

REPORT TO PARTICIPANTS IN THE ABRAXIS MICROCYSTINS PROFICIENCY TESTING PROGRAM

SHIPMENT WEEK OF 04/06/2015

Sample Set #01



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ABRAXIS

54 Steamwhistle Drive

Warminster, PA 18974

Phone: (215) 357-3911

Fax: (215) 357-5232

Email: info@abraxiskits.com

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Authorization
This report has been authorized by Fernando Rubio, President and CSO of Abraxis, LLC 

1.0 INTRODUCTION

The Microcystins Proficiency Testing Program was intended to satisfy the increasing international demand for services and products for conformity assessment in the field of cyanotoxin analysis.

Test materials for the Microcystins Proficiency Testing Program were shipped to participants during the week of April 6, 2015. To maintain confidentiality of results, each subscriber laboratory was given a site identification number.

A total of 43 participants from 6 countries (Brazil, Canada, France, Uruguay, Russia, and the United States) enrolled in the proficiency program returning results by May 29, 2015 (see Table 1). Some laboratories reported results by more than one method resulting in 51 site identification numbers assigned. One laboratory (L005) did not submit results.

Table 1 – Participating Laboratories

Abraxis
Alberta Centre for Toxicology University of Calgary
California Animal Health & Food Safety (CAHFS)
California Department of Fish and Game
CARSO LSEHL
Central Ontario Analytical Laboratory
City of Bloomington
City of Hamilton
City of Lawrence
City of Philadelphia Water Department
City of Tulsa
Companhia de Agua e Esgoto de Ceara
Companhia de Saneamento de Minas Gerais
Companhia de Tecnologia de Saneamento Ambiental
Companhia Estadual de Aguas e Esgoto
Companhia Pernambucana de Saneamento
Empresa Baiana de Saneamento
ENDETEC - CAE Grand Ouest
Eurofins Eaton Analytical, Inc.
Florida Department of Environmental Protection
GIE des Laboratoires - CAE94
GreenWater Laboratories
IANESCO
Illinois EPA

Iowa State University Veterinary Diagnostic Laboratory
King County Environmental Lab
Laboratoire des Pyrenees et des Landes
Laboratorio OSE-Hidrobiologia
Laboratorio OSE-Quimica
Laboratorio OSE-UGD
Laboratorio Techologic del Uruguay (LATU)
LACEN/PE
Lake Superior State University
Metro Vancouver - SCFP
Midwest Laboratories, Inc.
Ohio EPA
Rhode Island State Health Laboratory
Saskatchewan Disease Control Laboratory
Stylab LLC
U.S. EPA Region 7
U.S. EPA Region 9 Laboratory
Virginia Commonwealth University
Westchester County Department of Laboratories and Research

2.0 PREPARATION OF TEST MATERIALS

Test materials consisted of a total of 6 samples (3 drinking and 3 surface waters) fortified with either purified Microcystin-LR or -LA congener (see Table 2).

Table 2 – Test Materials

	Matrix	Spiking Material
Sample A	Surface Water	None
Sample B	Surface Water	Microcystin-LR
Sample D	Drinking Water	Microcystin-LR
Sample E	Drinking Water	None
Sample F	Drinking Water	Microcystin-LA
Sample G	Surface Water	Microcystin-LA

Drinking water was collected from the Warminster public water system at 54 Steamwhistle Drive, Warminster, PA, USA. To quench the chlorine, sodium thiosulfate at a concentration of 100 mg/L was added and mixed well prior to fortifying the samples. Samples were spiked with an outside certified (when available) solution of a Microcystin congener. Samples B and D were spiked to a theoretical concentration of 1.5 and 1.25 µg/L Microcystin-LR, respectively, while Samples F and G were spiked to a theoretical concentration of 1.0 and 1.05 µg/L Microcystin-LA, respectively. Individual vials were aliquoted into glass bottles with Teflon lined caps and stored frozen until shipment.

Surface water was collected from a local lake and filtered. Samples were spiked with an outside certified (when available) solution of a Microcystin congener. Individual vials were aliquoted into glass bottles with Teflon lined caps and stored frozen until shipment.

Samples were bottled in 75 mL aliquots in glass bottles for participants using instrumental analysis and in 5 mL aliquots in glass vials for participants employing ELISA or Phosphatase methodologies.

Two samples of each of the test materials (2 unspiked and 4 spiked) were stored under four conditions (frozen, 4°C, room temperature, i.e., ambient and 37°C) for two months. All samples were analyzed for Microcystins using an ELISA-ADDA method initially and again at the end of two months. The results are shown in Appendix I. It was concluded that all test materials were stable during the testing period.

Instructions for use (Appendix II) and report forms (Appendix III) were distributed with the test materials to the participants.

3.0 RESULTS

3.1. Calculation of the Assigned Value

The assigned value is the best estimate of the true value of X. Since methods used for the measurement of Microcystins can have different detection responses to a given Microcystin congener, the assigned values will be different for different methods. For example, test materials used for this program were spiked with Microcystin-LR and Microcystin-LA. The assigned values were therefore calculated from the results reported by the participants using the “robust mean” (ISO 13528 Annex C) for each spiked sample (Samples B, D, F and G) for each method. A summary of assigned values is given in Table 3. As recommended by Horwitz (1988), no assigned values were determined for the following methods since less than 8 participants used these methods:

- Phosphatase
- Semi-quantitative ELISA Strip Test (Abraxis P/N 520022)
- ELISA-B (Beacon Cat# 20-0068)
- ELISA-Tube (Abraxis P/N 520012)

Table 3 – Assigned Values

Test Method	Proficiency Samples (µg/L or ppb)					
	A	B	D	E	F	G
Instrumental (e.g., LC-MS)	ND	1.99	1.22	ND	0.61	0.60
ELISA-ADDA	ND	1.77	1.25	ND	1.10	1.24
ELISA-DM	ND	1.94	1.24	ND	0.58	0.59
ELISA-Envirologix	ND	1.95	1.44	ND	0.70	0.73

ND-Not Detected

3.2. Standard Deviation for Proficiency

The proficiency standard deviation, σ_p , was calculated based on a fitness for purpose criteria using Thompson's modification to the Horwitz equation (Thompson, 2000). For test materials less than 120 ppb, the recommended calculation is as follows:

$$\sigma_p = 0.22c$$

where c is the assigned value x concentration express in dimensionless mass ratio. A summary of proficiency standard deviations, σ_p , of each of the test materials is shown in Table 4 below.

