

Proficiency Testing Scheme for Water Analysis

**Round M146
Metals**

Sample Dispatch: 11 March 2019





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Round:	M146	Date / Signature: 12.4.2018 W.K.

This report has 89 pages.

This report summarises the results of round M146 (trace metals) within the IFA-Test Proficiency Testing Scheme for Water Analysis. The samples M146A and M146B were distributed to the participants on Monday, 11 March 2019. Closing date for reporting results to the IFA-Tulln was Friday, 5 April 2019. Each participant received two samples of 275 mL filled into LDPE bottles.

23 laboratories participated in this interlaboratory comparison. All participants submitted results.

To make the results of this round anonymous, each laboratory was given a laboratory code on a random basis.

Samples

The samples consisted of artificial ground water spiked with pure standards. For sample preparation, ultrapure water was spiked with concentrated solutions of salts in order to simulate the ionic composition of natural Austrian ground water. Ultrapure HNO₃ (0.5 % v/v) was added to stabilise the sample at a pH below 2, which meets the standard sampling procedure in the Austrian monitoring program. The following ultrapure salts were used: CaCO₃, Mg(NO₃)₂, NaCl, KCl, besides ultrapure H₂SO₄ for sulphate. By this, the matrix of the samples consisted of about 45.9 mg/l Ca, 19.5 mg/l Mg, 11.2 mg/l Na, 1.11 mg/l K, 21.6 mg/l SO₄²⁻ und 19.0 mg/l Cl⁻.

Traces of Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Ni, Se, U and Zn were added, using certified spectroscopy standards. For most of the compounds added to the samples, the target concentrations were higher than the minimum quantifiable values of the Austrian ground and river water monitoring program. The calculation of the target concentrations of the compounds was based on the mass of standard added to the samples.

Homogeneity, accuracy and stability tests at the IFA-Tulln

Some samples of the round M146A and M146B were analysed for all investigated parameters in order to verify homogeneity and accuracy prior to shipment to the participants. The results are listed in the results tables and the parameter oriented part of the report.

Stability tests will be carried out together with the accuracy tests of the following round (M147).

According to our experience, the concentrations of Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Se, U and Zn in the samples remain stable up to 18 months when stored at 4-6 °C in the dark. For the parameter Hg a concentration decrease of 2 % to 4 % per month can be expected.

Results

Data evaluation was based on target concentrations that were calculated from the weights of the standards used to produce the samples. Their uncertainty intervals correspond to the expanded uncertainty (coverage factor k = 2) as described in the EURACHEM/CITAC Guide "Quantifying Uncertainty in Analytical Measurement, 3rd Edition (2012)".

Recoveries for individual laboratory results and overall mean values are related to the assigned concentrations. The results were tested for outliers by application of the Hampel outlier test (level of significance 99 %). A minimum number of four results was required for the outlier test.

Arsenic was not added to the sample M146B in order to check the analytical blank values. The target concentration was set to <0.5 µg/L As, which meets the minimum quantifiable values defined by the Austrian ground and river water monitoring program and is well above the quantification limits of the analytical methods applied in the IFA-Tulln.

The sample M146A was prepared with a mercury concentration of 0.201 µg/L. Since the spread of the results of the participants was unusually high and the values measured at the IFA-Tulln did not allow a clear statement about the stability behaviour, the target value was set to <0.25 µg/L Hg for evaluation.

The recoveries of the target concentrations, calculated from outlier-corrected data mean values ranged between 93.8 % (copper in sample M146B) and 105.2 % (selenium in sample M146A).

The between laboratory CVs covered the range between 2.8 % (zinc in sample M146B) and 11.4 % (mercury in sample M146A).

All confidence intervals of the outlier-corrected laboratory mean values except that for iron in sample M146A ($95.2\% \pm 2.9\%$) and copper in sample M146A ($93.8\% \pm 4.4\%$) encompass the corresponding target values with their uncertainties. For all other parameters no difference could be detected between target concentrations and outlier corrected laboratory means statistically.

z-scores

The most common approach is to form the z-score given by

$$z = \frac{x_i - \bar{x}}{\sigma}$$

z	z-score
x_i	result of laboratory
\bar{x}	target value or mean value („consensus value“)
σ	standard deviation

Thus, the z-score is the ratio of the estimated bias (difference between result and target value) and a standard deviation. The z-score criteria were determined from relative standard deviations from all interlaboratory comparisons that were organised by the IFA-Tulln in the period from 2008 to 2018. They represent long-term performance data of all former participating laboratories. The z-scores are listed together with the recoveries in the tables of the parameter oriented part.

Additionally, each laboratory obtained for every sample a single sheet that summarises the z-scores of the laboratory in graphical and tabular form.

The following table lists the z-score criteria as relative standard deviation and their limits of applicability. Z-scores were only calculated, if the target values were higher than these limits.

Parameter	z-Score-criteria (%)	Lower limit [$\mu\text{g/L}$]
Aluminium	8.6	8
Arsenic	8.2	0.5
Cadmium	6.2	0.1
Chromium	6.7	0.5
Copper	9.0	1.2
Iron	7.4	10
Lead	7.3	0.3
Manganese	6.0	2.5
Mercury	11	0.2
Nickel	8.6	1.0
Selenium	12	0.3
Uranium	5.9	0.4
Zinc	9.0	3

Normally, a classification based on z-scores is made this way:

z-Score	Classification
<2	satisfactory
2< z <3	questionable
>3	unsatisfactory

Please note that this evaluation is made on the background of the average performance of all participants of the IFA-Test-Systems proficiency testing scheme during the period from 2008 to 2018.

Illustration of results

An explanation to the illustration of the results is given on the following page.

The **laboratory oriented part** contains the measurement results and reported uncertainties of each individual laboratory for all parameters together with the achieved recoveries in graphical and tabular form. This part of the report also lists tables with the results originally reported by the laboratories.

In the **parameter oriented part** the reported results and corresponding uncertainties are illustrated together with recoveries of the target values and the z-scores for each parameter and all laboratories. This information is presented in graphical and tabular form. Results, which were identified as outliers by the Hampel test are marked with an asterisk in the column "out". These values were not considered for the calculation of statistical parameters (mean values, standard deviations and confidence intervals). Moreover, the parameter oriented part contains the uncertainties of the target values. The uncertainty intervals correspond to the expanded uncertainty (coverage factor $k = 2$) as described in the EURACHEM / CITAC Guide "Quantifying Uncertainty in Analytical Measurement" 3rd Edition (2012) ". The uncertainty interval of the reference concentration is illustrated in the graphs as a grey band around the 100 % recovery line.

Results, for which no recoveries could be calculated, are illustrated by one of the following symbols: **FN** (false negative), **FP** (false positive) or • - symbol.

- "FN": a result is considered false negative when the "< result" reported is lower than the corresponding target value
- "FP": False positive results can only be obtained for compounds that were evaluated on the basis of a "< target value". A result is termed FP if it does not include (strike) the "< target" with its measurement uncertainty.
- "•": All other results for which no recoveries can be calculated are illustrated by this symbol

Tulln, 12 April 2019

EXPLANATION

Sample M106A

Parameter Copper

Target value $\pm U$ ($k=2$) $4,79 \mu\text{g/l} \pm 0,13 \mu\text{g/l}$

IFA result $\pm U$ ($k=2$) $4,79 \mu\text{g/l} \pm 0,38 \mu\text{g/l}$

Stability test $\pm U$ ($k=2$) $4,69 \mu\text{g/l} \pm 0,38 \mu\text{g/l}$

Obtained from sample preparation, U =uncertainty

Determined at IFA prior to shipment of samples

Determined at IFA 3 weeks after sample dispatch

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	5.16	0.4128	$\mu\text{g/l}$	108%	0.90
B	4.22	0.42	$\mu\text{g/l}$	88%	-1.38
C	4.45	0.13	$\mu\text{g/l}$	93%	-0.83
D			$\mu\text{g/l}$		
E			$\mu\text{g/l}$		
F	4.10	0.08	$\mu\text{g/l}$	86%	-1.68
G			$\mu\text{g/l}$		
H			$\mu\text{g/l}$		
I	4.75	0.74	$\mu\text{g/l}$	99%	-0.10
J	<5		$\mu\text{g/l}$	*	
K	4.76		$\mu\text{g/l}$	99%	-0.07
L	<10		$\mu\text{g/l}$	*	
M	4.8	0.5	$\mu\text{g/l}$	100%	0.02
N	3.7	0.4	$\mu\text{g/l}$	77%	-2.65
O	4.47	0.447	$\mu\text{g/l}$	93%	-0.78
P	6.0		$\mu\text{g/l}$	125%	2.94
Q	4.17	0.2	$\mu\text{g/l}$	87%	-1.51
R	4.6	0.8	$\mu\text{g/l}$	96%	-0.46
S	4.44	0.67	$\mu\text{g/l}$	93%	-0.85
T			$\mu\text{g/l}$		
U	4.675	0.935	$\mu\text{g/l}$	98%	-0.28
V	5.0	0.50	$\mu\text{g/l}$	104%	0.51
W	3.54	0.3	$\mu\text{g/l}$	74%	-3.03
X	7.108	*	$\mu\text{g/l}$	148%	5.63
Y	<10		$\mu\text{g/l}$	*	
Z			$\mu\text{g/l}$		
AA	<3.0		$\mu\text{g/l}$	FN	
AB	3.775	0.107	$\mu\text{g/l}$	79%	-2.46
AC	<10.0		$\mu\text{g/l}$	*	

An asterisk indicates a result detected as outlier by Hampel test

Interval expected to encompass target value as stated by participant

	All results	Outliers excl.	Unit
Mean $\pm CI(99\%)$	$4,65 \pm 0,57$	$4,51 \pm 0,42$	$\mu\text{g/l}$
Recov. $\pm CI(99\%)$	$97,1 \pm 12,0$	$94,1 \pm 8,8$	%
SD between labs	0.84	0.59	$\mu\text{g/l}$
RSD between labs	18.1	13.2	%
n for calculation	18	17	

Between laboratory standard deviation

Laboratory mean and recovery of target value with corresponding confidence intervals ($p=99\%$)

Number of results used for calculation of statistic parameters

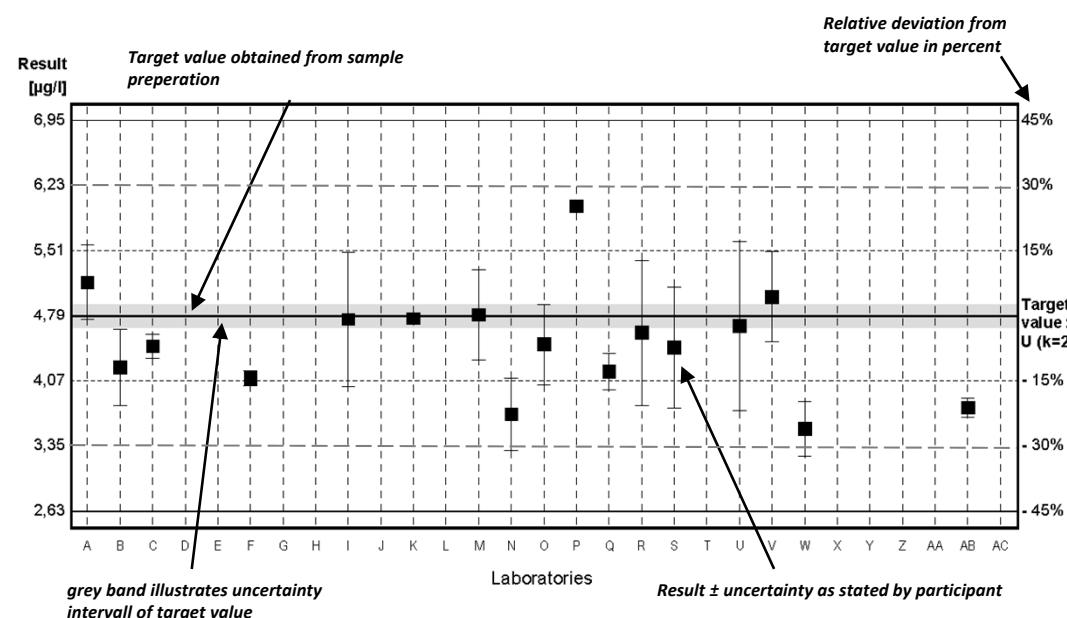


Diagram 1: Measurement results and their uncertainties

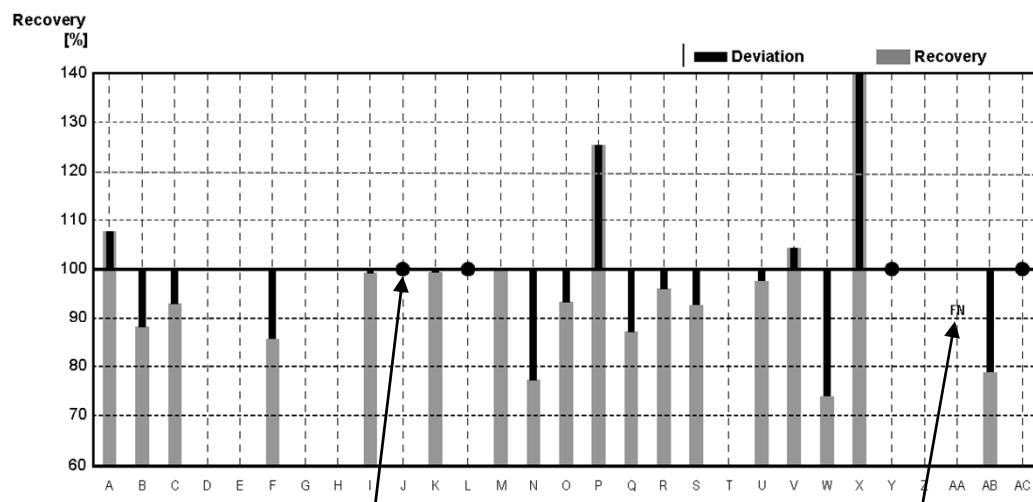


Diagram 2: Recoveries and deviations from target values

Illustration of Results Tables and Parameter Oriented Part

**Round M146
Metals**

Sample Dispatch: 11 March 2019



Results Sample M146A

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
Target value	16.6	2.18	2.18	0.119	3.16	31.9	7.96
IFA result	16.6	2.15	2.20	0.124	3.24	33.1	7.96
A	12.4	2.4	2.1	<1.0	3.1	30.0	7.2
B	17.6	<2.0	2.39	0.100	<5	30.5	8.17
C	17.2	2.2	2.2	0.1	3.3	31.4	7.7
D	16.3	2.3	2.4	<0.2	3.3	30.7	8.6
E		2.3	<2.5	<0.4	2.8	27.5	6.0
F	17.86	2.23	2.13	<0.2	3.19	32.69	7.51
G	17.3	2.32	2.10	0.122	3.17	31.6	7.90
H	15.5	2.12	2.13	0.123	3.34	31.5	7.64
I	18.0		<4.0	<0.5	3.31	31.6	8.39
J	35.0		<4		<2	30.7	6.3
K	17.4	2.30	2.34	0.128	3.22	31.8	8.24
L	16.4	2.03	2.14	0.12	3.14	30.7	7.68
M	16.4					28.8	
N	17.4	2.12	1.97	0.109	3.10	30.9	7.38
O	12.0	2.3	2.2	<1.0	3.1	29.8	7.6
P	16	2.3	2.1	0.12	3.0	31	7.4
Q	17.01	2.236	1.948	0.123	2.971	36.00	6.535
R	19	2.2	2	0.1	3	30	7.5
S	16.52	2.38	1.91	0.12	3.01	28.84	7.19
T	16.2	3.21	2.24	0.12	2.95	27.0	7.12
U						28	
V	16.2	2.27	2.09	<0.4	<5	32.5	8.4
W	<20.0					30.8	

All data in µg/L

Measurement Uncertainties Sample M146A

	Aluminium ±	Arsenic ±	Lead ±	Cadmium ±	Chromium ±	Iron ±	Copper ±
Target value	0.3	0.02	0.02	0.002	0.02	0.2	0.10
IFA result	1.0	0.15	0.11	0.011	0.19	3.0	0.72
A	2.3	0.4	0.3		1.2	3.3	1.5
B	2.71		0.41	0.007		2.5	2.12
C							
D	1.5	0.2	0.2		0.3	3	0.9
E		0.2			0.28	2	0.6
F	2.68	0.34	0.32		0.48	4.90	1.13
G	1.91	0.13	0.22	0.006	0.45	3.50	0.43
H	0.40	0.09	0.05	0.017	0.11	1.08	0.03
I	3.3				0.50	3.2	1.3
J	3.2					1.9	0.7
K	0.058	0.072	0.050	0.009	0.040	0.289	0.168
L	2.5	0.16	0.34	0.03	0.38	4.3	0.92
M	4.4					4.3	
N	0.5	0.04	0.02	0.009	0.06	0.4	0.14
O	2.4	0.46	0.44		0.62	6.0	1.52
P	3	0.4	0.4	0.03	0.4	3	1.0
Q	2.30	0.340	0.393	0.0250	0.410	5.62	0.810
R	1.9	0.264	0.16	0.008	0.36	7.8	0.6
S	3.80	0.64	0.19	0.03	0.27	3.75	1.29
T	2.43	0.48	0.34	0.02	0.44	4.04	1.07
U						3	
V	1.2	0.17	0.06			1.9	1.2
W						6.0	

All data in µg/L

Results Sample M146A

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
Target value	25.1	1.18	<0.25	2.30	4.44	16.0
IFA result	25.8	1.22	0.17	2.44	4.15	16.5
A	24.3	1.5	<0.20	2.4	4.3	16.0
B	24.4	<2.0		<5.0		16.4
C	24.7	1.2	<0.2	2.5	4.3	15.8
D	26.0	1.3	0.1	2.6	4.4	17.1
E	25.8	<2	<0.3	2.65		15.5
F	25.49	1.13	0.225		4.51	15.82
G	25.0	1.27	0.10	2.40	4.18	16.6
H	24.2	1.21	<0.050	2.27	4.27	16.7
I	25.5	1.32	<0.2			15.9
J	21.4	<2				12.6
K	25.8	1.17	0.125	2.29	4.35	16.3
L	23.7	<1.0	0.11	2.69	4.23	14.2
M	23.2					
N	24.4	1.32	0.115	2.22	4.07	15.1
O	25.1	1.2	0.12	2.4	4.7	16.3
P	24	1.1	0.14	2.2	4.2	15
Q	22.10	1.208	0.1677	2.236	4.244	15.08
R	24	1	0.14	2.4	4.1	16
S	23.09	1.18	0.16	2.51	4.47	15.55
T	23.9	1.15	0.20	2.60	4.40	19.58
U	22					
V	25.7	<1	0.10	2.36	4.77	17.6
W	23.9					

