and chlorine, where the reference solutions are prepared in house from solid stock chemicals, which are unlikely to satisfy the more rigorous traceability requirements of ISO/IEC17025:2017. There would be benefit in the laboratory reviewing the traceability of all methods and determinands, to ensure the requirements of the new Standard are satisfied. QC solutions (CCV) are always prepared from different stocks to the calibration, and for some methods, the ability to prepare QC or calibration solutions in-house from pure chemical stocks, gives a benefit and enhanced ability to investigate problems. There are good records for the preparation of reference solutions including suppliers and batch numbers, weights/volumes taken, flasks used, solution expiry dates and analyst's initials.

Handling of samples

Samples are registered on an AIS LIMS, which produced worksheets. Further samples may be added manually to the worksheets if more samples are received during the day, particularly for tests like pH. Results are mainly manually entered into LIMS and authorised by a designated competent person, but there is some electronic transfer, and all reports are checked and signed by a designated competent senior member of staff.

Assurance of quality of tests

External Proficiency Testing

The laboratory subscribes to several schemes for chemical testing with good results, which for 2017 are summarised below:

Summary of PT Performance since 2017 UKAS visit (Environment Section)

AQUACHECK

Round 525 Sample 1S	Major inorganic components (soft water) See QA/C/2017/02,03	10/11
Round 525 Sample 2S	Nutrients and others (soft water)	7/7
Round 531 Sample 11	Non-specific determinands See QA/C/2017/04	4/5
Round 533 Sample 1S	Major inorganic components (soft water)	6/6
Round 533 Sample 2S	Nutrients and others (soft water) See QA/C/2017/05	4/5
Round 533 Sample 4 Metals	See QA/C,2017/06	6/7
Round 534 Sample 3B Free chlorine		1/1
Round 535 Sample 10 Nutrients		6/6
Round 535 Sample 12 Metals		12/12
Round 536 Sample 4G Metals in ground water		7/7
Round 537 Sample 3 Non-specific determinands		4/4
Round 537 Sample 5 Toxic metals		10/10
Round 538 Sample 3c Total chlorine		1/1

Round 539 Sample 17c Metals - waste water	16/16

NO_2 Intercomparison Exercise

January 2017	4/4
February 2017	4/4
March 2017	4/4
April 2017	4/4
May 2017	4/4
June 2017	4/4

LGC Air PT Scheme

Round 18 Samples 11A to 11D	4/4
Round 19 Samples 11A to 11D	4/4
Round 21 Samples 11A to 11D	4/4

PT results are all plotted on trend graphs, with data going back as far as 2003 for some determinands, and these charts show an impressive history of successful PT participation.

Of the four unacceptable/questionable results, only one (pH) was due to technical reasons. The investigation into the questionable result for pH in Aquacheck was examined. The investigation was well documented, the root cause identified, the impact of the result assessed. (The root cause identified the pH electrode filler cap hadn't been removed prior to using the electrode. This makes a very slight difference to the pH result, sufficient to give a questionable Z-score, but considered not sufficient to affect the results of samples significantly.)

QC Data Analysis and Corrective Actions

Standard solutions (CCVs) were used as both as QC samples and calibration checks for the methods witnessed, but duplicate samples are also tested and charts plotted. The charts for the methods witnessed had appropriate control limits and no significant adverse features. Control charts are reviewed every three months by the quality Manager. Failures are treated as calibration failures rather than QC failure so documentation is brief and reasons for the failure are not investigated. Better clarity is required between the calibration check role and the QC role.

Reporting

The report for sample 10179325 (private water supply sample) was examined as part of a vertical audit and found satisfactory. The UKAS mark was correctly used, the supporting sample information was included, the results reported had an appropriate number of significant figures, the units were clear, method codes were provided and the PCVs were also listed.

DWTS including vertical audits

The laboratory produces an annual DWTS performance summary for all the DWTS parameters, which in 2017 satisfied the Regulatory performance targets.