Table 4 – Sample Standard Deviations, σ_p

Test Method	Proficiency Samples (µg/L or ppb)					
	A	B	D	E	F	G
Instrumental (e.g., LC-MS)	N/A	0.44	0.27	N/A	0.13	0.13
ELISA-ADDA	N/A	0.39	0.27	N/A	0.24	0.27
ELISA-DM	N/A	0.43	0.27	N/A	0.13	0.13
ELISA-Envirologix	N/A	0.43	0.32	N/A	0.15	0.16

N/A – Not applicable

3.3. Evaluation of Individual Results and z-Scores

For those test materials containing Microcystins (Samples B, D, F and G) analyzed using quantitative methodologies (i.e., those methods categorized as Instrumental, ELISA-ADDA, ELISA-DM, or ELISA-Envirologix) the participants' performance was evaluated by calculating a z score for each individual result as follows:

$$z = \frac{(x - X)}{\sigma}$$

Where:

- z = the z score (standard score)
- x = the reported value of analyte
- X = the assigned value, the best estimate of the "true" concentration
- σ = the estimate of variation (proficiency standard deviation)

The following interpretations for z-scores in proficiency testing schemes are recommended in ISO 17043 as follows:

<u>Results Obtained</u>	<u>Rating</u>
$ z \leq 2$	Satisfactory
$2 < z < 3$	Questionable
$ z \geq 3$	Unsatisfactory

Participants' z-scores for Microcystins are given in Table 5 and shown as a histogram in Figure 1.

For test materials not containing Microcystins ("blanks"), the participant's results were evaluated as follows:

Result	Evaluation
Not Detected	Satisfactory
≤1ppb	Questionable
>1ppb	Unsatisfactory

Results reported by participants were evaluated as "Not Detected" if they were reported as < or ND or at a concentration less than the reporting limit recommended by the manufacturer.

The number and percentage of z-scores in the range $-2 \leq z \leq 2$ for Microcystins are given in Table 6.

3.4. General Discussion of Results

Normal distribution of results would predict that over time z-scores in the range of $-2 \leq z \leq 2$ would occur about 95% of the time. In this program, consistent with a normal distribution, 94.6% of the evaluated results from all six samples (265 or 280) were evaluated as “Satisfactory.”

Z-score results $2 < |z| < 3$ (i.e., evaluated as “Questionable”) are predicted to occur at a rate of 1 in 20 and should be considered along with other scores to determine their overall importance. In this proficiency program, 13 Questionable results were reported representing 4.6% of the evaluated results.

In this program, two results (0.7%) were evaluated as “Unsatisfactory”. Since a z-score greater than 3 is only expected at a rate of 1 in 300, it is a strong indication that the result is not fit-for-purpose and it is highly suggested that it be investigated further.

Each laboratory should use the information in this study for improvement. While reviewing the results of this proficiency program it should be noted that Microcystins are a class of toxins composed of over 100 congeners (Feurstein, 2011). In this program, two congeners (Microcystin-LR and Microcystin-LA) were used to spike water samples. The expected occurrence and reactivity of these congeners in immunoassays has been described in the literature (Heussner, 2014) and are commonly available in the kit manufacturer’s user’s guide. The reactivity is generally expressed as “% cross-reactivity.” Typically, since Microcystin-LR is used for calibration, the cross-reactivity is reported as 100%. The Microcystin-LA congener reacts differently in various immunoassays and therefore its % cross-reactivity will vary. For example, the cross-reactivity is reported in the user’s guides to be 120% for ELISA-ADDA, 66% for ELISA-DM, and 62% for ELISA-Envirologix.

Instrumental methods (e.g., LC-MS) require calibration using the specific congener to be measured; most commonly Microcystin-LR. In this program, of the 13 participants using Instrumental methods, five did not use Microcystin-LA calibrators and therefore did not detect the presence of Microcystins for Samples F and G, which were spiked with purified Microcystin-LA.

If a participant would like to appeal against the assessment of their performance in this proficiency testing program, please contact the Abraxis staff at info@abraxiskits.com.

4.0 REFERENCES

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Table 5: Results and z-Scores

Table 5.1: Results for Blank Waters

Lab Code	Method	Sample A Blank Surface Water		Sample E Blank Drinking Water	
		Result (µg/L or ppb)	Evaluation	Result (µg/L or ppb)	Evaluation
L001	Instrumental	ND	Satisfactory	ND	Satisfactory
L002	Instrumental	0	Satisfactory	0	Satisfactory
L003	ELISA-ADDA	<0.1	Satisfactory	<0.1	Satisfactory
L004	ELISA-E	<0.16	Satisfactory	<0.16	Satisfactory
L006	ELISA-E	ND	Satisfactory	ND	Satisfactory
L007	Instrumental	<1.00	Satisfactory ¹	<1.00	Satisfactory ¹
L008	Semi-Quantitative	0	Satisfactory	NR	Satisfactory
L009	ELISA-ADDA	0.08	Satisfactory	0.06	Satisfactory
L010	ELISA-ADDA	<0.15	Satisfactory	<0.15	Satisfactory
L011	ELISA-Tube	<0.10	Satisfactory	<0.10	Satisfactory
L012	ELISA-DM	<0.14	Satisfactory	<0.14	Satisfactory
L013	Instrumental	0	Satisfactory	0	Satisfactory
L014	ELISA-ADDA	0.019	Satisfactory	0	Satisfactory
L015	ELISA-ADDA	0.09	Satisfactory	0.06	Satisfactory
L016	ELISA-ADDA	0.02	Satisfactory	0.01	Satisfactory
L017	Instrumental	ND	Satisfactory	ND	Satisfactory
L018	ELISA-ADDA	<0.15	Satisfactory	<0.15	Satisfactory
L019	Instrumental	<MDL	Satisfactory	<MDL	Satisfactory
L020	ELISA-ADDA	0.16	Questionable	<0.15	Satisfactory
L021	Instrumental	<1.00	Satisfactory ¹	<1.00	Satisfactory ¹
L022	ELISA-ADDA	<0.15	Satisfactory	<0.15	Satisfactory
L023	Instrumental	<0.25	Satisfactory ¹	<0.25	Satisfactory ¹
L024	ELISA-DM	0.15	Satisfactory	0.15	Satisfactory
L025	ELISA-DM	<0.15	Satisfactory	<0.15	Satisfactory
L026	ELISA-ADDA	0.08	Satisfactory	0.08	Satisfactory
L027	ELISA-E	<0.16	Satisfactory	<0.16	Satisfactory
L028	ELISA-E	<0.16	Satisfactory	<0.16	Satisfactory
L029	Instrumental	ND	Satisfactory ¹	ND	Satisfactory ¹
L030	Instrumental	<0.43	Satisfactory ¹	<0.43	Satisfactory ¹
L031	ELISA-ADDA	<0.30	Satisfactory	<0.30	Satisfactory
L032	ELISA-ADDA	ND	Satisfactory	<0.10	Satisfactory
L033	Instrumental	<0.10	Satisfactory	<0.10	Satisfactory
L034	Phosphatase	ND	Satisfactory	ND	Satisfactory
L035	ELISA-ADDA	<MDL	Satisfactory	<MDL	Satisfactory
L036	ELISA-E	<MDL	Satisfactory	<MDL	Satisfactory
L037	ELISA-ADDA	<0.15	Satisfactory	<0.15	Satisfactory
L038	ELISA-E	<0.16	Satisfactory	<0.16	Satisfactory
L039	ELISA-E	<0.16	Satisfactory	<0.16	Satisfactory
L040	ELISA-B	<0.1	Satisfactory	<0.1	Satisfactory
L041	ELISA-DM	0.66	Questionable	0.51	Questionable
L042	ELISA-ADDA	<0.15	Satisfactory	<0.15	Satisfactory
L043	ELISA-E	0.06	Satisfactory	0.06	Satisfactory
L044	ELISA-DM	0.12	Satisfactory	0.12	Satisfactory
L045	ELISA-DM	0.09	Satisfactory	0.05	Satisfactory
L046	ELISA-ADDA	<0.15	Satisfactory	<0.15	Satisfactory
L047	Instrumental	ND	Satisfactory	ND	Satisfactory
L048	ELISA-ADDA	ND	Satisfactory	ND	Satisfactory
L049	ELISA-ADDA	<0.150	Satisfactory	<0.150	Satisfactory
L050	ELISA-DM	<0.150	Satisfactory	<0.150	Satisfactory
L051	ELISA-DM	<0.150	Satisfactory	<0.150	Satisfactory
L052	Instrumental	ND	Satisfactory	ND	Satisfactory
¹ Lab did not calibrate for MC-LA congener					