All data in µg/L

Measurement Uncertainties Sample M146A

	Manganese ±	Nickel ±	Mercury ±	Selenium ±	Uranium ±	Zinc ±
Target value	0.2	0.05		0.06	0.03	0.5
IFA result	2.1	0.11	0.02	0.44	0.42	3.8
A	2.6	1.0		0.3	0.4	3.4
B	2.3					2.3
C						
D	3	0.1	0.01	0.3	0.4	1.7
E	1.2			0.25		0.7
F	3.82	0.17	0.034		0.68	2.37
G	1.36	0.10	0.015	0.29	0.44	1.04
H	0.68	0.22		0.23	0.03	0.35
I	2.6	0.16				1.9
J	1.7					
K	0.265	0.025	0.002	0.096	0.101	0.100
L	1.20		0.03	0.25	0.47	1.3
M	4.9					
N	0.8	0.05	0.003	0.03	0.15	0.5
O	5.0	0.24	0.024	0.48	0.94	3.2
P	3	0.2	0.03	0.4	0.6	2
Q	2.83	0.135	0.0434	0.501	0.738	2.43
R	2.4	0.1	0.0168	0.36	0.205	1.6
S	3.23	0.12	0.04	0.40	0.49	2.80
T	3.59	0.17	0.03	0.39	0.66	2.94
U	2					
V	0.9		0.02	0.07	1.27	1.6
W	5.0					

All data in µg/L

Results Sample M146B

	Aluminium	Arsenic	Lead	Cadmium	Chromium	Iron	Copper
Target value	27.8	<0.5	3.25	0.470	1.18	11.9	2.97
IFA result	28.3	<0.05	3.17	0.483	1.21	12.2	2.99
A	23.3	<1.0	3.1	<1.0	1.2	11.9	2.6
B	28.8	<2.0	3.46	0.461	<5	<30	2.56
C	28	<0.1	3.3	0.4	1.2	11.1	2.9
D	27.9	<1	3.5	0.44	1.2	11.5	3.2
E		<2	3.1	0.44	<2	<12	<3
F	30.34	<1	3.12	0.459	1.17	12.49	2.75
G	28.1	<0.5	3.11	0.468	1.09	11.8	2.89
H	25.9	[0.10]	3.24	0.472	1.43	11.8	2.94
I	29.3		<4.0	<0.5	1.23	11.4	<5.0
J	26.4		<4		<2	16.2	2.8
K	28.7	<0.20	3.37	0.522	1.15	10.7	3.06
L	28.1	<1.0	3.20	0.46	1.31	13.3	2.80
M	27.8					10.6	
N	28.5	<0.05	2.93	0.429	1.12	11.6	2.70
O	23.2	<1.0	3.2	<1.0	1.2	9.8	2.6
P	28	<0.40	3.1	0.47	1.1	12	2.7
Q	28.03	<0.5	2.909	0.468	1.123	17.80	2.478
R	29	0.02	2.9	0.5	1.1	13	2.9
S	27.94	<0.50	2.89	0.47	1.13	10.87	2.67
T	27.3	<1	3.32	0.53	1.14	<10	2.81
U						<20	
V	28.9	[0.1]	3.10	0.47	<5	12.4	<5
W	<20.0					<20.0	

All data in µg/L

Measurement Uncertainties Sample M146B

	Aluminium ±	Arsenic ±	Lead ±	Cadmium ±	Chromium ±	Iron ±	Copper ±
Target value	0.3		0.02	0.006	0.01	0.2	0.03
IFA result	1.7		0.16	0.043	0.07	1.1	0.27
A	3.5		0.4		1	1.5	1.1
B	4.44		0.59	0.032			0.67
C							
D	3		0.3	0.04	0.1	1	0.3
E			0.3	0.04			
F	4.55		0.47	0.069	0.18	1.87	0.41
G	3.12		0.33	0.022	0.15	1.31	0.16
H	0.36		0.04	0.014	0.13	1.20	0.03
I	5.3				0.19	1.2	
J	2.4					1.0	0.3
K	0.153		0.081	0.047	0.026	0.100	0.020
L	4.2		0.51	0.10	0.16	1.9	0.34
M	7.5					1.6	
N	0.7		0.03	0.011	0.07	0.2	0.08
O	4.6		0.64		0.24	2.0	0.52
P	4		0.5	0.07	0.2	2	0.4
Q	3.79		0.588	0.0950	0.155	2.78	0.307
R	2.9		0.232	0.04	0.132	3.38	0.232
S	6.43		0.29	0.10	0.10	1.41	0.48
T	4.10		0.50	0.08	0.17		0.42
U							
V	1.0		0.06	0.05		1.0	
W							

All data in µg/L

Results Sample M146B

	Manganese	Nickel	Mercury	Selenium	Uranium	Zinc
Target value	2.79	2.45	1.28	0.60	0.95	23.3
IFA result	2.85	2.52	1.06	0.61	0.85	23.1
A	2.8	2.8	1.09	<2.0	<1.0	23.2
B	<3.0	2.40		<5.0		23.3
C	2.7	2.4	1.2	0.6	1.1	22.5
D	<5	2.7	1.2	<1	0.91	27.4
E	2.3	2.35	1.37	<1.5		21.2
F	<10	2.28	1.400		0.967	22.99
G	2.66	2.44	1.17	<1.0	0.897	23.2
H	<10.0	2.44	1.08	<1.00	<1.00	23.4
I	<5.0	2.61	1.10			23.2
J	2.4	2.6				18.9
K	2.89	2.52	1.19	0.639	0.897	23.7
L	2.70	1.73	1.18	<1.0	<1.0	21.0
M	<10					
N	2.55	2.44	1.21	0.58	0.86	21.9
O	2.9	2.4	1.3	<1.0	0.99	23.2
P	2.7	2.4	1.2	<1.0	<1.0	23
Q	2.532	2.368	1.406	0.595	0.914	22.116
R	3	2.2	1.35	0.6	0.9	23
S	2.54	2.41	1.36	0.68	0.99	22.75
T	2.70	2.34	1.59	0.81	0.93	28.30
U	<5					
V	<4	2.37	1.05	<1	<2	22.6
W	<5.0					

All data in µg/L

Measurement Uncertainties Sample M146B

	Manganese ±	Nickel ±	Mercury ±	Selenium ±	Uranium ±	Zinc ±
Target value	0.03	0.05	0.02	0.06	0.01	0.5
IFA result	0.23	0.23	0.11	0.11	0.09	5.3
A	0.7	1.2	0.16			4.1
B		0.30				3.3
C						
D		0.3	0.1		0.09	2.7
E	0.2	0.25	0.15			1
F		0.34	0.210		0.145	3.45
G	0.15	0.19	0.18		0.095	1.45
H		0.20	0.031			0.36
I		0.32	0.22			2.8
J	0.2	0.3				
K	0.055	0.023	0.057	0.021	0.010	0.208
L	0.30	0.21	0.15			1.9
M	2.1					
N	0.19	0.16	0.04	0.01	0.02	0.7
O	0.58	0.48	0.26		0.20	4.6
P	0.4	0.4	0.2			3
Q	0.324	0.265	0.364	0.133	0.159	3.56
R	0.3	0.22	0.162	0.09	0.045	2.3
S	0.36	0.24	0.34	0.11	0.11	4.10
T	0.41	0.35	0.24	0.12	0.14	4.25
U						
V		0.15	0.02			0.5
W						

All data in $\mu\text{g/L}$

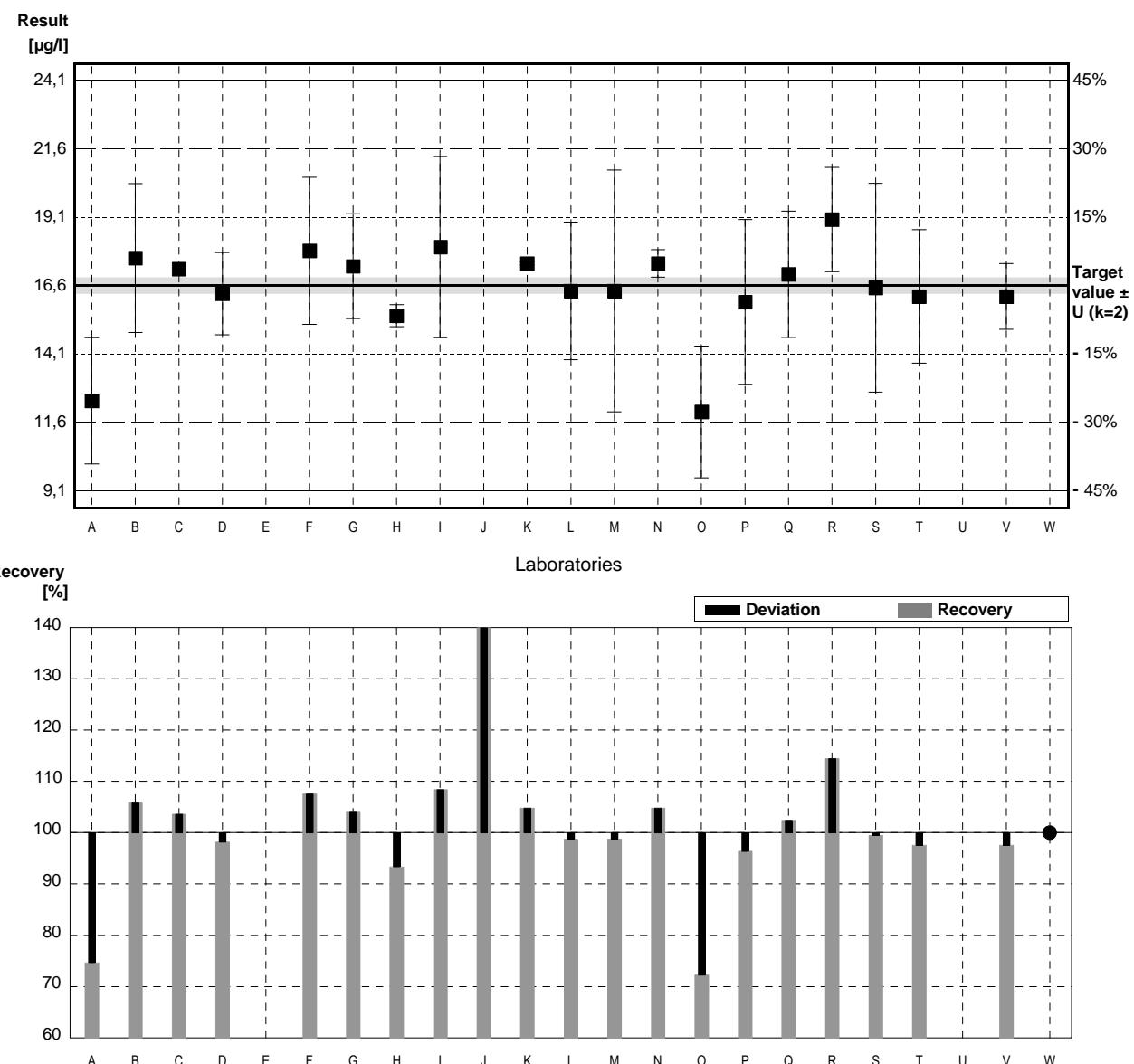
Sample M146A

Parameter Aluminium

Target value $\pm U (k=2)$ 16,6 $\mu\text{g/l}$ \pm 0,3 $\mu\text{g/l}$
 IFA result $\pm U (k=2)$ 16,6 $\mu\text{g/l}$ \pm 1,0 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	12,4 *	2,3	$\mu\text{g/l}$	75%	-2,94
B	17,6	2,71	$\mu\text{g/l}$	106%	0,70
C	17,2		$\mu\text{g/l}$	104%	0,42
D	16,3	1,5	$\mu\text{g/l}$	98%	-0,21
E			$\mu\text{g/l}$		
F	17,86	2,68	$\mu\text{g/l}$	108%	0,88
G	17,3	1,91	$\mu\text{g/l}$	104%	0,49
H	15,5	0,40	$\mu\text{g/l}$	93%	-0,77
I	18,0	3,3	$\mu\text{g/l}$	108%	0,98
J	35,0 *	3,2	$\mu\text{g/l}$	211%	12,89
K	17,4	0,058	$\mu\text{g/l}$	105%	0,56
L	16,4	2,5	$\mu\text{g/l}$	99%	-0,14
M	16,4	4,4	$\mu\text{g/l}$	99%	-0,14
N	17,4	0,5	$\mu\text{g/l}$	105%	0,56
O	12,0 *	2,4	$\mu\text{g/l}$	72%	-3,22
P	16	3	$\mu\text{g/l}$	96%	-0,42
Q	17,01	2,30	$\mu\text{g/l}$	102%	0,29
R	19	1,9	$\mu\text{g/l}$	114%	1,68
S	16,52	3,80	$\mu\text{g/l}$	100%	-0,06
T	16,2	2,43	$\mu\text{g/l}$	98%	-0,28
U			$\mu\text{g/l}$		
V	16,2	1,2	$\mu\text{g/l}$	98%	-0,28
W	<20,0		$\mu\text{g/l}$	*	

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	17,4 \pm 2,9	17,0 \pm 0,6	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	104,7 \pm 17,2	102,2 \pm 3,8	%
SD between labs	4,5	0,9	$\mu\text{g/l}$
RSD between labs	25,7	5,2	%
n for calculation	20	17	



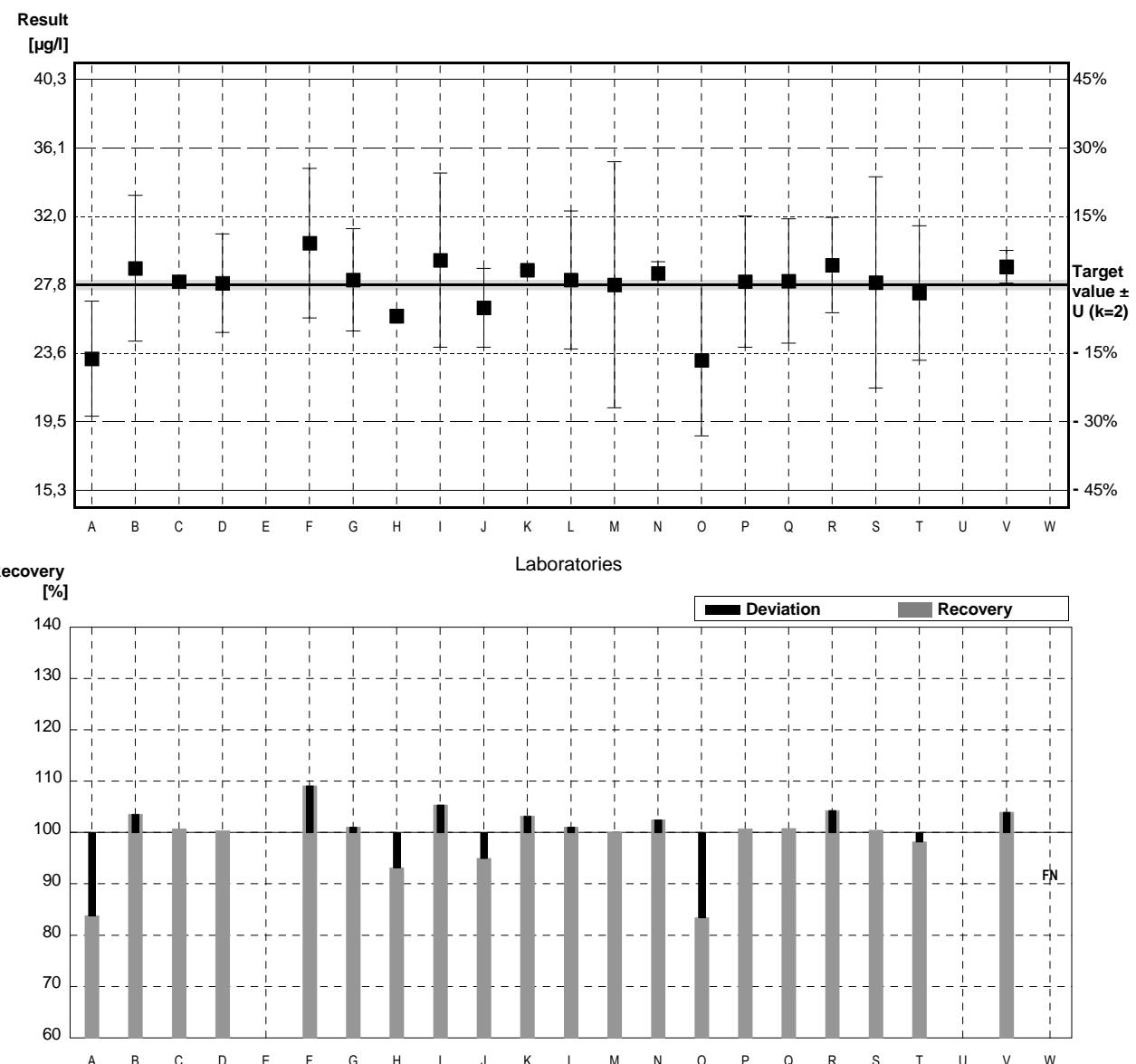
Sample M146B

Parameter Aluminium

Target value $\pm U (k=2)$ 27,8 µg/l \pm 0,3 µg/l
 IFA result $\pm U (k=2)$ 28,3 µg/l \pm 1,7 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	23,3 *	3,5	µg/l	84%	-1,88
B	28,8	4,44	µg/l	104%	0,42
C	28		µg/l	101%	0,08
D	27,9	3	µg/l	100%	0,04
E			µg/l		
F	30,34	4,55	µg/l	109%	1,06
G	28,1	3,12	µg/l	101%	0,13
H	25,9	0,36	µg/l	93%	-0,79
I	29,3	5,3	µg/l	105%	0,63
J	26,4	2,4	µg/l	95%	-0,59
K	28,7	0,153	µg/l	103%	0,38
L	28,1	4,2	µg/l	101%	0,13
M	27,8	7,5	µg/l	100%	0,00
N	28,5	0,7	µg/l	103%	0,29
O	23,2 *	4,6	µg/l	83%	-1,92
P	28	4	µg/l	101%	0,08
Q	28,03	3,79	µg/l	101%	0,10
R	29	2,9	µg/l	104%	0,50
S	27,94	6,43	µg/l	101%	0,06
T	27,3	4,10	µg/l	98%	-0,21
U			µg/l		
V	28,9	1,0	µg/l	104%	0,46
W	<20,0		µg/l	FN	

	All results	Outliers excl.	Unit
Mean $\pm CI(99\%)$	27,7 \pm 1,1	28,2 \pm 0,7	µg/l
Recov. $\pm CI(99\%)$	99,6 \pm 4,1	101,3 \pm 2,5	%
SD between labs	1,8	1,0	µg/l
RSD between labs	6,5	3,6	%
n for calculation	20	18	



