DUBAI ACCREDITATION DEPARTMENT

REPORT ON PTP 198TH INTER-LABORATORY PROFICIENCY TESTING PROGRAM DETERMINATION OF WASTE WATER ANALYSIS USING ULTRACHECK™ QUALITY CHECK SAMPLES

Date: 22 November 2010

1. INTRODUCTION

This document presents the results of the 198th inter-laboratory proficiency testing program conducted during the month of October involving the analysis of quality check samples for waste water analysis using **Ultra check™ Quality Check Samples** with thirteen (13) participating laboratories.

This program is part of the Inter-laboratory Comparison Programs organized by Dubai Accreditation Department (DAC) of Dubai Municipality (DM) for monitoring the validity of test results of laboratories operating in Dubai as a requirement of the Law No. 2/2010 and ISO/IEC 17011: 2004.

2. EXPERIMENTAL DESIGN

2.1 Participants:

Thirteen laboratories participated in this program. Eleven of them are private laboratories and only one is governmental. All laboratories are operating in Dubai and working on environmental waste water analysis, in addition to one participant from Qatar.

2.2 Samples tested:

The following samples were distributed

2.2.1 ULTRAcheck WP & DMR – QA Demands Sample
Catalog No. QCI-735
This consists of ampoules with instructions for dilution and preparation
Tests to be carried out: Biochemical oxygen demand (BOD) as per APHA-5210B and Chemical oxygen demand (COD) as per APHA-5220 B/ APHA-5220 C/ APHA-5220 D

2.2.2 ULTRA check Trace Metals Sample – Part A
Catalog No. QCI-700A
This consists of ampoules with instructions for dilution and preparation
Tests to be carried out: Trace metals, Cu, Cd, Pb, Ni, Zn, Cr, Co, Fe, Mn, and Ag as per APHA-3030 (3111/3113/3120).

2.2.3 ULTRAcheck Solids Sample

Catalog No. QCI-711

This consists of ready-to-use water samples

Tests to be carried out: Total dissolved solids (TDS) as per APHA-2540C and Total suspended solids (TSS) as per APHA-2540D.

2.2.4 ULTRAcheck Oil & Grease Sample

Catalog No.QCI - 770.

This consists of ampoules with instructions for dilution and preparation.

Tests to be carried out: Oil & grease as per APHA-5520 B / APHA-5520 C / APHA-5520 D.

Sample preparation:

Sample preparation is as per the enclosed ULTRAcheck instructions.

3. CONFIDENTIALITY

Each laboratory is given a code number to maintain confidentiality of results and to protect their identities. Only the concerned laboratory knows its code number.

4. TEST METHOD

Instructions were given to the participants to test the samples for APHA-AWWA- WEF 20th Ed. 1998.

5. TEST RESULTS

5.1 Upon receipt of the test results from the participating laboratories, the sealed envelopes containing the Certificate of Analysis of the samples distributed were opened. The certified "Assigned value" and "Advisory Range" as given in the Certificates are shown in the third and fourth column of Table (1) - Appendix A. Copies of the Certificates of Analysis are given in the Appendix B.

5.2 The test results submitted by the participating laboratories are also given in Table (1). In order to protect the identities of the participating laboratories, each one was assigned a code number.

5.3 Table (1) also indicates whether the participating laboratory's results are within (Pass) or (Fail) i.e. outside the "Advisory Range".

5.4 Only six laboratories were capable to test all the parameters included in RM certificate the other seven reported only 15 parameters, therefore, the inter-laboratory comparisons is based on the number of parameters which are tested by the participant laboratory and fail results are highlighted in yellow color and pass/fail results are calculated as per the number of parameter reported by the participant appendix A.

5.5 From thirteen participants only four laboratories test the mercury parameter, but, unfortunately their results are outlier the advisory range.

5.6 For lab 2 although only one parameter is highlighted in yellow as outlier, but, the value (56) is very close to the upper value (39.6-55.6) of the advisory range, while the other 25 parameters were correctly determined and this deference was neglected and, consequently, all the results reported by the laboratory are acceptable, the same argument can be applied for lab49 for oil and grease parameter (38) compared with advisory range (38.7-58.4).