Table 5.2: Results for Fortified Waters

Lab Code	Method	Sample B			Sample D			Sample F			Sample G		
		Result (µg/L or ppb)	z-Score	Evaluation	Result (µg/L or ppb)	z-Score	Evaluation	Result (µg/L or ppb)	z-Score	Evaluation	Result (µg/L or ppb)	z-Score	Evaluation
L001	Instrumental	2.21	0.497	Satisfactory	1.49	0.999	Satisfactory	0.61	-0.012	Satisfactory	0.64	0.342	Satisfactory
L002	Instrumental	2.04	0.109	Satisfactory	1.11	-0.415	Satisfactory	0.69	0.583	Satisfactory	0.77	1.334	Satisfactory
L003	ELISA-ADDA	1.61	-0.418	Satisfactory	1.15	-0.347	Satisfactory	1.00	-0.409	Satisfactory	1.19	-0.196	Satisfactory
L004	ELISA-E	2.12	0.396	Satisfactory	1.29	-0.473	Satisfactory	0.53	-1.103	Satisfactory	0.72	-0.062	Satisfactory
L006	ELISA-E	1.76	-0.443	Satisfactory	1.04	-1.263	Satisfactory	0.582	-0.765	Satisfactory	0.569	-1.002	Satisfactory
L007	Instrumental	1.54	-1.032	Satisfactory	1.07	-0.564	Satisfactory	Not Analyzed ¹	NA	Not Evaluated	Not Analyzed ¹	NA	Not Evaluated
L008	Semi-Quantitative	5.00	NA	Not Evaluated	NR	NA	Not Evaluated	NR	NA	Not Evaluated	1.00	NA	Not Evaluated
L009	ELISA-ADDA	1.9	0.326	Satisfactory	1.39	0.529	Satisfactory	1.13	0.128	Satisfactory	1.31	0.243	Satisfactory
L010	ELISA-ADDA	1.81	0.095	Satisfactory	1.46	0.785	Satisfactory	1.10	0.004	Satisfactory	1.15	-0.342	Satisfactory
L011	ELISA-Tube	1.94	NA	Not Evaluated	1.26	NA	Not Evaluated	0.21	NA	Not Evaluated	0.20	NA	Not Evaluated
L012	ELISA-DM	1.92	-0.047	Satisfactory	1.19	-0.168	Satisfactory	0.58	-0.002	Satisfactory	0.57	-0.123	Satisfactory
L013	Instrumental	2.49	1.136	Satisfactory	1.58	1.334	Satisfactory	0.47	-1.052	Satisfactory	0.34	-1.949	Satisfactory
L014	ELISA-ADDA	2.495	1.852	Satisfactory	1.354	0.398	Satisfactory	1.272	0.716	Satisfactory	1.923	2.483	Questionable
L015	ELISA-ADDA	2.19	1.070	Satisfactory	1.48	0.858	Satisfactory	1.33	0.955	Satisfactory	1.68	1.595	Satisfactory
L016	ELISA-ADDA	1.28	-1.264	Satisfactory	0.99	-0.931	Satisfactory	1.44	1.410	Satisfactory	1.10	-0.525	Satisfactory
L017	Instrumental	1.08	-2.081	Questionable	0.62	-2.238	Questionable	0.35	-1.944	Satisfactory	0.44	-1.186	Satisfactory
L018	ELISA-ADDA	1.227	-1.400	Satisfactory	1.08	-0.603	Satisfactory	0.744	-1.468	Satisfactory	1.307	0.232	Satisfactory
L019	Instrumental	1.96	-0.074	Satisfactory	1.46	0.888	Satisfactory	0.496	-0.859	Satisfactory	0.492	-0.788	Satisfactory
L020	ELISA-ADDA	2.08	0.788	Satisfactory	1.28	0.128	Satisfactory	1.05	-0.203	Satisfactory	1.1	-0.525	Satisfactory
L021	Instrumental	2.01	0.041	Satisfactory	1.08	-0.526	Satisfactory	Not Analyzed ¹	NA	Not Evaluated	Not Analyzed ¹	NA	Not Evaluated
L022	ELISA-ADDA	1.65	-0.315	Satisfactory	1.13	-0.420	Satisfactory	1.07	-0.120	Satisfactory	1.11	-0.488	Satisfactory
L023	Instrumental	2.70	1.615	Satisfactory	2.20	3.642	Unsatisfactory	Not Analyzed ¹	NA	Not Evaluated	Not Analyzed ¹	NA	Not Evaluated
L024	ELISA-DM	2.26	0.749	Satisfactory	1.17	-0.241	Satisfactory	0.61	0.233	Satisfactory	0.71	0.963	Satisfactory
L025	ELISA-DM	2.09	0.351	Satisfactory	1.31	0.274	Satisfactory	0.5	-0.629	Satisfactory	0.53	-0.434	Satisfactory
L026	ELISA-ADDA	2.06	0.736	Satisfactory	1.25	0.018	Satisfactory	1.19	0.376	Satisfactory	1.5	0.937	Satisfactory
L027	ELISA-E	2.07	0.279	Satisfactory	1.53	0.284	Satisfactory	0.85	0.975	Satisfactory	0.92	1.183	Satisfactory
L028	ELISA-E	1.82	-0.303	Satisfactory	1.27	-0.537	Satisfactory	0.6	-0.648	Satisfactory	0.61	-0.747	Satisfactory
L029	Instrumental	2.1	0.246	Satisfactory	0.7	-1.940	Satisfactory	Not Analyzed ¹	NA	Not Evaluated	Not Analyzed ¹	NA	Not Evaluated
L030	Instrumental	2.78	1.797	Satisfactory	1.78	2.079	Questionable	Not Analyzed ¹	NA	Not Evaluated	Not Analyzed ¹	NA	Not Evaluated
L031	ELISA-ADDA	1.6	-0.443	Satisfactory	1.26	0.055	Satisfactory	0.71	-1.609	Satisfactory	1.17	-0.269	Satisfactory
L032	ELISA-ADDA	1.66	-0.289	Satisfactory	1.31	0.237	Satisfactory	0.49	-2.519	Questionable	0.60	-2.352	Questionable
L033	Instrumental	1.59	-0.918	Satisfactory	1.30	0.292	Satisfactory	1.34	5.414	Unsatisfactory	0.78	1.411	Satisfactory
L034	Phosphatase	1.45	NA	Not Evaluated	0.42	NA	Not Evaluated	0.19	NA	Not Evaluated	0.55	NA	Not Evaluated
L035	ELISA-ADDA	2.07	0.762	Satisfactory	1.47	0.821	Satisfactory	1.51	1.700	Satisfactory	1.53	1.047	Satisfactory
L036	ELISA-E	2.03	0.186	Satisfactory	1.65	0.663	Satisfactory	0.711	0.072	Satisfactory	0.831	0.629	Satisfactory
L037	ELISA-ADDA	1.6	-0.443	Satisfactory	0.96	-1.041	Satisfactory	1.25	0.625	Satisfactory	0.92	-1.183	Satisfactory
L038	ELISA-E	1.59	-0.839	Satisfactory	1.17	-0.852	Satisfactory	0.66	-0.259	Satisfactory	0.65	-0.498	Satisfactory
L039	ELISA-E	2.18	0.536	Satisfactory	1.75	0.979	Satisfactory	0.77	0.456	Satisfactory	0.70	-0.187	Satisfactory
L040	ELISA-B	1.794	NA	Not Evaluated	1.505	NA	Not Evaluated	0.167	NA	Not Evaluated	0.173	NA	Not Evaluated