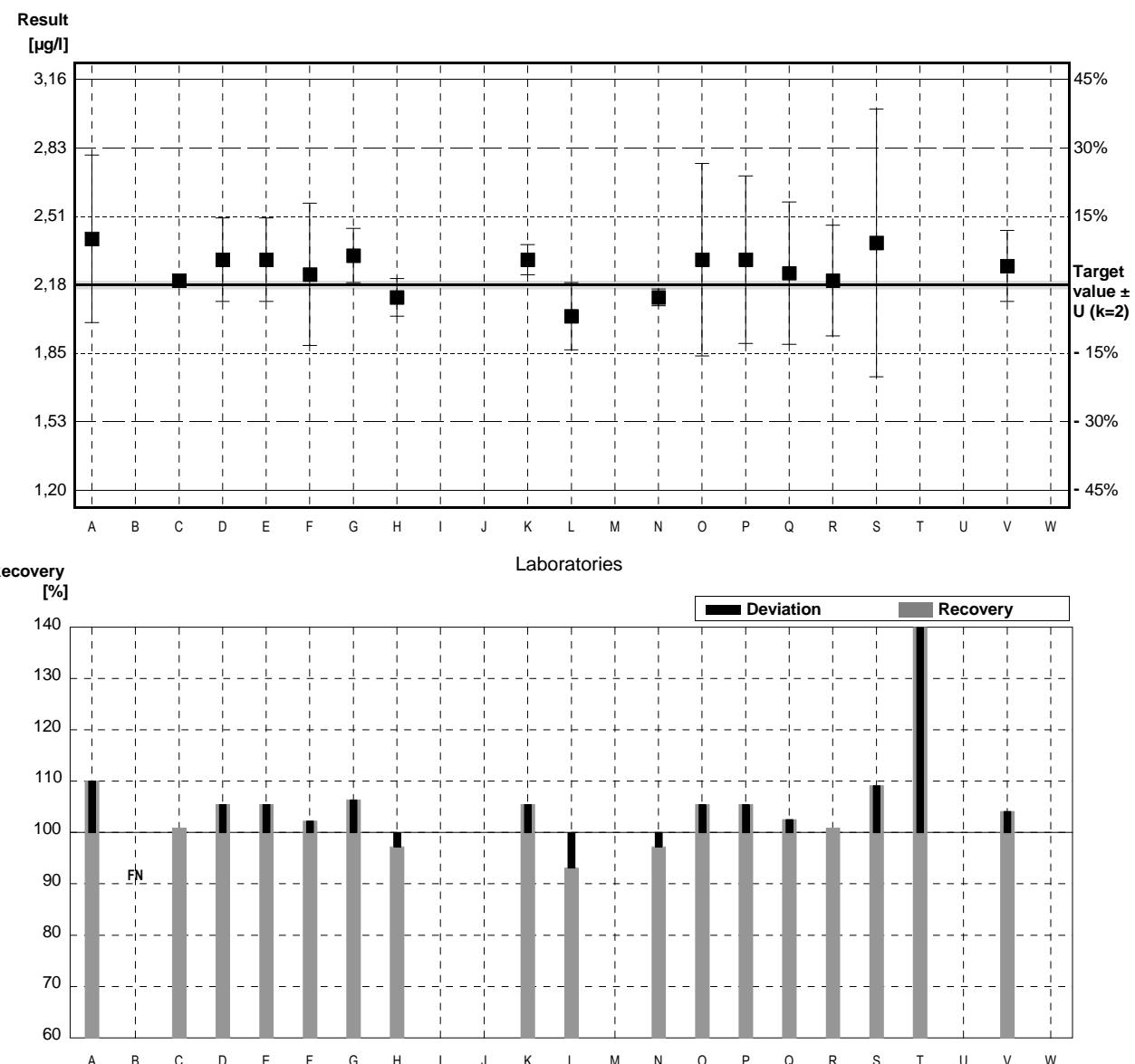
Sample M146A

Parameter Arsenic

Target value $\pm U (k=2)$ 2,18 µg/l \pm 0,02 µg/l
 IFA result $\pm U (k=2)$ 2,15 µg/l \pm 0,15 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	2,4	0,4	µg/l	110%	1,23
B	<2,0		µg/l	FN	
C	2,2		µg/l	101%	0,11
D	2,3	0,2	µg/l	106%	0,67
E	2,3	0,2	µg/l	106%	0,67
F	2,23	0,34	µg/l	102%	0,28
G	2,32	0,13	µg/l	106%	0,78
H	2,12	0,09	µg/l	97%	-0,34
I			µg/l		
J			µg/l		
K	2,30	0,072	µg/l	106%	0,67
L	2,03	0,16	µg/l	93%	-0,84
M			µg/l		
N	2,12	0,04	µg/l	97%	-0,34
O	2,3	0,46	µg/l	106%	0,67
P	2,3	0,4	µg/l	106%	0,67
Q	2,236	0,340	µg/l	103%	0,31
R	2,2	0,264	µg/l	101%	0,11
S	2,38	0,64	µg/l	109%	1,12
T	3,21 *	0,48	µg/l	147%	5,76
U			µg/l		
V	2,27	0,17	µg/l	104%	0,50
W			µg/l		

	All results	Outliers excl.	Unit
Mean $\pm CI(99\%)$	2,31 \pm 0,18	2,25 \pm 0,07	µg/l
Recov. $\pm CI(99\%)$	105,8 \pm 8,2	103,2 \pm 3,3	%
SD between labs	0,25	0,10	µg/l
RSD between labs	10,9	4,4	%
n for calculation	17	16	



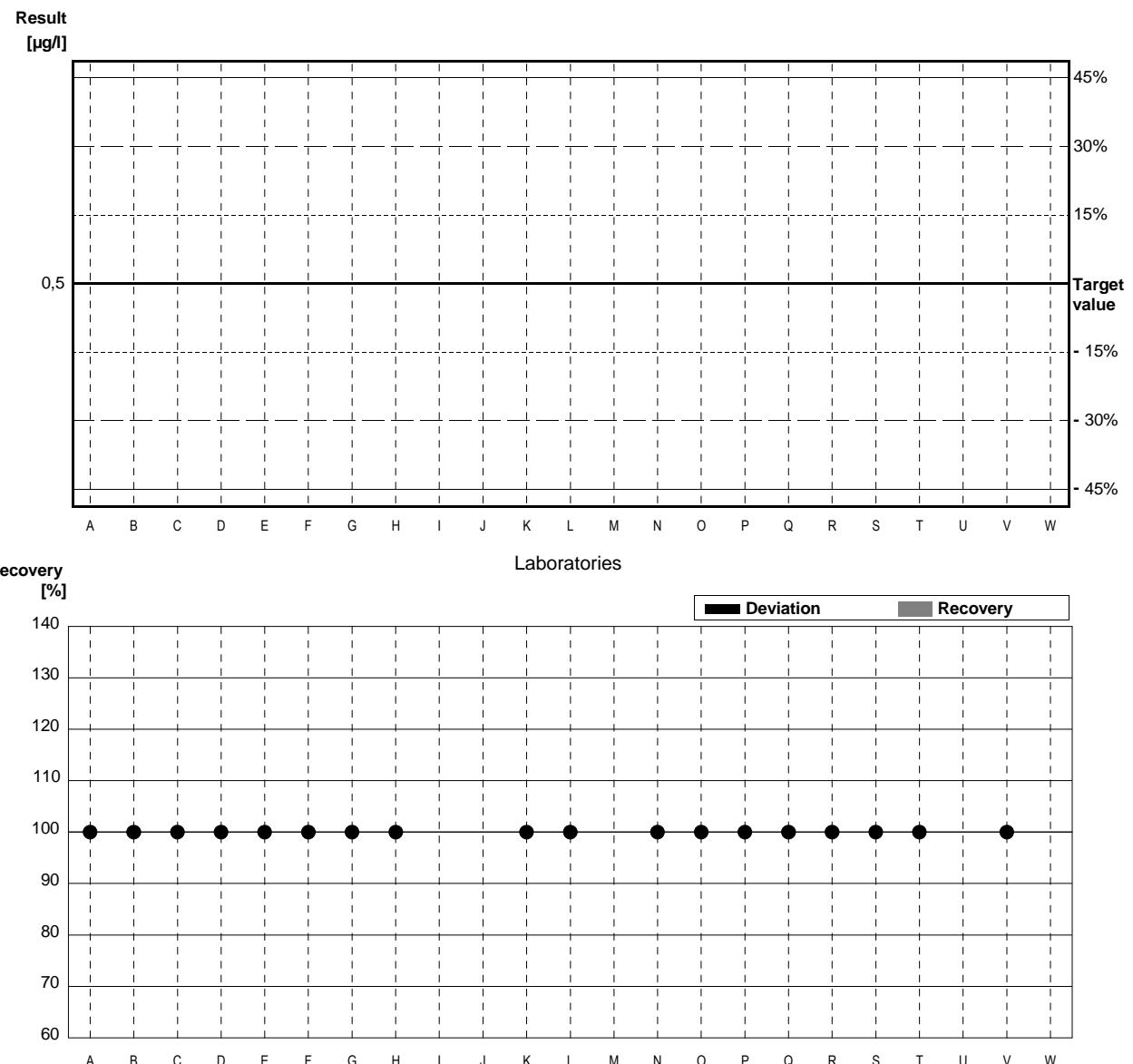
Sample M146B

Parameter Arsenic

Target value <0,5 µg/l
IFA result <0,05 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	<1,0		µg/l	•	
B	<2,0		µg/l	•	
C	<0,1		µg/l	•	
D	<1		µg/l	•	
E	<2		µg/l	•	
F	<1		µg/l	•	
G	<0,5		µg/l	•	
H	[0,10]		µg/l	•	
I			µg/l		
J			µg/l		
K	<0,20		µg/l	•	
L	<1,0		µg/l	•	
M			µg/l		
N	<0,05		µg/l	•	
O	<1,0		µg/l	•	
P	<0,40		µg/l	•	
Q	<0,5		µg/l	•	
R	0,02		µg/l	•	
S	<0,50		µg/l	•	
T	<1		µg/l	•	
U			µg/l		
V	[0,1]		µg/l	•	
W			µg/l		

	All results	Outliers excl.	Unit
Mean ± CI(99%)			µg/l
Recov. ± CI(99%)			%
SD between labs			µg/l
RSD between labs			%
n for calculation			



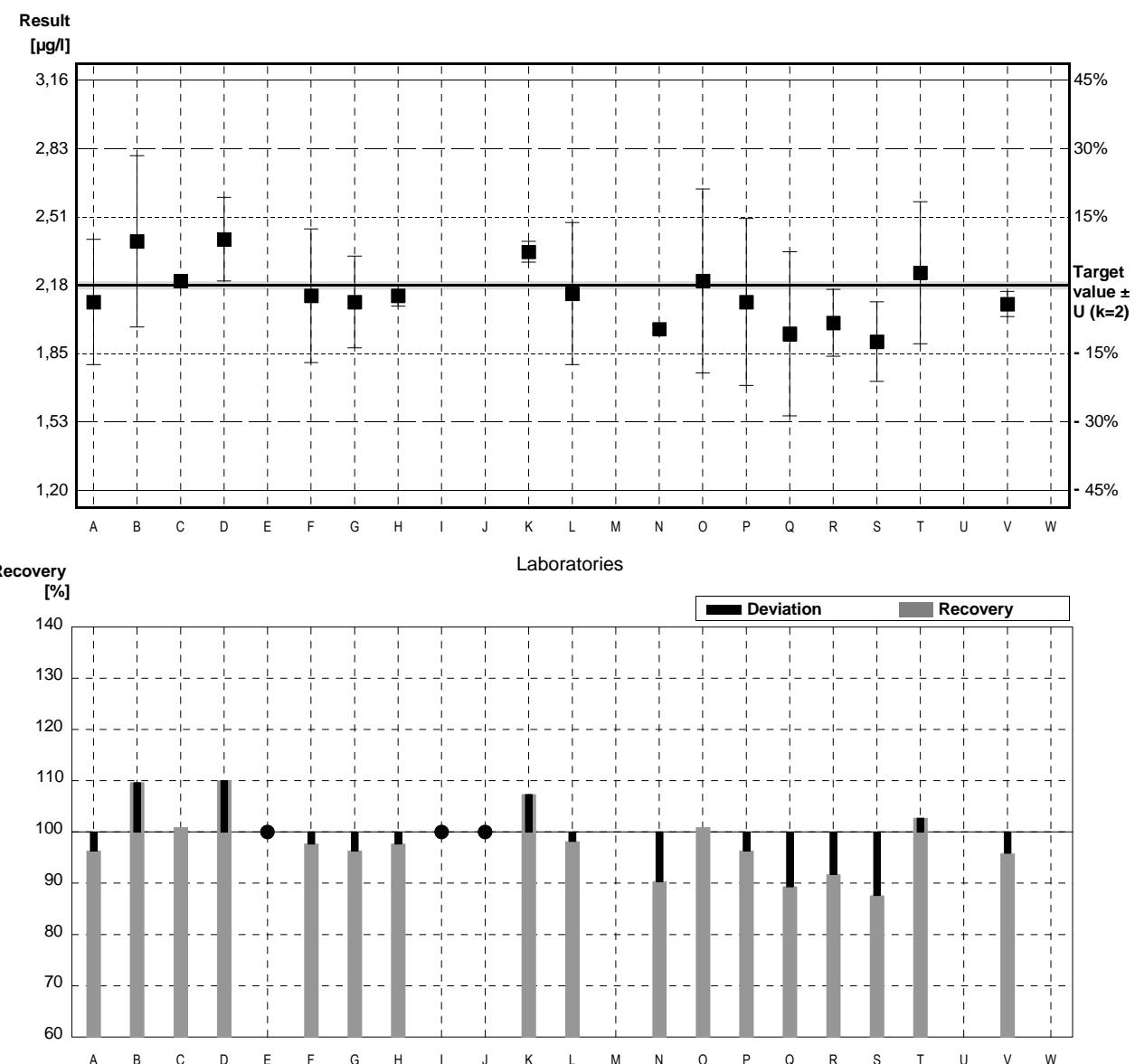
Sample M146A

Parameter Lead

Target value $\pm U (k=2)$ 2,18 µg/l \pm 0,02 µg/l
 IFA result $\pm U (k=2)$ 2,20 µg/l \pm 0,11 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	2,1	0,3	µg/l	96%	-0,50
B	2,39	0,41	µg/l	110%	1,32
C	2,2		µg/l	101%	0,13
D	2,4	0,2	µg/l	110%	1,38
E	<2,5		µg/l	•	
F	2,13	0,32	µg/l	98%	-0,31
G	2,10	0,22	µg/l	96%	-0,50
H	2,13	0,05	µg/l	98%	-0,31
I	<4,0		µg/l	•	
J	<4		µg/l	•	
K	2,34	0,050	µg/l	107%	1,01
L	2,14	0,34	µg/l	98%	-0,25
M			µg/l		
N	1,97	0,02	µg/l	90%	-1,32
O	2,2	0,44	µg/l	101%	0,13
P	2,1	0,4	µg/l	96%	-0,50
Q	1,948	0,393	µg/l	89%	-1,46
R	2	0,16	µg/l	92%	-1,13
S	1,91	0,19	µg/l	88%	-1,70
T	2,24	0,34	µg/l	103%	0,38
U			µg/l		
V	2,09	0,06	µg/l	96%	-0,57
W			µg/l		

	All results	Outliers excl.	Unit
Mean $\pm CI(99\%)$	2,14 \pm 0,10	2,14 \pm 0,10	µg/l
Recov. $\pm CI(99\%)$	98,2 \pm 4,7	98,2 \pm 4,7	%
SD between labs	0,14	0,14	µg/l
RSD between labs	6,7	6,7	%
n for calculation	17	17	



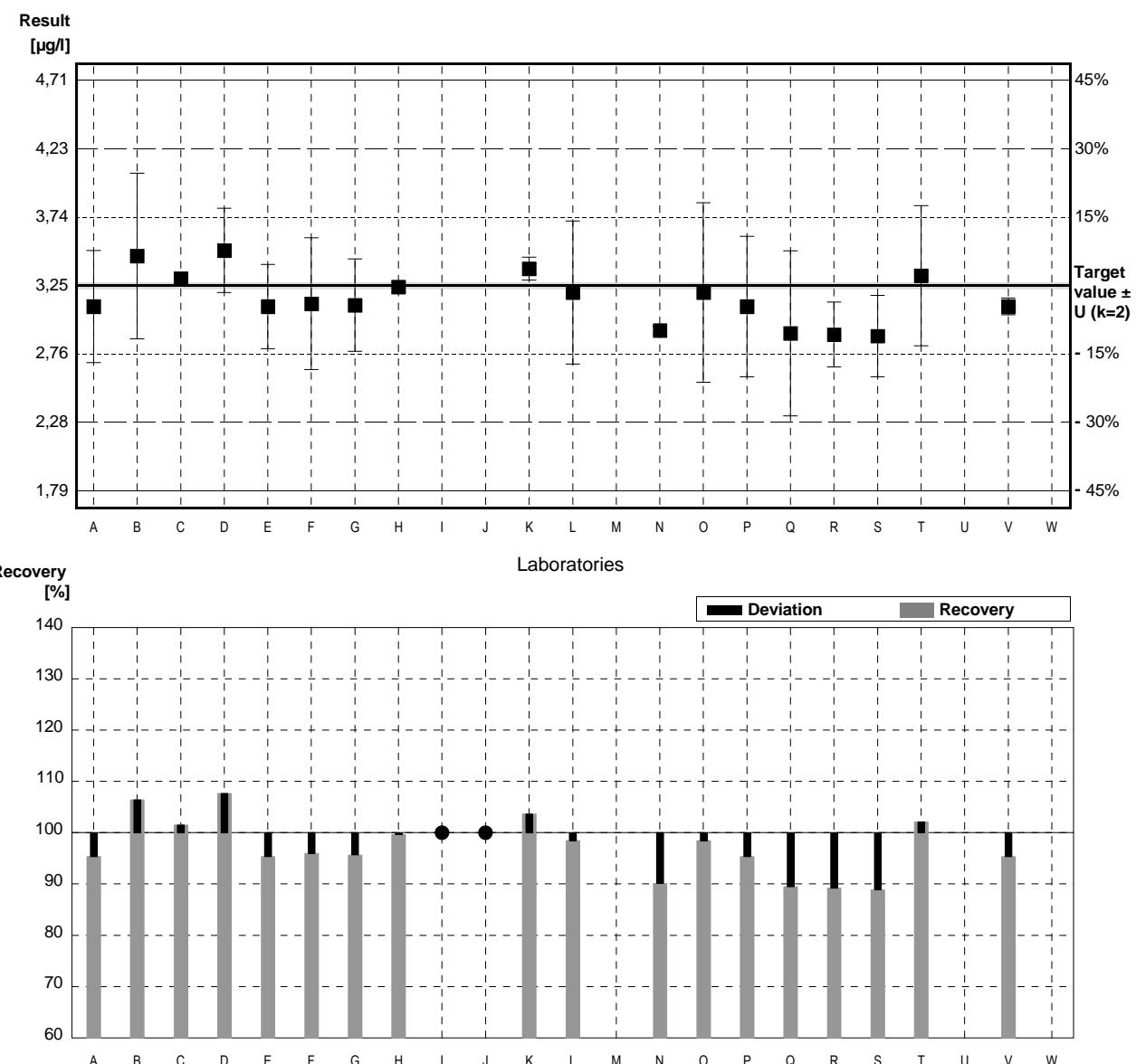
Sample M146B

Parameter Lead

Target value $\pm U (k=2)$ 3,25 $\mu\text{g/l}$ \pm 0,02 $\mu\text{g/l}$
 IFA result $\pm U (k=2)$ 3,17 $\mu\text{g/l}$ \pm 0,16 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	3,1	0,4	$\mu\text{g/l}$	95%	-0,63
B	3,46	0,59	$\mu\text{g/l}$	106%	0,89
C	3,3		$\mu\text{g/l}$	102%	0,21
D	3,5	0,3	$\mu\text{g/l}$	108%	1,05
E	3,1	0,3	$\mu\text{g/l}$	95%	-0,63
F	3,12	0,47	$\mu\text{g/l}$	96%	-0,55
G	3,11	0,33	$\mu\text{g/l}$	96%	-0,59
H	3,24	0,04	$\mu\text{g/l}$	100%	-0,04
I	<4,0		$\mu\text{g/l}$	•	
J	<4		$\mu\text{g/l}$	•	
K	3,37	0,081	$\mu\text{g/l}$	104%	0,51
L	3,20	0,51	$\mu\text{g/l}$	98%	-0,21
M			$\mu\text{g/l}$		
N	2,93	0,03	$\mu\text{g/l}$	90%	-1,35
O	3,2	0,64	$\mu\text{g/l}$	98%	-0,21
P	3,1	0,5	$\mu\text{g/l}$	95%	-0,63
Q	2,909	0,588	$\mu\text{g/l}$	90%	-1,44
R	2,9	0,232	$\mu\text{g/l}$	89%	-1,48
S	2,89	0,29	$\mu\text{g/l}$	89%	-1,52
T	3,32	0,50	$\mu\text{g/l}$	102%	0,30
U			$\mu\text{g/l}$		
V	3,10	0,06	$\mu\text{g/l}$	95%	-0,63
W			$\mu\text{g/l}$		

