DUBAI ACCREDITATION DEPARTMENT

REPORT ON PTP 182TH INTER-LABORATORY PROFICIENCY TESTING PROGRAM DETERMINATION OF WASTE WATER ANALYSIS USING ULTRACHECK™ QUALITY CHECK SAMPLES

Date: 29 October 2009

1. INTRODUCTION

This document presents the results of the 182nd inter-laboratory proficiency testing program conducted during the month of October involving the analysis of quality check samples for waste water analysis using **Ultracheck™ 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 Local Order 52/1990 and ISO/IEC 17011: 2004.

2. EXPERIMENTAL DESIGN

2.1 Participants:

Thirteen laboratories participated in this program. Eleven of them are private laboratories and one is governmental are accredited by DAC for environmental waste water analysis, and 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 ULTRAcheck 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.

2.3 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 first half 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 given in the second half of 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 outside (Fail) the "Advisory Range".

5.4 The inter-laboratory comparisons is based on the number of parameters which are tested by all participants, however, pass/fail results which are highlighted in yellow color are calculated as per the number of parameter reported by the participant. Extra parameters were reported only by three laboratories, these are retained in appendix A not for inter-laboratory comparison, but, for the concerned laboratories to evaluate the competent of their results by themselves.

6. EVALUATION OF RESULTS

Outliers Results

Test Parameter	Labs with Outlier Results
TSS	**Lab 2 ; Lab G02; Lab EX4; Lab 23; Lab 28; Lab 79**
TDS	**Lab G02**
Oil & Grease	**Lab EX4; Lab 19**
Trace Metal Cadmium (Cd)	**Lab G02**
Trace Metal Chromium (Cr)	**Lab G02**
Trace Metal Iron (Fe)	**Lab IN02**
Trace Metal Lead (Pb)	**Lab G02;**
Trace Metal Manganese(Mn)	**Lab IN02**
Trace Metal Silver (Ag)	**Lab 19; Lab 23; Lab 28**

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.

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7. APPENDICES

7.1 Appendix A: Table (1) Summary of results

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

---- End of Report ---

Determination of Water Analysis Using Ultracheck™ Quality Check Samples

Appendix A: Table (1) Summary of results

S. No.	Parameters	Assigned Value	Advisory Range	Lab. 4	Lab. 79	Lab. 28	Lab. G 02	Lab. 23	Lab. IN2	Lab. 19	Lab. 37	Lab. 2	Lab. 22	Lab. 49	Lab. 27	Lab. EX4
1	TDS	650 ± 18 mg/L	550 – 750	588	702	680	778	690	658	596	648	632	589	590	665	671
2	TSS	127 ± 3 mg/L	112 – 139	116	108	106	106	104	129	124	120	109	118	114	113	110
3	Oil& Grease	60 ± 0.1 mg/L	45.3 – 66.7	59	57	55	65	55	57	43	58	52	50	52.8	53	42.5
4	BOD	103 ± 1 mg/L	44 – 113	62	60	60	59	65	65	75	-	61	69	68.1	58	-
5	COD	105 ± 1 mg/L	86 – 116	96	103	106	101	100	101	113	99	103	109	99.2	99	-
6	Cadmium – Cd	200 ± 2 µg/L	180 – 220	202	209	205	223	210	210	202	201	206	200	203	201	218
7	Chromium – Cr	1000 ± 10 µg/L	900 – 1100	1100	1005	973	1176	1040	1030	957	1009	1000	950	979	1010	1094
8	Cobalt – Co	1000 ± 10 µg/L	900 – 1100	1060	1037	990	1027	1048	1050	980	1004	980	930	1020	1007	992
9	Copper – Cu	300 ± 3 µg/L	270 – 330	301	308	307	299	310	320	300	306	324	300	292	315	293
10	Iron – Fe	700 ± 7 µg/L	630 – 770	713	725	720	737	729	860	679	755	696	680	734	700	745
11	Lead – Pb	600 ± 6 µg/L	540 – 660	600	615	595	1146	630	630	582	598	602	590	618	612	593
12	Manganese - Mn	800 ± 8 µg/L	720 – 880	802	808	801	802	819	950	784	806	765	770	816	800	865
13	Nickel – Ni	300 ± 3 µg/L	270 – 330	301	321	312	312	330	320	302	304	305	290	310	310	318
14	Silver – Ag	200 ± 2 µg/L	180 – 220	190	192	170	205	482	210	146	202	203	190	203	203	216
15	Zinc – Zn	900 ± 9 µg/L	810 – 990	874	934	901	932	930	910	877	903	921	840	877	907	897
16	Mercury	10.0 ± 0.1 µg/L	7.4 – 12.3					9			5.1					
17	Selenium– Se	250 ± 3 µg/L	211- 275					203	200		505.8					
18	Arsenic– As	50.0 ± 0.5 µg/L	41.5 – 57.7					40	48		59.5					
19	Strontium – Sr	600 ± 6 µg/L	540 - 660					596	650		602					
20	Barium – Ba	800 ± 8 µg/L	720 - 880					836	880		800.6					
21	Molybdenum -Mo	100 ± 1 µg/L	86 - 113					100.4	110		101.2					
22	Thallium - Tm	30.0 ± 0.3 µg/L	5.9 – 46.4					30			30.1					
23	Vanadium - V	600 ± 6 µg/L	540 - 660					637	580		604.9					
24	Aluminium -Al	200 ± 2 µg/L	158 - 248					200	200		201					
25	Antimony as - Sb	200 ± 2 µg/L	151 - 226					220.2	320		185.4					
26	Beryllium - Be	100.0 ± 1.0 µg/L	88.7 – 110.0					99			100.9					
27	Boron - B	200 ± 2 µg/L	180.- 227					211	200		200.4					
Number of parameters determined correctly out of 15				15/15	14/15	13/15	10/15	13/15	13/15	13/15	14/14	14/15	15/15	15/15	15/15	11/13