Table 5.2: Results for Fortified Waters (cont.)

Lab Code	Method	Sample B			Sample D			Sample F			Sample G		
		Result (µg/L or ppb)	z-Score	Evaluation	Result (µg/L or ppb)	z-Score	Evaluation	Result (µg/L or ppb)	z-Score	Evaluation	Result (µg/L or ppb)	z-Score	Evaluation
L041	ELISA-DM	1.47	-1.102	Satisfactory	1.31	0.274	Satisfactory	0.65	0.547	Satisfactory	0.64	0.420	Satisfactory
L042	ELISA-ADDA	1.82	0.121	Satisfactory	1.64	1.442	Satisfactory	1.59	2.031	Questionable	1.45	0.754	Satisfactory
L043	ELISA-E	1.96	0.023	Satisfactory	1.82	1.199	Satisfactory	1.07	2.404	Questionable	0.84	0.685	Satisfactory
L044	ELISA-DM	2.47	1.241	Satisfactory	1.83	2.187	Questionable	0.88	2.348	Questionable	0.77	1.429	Satisfactory
L045	ELISA-DM	1.97	0.070	Satisfactory	1.31	0.274	Satisfactory	0.64	0.468	Satisfactory	0.59	0.032	Satisfactory
L046	ELISA-ADDA	2.06	0.736	Satisfactory	1.31	0.237	Satisfactory	1.16	0.252	Satisfactory	1.60	1.303	Satisfactory
L047	Instrumental	1.50	-1.123	Satisfactory	0.80	-1.568	Satisfactory	0.60	-0.086	Satisfactory	0.80	1.564	Satisfactory
L048	ELISA-ADDA	1.60	-0.443	Satisfactory	0.95	-1.077	Satisfactory	0.71	-1.609	Satisfactory	0.85	-1.439	Satisfactory
L049	ELISA-ADDA	1.391	-0.979	Satisfactory	1.011	-0.854	Satisfactory	0.886	-0.881	Satisfactory	0.931	-1.143	Satisfactory
L050	ELISA-DM	1.600	-0.797	Satisfactory	0.993	-0.892	Satisfactory	0.436	-1.130	Satisfactory	0.436	-1.163	Satisfactory
L051	ELISA-DM	1.742	-0.464	Satisfactory	1.061	-0.642	Satisfactory	0.464	-0.911	Satisfactory	0.441	-1.124	Satisfactory
L052	Instrumental	1.80	-0.439	Satisfactory	1.00	-0.824	Satisfactory	0.80	1.401	Satisfactory	0.50	-0.727	Satisfactory
NR - Not reported													
NA - Not applicable, insufficient data to calculate z-score													
¹ Lab did not calibrate for MC-LA congener													

Table 5.3: Statistical Summaries by Method for Fortified Waters

Sample B

	ELISA-ADDA	ELISA-DM	ELISA-E	Instrumental
Number of Results Reported	18	8	8	13
Mean	1.78	1.94	1.94	1.98
Robust Mean	1.77	1.94	1.95	1.99
Standard Deviation	0.33	0.33	0.20	0.49
Robust Standard Deviation	0.35	0.38	0.21	0.54
Proficiency Standard Deviation	0.39	0.43	0.43	0.44

Sample D

	ELISA-ADDA	ELISA-DM	ELISA-E	Instrumental
Number of Results Reported	18	8	8	13
Mean	1.25	1.27	1.44	1.25
Robust Mean	1.25	1.24	1.44	1.22
Standard Deviation	0.20	0.26	0.29	0.45
Robust Standard Deviation	0.22	0.13	0.33	0.46
Proficiency Standard Deviation	0.27	0.27	0.32	0.27

Sample F

	ELISA-ADDA	ELISA-DM	ELISA-E	Instrumental
Number of Results Reported	18	8	8	8
Mean	1.09	0.60	0.72	0.67
Robust Mean	1.10	0.58	0.70	0.61
Standard Deviation	0.30	0.14	0.18	0.30
Robust Standard Deviation	0.31	0.12	0.15	0.20
Proficiency Standard Deviation	0.24	0.13	0.15	0.13

Sample G

	ELISA-ADDA	ELISA-DM	ELISA-E	Instrumental
Number of Results Reported	18	8	8	8
Mean	1.25	0.59	0.73	0.60
Robust Mean	1.24	0.59	0.73	0.60
Standard Deviation	0.33	0.12	0.12	0.18
Robust Standard Deviation	0.33	0.13	0.14	0.20
Proficiency Standard Deviation	0.27	0.13	0.16	0.13

Test Method	Number Satisfactory	Total Report Results	% Satisfactory
Instrumental (e.g., LC-MS)	13	13	100
ELISA-ADDA	17	18	94
ELISA-DM	7	8	88
ELISA-Envirologix	8	8	100
Others	4	4	100
All Methods	49	51	96