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	$3,16 \pm 0,13$	$3,16 \pm 0,13$	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	$97,2 \pm 3,9$	$97,2 \pm 3,9$	%
SD between labs	0,18	0,18	$\mu\text{g/l}$
RSD between labs	5,8	5,8	%
n for calculation	18	18	



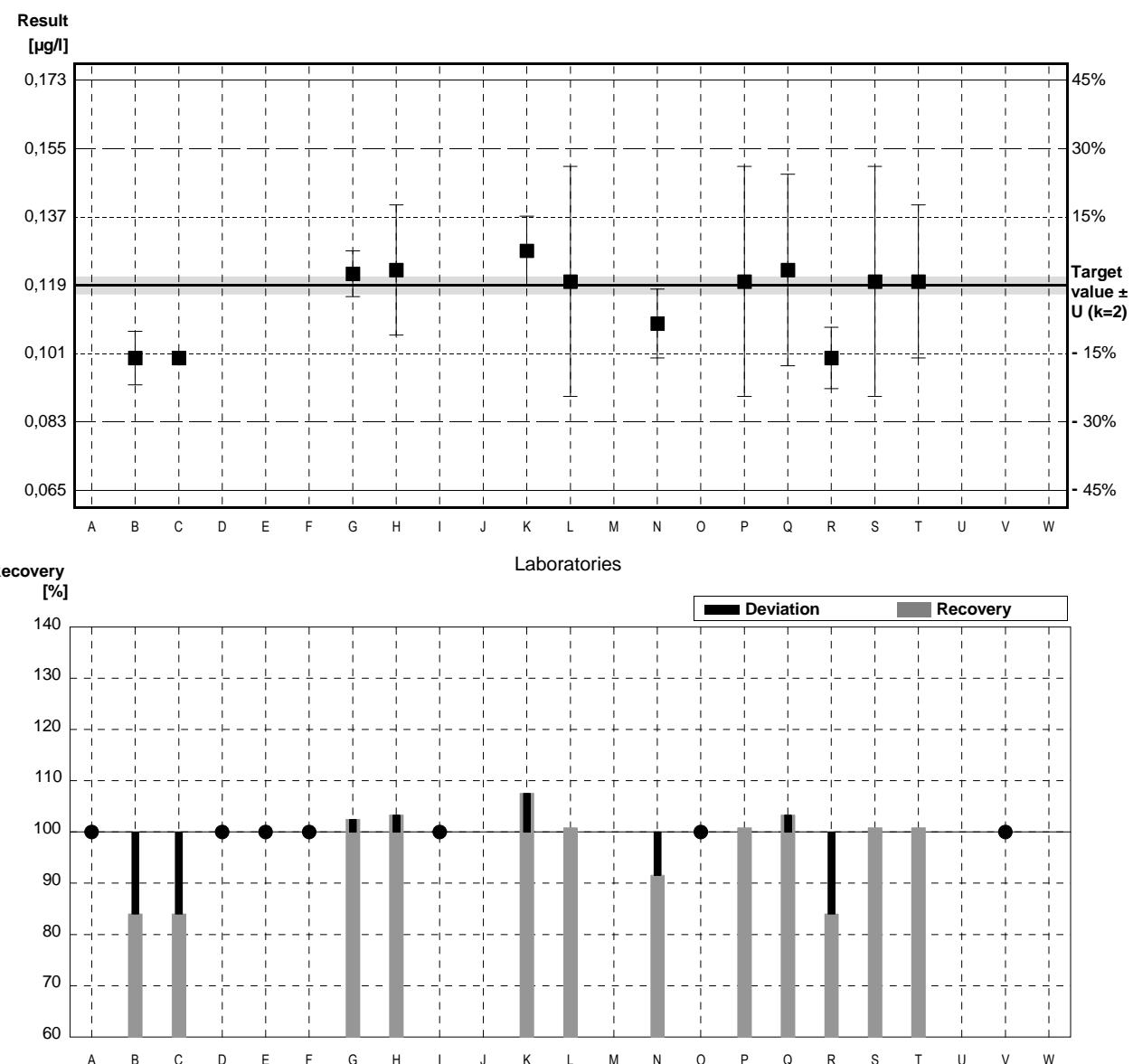
Sample M146A

Parameter Cadmium

Target value $\pm U$ ($k=2$) 0,119 µg/l \pm 0,002 µg/l
 IFA result $\pm U$ ($k=2$) 0,124 µg/l \pm 0,011 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	<1,0		µg/l	•	
B	0,100 *	0,007	µg/l	84%	-2,58
C	0,1 *		µg/l	84%	-2,58
D	<0,2		µg/l	•	
E	<0,4		µg/l	•	
F	<0,2		µg/l	•	
G	0,122	0,006	µg/l	103%	0,41
H	0,123	0,017	µg/l	103%	0,54
I	<0,5		µg/l	•	
J			µg/l		
K	0,128	0,009	µg/l	108%	1,22
L	0,12	0,03	µg/l	101%	0,14
M			µg/l		
N	0,109	0,009	µg/l	92%	-1,36
O	<1,0		µg/l	•	
P	0,12	0,03	µg/l	101%	0,14
Q	0,123	0,0250	µg/l	103%	0,54
R	0,1 *	0,008	µg/l	84%	-2,58
S	0,12	0,03	µg/l	101%	0,14
T	0,12	0,02	µg/l	101%	0,14
U			µg/l		
V	<0,4		µg/l	•	
W			µg/l		

	All results	Outliers excl.	Unit
Mean \pm Cl(99%)	0,115 \pm 0,009	0,121 \pm 0,006	µg/l
Recov. \pm Cl(99%)	97,0 \pm 7,7	101,3 \pm 4,8	%
SD between labs	0,010	0,005	µg/l
RSD between labs	8,9	4,2	%
n for calculation	12	9	



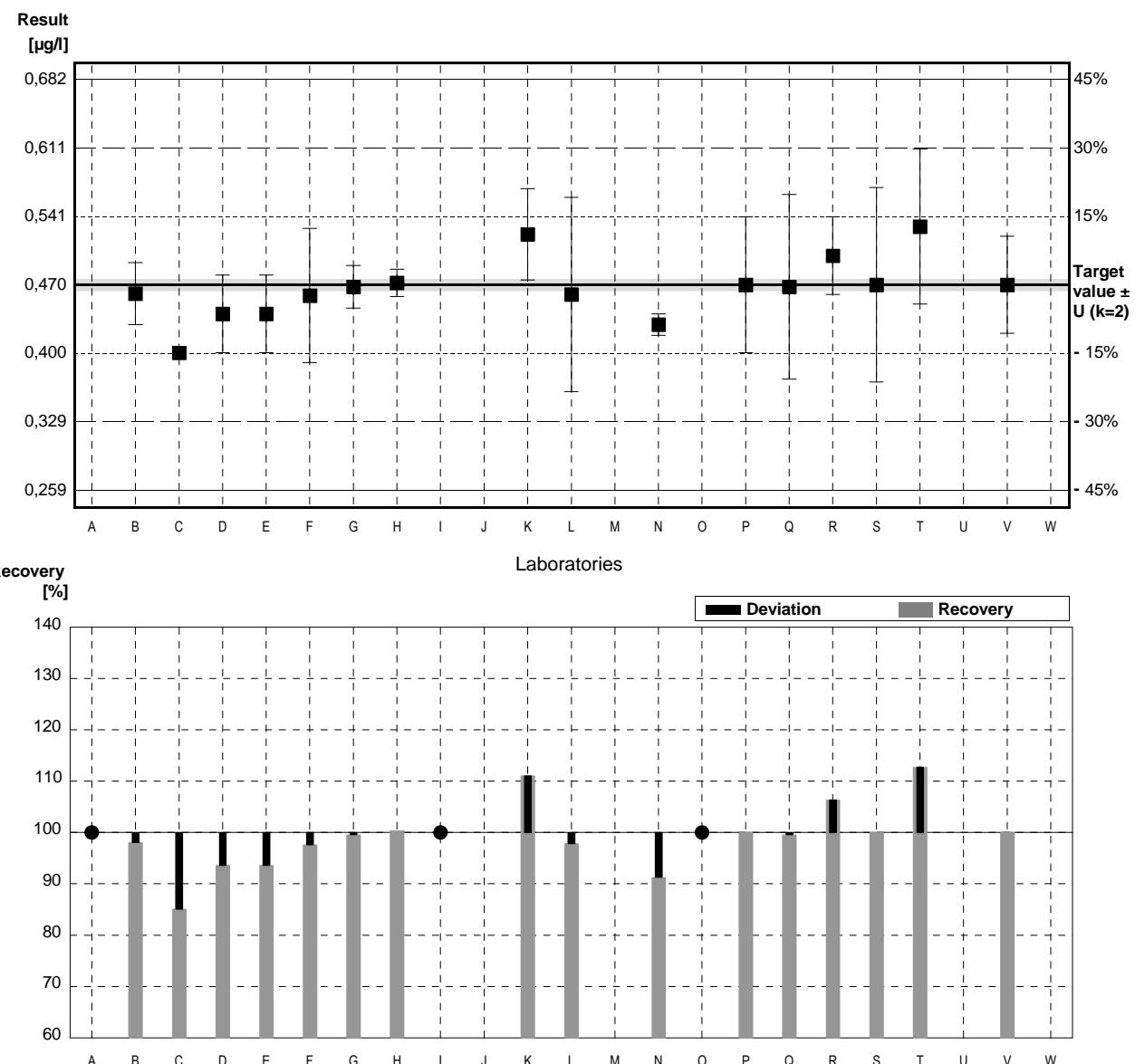
Sample M146B

Parameter Cadmium

Target value $\pm U$ ($k=2$) 0,470 $\mu\text{g/l}$ \pm 0,006 $\mu\text{g/l}$
 IFA result $\pm U$ ($k=2$) 0,483 $\mu\text{g/l}$ \pm 0,043 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	<1,0		$\mu\text{g/l}$	*	
B	0,461	0,032	$\mu\text{g/l}$	98%	-0,31
C	0,4 *		$\mu\text{g/l}$	85%	-2,40
D	0,44	0,04	$\mu\text{g/l}$	94%	-1,03
E	0,44	0,04	$\mu\text{g/l}$	94%	-1,03
F	0,459	0,069	$\mu\text{g/l}$	98%	-0,38
G	0,468	0,022	$\mu\text{g/l}$	100%	-0,07
H	0,472	0,014	$\mu\text{g/l}$	100%	0,07
I	<0,5		$\mu\text{g/l}$	*	
J			$\mu\text{g/l}$		
K	0,522 *	0,047	$\mu\text{g/l}$	111%	1,78
L	0,46	0,10	$\mu\text{g/l}$	98%	-0,34
M			$\mu\text{g/l}$		
N	0,429	0,011	$\mu\text{g/l}$	91%	-1,41
O	<1,0		$\mu\text{g/l}$	*	
P	0,47	0,07	$\mu\text{g/l}$	100%	0,00
Q	0,468	0,0950	$\mu\text{g/l}$	100%	-0,07
R	0,5	0,04	$\mu\text{g/l}$	106%	1,03
S	0,47	0,10	$\mu\text{g/l}$	100%	0,00
T	0,53 *	0,08	$\mu\text{g/l}$	113%	2,06
U			$\mu\text{g/l}$		
V	0,47	0,05	$\mu\text{g/l}$	100%	0,00
W			$\mu\text{g/l}$		

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	$0,466 \pm 0,024$	$0,462 \pm 0,015$	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	$99,2 \pm 5,1$	$98,3 \pm 3,2$	%
SD between labs	0,032	0,018	$\mu\text{g/l}$
RSD between labs	6,9	3,9	%
n for calculation	16	13	



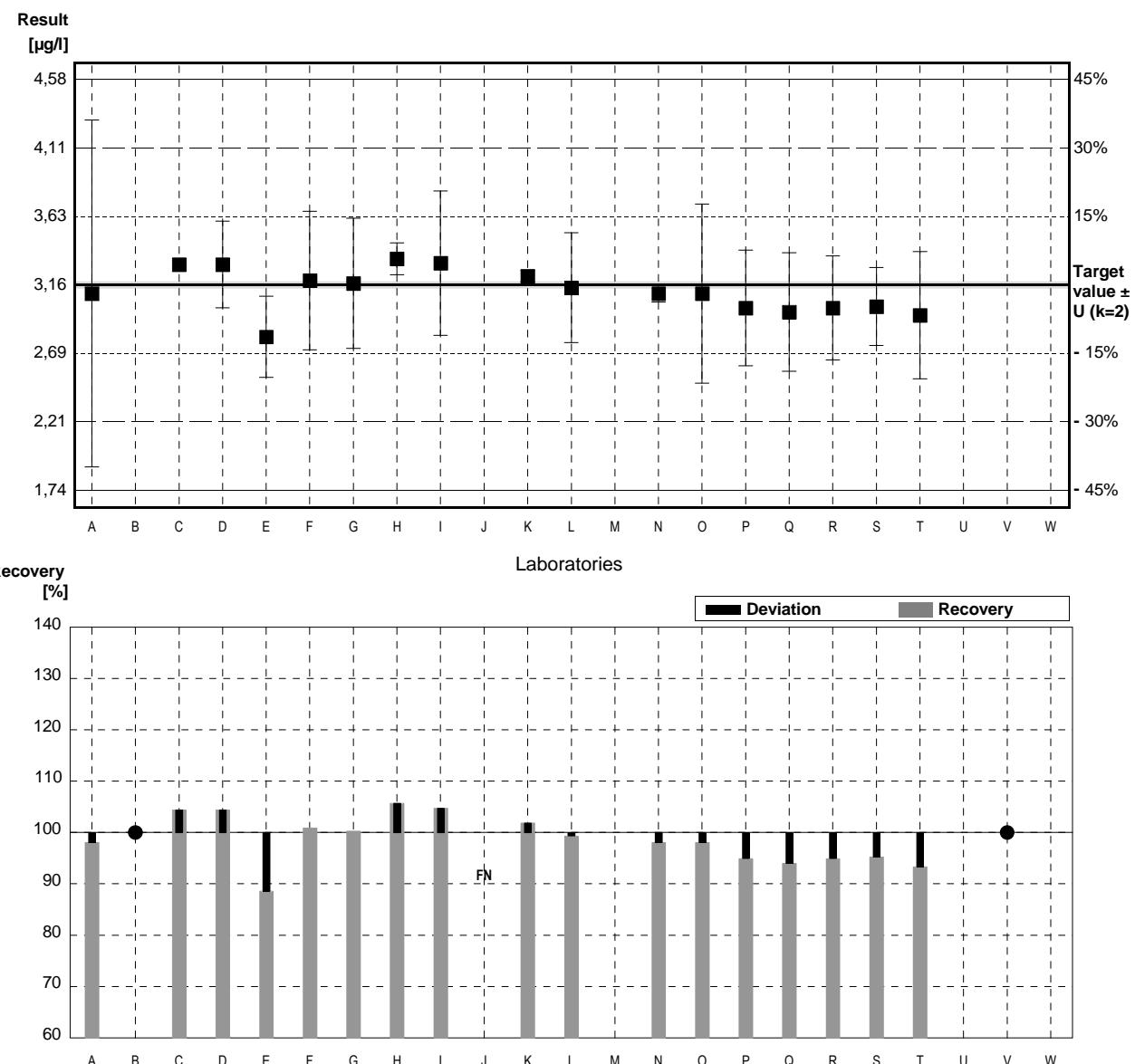
Sample M146A

Parameter Chromium

Target value $\pm U (k=2)$ 3,16 µg/l \pm 0,02 µg/l
 IFA result $\pm U (k=2)$ 3,24 µg/l \pm 0,19 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	3,1	1,2	µg/l	98%	-0,28
B	<5		µg/l	*	
C	3,3		µg/l	104%	0,66
D	3,3	0,3	µg/l	104%	0,66
E	2,8	0,28	µg/l	89%	-1,70
F	3,19	0,48	µg/l	101%	0,14
G	3,17	0,45	µg/l	100%	0,05
H	3,34	0,11	µg/l	106%	0,85
I	3,31	0,50	µg/l	105%	0,71
J	<2		µg/l	FN	
K	3,22	0,040	µg/l	102%	0,28
L	3,14	0,38	µg/l	99%	-0,09
M			µg/l		
N	3,10	0,06	µg/l	98%	-0,28
O	3,1	0,62	µg/l	98%	-0,28
P	3,0	0,4	µg/l	95%	-0,76
Q	2,971	0,410	µg/l	94%	-0,89
R	3	0,36	µg/l	95%	-0,76
S	3,01	0,27	µg/l	95%	-0,71
T	2,95	0,44	µg/l	93%	-0,99
U			µg/l		
V	<5		µg/l	*	
W			µg/l		