The failure of the Dionex IC used for anions, and rapid replacement with the Metrohm system put considerable pressure on the laboratory. Some samples were sub-contracted to an ISO 17025 accredited testing laboratory, however the laboratory chosen was not DWTS accredited and there is the possibility that some of the samples were compliance monitoring samples. The laboratory has been asked to identify any such samples and advise the client that testing did not meet the DWTS requirements.

The lack of validation of the new IC instrument would normally warrant suspension of the method, but the initial verification using the PT sample, and demonstration that the on-going performance of the AQC in precision and bias is similar to that achieved by the Dionex, suggests the method is fit for purpose, sufficient to allow continued use of the method pending full validation.

The laboratory re-evaluates its DWTS methods every 3 years and in 2017 the following methods were reviewed: lead, nitrite, pH, conductivity, turbidity, alkalinity, colour, and chlorine, concluded that the on-going performance was satisfactory and no methods required revalidation.

CPD
There is a procedure for CPD (1059), and a list of designated competent analysts/mangers (according to DWI requirements) in the Quality Manual, who countersign all test reports All staff apart from assistant scientists have CPD records.

The CPD record or (Senior Analyst) contains a good number of entries for 2017 and 2018 to date, but the entries are not categorised into different skills. CPD record includes five categories based on the Public Analysts' approach and these broadly cover the 9 categories of skills required for competent analysts listed in the DWI Guidance. All the entries are listed under the first category, so there is no evidence to show that the activities cover the range of skills required.

A vertical audit was undertaken on sample 10179325, a private water supply sampled on 29/01/18 and tested for lead by GF-AAS on 14/02/18. The audit included checking sample reception, traceability, analytical raw data including calibration, system suitability and AQC results, the final report and training records of the staff involved. The audit was largely satisfactory, the only finding relating to the digestion oven not being temperature profiled when due, which has already been identified.

Witnessed Activity (test/ calibration/ inspection/ audit*)	Performed By	Technical Assessor	Comments
4102 Anions by IC		PJW	New instrument
4523 Metals by ICP-AES			
4208 Colour			
4205 Turbidity			16 months employed
4520 Ammonia			
4219 Chlorine			Senior Scientist
			All the tests were competently demonstrated.

Technical Competence – Food and Water Microbiology (Chris Dixon)

Test Methods
Methods are a combination of those referenced against BS/ISO standards, Drinking Water standards and documented in house methods. The methods include those required for DWTS water testing. Each method is well documented and includes cross references to supporting procedures.

A number of water and food standard methods have been revised and re-issued. Some of the revisions have not been identified by the laboratory and others have been identified but not yet fully reviewed, see findings. Whilst some reviews may not identify the need for any technical changes, if method validation or verification is required, extension to scope applications would be needed. For Legionella testing, an extension to scope application is required, as the new version of the standard contains significant changes when compared with the previous versions which have now been combined.

The laboratory is reminded that when new versions of standards are issued and the laboratory wishes that standard year referenced on the schedule be revised, UKAS should be contacted. The amount of information UKAS will require, will vary from a simple comparison of versions, where

minimal changes are required by the laboratory, to methods requiring an extension to scope and validation work. The laboratory should not report work as accredited based on the new version of the standard until is in included on their scope of accreditation.

On-going method validity is confirmed by the participation in EQA and a range of IQA testing and process controls. Methods are considered fit for purpose.

The laboratory has an audit program for Performance Audits and test witnessing. Some Performance Audits need to be completed, see finding, Test witnessing audits appear to up to date. Those method audits reviewed contained sufficient detail. DWTS methods are witnessed on an annual basis.

Staff & Training

The laboratory has adequate staff and levels of supervision and experience for the work type and workload. As previously seen, methods were demonstrated with good technical competence and a good understanding of the activities been witnessed.

Two members of staff are designated competent persons responsible for DWTS work. Training records including CPD were reviewed and show on-going training is maintained. Records were also available to show participation in EQA and IQA. For all members of staff performing water testing a Performance Audit should take place for all methods over a three-year period. This program has not been fully maintained, see finding.

There is one designated food examiner who would oversee the testing of 'formal' food samples received from the Environmental Health Offices. Only one formal sample was received this year and that was part of an EHO training exercise.