Test Method	Number Satisfactory	Total Report Results	% Satisfactory
Instrumental (e.g., LC-MS)	12	13	88
ELISA-ADDA	18	18	100
ELISA-DM	8	8	100
ELISA-Envirologix	8	8	100
All Methods	46	47	98

Test Method	Number Satisfactory	Total Report Results	% Satisfactory
Instrumental (e.g., LC-MS)	10	13	77
ELISA-ADDA	18	18	100
ELISA-DM	7	8	88
ELISA-Envirologix	8	8	100
All Methods	43	47	91

Table 6.4

Sample E
Blank Drinking Water

Test Method	Number Satisfactory	Total Report Results	% Satisfactory
Instrumental (e.g., LC-MS)	13	13	100
ELISA-ADDA	18	18	100
ELISA-DM	7	8	88
ELISA-Envirologix	8	8	100
Others	4	4	100
All Methods	50	51	98

Table 6.5

Sample F
Microcystin-LA Drinking Water

Test Method	Number Satisfactory	Total Report Results	% Satisfactory
Instrumental (e.g., LC-MS)	7	8	88
ELISA-ADDA	16	18	89
ELISA-DM	7	8	88
ELISA-Envirologix	7	8	88
All Methods	37	42	88

Table 6.6

Sample G
Microcystin-LA Surface Water

Test Method	Number Satisfactory	Total Report Results	% Satisfactory
Instrumental (e.g., LC-MS)	8	8	100
ELISA-ADDA	16	18	89
ELISA-DM	8	8	100
ELISA-Envirologix	8	8	100
All Methods	40	42	95

Figure 1: z-Scores for Microcystins

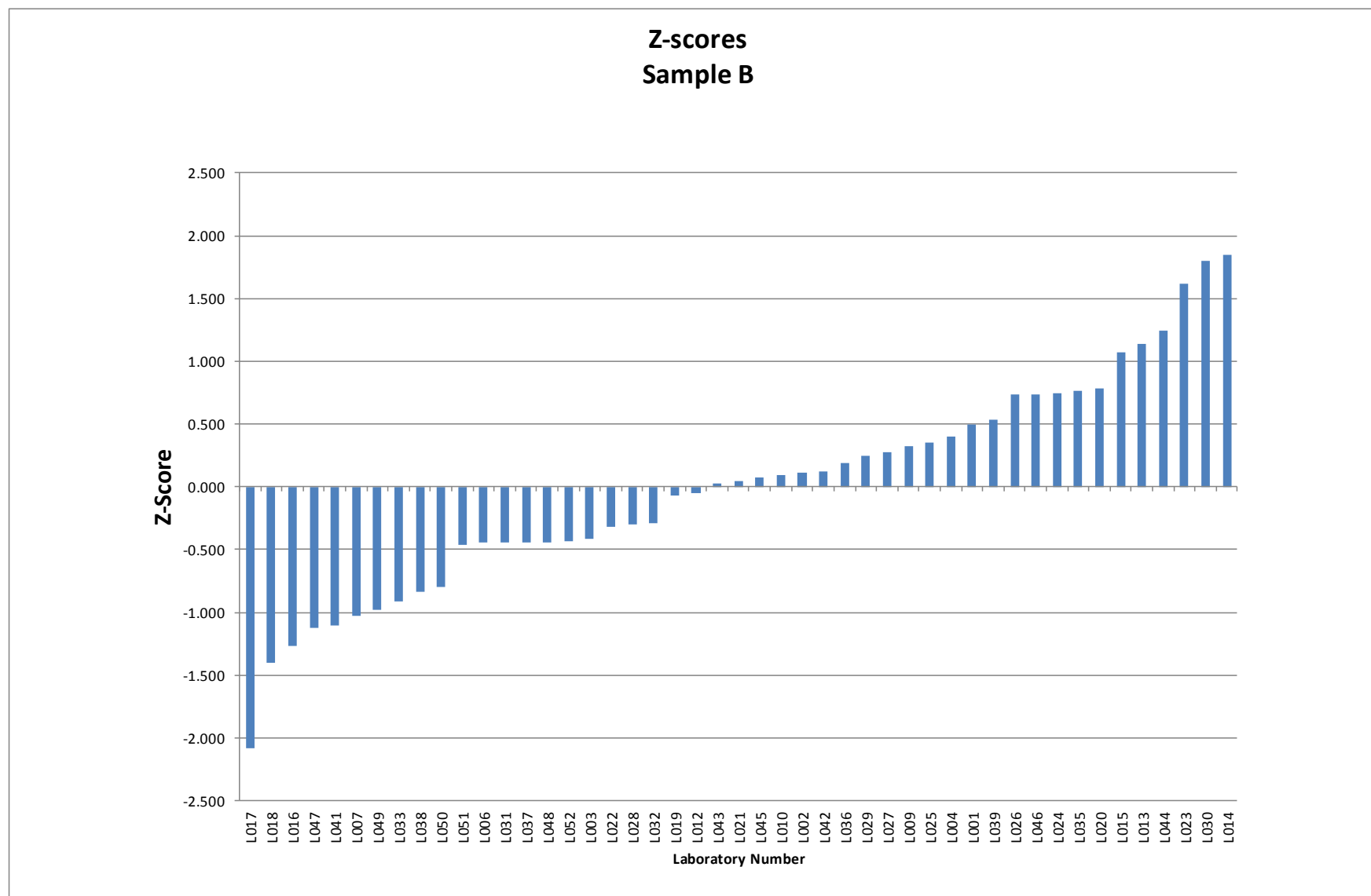


Figure 1: z-Scores for Microcystins (cont.)