6. EVALUATION OF RESULTS

Outliers Results

Test Parameter	Labs with Outlier Results
TSS	**Lab 19; Lab 22**
COD	**Lab 27**
Oil & Grease	**Lab EX4**
Mercury	**Lab EX4; Lab IN02; Lab 23; Lab 27**
Trace Metal Vanadium (V)	**Lab 23**
Trace Metal Strontium (Sr)	**Lab IN02; Lab 23**
Trace Metal Iron (Fe)	**Lab IN02**
Trace Metal Lead (Pb)	**Lab IN02; Lab 27**
Trace Metal Manganese(Mn)	**Lab IN02**
Trace Metal Copper (Cu)	**Lab 23**
Arsenic(As)	**Lab EX4**
Thallium(Tl)	**Lab EX4**
Boron(B)	**Lab IN02; Lab EX4**
Nickel(Ni)	**Lab IN02**
Selenium(Se)	**Lab IN02; Lab 37**
Barium(Ba)	**Lab IN02**
Molybdenum(Mo)	**Lab IN02**

The test results provided by the above mentioned laboratories are outside the advisory limits. The above mentioned laboratories are requested to investigate the root cause of the outlier results, implement corrective action and a report shall be available upon need by the assessment team during the nearest assessment visit.

7. APPENDICES

7.1 Appendix A: Table (1) Summary of results

7.2 Appendix B:
7.2.1 ULTRA check WP & DMR – QA Demands Sample, Catalog No. QCI-735
7.2.2 ULTRA check Trace Metals Sample – Part A, Catalog No. QCI-700A
7.2.3 ULTRA check Solids Sample, Catalog No. QCI-711
7.2.4 ULTRA check Oil & Grease Sample, Catalog No. QCI-770.

---- End of Report ---

Appendix A: Table (1) Assigned value; Advisory range and Summary of results

Lab Code				Lab. 4	Lab. 2	Lab. G 02	Lab. 19	Lab. 22	Lab. 23	Lab. EX4	Lab. 49	Lab. IN02	Lab. 27	Lab. 28	Lab. 79	Lab. 37
Laboratory Name				Al hoty	Exsova	EHS	EIL	Geochem	GTL	Gulf L.Q.	Inspectorate	Intertek	Lonestar	Mlab	Matcon	SGS
S. No.	Parameters	Assigned Value	Advisory Range													
	TDS	3110 ± 16 µg/L	2670 – 3550	**3096**	**3179**	**3114**	**3335**	**3274**	**3190**	**3170**	**3172**	**3098**	**3240**	**3202**	**3195**	**3178**
	TSS	110 ± 3 µg/L	96 – 121	**96**	**116**	**109**	**80**	**84**	**111**	**103**	**110**	**116**	**110**	**116**	**115**	**99**
	TS	3270 ± 10 µg/L	2940 – 3600							**3276**				**3350**	**3382**	
1	TOC	82.9 ± 0.8 mg/L	73.6 – 91.2													
2	CBOD	205 ± 2 mg/L	71 – 226													
3	Oil& Grease	52.1 ± 0.1 mg/L	38.7 – 58.4	49	47	52.6	52.5	50	48	15.1	38	52	46	n.d.	48	48
4	BOD	205 ± 2 mg/L	87 – 226	160	122	138	142	150	140	n.d.	128	187	105	137	138	145
5	COD	210 ± 2 mg/L	175 – 231	200	205	208	208	200	190	n.d.	213	209	160	196	196	209
6	Cadmium – Cd	400 ± 4 µg/L	360 – 440	420	419	408	421	413	388	407	435	439	375	404	400	398
7	Chromium – Cr	200 ± 2 µg/L	180 – 220	210	208	198	202	195	192	210	206	217	184	203	205	199
8	Cobalt – Co	300 ± 3 µg/L	270 – 330	320	308	300	312	312	303	299	323	312	296	301	300	294
9	Copper – Cu	100 ± 1 µg/L	90 – 110	90	103	103	106	103	992	104	105	107	102	102	99	99
10	Iron – Fe	800 ± 8 µg/L	720 – 880	810	797	802	828	810	793	849	851	1000	770	793	805	n.d.
11	Lead – Pb	900 ± 9 µg/L	810 – 990	930	902	923	910	915	884	928	946	1137	806	894	905	901
12	Manganese - Mn	100 ± 1 µg/L	90 – 110	100	99	97	100	102	97	105	105	130	102	99	100	98
13	Nickel – Ni	900 ± 9 µg/L	810 – 990	920	977	890	920	915	888	939	952	1003	862	890	899	895
14	Silver – Ag	50.0 ± 0.5 µg/L	44.8 – 55.0	50	51	51	50	50	50	51	52	55	51	52	49	50
15	Zinc – Zn	500 ± 5 µg/L	450 – 552	500	520	478	505	499	493	524	520	507	503	504	501	459
16	Mercury	2.00 ± 0.02 µg/L	1.52 – 2.59	n.d *	n.d	n.d.	n.d.	n.d.	14	5.09	n.d.	< 10	0.6	n.d.	n.d.	n.d.
17	Selenium– Se	50.0 ± 0.5 µg/L	39.6 - 55.6		56				46	n.d.		14	53			99
18	Arsenic– As	250 ± 3 µg/L	222- 280		255				261	42		255	252			249
19	Strontium – Sr	1000 ± 10 µg/L	900 - 1100		1003				10460	988		125	n.d.			978
20	Barium – Ba	200 ± 2 µg/L	180 - 220		208				199	208		225	185			199
21	Molybdenum -Mo	600 ± 6 µg/L	539 - 660		596				587	619		779	586			579
22	Thallium - Tm	100 ± 1 µg/L	70 – 124		108				96	230		n.d.	n.d.			104
23	Vanadium - V	300 ± 3 µg/L	270 - 330		300				185.8	310		290	284			299
24	Aluminium -Al	650 ± 7 µg/L	558 - 740		680				637	609		728	620			n.d.
25	Antimony as - Sb	50 ± 0.5 µg/L	30.0 - 58.6		52				52	n.d.		53	42			51
26	Beryllium - Be	200 ± 2 µg/L	179 – 220		212				202	196		205	200			187.8
27	Boron - B	600 ± 6 µg/L	538 - 668		633				609	488		842	560			550
parameters correctly determined out of total parameters				15/15	26/26	15/15	14/15	14/15	23/27	19/24	15/15	16/26	22/25	15/15	16/16	23/24