	All results	Outliers excl.	Unit
Mean $\pm CI(99\%)$	3,12 \pm 0,11	3,12 \pm 0,11	µg/l
Recov. $\pm CI(99\%)$	98,7 \pm 3,4	98,7 \pm 3,4	%
SD between labs	0,15	0,15	µg/l
RSD between labs	4,8	4,8	%
n for calculation	17	17	



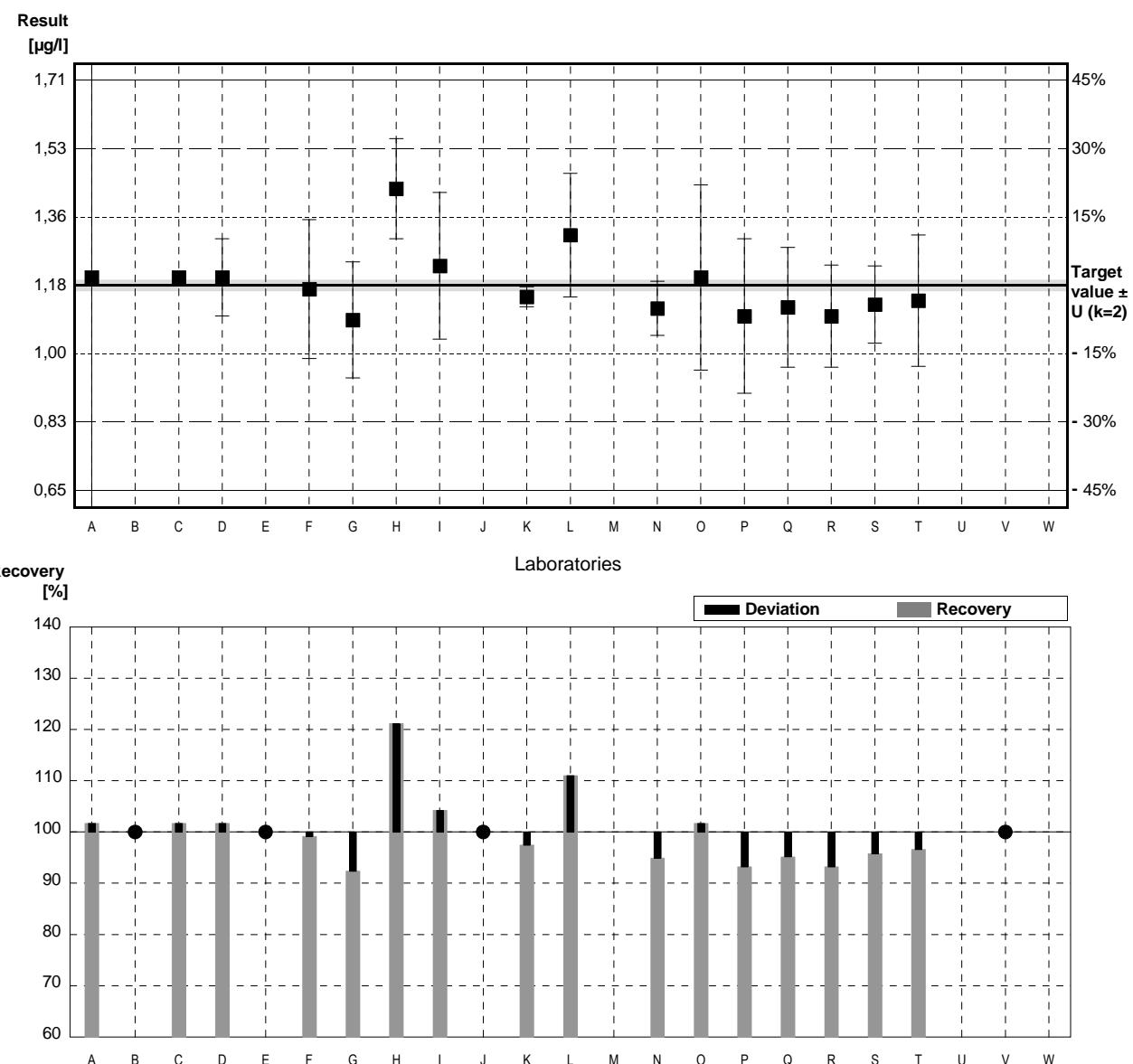
Sample M146B

Parameter Chromium

Target value $\pm U (k=2)$ 1,18 µg/l \pm 0,01 µg/l
 IFA result $\pm U (k=2)$ 1,21 µg/l \pm 0,07 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	1,2	1	µg/l	102%	0,25
B	<5		µg/l	•	
C	1,2		µg/l	102%	0,25
D	1,2	0,1	µg/l	102%	0,25
E	<2		µg/l	•	
F	1,17	0,18	µg/l	99%	-0,13
G	1,09	0,15	µg/l	92%	-1,14
H	1,43 *	0,13	µg/l	121%	3,16
I	1,23	0,19	µg/l	104%	0,63
J	<2		µg/l	•	
K	1,15	0,026	µg/l	97%	-0,38
L	1,31	0,16	µg/l	111%	1,64
M		µg/l			
N	1,12	0,07	µg/l	95%	-0,76
O	1,2	0,24	µg/l	102%	0,25
P	1,1	0,2	µg/l	93%	-1,01
Q	1,123	0,155	µg/l	95%	-0,72
R	1,1	0,132	µg/l	93%	-1,01
S	1,13	0,10	µg/l	96%	-0,63
T	1,14	0,17	µg/l	97%	-0,51
U		µg/l			
V	<5		µg/l	•	
W			µg/l		

	All results	Outliers excl.	Unit
Mean $\pm CI(99\%)$	1,18 \pm 0,06	1,16 \pm 0,05	µg/l
Recov. $\pm CI(99\%)$	100,1 \pm 5,5	98,7 \pm 3,9	%
SD between labs	0,09	0,06	µg/l
RSD between labs	7,5	5,1	%
n for calculation	16	15	



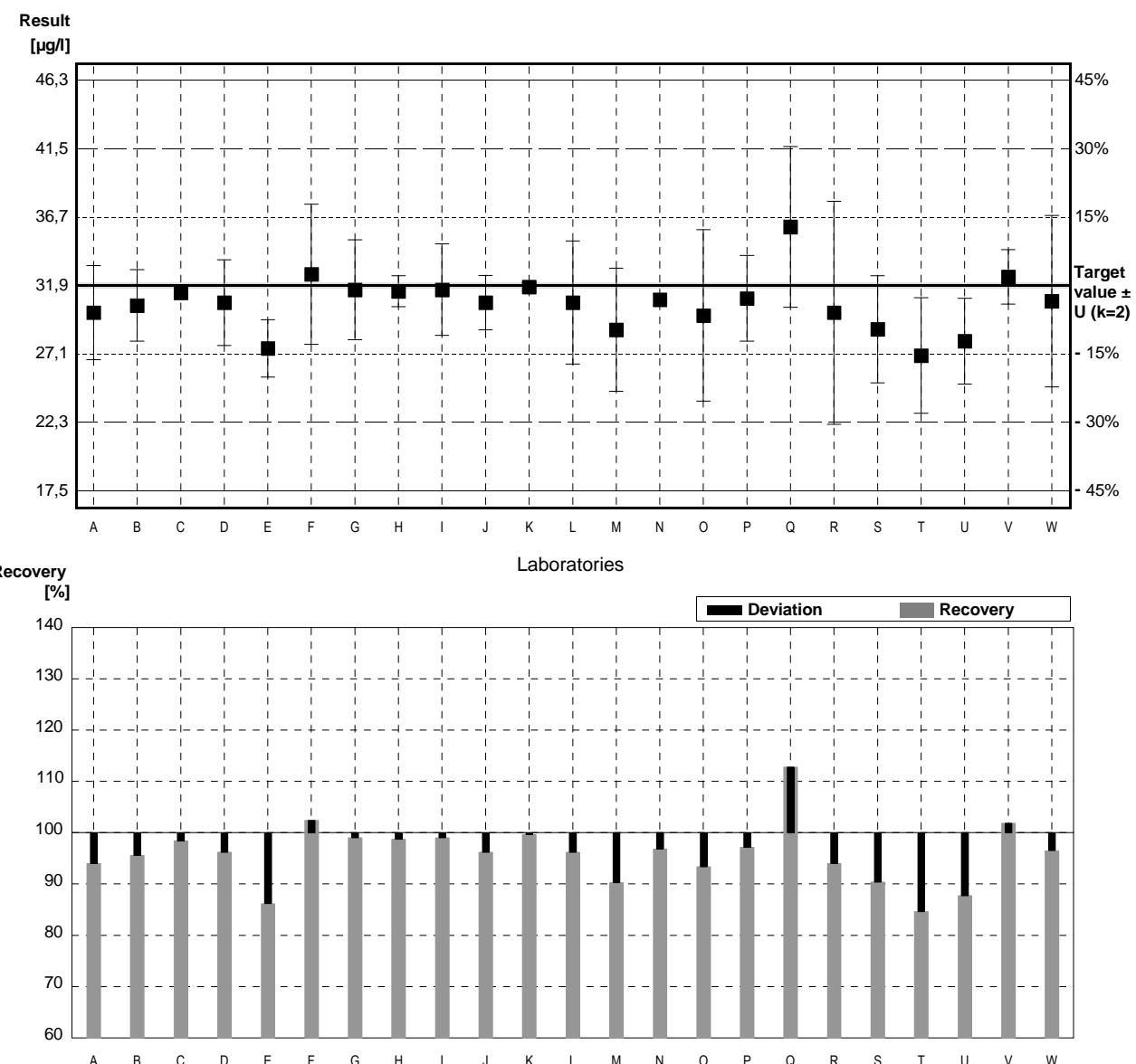
Sample M146A

Parameter Iron

Target value $\pm U (k=2)$ 31,9 $\mu\text{g/l}$ \pm 0,2 $\mu\text{g/l}$
 IFA result $\pm U (k=2)$ 33,1 $\mu\text{g/l}$ \pm 3,0 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	30,0	3,3	$\mu\text{g/l}$	94%	-0,80
B	30,5	2,5	$\mu\text{g/l}$	96%	-0,59
C	31,4		$\mu\text{g/l}$	98%	-0,21
D	30,7	3	$\mu\text{g/l}$	96%	-0,51
E	27,5	2	$\mu\text{g/l}$	86%	-1,86
F	32,69	4,90	$\mu\text{g/l}$	102%	0,33
G	31,6	3,50	$\mu\text{g/l}$	99%	-0,13
H	31,5	1,08	$\mu\text{g/l}$	99%	-0,17
I	31,6	3,2	$\mu\text{g/l}$	99%	-0,13
J	30,7	1,9	$\mu\text{g/l}$	96%	-0,51
K	31,8	0,289	$\mu\text{g/l}$	100%	-0,04
L	30,7	4,3	$\mu\text{g/l}$	96%	-0,51
M	28,8	4,3	$\mu\text{g/l}$	90%	-1,31
N	30,9	0,4	$\mu\text{g/l}$	97%	-0,42
O	29,8	6,0	$\mu\text{g/l}$	93%	-0,89
P	31	3	$\mu\text{g/l}$	97%	-0,38
Q	36,00 *	5,62	$\mu\text{g/l}$	113%	1,74
R	30	7,8	$\mu\text{g/l}$	94%	-0,80
S	28,84	3,75	$\mu\text{g/l}$	90%	-1,30
T	27,0	4,04	$\mu\text{g/l}$	85%	-2,08
U	28	3	$\mu\text{g/l}$	88%	-1,65
V	32,5	1,9	$\mu\text{g/l}$	102%	0,25
W	30,8	6,0	$\mu\text{g/l}$	97%	-0,47

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	$30,6 \pm 1,1$	$30,4 \pm 0,9$	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	$96,0 \pm 3,5$	$95,2 \pm 2,9$	%
SD between labs	1,9	1,5	$\mu\text{g/l}$
RSD between labs	6,2	5,0	%
n for calculation	23	22	



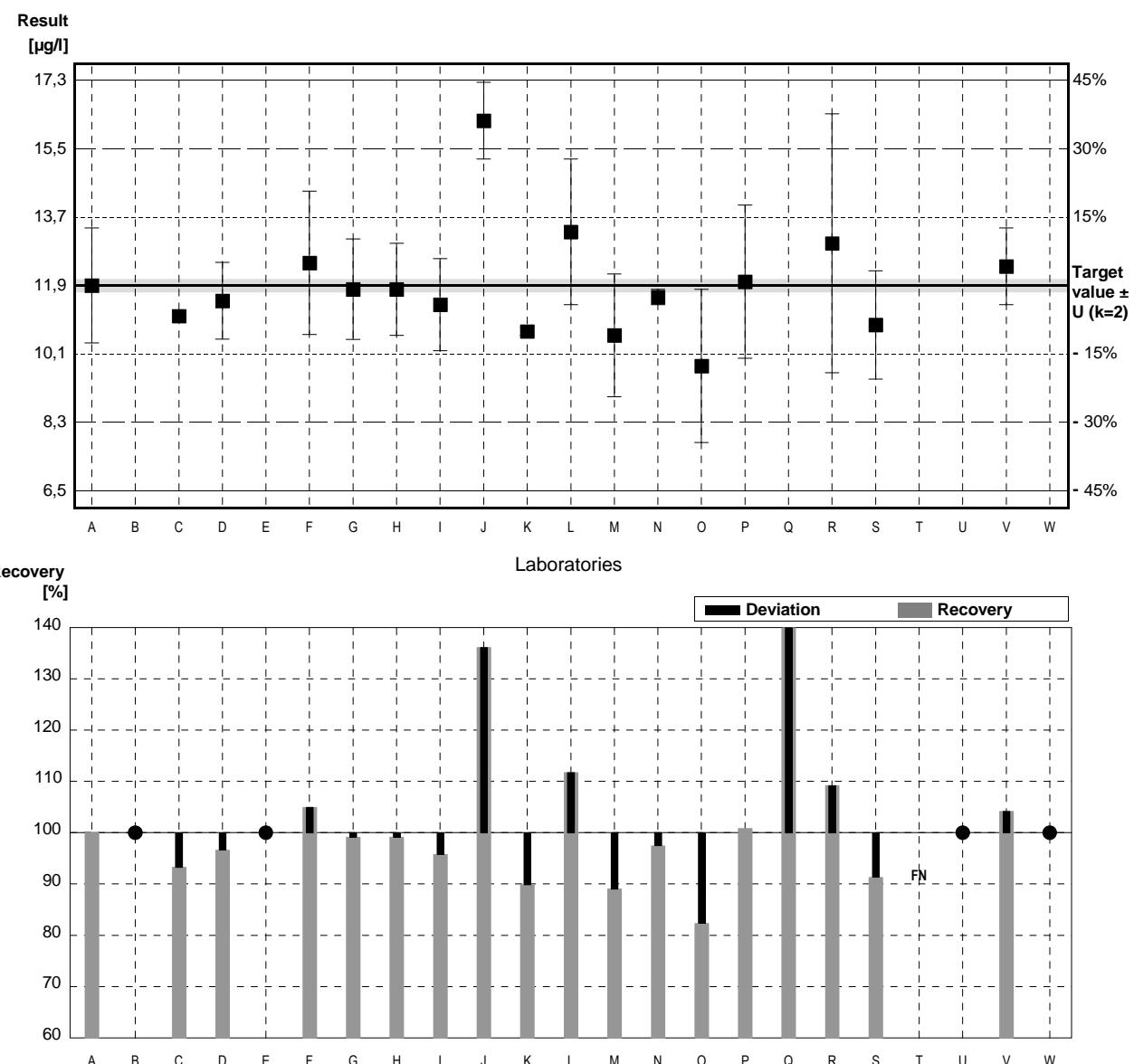
Sample M146B

Parameter Iron

Target value $\pm U$ ($k=2$) 11,9 $\mu\text{g/l}$ \pm 0,2 $\mu\text{g/l}$
 IFA result $\pm U$ ($k=2$) 12,2 $\mu\text{g/l}$ \pm 1,1 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	11,9	1,5	$\mu\text{g/l}$	100%	0,00
B	<30		$\mu\text{g/l}$	*	
C	11,1		$\mu\text{g/l}$	93%	-0,91
D	11,5	1	$\mu\text{g/l}$	97%	-0,45
E	<12		$\mu\text{g/l}$	*	
F	12,49	1,87	$\mu\text{g/l}$	105%	0,67
G	11,8	1,31	$\mu\text{g/l}$	99%	-0,11
H	11,8	1,20	$\mu\text{g/l}$	99%	-0,11
I	11,4	1,2	$\mu\text{g/l}$	96%	-0,57
J	16,2 *	1,0	$\mu\text{g/l}$	136%	4,88
K	10,7	0,100	$\mu\text{g/l}$	90%	-1,36
L	13,3	1,9	$\mu\text{g/l}$	112%	1,59
M	10,6	1,6	$\mu\text{g/l}$	89%	-1,48
N	11,6	0,2	$\mu\text{g/l}$	97%	-0,34
O	9,8	2,0	$\mu\text{g/l}$	82%	-2,38
P	12	2	$\mu\text{g/l}$	101%	0,11
Q	17,80 *	2,78	$\mu\text{g/l}$	150%	6,70
R	13	3,38	$\mu\text{g/l}$	109%	1,25
S	10,87	1,41	$\mu\text{g/l}$	91%	-1,17
T	<10		$\mu\text{g/l}$	FN	
U	<20		$\mu\text{g/l}$	*	
V	12,4	1,0	$\mu\text{g/l}$	104%	0,57
W	<20,0		$\mu\text{g/l}$	*	

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	12,2 \pm 1,3	11,6 \pm 0,7	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	102,8 \pm 11,2	97,8 \pm 5,7	%
SD between labs	2,0	0,9	$\mu\text{g/l}$
RSD between labs	16,0	7,8	%
n for calculation	18	16	