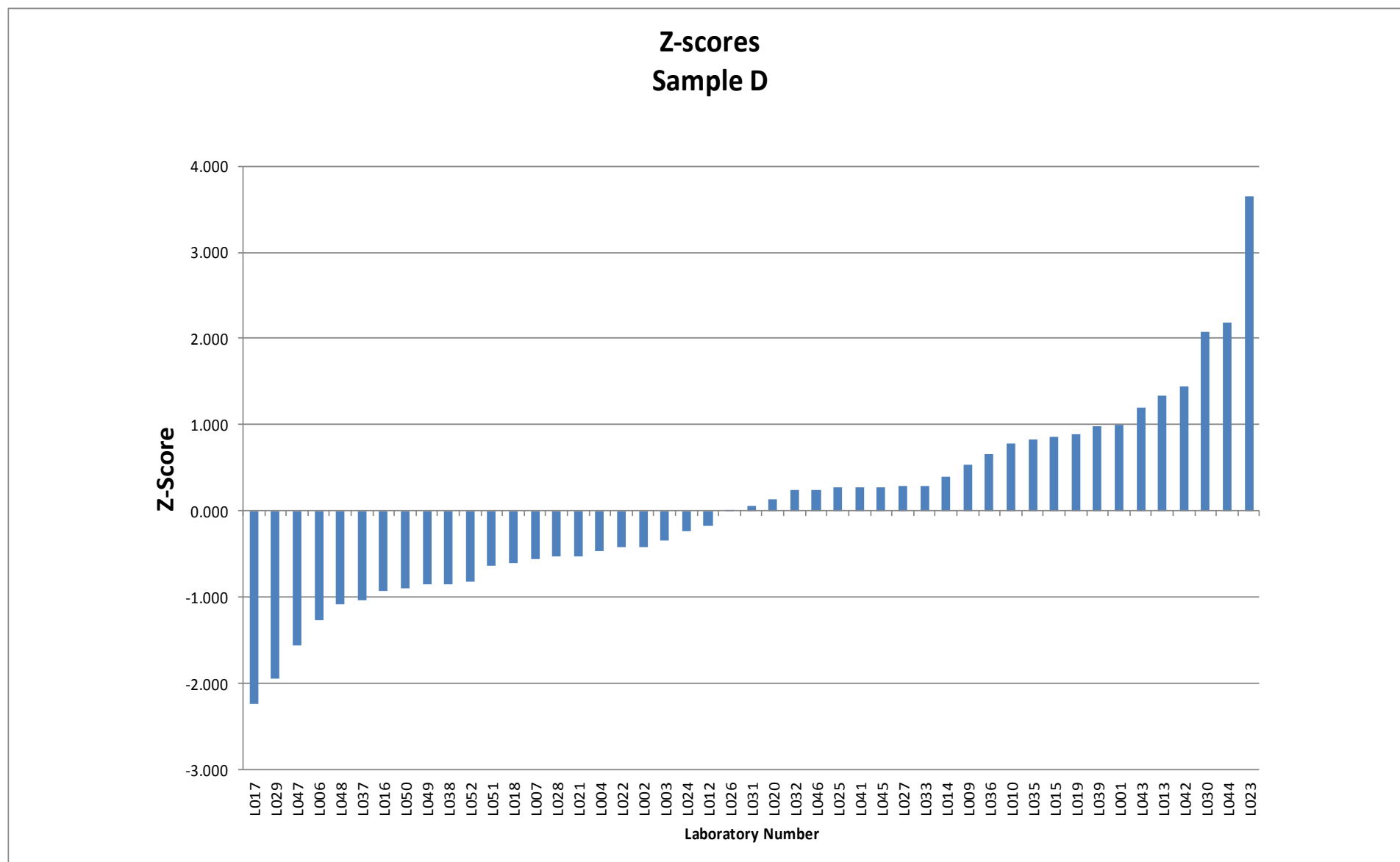


Figure 1: z-Scores for Microcystins (cont.)