External Proficiency Testing

External quality assurance is supplied by the LGC; Quality in Food and Water (Drinking water, bottled/mineral water recreational/surface water) and Public Health England, European Food Legislation and Legionella schemes. Overall EQA performance during 2017 was good, with eight anomalous results seen. These were across a range of tests and mostly had questionable Z-Scores, between 2-3.

Overall EQA coverage is good and the laboratory has a satisfactory plan in place for the purchase of 2018 samples. All DWTS methods are incorporated into the EQA plan.

Internal Quality Control

The laboratory uses a variety of internal quality controls on a monthly basis and process controls with each batch of samples. During 2017 and to date this year, planned monthly IQA testing was maintained.

Trend, Bias, Uncertainty of Measurement (UoM) and Limits of Detection.

The laboratory has procedures in place for reviewing trend, bias and calculating UoM. Data is used from EQA and IQA. A selection of graphs for food and water testing were reviewed and these were up to date with no obvious trend or bias. The laboratory is monitoring these graphs on an on-going basis. During the previous assessment it was identified that UoM data was included data going back several years. Historic data is now maintained separately, with UoM calculated over three-year blocks and compared every three years. Data is added on an ongoing basis. For 2015-2017 The UoM values were <10% for food methods except Enterobacteriaceae, which was 15%. For waters methods the laboratory uses 95% confidence level. Results seen for all methods were acceptable.

Low level inoculum, including some of <10cfu/25g, have been used to confirm acceptable levels of detection, for all of the detection methods.

Witnessed Activity (test/ calibration/ inspection/ audit*)	Performed By	Technical Assessor	Comments
Food Enumeration			
PA/IHT/6103 TACC 48h Spread plate PA/IHT/6103 TACC 72h Spread plate		Chris Dixon	All test methods demonstrated with good technical competency. All colony morphologies typical and confirmatory test gave expected results. Appropriate controls being used throughout.
PA/IHT/6104 TACC 48h Spiral plate			
PA/IHT/6107 Coagulase positive Staphylococci			
Pool and spa water			
PA/IHT/7606 Coagulase positive Staphylococci			
Drinking water (DWTS)			
PA/IHT/001 Heterotrophic Colony Count			
Food Detection			
PA/IHT/6501 Campylobacter			
PA/IHT/6513 Listeria			

Technical Competence – Food Chemistry (Andrew Jervis)

Follow up from previous visit
The laboratory had carried out validation on the new Gerhardt Vapodest nitrogen analyser, but the data generated had not been assessed for fitness for purpose by the laboratory. The laboratory would benefit from a procedure for the commissioning and validation of new items of equipment at the laboratory.

Test Method
The test methods are all available as controlled hard copy documents in the laboratory; they are readily available to the staff and were referred to by the staff demonstrating the procedures.
The methods are clearly written and detailed with good associated procedures detailing the use and calibration of the equipment.
Not all of the procedures are carried out on a routine basis, with competence being maintained through participation in relevant proficiency test schemes.
All witnessed procedures were demonstrated competently.

Staff & Training
Training records are maintained electronically within the LIMS system, detailing the training that has been received in the analytical procedures. The electronic training records contain details in the training in the individual analytical procedures with links to the location of the raw data that was generated.
The laboratory does however need to ensure that it has a procedure in place to record induction and training in the quality system.
The laboratory is staffed with well trained and experienced staff willing and able to discuss the issues that arose.

Quality Control
Quality control in the laboratory is achieved through the analysis of a combination of in house QC materials, certified reference materials, standards and duplicates.
The frequency of analysis of the quality control materials is defined in the individual analytical procedures.

Sample handing

Samples are allocated a unique number within the laboratory, which is traceable throughout. There are appropriate storage conditions for samples. Good aseptic technique was observed during testing and sample integrity maintained.

Media and reagents

All reagents and media seen during method demonstrations were in date and appropriately stored. Batch numbers of the media and reagents used were recorded, enabling full traceability.