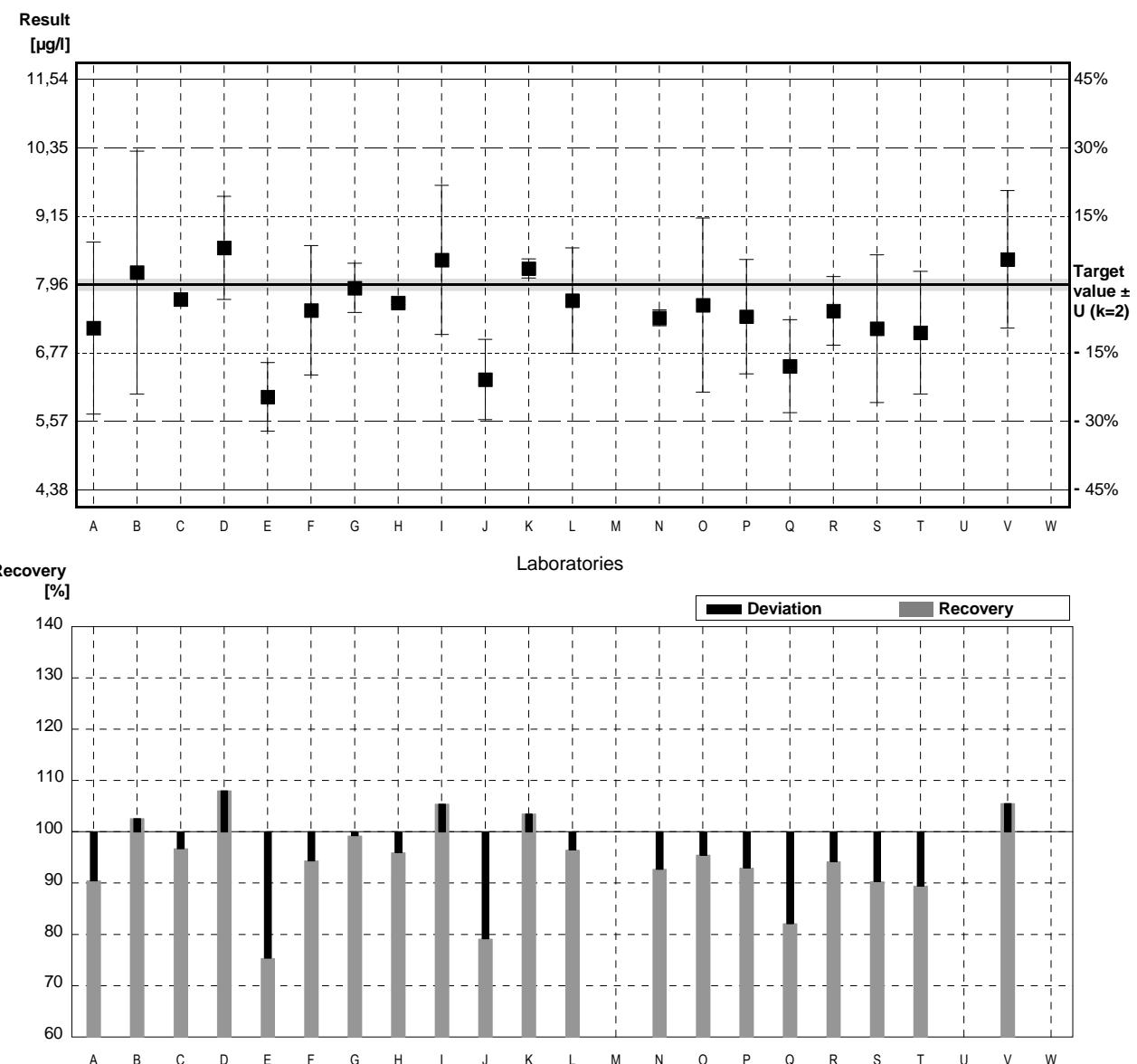
Sample M146A

Parameter Copper

Target value $\pm U (k=2)$ 7,96 µg/l \pm 0,10 µg/l
 IFA result $\pm U (k=2)$ 7,96 µg/l \pm 0,72 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	7,2	1,5	µg/l	90%	-1,06
B	8,17	2,12	µg/l	103%	0,29
C	7,7		µg/l	97%	-0,36
D	8,6	0,9	µg/l	108%	0,89
E	6,0	0,6	µg/l	75%	-2,74
F	7,51	1,13	µg/l	94%	-0,63
G	7,90	0,43	µg/l	99%	-0,08
H	7,64	0,03	µg/l	96%	-0,45
I	8,39	1,3	µg/l	105%	0,60
J	6,3	0,7	µg/l	79%	-2,32
K	8,24	0,168	µg/l	104%	0,39
L	7,68	0,92	µg/l	96%	-0,39
M		µg/l			
N	7,38	0,14	µg/l	93%	-0,81
O	7,6	1,52	µg/l	95%	-0,50
P	7,4	1,0	µg/l	93%	-0,78
Q	6,535	0,810	µg/l	82%	-1,99
R	7,5	0,6	µg/l	94%	-0,64
S	7,19	1,29	µg/l	90%	-1,07
T	7,12	1,07	µg/l	89%	-1,17
U		µg/l			
V	8,4	1,2	µg/l	106%	0,61
W		µg/l			

	All results	Outliers excl.	Unit
Mean $\pm CI(99\%)$	7,52 \pm 0,44	7,52 \pm 0,44	µg/l
Recov. $\pm CI(99\%)$	94,5 \pm 5,5	94,5 \pm 5,5	%
SD between labs	0,69	0,69	µg/l
RSD between labs	9,2	9,2	%
n for calculation	20	20	



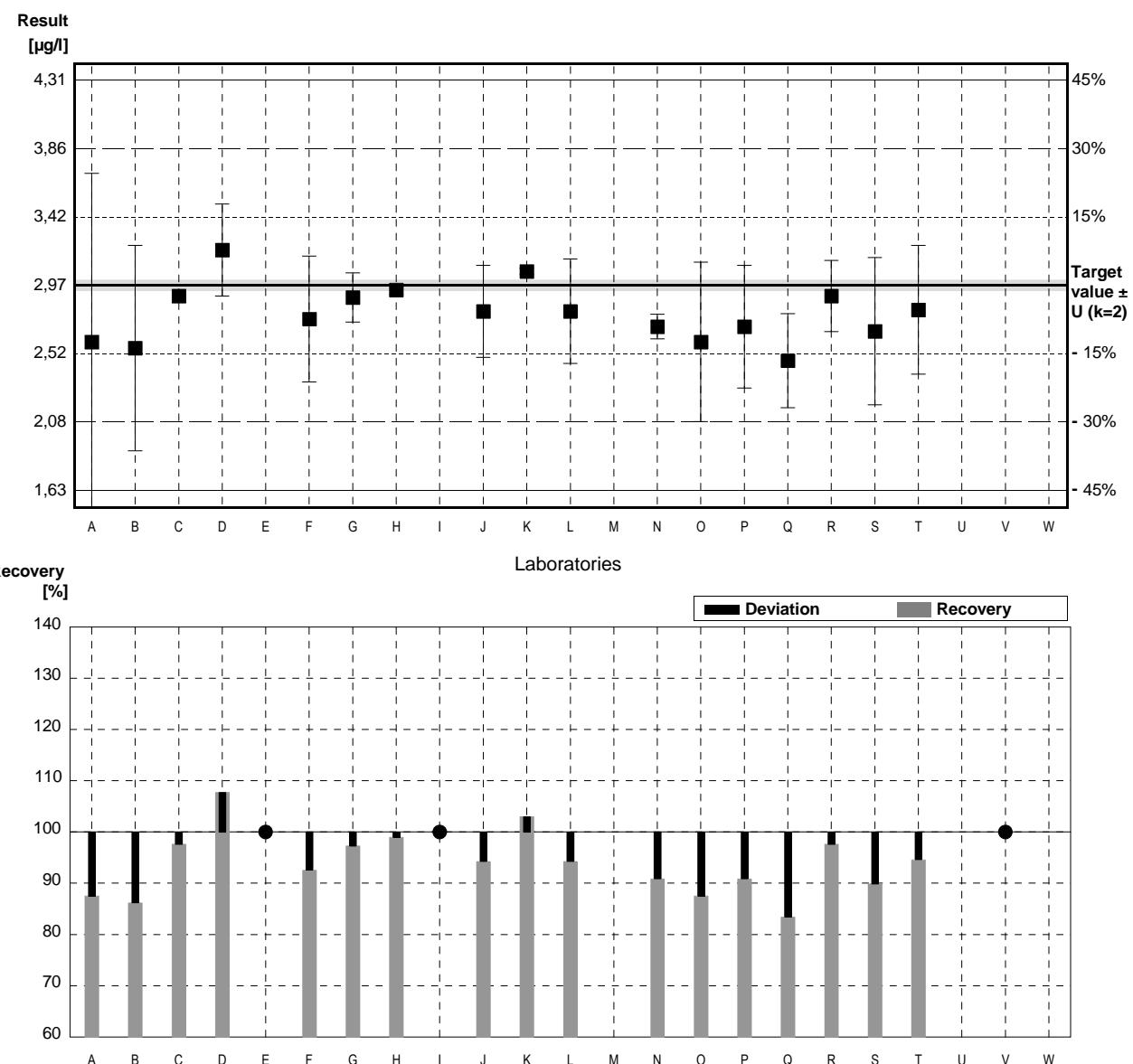
Sample M146B

Parameter Copper

Target value $\pm U (k=2)$ 2,97 µg/l \pm 0,03 µg/l
 IFA result $\pm U (k=2)$ 2,99 µg/l \pm 0,27 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	2,6	1,1	µg/l	88%	-1,38
B	2,56	0,67	µg/l	86%	-1,53
C	2,9		µg/l	98%	-0,26
D	3,2	0,3	µg/l	108%	0,86
E	<3		µg/l	•	
F	2,75	0,41	µg/l	93%	-0,82
G	2,89	0,16	µg/l	97%	-0,30
H	2,94	0,03	µg/l	99%	-0,11
I	<5,0		µg/l	•	
J	2,8	0,3	µg/l	94%	-0,64
K	3,06	0,020	µg/l	103%	0,34
L	2,80	0,34	µg/l	94%	-0,64
M			µg/l		
N	2,70	0,08	µg/l	91%	-1,01
O	2,6	0,52	µg/l	88%	-1,38
P	2,7	0,4	µg/l	91%	-1,01
Q	2,478	0,307	µg/l	83%	-1,84
R	2,9	0,232	µg/l	98%	-0,26
S	2,67	0,48	µg/l	90%	-1,12
T	2,81	0,42	µg/l	95%	-0,60
U			µg/l		
V	<5		µg/l	•	
W			µg/l		

	All results	Outliers excl.	Unit
Mean $\pm CI(99\%)$	2,79 \pm 0,13	2,79 \pm 0,13	µg/l
Recov. $\pm CI(99\%)$	93,8 \pm 4,4	93,8 \pm 4,4	%
SD between labs	0,19	0,19	µg/l
RSD between labs	6,7	6,7	%
n for calculation	17	17	



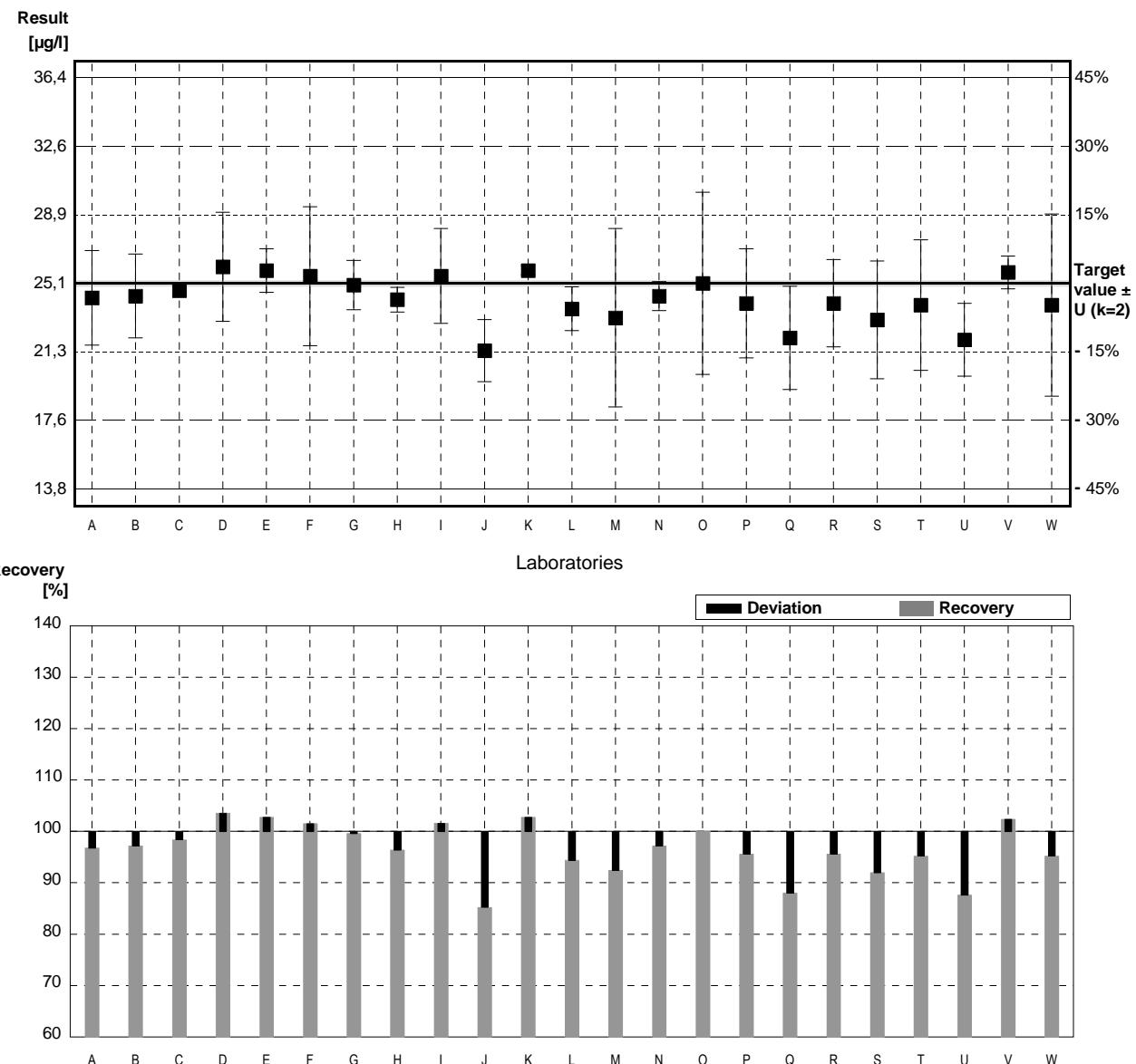
Sample M146A

Parameter Manganese

Target value $\pm U (k=2)$ 25,1 $\mu\text{g/l}$ \pm 0,2 $\mu\text{g/l}$
 IFA result $\pm U (k=2)$ 25,8 $\mu\text{g/l}$ \pm 2,1 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	24,3	2,6	$\mu\text{g/l}$	97%	-0,53
B	24,4	2,3	$\mu\text{g/l}$	97%	-0,46
C	24,7		$\mu\text{g/l}$	98%	-0,27
D	26,0	3	$\mu\text{g/l}$	104%	0,60
E	25,8	1,2	$\mu\text{g/l}$	103%	0,46
F	25,49	3,82	$\mu\text{g/l}$	102%	0,26
G	25,0	1,36	$\mu\text{g/l}$	100%	-0,07
H	24,2	0,68	$\mu\text{g/l}$	96%	-0,60
I	25,5	2,6	$\mu\text{g/l}$	102%	0,27
J	21,4	1,7	$\mu\text{g/l}$	85%	-2,46
K	25,8	0,265	$\mu\text{g/l}$	103%	0,46
L	23,7	1,20	$\mu\text{g/l}$	94%	-0,93
M	23,2	4,9	$\mu\text{g/l}$	92%	-1,26
N	24,4	0,8	$\mu\text{g/l}$	97%	-0,46
O	25,1	5,0	$\mu\text{g/l}$	100%	0,00
P	24	3	$\mu\text{g/l}$	96%	-0,73
Q	22,10	2,83	$\mu\text{g/l}$	88%	-1,99
R	24	2,4	$\mu\text{g/l}$	96%	-0,73
S	23,09	3,23	$\mu\text{g/l}$	92%	-1,33
T	23,9	3,59	$\mu\text{g/l}$	95%	-0,80
U	22	2	$\mu\text{g/l}$	88%	-2,06
V	25,7	0,9	$\mu\text{g/l}$	102%	0,40
W	23,9	5,0	$\mu\text{g/l}$	95%	-0,80

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	24,2 \pm 0,7	24,2 \pm 0,7	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	96,6 \pm 3,0	96,6 \pm 3,0	%
SD between labs	1,3	1,3	$\mu\text{g/l}$
RSD between labs	5,2	5,2	%
n for calculation	23	23	