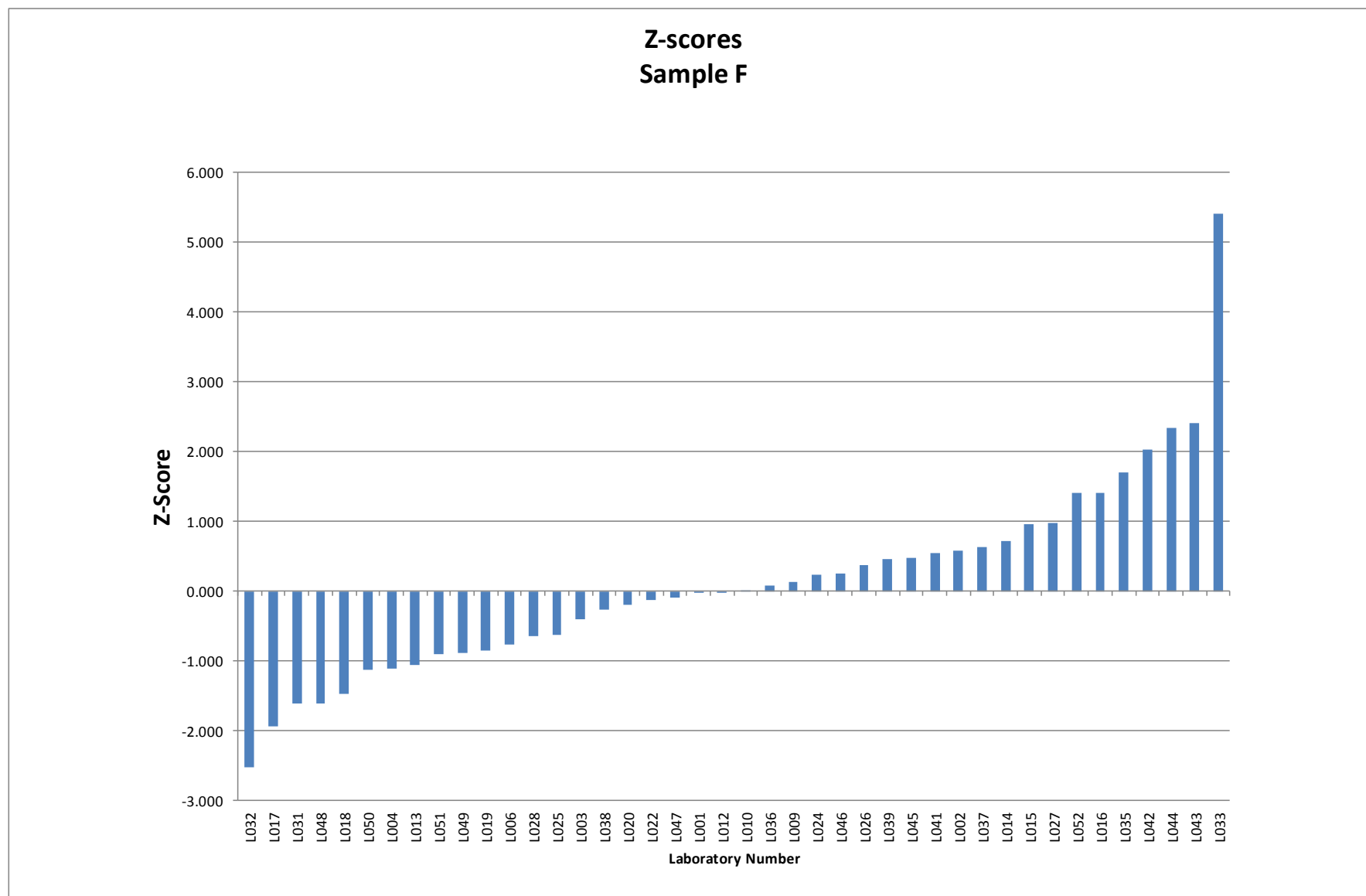
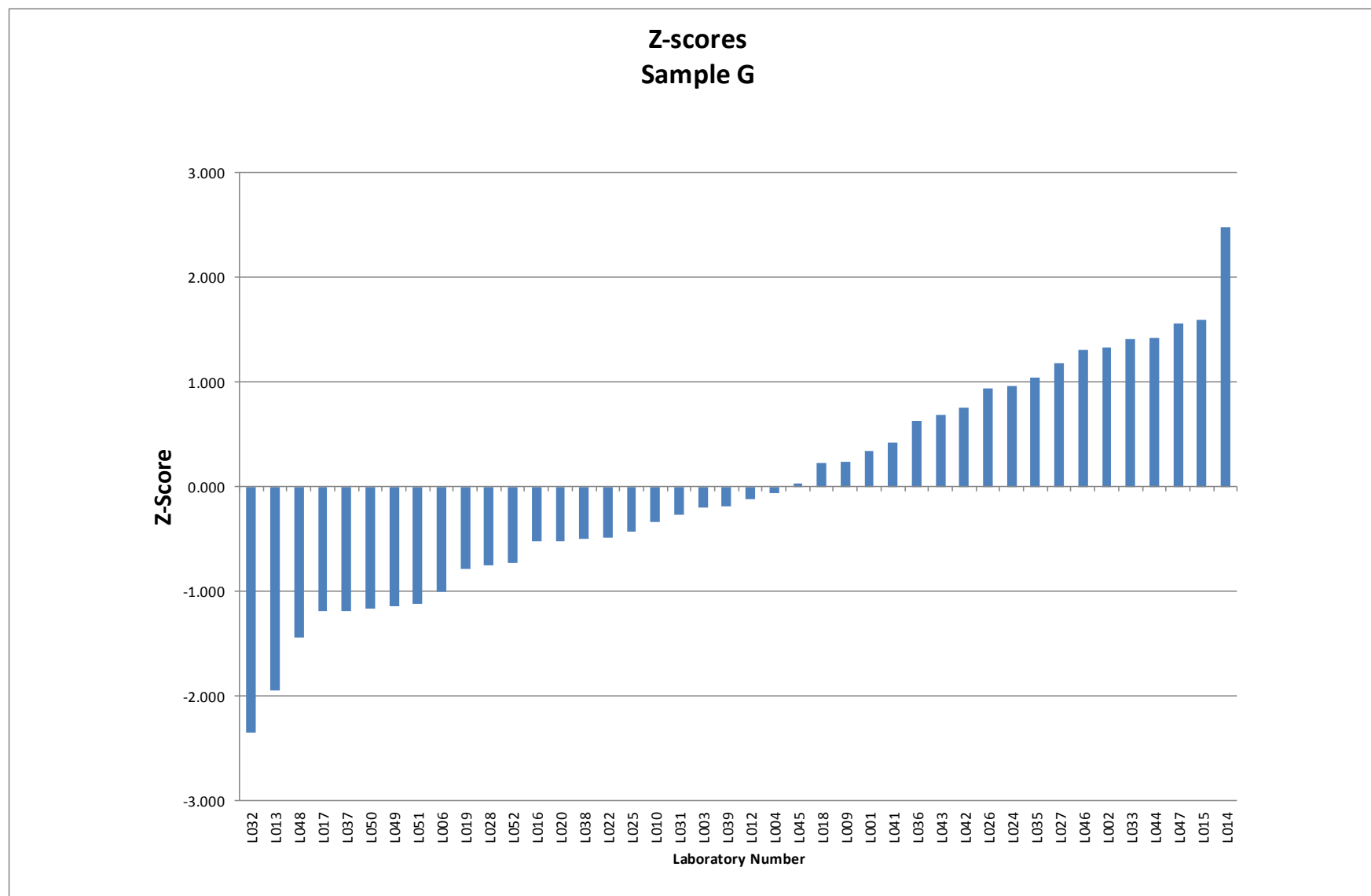
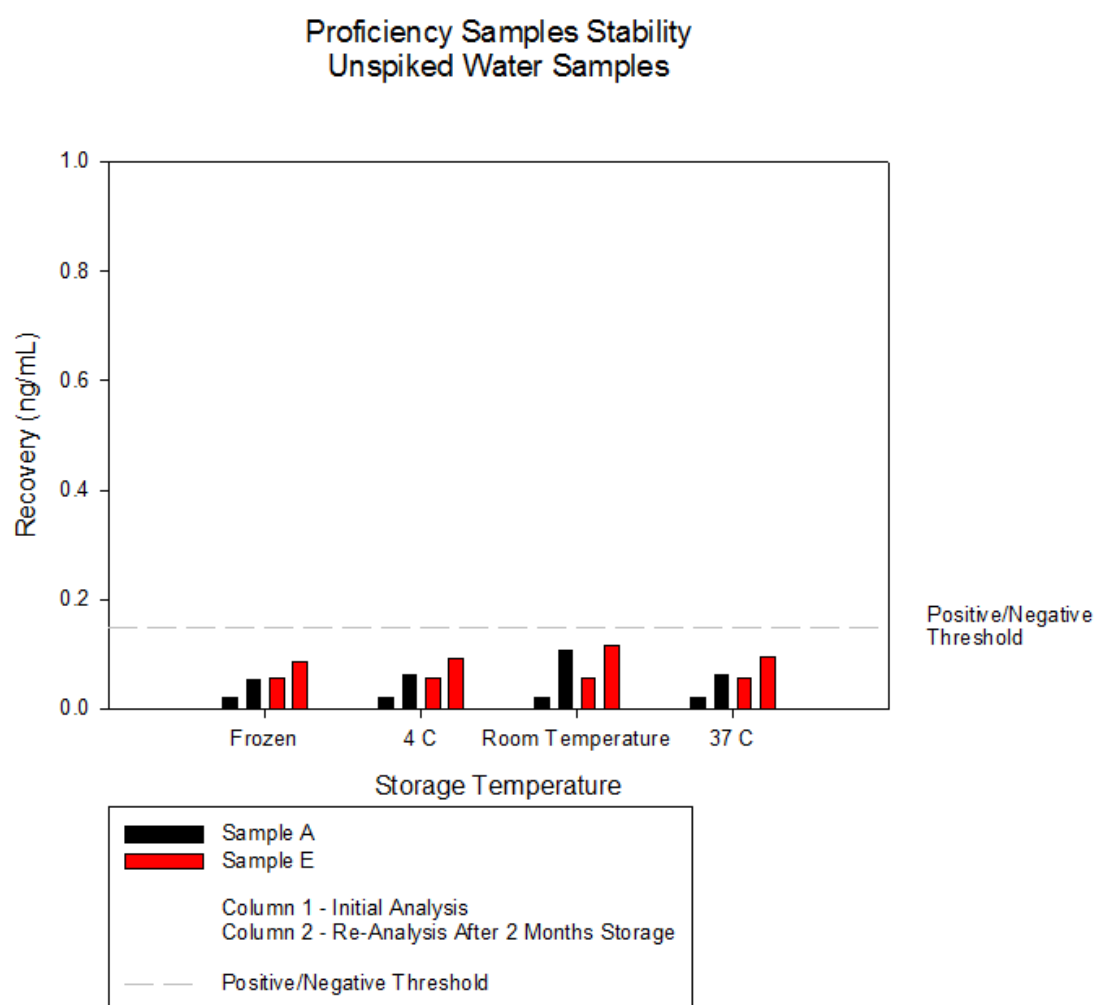