* : the parameter is not detected by laboratories

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

WP & DMR-QA Demands Sample

Catalog Number: QCI-735

Code Number: 72623

This ULTRAcheck® sample was gravimetrically prepared, and the analyte concentrations were confirmed using the analytical technique listed. Concentrations are traceable to the NIST standard reference materials (SRMs) listed. The reference value represents the determined value when the sample has been prepared according to instructions.

Analyte	Assigned Value		Analytical Method	NIST SRM	Advisory Range *
TOC	82.9 ± 0.8	mg/L	EPA Method 415.1	N/A	73.6 - 91.2
COD	210 ± 2	mg/L	EPA Method 410.4	N/A	175 - 231
BOD	205 ± 2	mg/L	EPA Method 405.1	N/A	87 - 226
CBOD	205 ± 2	mg/L	EPA Method 405.1	N/A	71 - 226

Note, the assigned values for BOD and CBOD represent the actual concentration of glucose and glutamic acid present in the sample after preparation. The advisory range represents the range of acceptable values for these parameters based upon the initial concentration of glucose and glutamic acid..

* Calculated from the NELAC Non-Potable Water Fields of Testing Document, effective 1/1/09.

A2LA ACCREDITED

ISO 17025 Accredited A2LA Cert. No. 0851-01

ISO 9001:2000 Registered TUV USA, Inc Cert. No. 09-1009

250 Smith Street, North Kingstown, RI 02852 USA
401-294-9400 Fax: 295-2330
www.ultrasci.com

William J. Leary
Quality Assurance Manager

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

Trace Metals Sample

Catalog Number: QCI-700A

Code Number: 79767

This ULTRAcheck™ sample was gravimetrically prepared, and the analyte concentrations were confirmed using the analytical technique listed. Concentrations are traceable to the NIST standard reference materials (SRMs) listed. The true values represent the gravimetrically determined values when the sample has been prepared according to instructions. Uncertainties are calculated as two times the manufacturing precision of the concentrates.