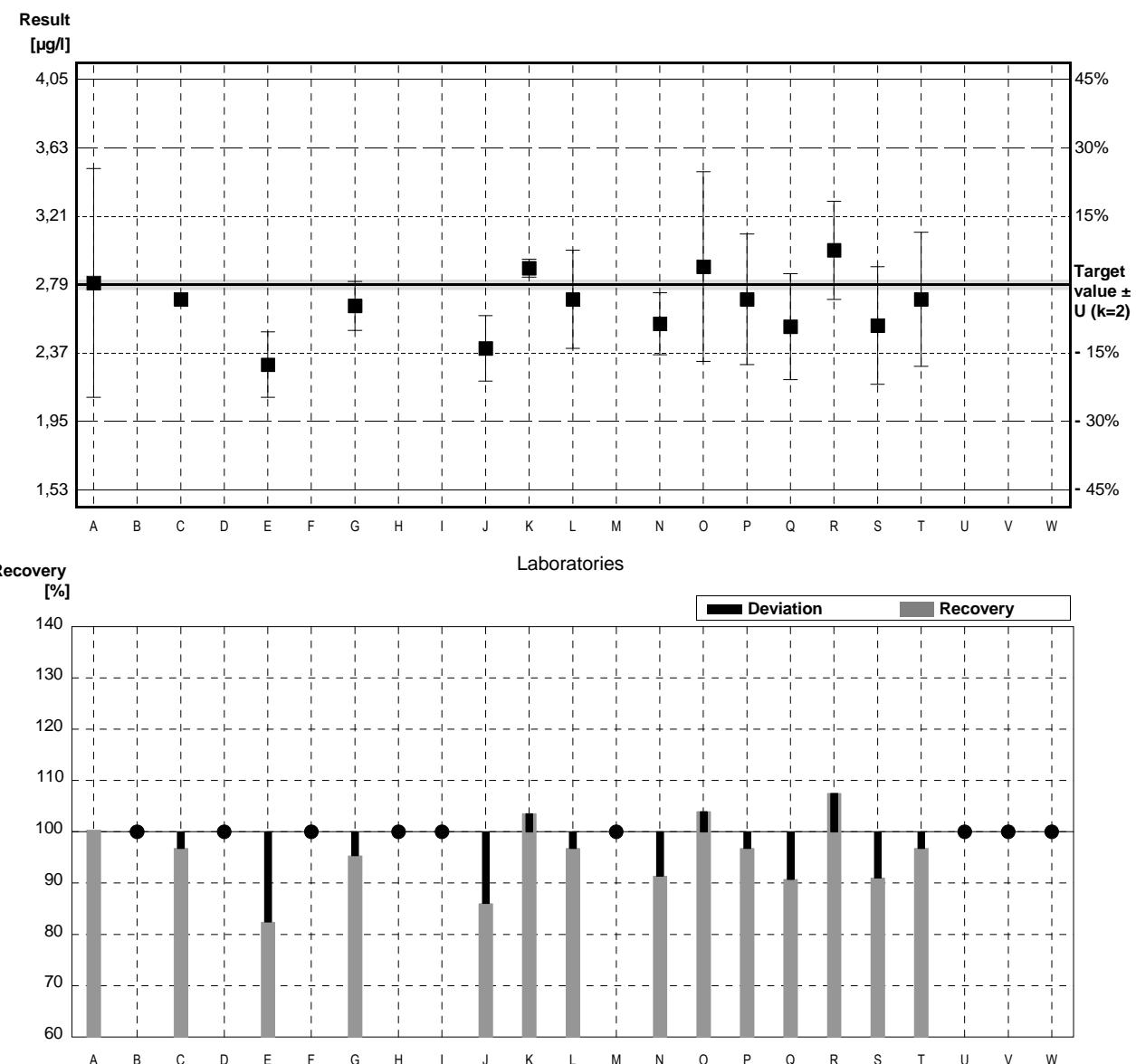
Sample M146B

Parameter Manganese

Target value $\pm U (k=2)$ 2,79 $\mu\text{g/l}$ \pm 0,03 $\mu\text{g/l}$
 IFA result $\pm U (k=2)$ 2,85 $\mu\text{g/l}$ \pm 0,23 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	2,8	0,7	$\mu\text{g/l}$	100%	0,06
B	<3,0		$\mu\text{g/l}$	•	
C	2,7		$\mu\text{g/l}$	97%	-0,54
D	<5		$\mu\text{g/l}$	•	
E	2,3	0,2	$\mu\text{g/l}$	82%	-2,93
F	<10		$\mu\text{g/l}$	•	
G	2,66	0,15	$\mu\text{g/l}$	95%	-0,78
H	<10,0		$\mu\text{g/l}$	•	
I	<5,0		$\mu\text{g/l}$	•	
J	2,4	0,2	$\mu\text{g/l}$	86%	-2,33
K	2,89	0,055	$\mu\text{g/l}$	104%	0,60
L	2,70	0,30	$\mu\text{g/l}$	97%	-0,54
M	<10	2,1	$\mu\text{g/l}$	•	
N	2,55	0,19	$\mu\text{g/l}$	91%	-1,43
O	2,9	0,58	$\mu\text{g/l}$	104%	0,66
P	2,7	0,4	$\mu\text{g/l}$	97%	-0,54
Q	2,532	0,324	$\mu\text{g/l}$	91%	-1,54
R	3	0,3	$\mu\text{g/l}$	108%	1,25
S	2,54	0,36	$\mu\text{g/l}$	91%	-1,49
T	2,70	0,41	$\mu\text{g/l}$	97%	-0,54
U	<5		$\mu\text{g/l}$	•	
V	<4		$\mu\text{g/l}$	•	
W	<5,0		$\mu\text{g/l}$	•	

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	2,67 \pm 0,16	2,67 \pm 0,16	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	95,7 \pm 5,6	95,7 \pm 5,6	%
SD between labs	0,19	0,19	$\mu\text{g/l}$
RSD between labs	7,3	7,3	%
n for calculation	14	14	



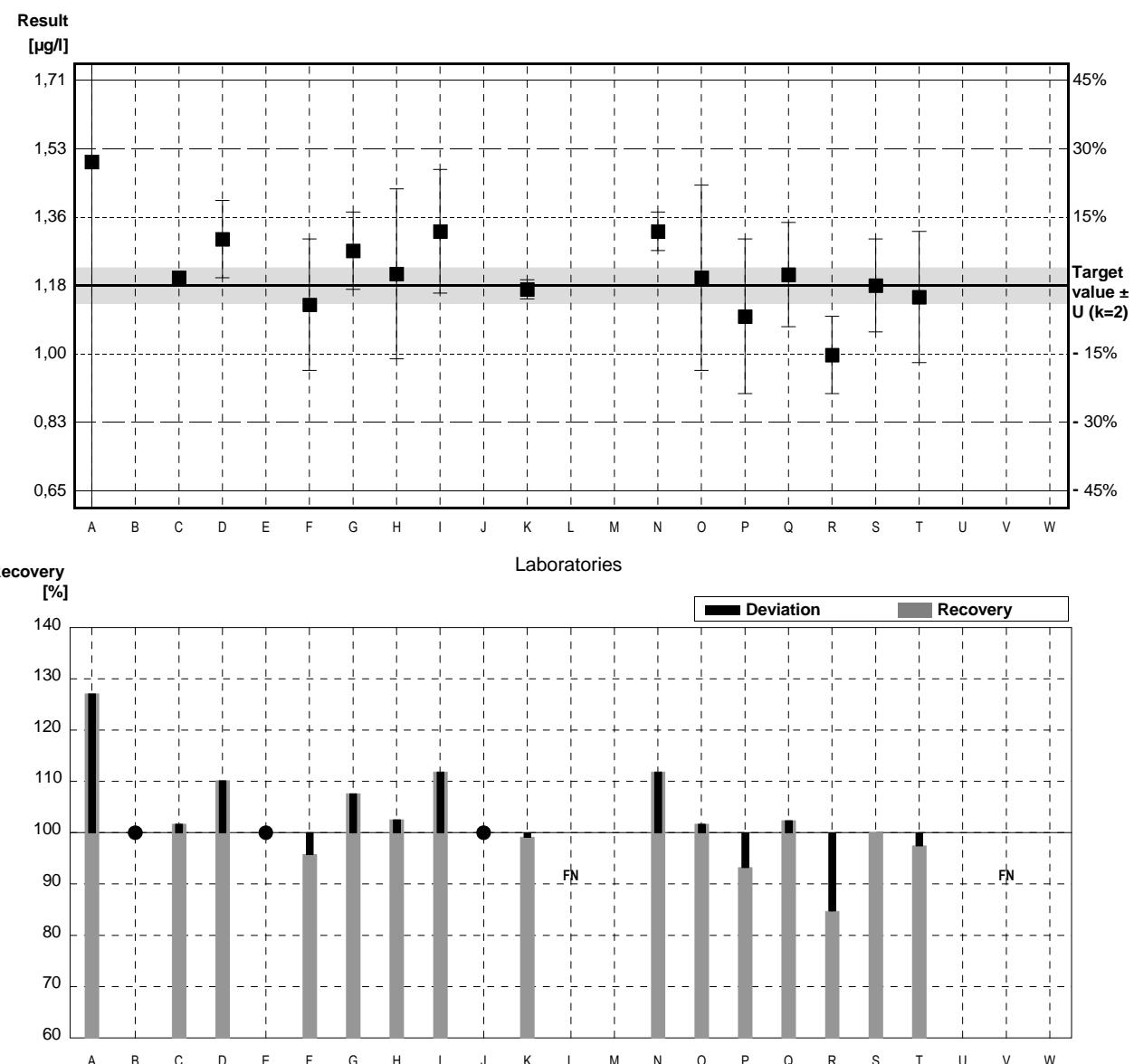
Sample M146A

Parameter Nickel

Target value $\pm U (k=2)$ 1,18 µg/l \pm 0,05 µg/l
 IFA result $\pm U (k=2)$ 1,22 µg/l \pm 0,11 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	1,5	1,0	µg/l	127%	3,15
B	<2,0		µg/l	•	
C	1,2		µg/l	102%	0,20
D	1,3	0,1	µg/l	110%	1,18
E	<2		µg/l	•	
F	1,13	0,17	µg/l	96%	-0,49
G	1,27	0,10	µg/l	108%	0,89
H	1,21	0,22	µg/l	103%	0,30
I	1,32	0,16	µg/l	112%	1,38
J	<2		µg/l	•	
K	1,17	0,025	µg/l	99%	-0,10
L	<1,0		µg/l	FN	
M			µg/l		
N	1,32	0,05	µg/l	112%	1,38
O	1,2	0,24	µg/l	102%	0,20
P	1,1	0,2	µg/l	93%	-0,79
Q	1,208	0,135	µg/l	102%	0,28
R	1	0,1	µg/l	85%	-1,77
S	1,18	0,12	µg/l	100%	0,00
T	1,15	0,17	µg/l	97%	-0,30
U			µg/l		
V	<1		µg/l	FN	
W			µg/l		

	All results	Outliers excl.	Unit
Mean $\pm CI(99\%)$	1,22 \pm 0,09	1,22 \pm 0,09	µg/l
Recov. $\pm CI(99\%)$	103,2 \pm 7,6	103,2 \pm 7,6	%
SD between labs	0,12	0,12	µg/l
RSD between labs	9,5	9,5	%
n for calculation	15	15	



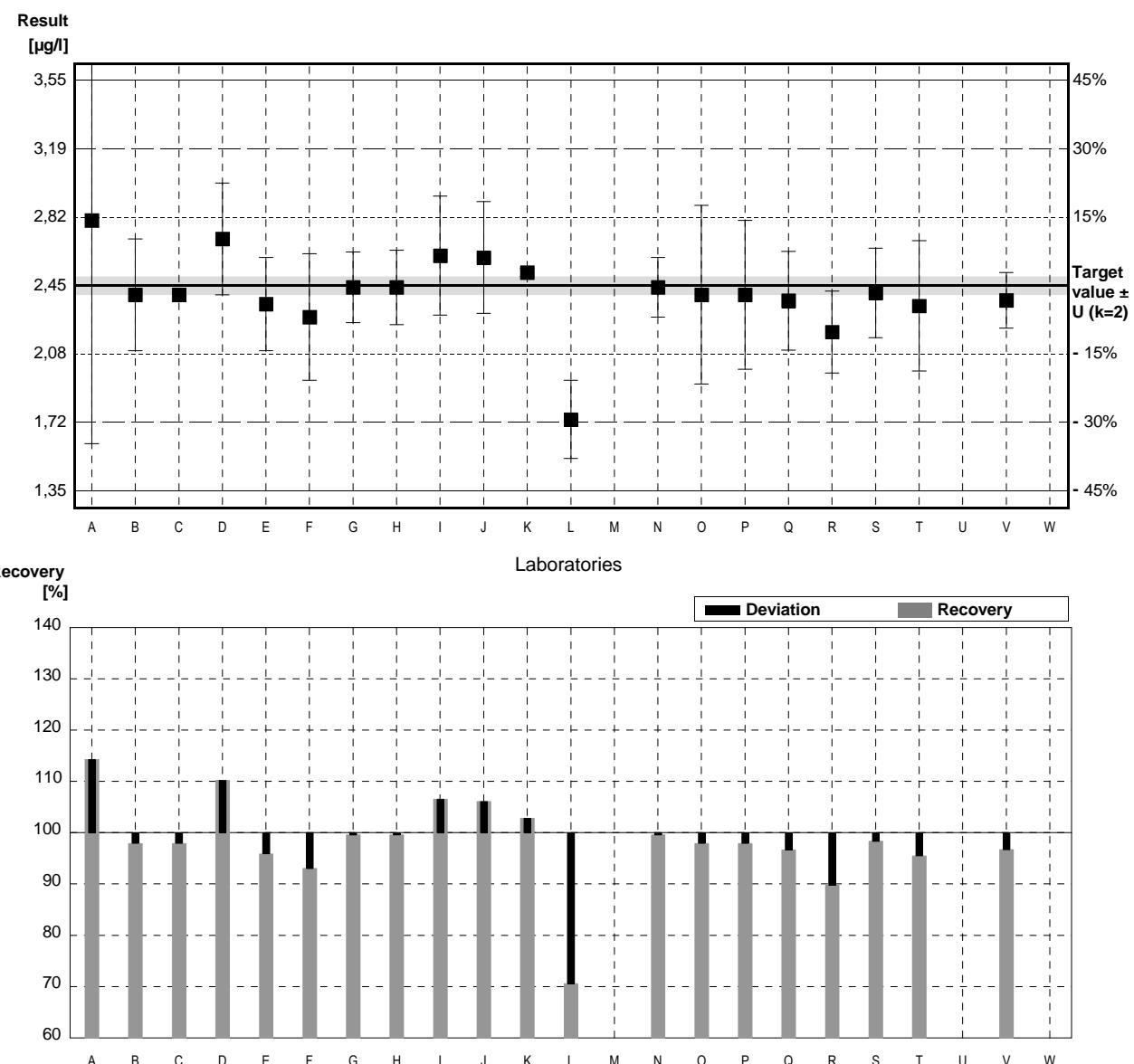
Sample M146B

Parameter Nickel

Target value $\pm U$ ($k=2$) 2,45 $\mu\text{g/l}$ \pm 0,05 $\mu\text{g/l}$
 IFA result $\pm U$ ($k=2$) 2,52 $\mu\text{g/l}$ \pm 0,23 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	2,8 *	1,2	$\mu\text{g/l}$	114%	1,66
B	2,40	0,30	$\mu\text{g/l}$	98%	-0,24
C	2,4		$\mu\text{g/l}$	98%	-0,24
D	2,7 *	0,3	$\mu\text{g/l}$	110%	1,19
E	2,35	0,25	$\mu\text{g/l}$	96%	-0,47
F	2,28	0,34	$\mu\text{g/l}$	93%	-0,81
G	2,44	0,19	$\mu\text{g/l}$	100%	-0,05
H	2,44	0,20	$\mu\text{g/l}$	100%	-0,05
I	2,61	0,32	$\mu\text{g/l}$	107%	0,76
J	2,6	0,3	$\mu\text{g/l}$	106%	0,71
K	2,52	0,023	$\mu\text{g/l}$	103%	0,33
L	1,73 *	0,21	$\mu\text{g/l}$	71%	-3,42
M			$\mu\text{g/l}$		
N	2,44	0,16	$\mu\text{g/l}$	100%	-0,05
O	2,4	0,48	$\mu\text{g/l}$	98%	-0,24
P	2,4	0,4	$\mu\text{g/l}$	98%	-0,24
Q	2,368	0,265	$\mu\text{g/l}$	97%	-0,39
R	2,2	0,22	$\mu\text{g/l}$	90%	-1,19
S	2,41	0,24	$\mu\text{g/l}$	98%	-0,19
T	2,34	0,35	$\mu\text{g/l}$	96%	-0,52
U			$\mu\text{g/l}$		
V	2,37	0,15	$\mu\text{g/l}$	97%	-0,38
W			$\mu\text{g/l}$		

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	2,41 $\pm 0,14$	2,41 $\pm 0,07$	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	98,4 $\pm 5,6$	98,4 $\pm 2,9$	%
SD between labs	0,21	0,10	$\mu\text{g/l}$
RSD between labs	8,8	4,2	%
n for calculation	20	17	

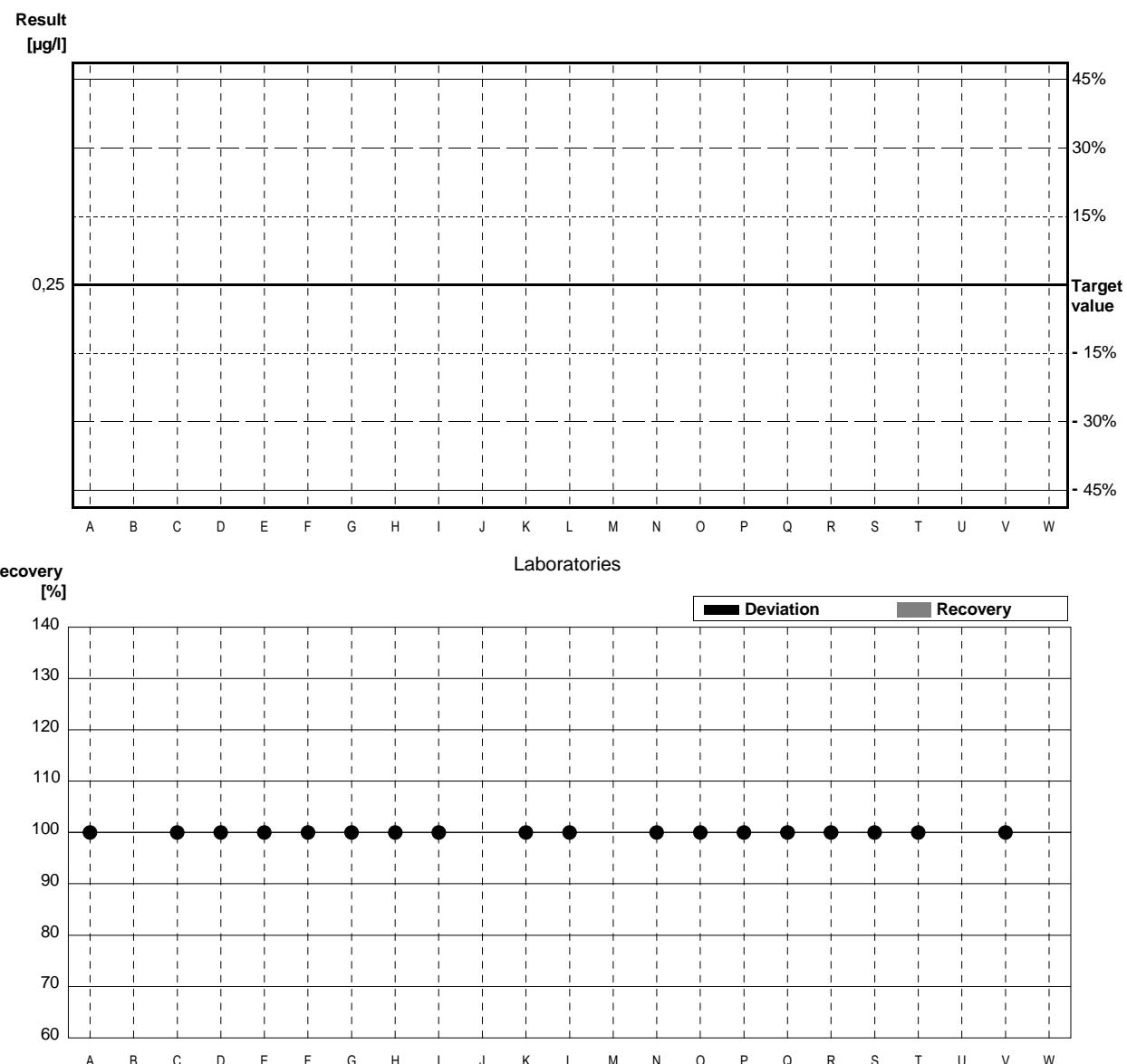


Sample M146A
Parameter Mercury

Target value <0,25 µg/l
 IFA result ± U (k=2) 0,17 µg/l ± 0,02 µg/l

Lab Code	Result	±	Unit	Recovery	z-Score
A	<0,20		µg/l	•	
B			µg/l		
C	<0,2		µg/l	•	
D	0,1	0,01	µg/l	•	
E	<0,3		µg/l	•	
F	0,225	0,034	µg/l	•	
G	0,10	0,015	µg/l	•	
H	<0,050		µg/l	•	
I	<0,2		µg/l	•	
J			µg/l		
K	0,125	0,002	µg/l	•	
L	0,11	0,03	µg/l	•	
M			µg/l		
N	0,115	0,003	µg/l	•	
O	0,12	0,024	µg/l	•	
P	0,14	0,03	µg/l	•	
Q	0,1677	0,0434	µg/l	•	
R	0,14	0,0168	µg/l	•	
S	0,16	0,04	µg/l	•	
T	0,20	0,03	µg/l	•	
U			µg/l		
V	0,10	0,02	µg/l	•	
W			µg/l		