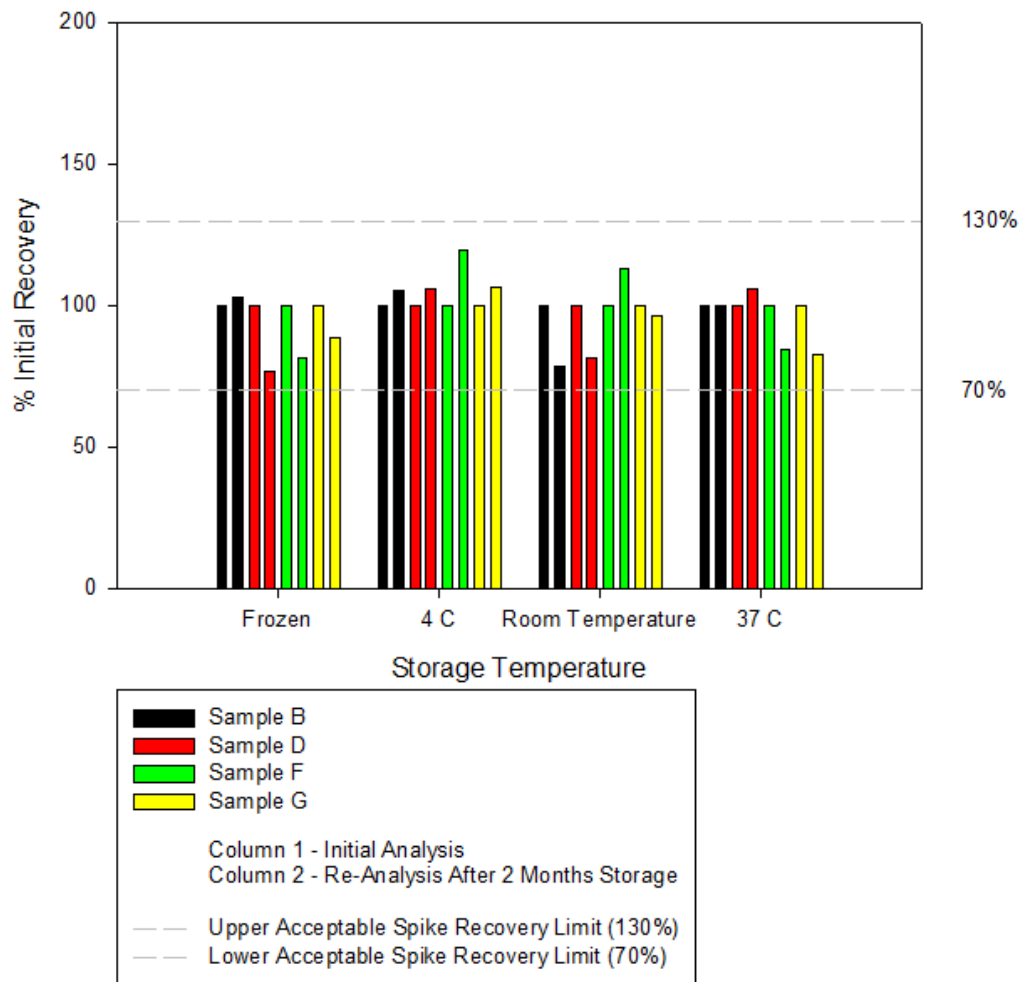
Figure 1: z-Scores for Microcystins (cont.)



Appendix I – Stability Testing



Proficiency Samples Stability MC-LR and MC-LA Spiked Water Samples



Appendix II – Instructions for Use

Microcystins Proficiency Samples (Instrumental Analysis)

Introduction

Analytical methods (ELISA, LC-MS, etc.) for Microcystins analysis are being employed in many laboratories for the analysis of drinking and recreational waters and other matrices. The use of proficiency samples is intended to help with the conformity assessment of microcystins analysis.

The Abraxis Microcystins Proficiency Sample Set contains 6 vials Microcystins (LR and/or LA) in filtered surface or quenched drinking water.

Reagents Provided

The Abraxis Microcystin Proficiency Sample Set contains 6 bottles Microcystins (LR and/or LA) in surface or drinking water, 75 mL each.

What to do?

Upon receipt:

- Unpack the bottles and store refrigerated until analysis

Report of results are due by 05/15/2015.

- Perform the analysis and review results.
- Report results in the provided results form

Ordering Information

PN 2015-01B

Abraxis LLC
54 Steamwhistle Drive
Warminster, PA 18974
Phone: (215) 357-3911
FAX: (215) 357-5232
WEB: www.abraxiskits.com



Microcystins Proficiency Samples (ELISA or Phosphatase Assays)

Introduction

Analytical methods (ELISA, LC-MS, etc.) for Microcystins analysis are being employed in many laboratories for the analysis of drinking and recreational waters and other matrices. The use of proficiency samples is intended to help with the conformity assessment of microcystins analysis.

The Abraxis Microcystins Proficiency Sample Set contains 6 vials Microcystins (LR and/or LA) in filtered surface or quenched drinking water.

Reagents Provided

The Abraxis Microcystins Proficiency Sample Set contains 6 vials Microcystins (LR and/or LA) in surface or drinking water, 5 mL each.

What to do?

Upon receipt:

- Unpack the vials and store refrigerated until analysis.

Report of results are due by 05/15/2015.

- Perform the analysis and review results.
- Report results in the provided results form

Ordering Information

PN 2015-01A

Abraxis LLC
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Warminster, PA 18974
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WEB: www.abraxiskits.com



Microcystin Proficiency Testing Round 2015-01 Results Reporting Form

Name: _____ Institution: _____

Phone: _____ Email: _____

Signature: _____ Date: _____

Address: _____

Technology used (i.e. LC, ELISA, phosphatase, etc.): _____

Instrumental Analysis (only):

Instrument Manufacturer: _____ Model: _____

Standard Type: _____ Source: _____

Direct Injection Or Pre-concentration: _____

ELISA, Phosphatase, etc. (only)

Kit Manufacturer: _____ Part Number: _____

Lot Number: _____ Exp. Date: _____

Data Reduction: 4 parameters, log logit, other (specify): _____

RESULTS (if possible please report results to 2 decimal places) ng/mL or ppb

SAMPLE A: _____

SAMPLE E: _____

SAMPLE B: _____

SAMPLE F: _____

SAMPLE D: _____

SAMPLE G: _____



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FAX: (215) 357-5232
Email: info@abraxiskits.com
http://www.abraxiskits.com