– : Means the parameter is not determined by laboratories

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Certificate of Analysis

Oil and Grease Sample

Catalog Number: QCI-770

Code Number: 77444

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	60.0 ± 0.1	mg/L	EPA Method 1664	gravimetric	45.3 - 66.7

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

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www.ultrasci.com

See Reverse For Additional Information

William J. Leary
Quality Assurance Manager

ULTRA SCIENTIFIC
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Certificate of Analysis

WP & DMR-QA Demands Sample

Catalog Number: QCI-735

Code Number: 79540

This ULTRAcheck(TM) 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	41.7 ± 0.4	mg/L	EPA Method 415.1	N/A	37.0 - 45.9
COD	105 ± 1	mg/L	EPA Method 410.4	N/A	86 - 116
BOD	103 ± 1	mg/L	EPA Method 405.1	N/A	44 - 113
CBOD	103 ± 1	mg/L	EPA Method 405.1	N/A	36 - 113

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.

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Certificate of Analysis

Trace Metals Sample

Catalog Number: QCI-700A

Code Number: 72434

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	200 ± 2	µg/L	ICP	3101a	158 - 248
antimony	200 ± 2	µg/L	ICP	3102a	151 - 226
arsenic	50.0 ± 0.5	µg/L	ICP	3103a	41.5 - 57.7
barium	800 ± 8	µg/L	ICP	3104a	720 - 880
beryllium	100.0 ± 1.0	µg/L	ICP	3105a	88.7 - 110.0
boron	200 ± 2	µg/L	ICP	3107	180 - 227
cadmium	200 ± 2	µg/L	ICP	3108	180 - 220
chromium	1000 ± 10	µg/L	ICP	3112a	900 - 1100
cobalt	1000 ± 10	µg/L	ICP	3113	900 - 1100
copper	300 ± 3	µg/L	ICP	3114	270 - 330
iron	700 ± 7	µg/L	ICP	3126a	630 - 770
lead	600 ± 6	µg/L	ICP	3128	540 - 660
manganese	800 ± 8	µg/L	ICP	3132	720 - 880
molybdenum	100 ± 1	µg/L	ICP	3134	86 - 113
nickel	300 ± 3	µg/L	ICP	3136	270 - 330
selenium	250 ± 3	µg/L	ICP	3149	211 - 275
silver	200 ± 2	µg/L	ICP	3151	180 - 220
strontium	600 ± 6	µg/L	ICP	3153a	540 - 660
thallium	30.0 ± 0.3	µg/L	ICP	3158	5.9 - 46.4
vanadium	600 ± 6	µg/L	ICP	3165	540 - 660
zinc	900 ± 9	µg/L	ICP	3168a	810 - 990

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

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Certificate of Analysis

Solids Sample

Catalog Number: QCI-711

Code Number: 73216

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)	650 ± 18 mg/L	EPA Method 160.1	gravimetric	550 - 750
non-filterable residue (TSS)	127 ± 3 mg/L	EPA Method 160.2	gravimetric	112 - 139
total residue (TS)	780 ± 11 mg/L	EPA Method 160.3	gravimetric	700 - 860

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

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Certificate of Analysis

Trace Metals Sample - Mercury

Catalog Number: QCI-700B

Code Number: 73442

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	True Value	Analytical Method	NIST SRM	Advisory Range*
mercury	10.0 ± 0.1 µg/L	ICP	3133	7.4 - 12.3

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

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