Reference standards

With the exception of Legionella and Campylobacter freeze dried reference culture are obtained from NCTC. These are then stored on cryobeads before being put in to use. These reference cultures are appropriately stored and newly prepared cultures are checked for purity and characteristics. Cultiloops are used for Legionella and Campylobacter as these have been found to be more consistent. This is good traceability.

pH buffers were NIST traceable.

Equipment

The laboratories are well equipped for the present work load. External calibration records were reviewed for autoclaves, reference thermometer and balances. All external calibrations were performed by UKAS accredited calibration companies, covered an appropriate range of calibration and had been reviewed by the laboratory. Equipment was uniquely identified and correctly labelled.

Intermediate checks such as daily balance checks, pipette calibrations, spiral platter and incubator monitoring are being maintained. All equipment used, including for DWTS testing appeared clean and fully functional.

Records

Technical records were of a high standard throughout. There was good traceability of reagents, media and a record of staff performing tests. Records being maintained on the IT system were readily retrieved.

Facilities and Environmental Conditions

Access to the laboratory is controlled by electronic keypad. The microbiology department comprises of several rooms, with a logical work flow in place. This segregation of work limits the potential for cross contamination. The laboratory was clean and tidy.

A monthly environmental monitoring program is in place but has only been maintained for eight out of the twelve months, see findings. The previous twelve months period was reviewed and these support that a 'clean' work environment is being maintained. Where occasional out of specification results were seen, additional cleaning was implemented and follow-up sampling done. Environmental monitoring included; air plates (ACC &Y/M), contact plates (ACC) and swabs for pathogens.

Reports and Certificates

A selection of laboratory reports/certificates were reviewed, including all test methods listed on the visit plan. All were compliant with the requirements of ISO 17025. There was correct use of the UKAS symbol and appropriate disclaimers present where relevant.

Vertical audits

A vertical audit was carried out on a sample with >201 Coliforms MPN/100ml. This being detected from a Private Water Supply; sample number 10178468. The audit demonstrated comprehensive technical records are in place from sample receipt to reporting. There was good traceability for all stages of the tests with regards to staff, materials, equipment's and timings.

The data generated is plotted on electronic control charts that are maintained within the LIMS system.
Control charts were available for all of the tests for which they were requested, all showed evidence of regular use and review and were in control with no evidence of trend or bias. All control charts seen had appropriate ranges with action and warning limits set at two and three standard deviations respectively.

External Proficiency Testing

The laboratory participates in the FAPAS and LGC proficiency test schemes. The laboratory has a plan for participation in proficiency test schemes to cover all accredited tests over a two-year period.
The level of participation is such that it adequately covers all of the tests on the schedule of accreditation over a range of matrices.
The performance of the laboratory in these schemes is monitored on hard copy control charts. The performance of the laboratory has been very good, with no results for accredited tests outside the acceptable Z score range of ± 2 in the previous twelve months.
All control charts seen were in control with no evidence of any significant trend or bias.

Reference standards

All reference standards seen showed appropriate traceability to iso guide 34.

Equipment

All requested equipment records were readily available at the laboratory and had been completed to a good standard. Major items of equipment were uniquely identified and labelled appropriately with a calibration status label.
Balances are calibrated by an external UKAS accredited organisation on an annual basis all balances seen were labelled with a current calibration status. The balances are monitored on a daily basis using appropriate weights and records maintained in logbooks.
The laboratory timers were all uniquely identified and subject to an annual check against the speaking clock.
Laboratory autopipettes and dispensers are calibrated on a three-monthly basis using five aliquots at three points over the operating range.
Working thermometers in the laboratory were uniquely identified and calibration records were available that were traceable to externally calibrated thermometers.
Temperature profiling records were available for all of the ovens for which they were requested.

Records and Record Keeping

The standard of record keeping at the laboratory is high, with all requested records being readily available, having been completed to a good standard.

Uncertainty of measurement

The laboratory uses a spreadsheet that is common to a number of public analyst laboratories to calculate uncertainty of measurement using a combination of precision form repeatability data and bias from proficiency test performance.
The laboratory has a schedule to review the uncertainty budgets of its accredited tests and current data was available to demonstrate that the requirements of the schedule had been achieved with current uncertainty budgets available.