Analyte	Assigned Value		Analytical Method	NIST SRM	Advisory Range*
aluminum	650 ± 7	µg/L	ICP	3101a	558 - 740
antimony	50.0 ± 0.5	µg/L	ICP	3102a	30.0 - 58.6
arsenic	250 ± 3	µg/L	ICP	3103a	222 - 280
barium	200 ± 2	µg/L	ICP	3104a	180 - 220
beryllium	200 ± 2	µg/L	ICP	3105a	179 - 220
boron	600 ± 6	µg/L	ICP	3107	538 - 668
cadmium	400 ± 4	µg/L	ICP	3108	360 - 440
chromium	200 ± 2	µg/L	ICP	3112a	180 - 220
cobalt	300 ± 3	µg/L	ICP	3113	270 - 330
copper	100 ± 1	µg/L	ICP	3114	90 - 110
iron	800 ± 8	µg/L	ICP	3126a	720 - 880
lead	900 ± 9	µg/L	ICP	3128	810 - 990
manganese	100 ± 1	µg/L	ICP	3132	90 - 110
molybdenum	600 ± 6	µg/L	ICP	3134	539 - 660
nickel	900 ± 9	µg/L	ICP	3136	810 - 990
selenium	50.0 ± 0.5	µg/L	ICP	3149	39.6 - 55.6
silver	50.0 ± 0.5	µg/L	ICP	3151	44.8 - 55.0
strontium	1000 ± 10	µg/L	ICP	3153a	900 - 1100
thallium	100 ± 1	µg/L	ICP	3158	70 - 124
vanadium	300 ± 3	µg/L	ICP	3165	270 - 330
zinc	500 ± 5	µg/L	ICP	3168a	450 - 552

* Calculated from the NELAC Non-Potable Water Fields of Testing Document, effective 1/1/09.

A2LA ACCREDITED

ISO 17025 Accredited A2LA Cert. No. 0851-01

ISO 9001:2000 Registered TUV USA, Inc. Cert. No. 09-1009

250 Smith Street, North Kingstown, RI 02852 USA
401-294-9400 Fax: 295-2330
www.ultrasci.com

William J. Leahy
Quality Assurance Manager

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

Solids Sample

Catalog Number: QCI-711

Code Number: 78767

This ULTRAcheck® sample was gravimetrically prepared, and the analyte concentrations were confirmed using the analytical technique listed. Concentrations are traceable to the NIST standard reference materials (SRMs) listed. Reference values are determined experimentally when the sample has been prepared according to instructions.

Test	Reference Value	Analytical Method	NIST Traceability	Advisory Range*
filterable residue (TDS)	3110 ± 16 mg/L	EPA Method 160.1	gravimetric	2670 - 3550
non-filterable residue (TSS)	110 ± 3 mg/L	EPA Method 160.2	gravimetric	96 - 121
total residue (TS)	3270 ± 10 mg/L	EPA Method 160.3	gravimetric	2940 - 3600

* Calculated from the NELAC Non-Potable Water Fields of Testing Document, effective 1/1/09.

ACCREDITED

ISO 17025
Accredited
A2LA
Cert. No. 0851-01

ISO 9001:2000
Registered
TUV USA, Inc.
Cert. No. 09-1009

250 Smith Street, North Kingstown, RI 02852 USA
401-294-9400 Fax: 295-2330
www.ultrasci.com

William J. Leary
Quality Assurance Manager

ULTRA SCIENTIFIC
Analytical Solutions

Certificate of Analysis

Oil and Grease Sample

Catalog Number: **QCI-770**

Code Number: **78288**

This ULTRAcheck™ sample was gravimetrically prepared, and the analyte concentrations were confirmed using the analytical technique listed. Concentrations are traceable to the NIST standard reference materials (SRMs) listed. The reference value represents the determined value when the sample has been prepared according to instructions.

Test	Reference Value		Analytical Method	NIST Traceability	Advisory Range*
Total Grease and Oil	52.1 ± 0.1	mg/L	EPA Method 1664	gravimetric	38.7 - 58.4

* Calculated from the NELAC Non-Potable Fields of Testing Documents, effective 1/1/09.

A2LA ACCREDITED

ISO 17025:2005
Accredited
A2LA
Cert. No. 0851-01

ISO 9001:2008
Registered
TUV USA, Inc.
Cert. No. 09-1009

250 Smith Street, North Kingstown, RI 02852 USA
401-294-9400 Fax: 295-2330
www.ultrasci.com

William J. Leary
Quality Assurance Manager