Facilities and Environmental Conditions

The laboratory facilities are good, with adequate segregation of working areas.

Reports and Certificates

The laboratory uses the UKAS symbol on its reports. A range of reports including a formal certificate were seen that included a combination of accredited and non-accredited tests along with opinions and interpretations. The reports meet the requirements of LAB1 and 'The national accreditation logo symbols conditions for use by UKAS and UKAS accredited organisations (February 2017)'.

Witnessed Activity (test/ calibration/ inspection/ audit*)	Performed By	Technical Assessor	Comments
PA/IHT/2450 The determination of sodium in food by ICP-OES.		A.P.Jervis	The procedure was witnessed to include sample digestion by microwave, preparation and traceability of calibration standards, instrument set up, system suitability, calibration, sample analysis and quality control.
PA/IHT/0217 The determination of the fat content of food by Soxhlet extraction.			The procedure was witnessed to include sample handling and preparation, use of drying oven, Soxhlet extraction, solvent handling and recycling, drying of oil, quality control, calculation and reporting of results.
PA/IHT/0003 The determination of ash in food and animal feedingstuffs.			The procedure was witnessed to include sample handling, use and profiling of furnaces, sample handling, quality control, calculation and reporting of results.
PA/IHT/0081 The determination of the acidity of wine by titration using bromothymol blue indicator.			The procedure was witnessed to include sample reflux, titration, quality control, calculation and reporting of results.
PA/VEM/0381 Calculation of the energy value of food.			The procedure was compared to the food labelling regulations EU 1169-2011, the procedure was witnessed within the LIMS system along with validation of the calculations.
PA/VEM/0247 The determination of the dry soluble residue in products processed from fruit, vegetables and honey.			The procedure was witnessed to include use of refractometer, quality control, calculation and reporting of results.
PA/VEM/0157 The determination of TVN (or TVB) in flesh foods.			The procedure was witnessed to include sample handling, distillation, titration, calculation and reporting of results.
PA/IHT/0152 The determination of mercury in food by cold vapour AAS			The procedure was witnessed to include microwave digestion, standard preparation and traceability, instrument set up and calibration, sample analysis, quality control, calculation and reporting of results.
PA/IHT/0307 The determination of the freezing point depression of milk by the thermistor cryoscope.			The procedure was witnessed to include instrument set up and system suitability, sample analysis and quality control.

Next Steps

Submission of evidence to address the mandatory findings raised within the agreed timescale. Objective evidence to demonstrate that the mandatory findings requiring close out action have

been suitably addressed is to be submitted electronically by email to UKAS at customerservices@ukas.com both your UKAS reference number(s) and the project number within the subject field. You should receive notification from UKAS that this evidence has been received within three working days of submission. NB: If this notification is not received, please contact UKAS. In order to ensure reliable delivery we request that all emails to be kept below approximately 5MB, if a large amount of data is to be submitted we request that multiple emails are used marked 1 of x, 2 of x to x of x etc. Where no evidence has been requested please indicate the action taken on the Improvement Action Summary form (IASF). Please use a separate form for each assessor.

Note: the laboratory is advised that if corrective action evidence supplied does not clear the nonconformities raised within two submissions of evidence, a review will be carried out with the expectation that an extra visit will be necessary to review actions taken and their implementation with the organisation.

NOTE: The laboratory is reminded of the importance of keeping UKAS informed of any changes to equipment, resources and personnel which could impact on the laboratories ability to maintain its accreditation to ISO/IEC 17025:2005 and DWTS. Where changes to methods are identified, UKAS must be informed before results can be reported as accredited using the amended test methods.

The Laboratory is to submit a number of Extensions to Scope, specifically Legionella Method for the changes following the update to the new version of the standard and an application to extend the scope of the Flexible Scope procedure to include classical techniques and animal feeds.

References (if applicable)

ISO/IEC 17025:2005
LAB 39
LAB 37
TPS 47
BEIS Publication – Accreditation Logo and Symbols, Conditions of use (February 2017)

Appendices (if applicable)

Improvement Action Report