	All results	Outliers excl.	Unit
Mean ± Cl(99%)			µg/l
Recov. ± Cl(99%)			%
SD between labs			µg/l
RSD between labs			%
n for calculation			



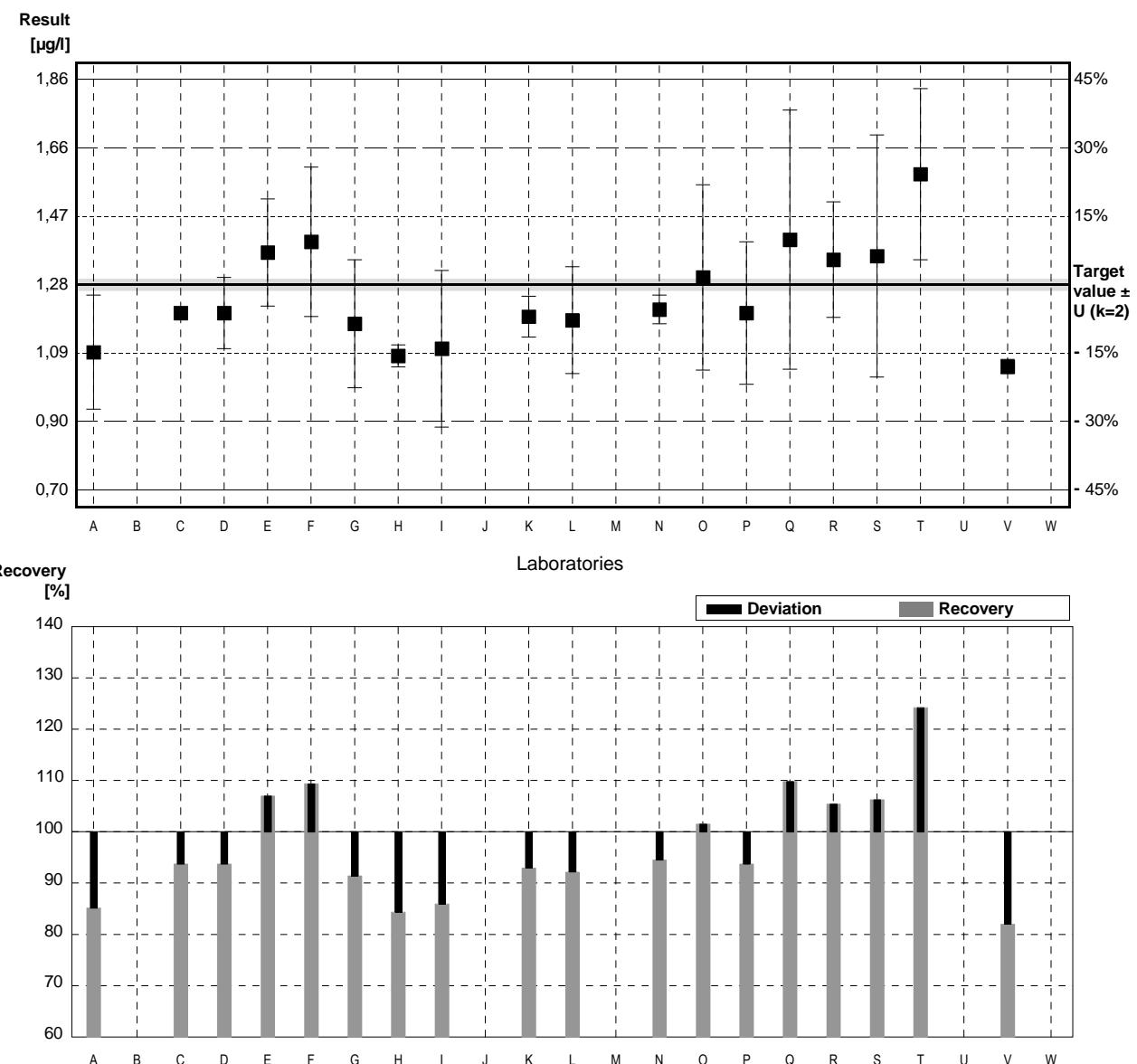
Sample M146B

Parameter Mercury

Target value $\pm U (k=2)$ 1,28 µg/l \pm 0,02 µg/l
 IFA result $\pm U (k=2)$ 1,06 µg/l \pm 0,11 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	1,09	0,16	µg/l	85%	-1,35
B			µg/l		
C	1,2		µg/l	94%	-0,57
D	1,2	0,1	µg/l	94%	-0,57
E	1,37	0,15	µg/l	107%	0,64
F	1,400	0,210	µg/l	109%	0,85
G	1,17	0,18	µg/l	91%	-0,78
H	1,08	0,031	µg/l	84%	-1,42
I	1,10	0,22	µg/l	86%	-1,28
J			µg/l		
K	1,19	0,057	µg/l	93%	-0,64
L	1,18	0,15	µg/l	92%	-0,71
M			µg/l		
N	1,21	0,04	µg/l	95%	-0,50
O	1,3	0,26	µg/l	102%	0,14
P	1,2	0,2	µg/l	94%	-0,57
Q	1,406	0,364	µg/l	110%	0,89
R	1,35	0,162	µg/l	105%	0,50
S	1,36	0,34	µg/l	106%	0,57
T	1,59	0,24	µg/l	124%	2,20
U			µg/l		
V	1,05	0,02	µg/l	82%	-1,63
W			µg/l		

	All results	Outliers excl.	Unit
Mean $\pm CI(99\%)$	1,25 \pm 0,10	1,25 \pm 0,10	µg/l
Recov. $\pm CI(99\%)$	97,4 \pm 7,6	97,4 \pm 7,6	%
SD between labs	0,14	0,14	µg/l
RSD between labs	11,4	11,4	%
n for calculation	18	18	



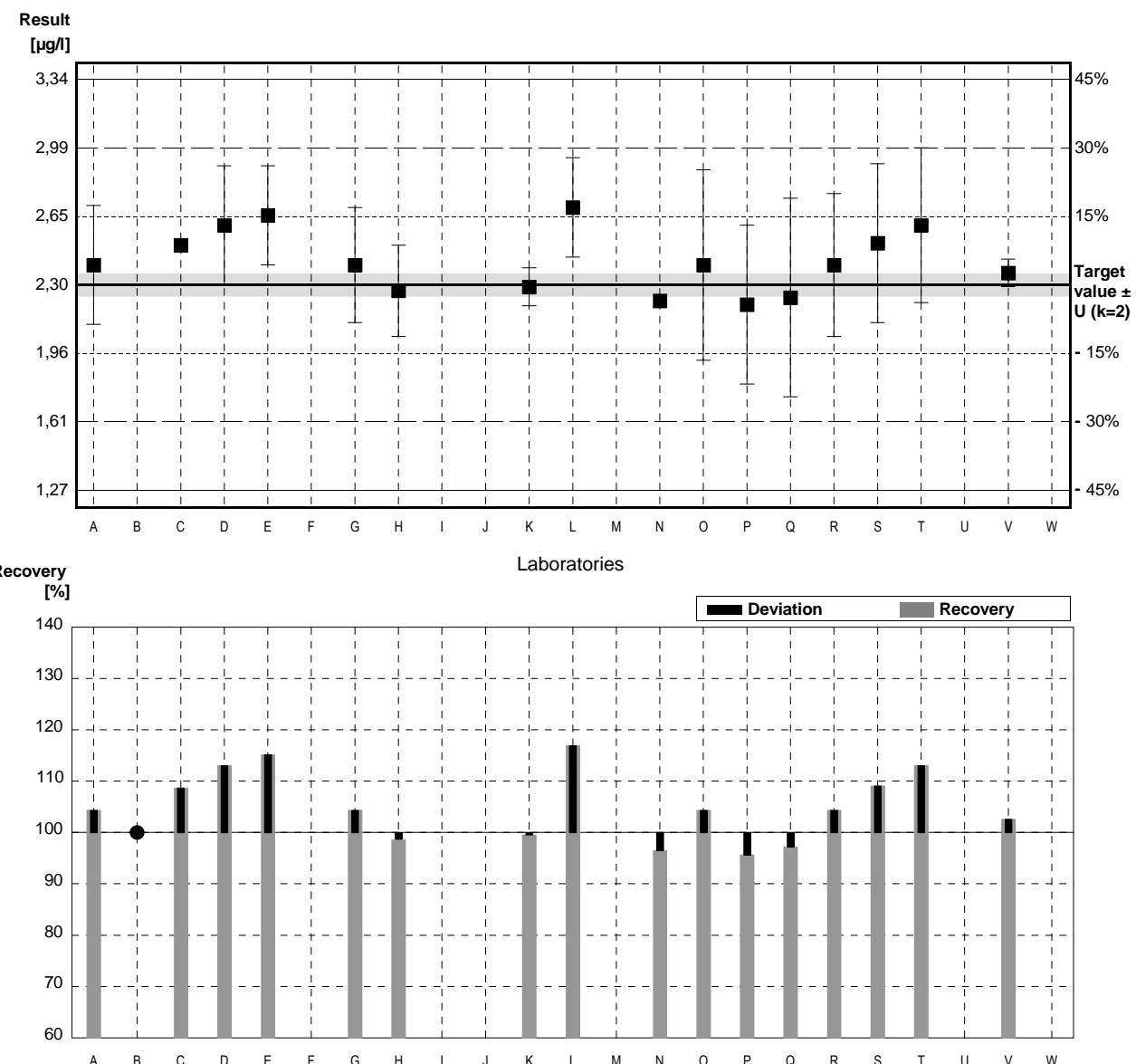
Sample M146A

Parameter Selenium

Target value $\pm U (k=2)$ 2,30 $\mu\text{g/l}$ \pm 0,06 $\mu\text{g/l}$
 IFA result $\pm U (k=2)$ 2,44 $\mu\text{g/l}$ \pm 0,44 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	2,4	0,3	$\mu\text{g/l}$	104%	0,36
B	<5,0		$\mu\text{g/l}$	•	
C	2,5		$\mu\text{g/l}$	109%	0,72
D	2,6	0,3	$\mu\text{g/l}$	113%	1,09
E	2,65	0,25	$\mu\text{g/l}$	115%	1,27
F			$\mu\text{g/l}$		
G	2,40	0,29	$\mu\text{g/l}$	104%	0,36
H	2,27	0,23	$\mu\text{g/l}$	99%	-0,11
I			$\mu\text{g/l}$		
J			$\mu\text{g/l}$		
K	2,29	0,096	$\mu\text{g/l}$	100%	-0,04
L	2,69	0,25	$\mu\text{g/l}$	117%	1,41
M			$\mu\text{g/l}$		
N	2,22	0,03	$\mu\text{g/l}$	97%	-0,29
O	2,4	0,48	$\mu\text{g/l}$	104%	0,36
P	2,2	0,4	$\mu\text{g/l}$	96%	-0,36
Q	2,236	0,501	$\mu\text{g/l}$	97%	-0,23
R	2,4	0,36	$\mu\text{g/l}$	104%	0,36
S	2,51	0,40	$\mu\text{g/l}$	109%	0,76
T	2,60	0,39	$\mu\text{g/l}$	113%	1,09
U			$\mu\text{g/l}$		
V	2,36	0,07	$\mu\text{g/l}$	103%	0,22
W			$\mu\text{g/l}$		

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	$2,42 \pm 0,12$	$2,42 \pm 0,12$	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	$105,2 \pm 5,0$	$105,2 \pm 5,0$	%
SD between labs	0,16	0,16	$\mu\text{g/l}$
RSD between labs	6,5	6,5	%
n for calculation	16	16	



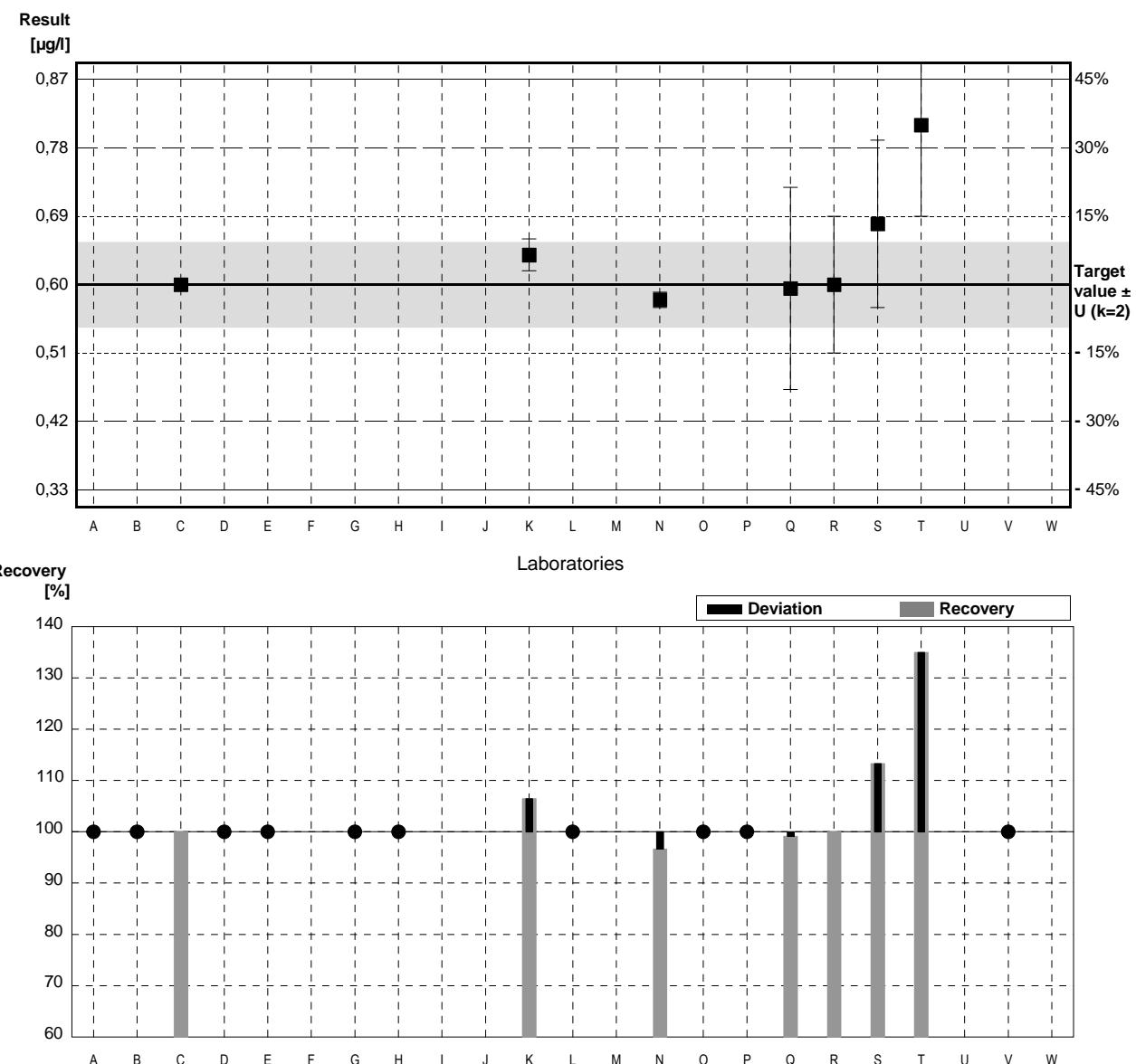
Sample M146B

Parameter Selenium

Target value $\pm U (k=2)$ 0,60 $\mu\text{g/l}$ \pm 0,06 $\mu\text{g/l}$
 IFA result $\pm U (k=2)$ 0,61 $\mu\text{g/l}$ \pm 0,11 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	<2,0		$\mu\text{g/l}$	•	
B	<5,0		$\mu\text{g/l}$	•	
C	0,6		$\mu\text{g/l}$	100%	0,00
D	<1		$\mu\text{g/l}$	•	
E	<1,5		$\mu\text{g/l}$	•	
F			$\mu\text{g/l}$		
G	<1,0		$\mu\text{g/l}$	•	
H	<1,00		$\mu\text{g/l}$	•	
I			$\mu\text{g/l}$		
J			$\mu\text{g/l}$		
K	0,639	0,021	$\mu\text{g/l}$	107%	0,54
L	<1,0		$\mu\text{g/l}$	•	
M			$\mu\text{g/l}$		
N	0,58	0,01	$\mu\text{g/l}$	97%	-0,28
O	<1,0		$\mu\text{g/l}$	•	
P	<1,0		$\mu\text{g/l}$	•	
Q	0,595	0,133	$\mu\text{g/l}$	99%	-0,07
R	0,6	0,09	$\mu\text{g/l}$	100%	0,00
S	0,68	0,11	$\mu\text{g/l}$	113%	1,11
T	0,81 *	0,12	$\mu\text{g/l}$	135%	2,92
U			$\mu\text{g/l}$		
V	<1		$\mu\text{g/l}$	•	
W			$\mu\text{g/l}$		

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	$0,64 \pm 0,11$	$0,62 \pm 0,06$	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	$107,2 \pm 18,9$	$102,6 \pm 10,2$	%
SD between labs	0,08	0,04	$\mu\text{g/l}$
RSD between labs	12,6	6,0	%
n for calculation	7	6	



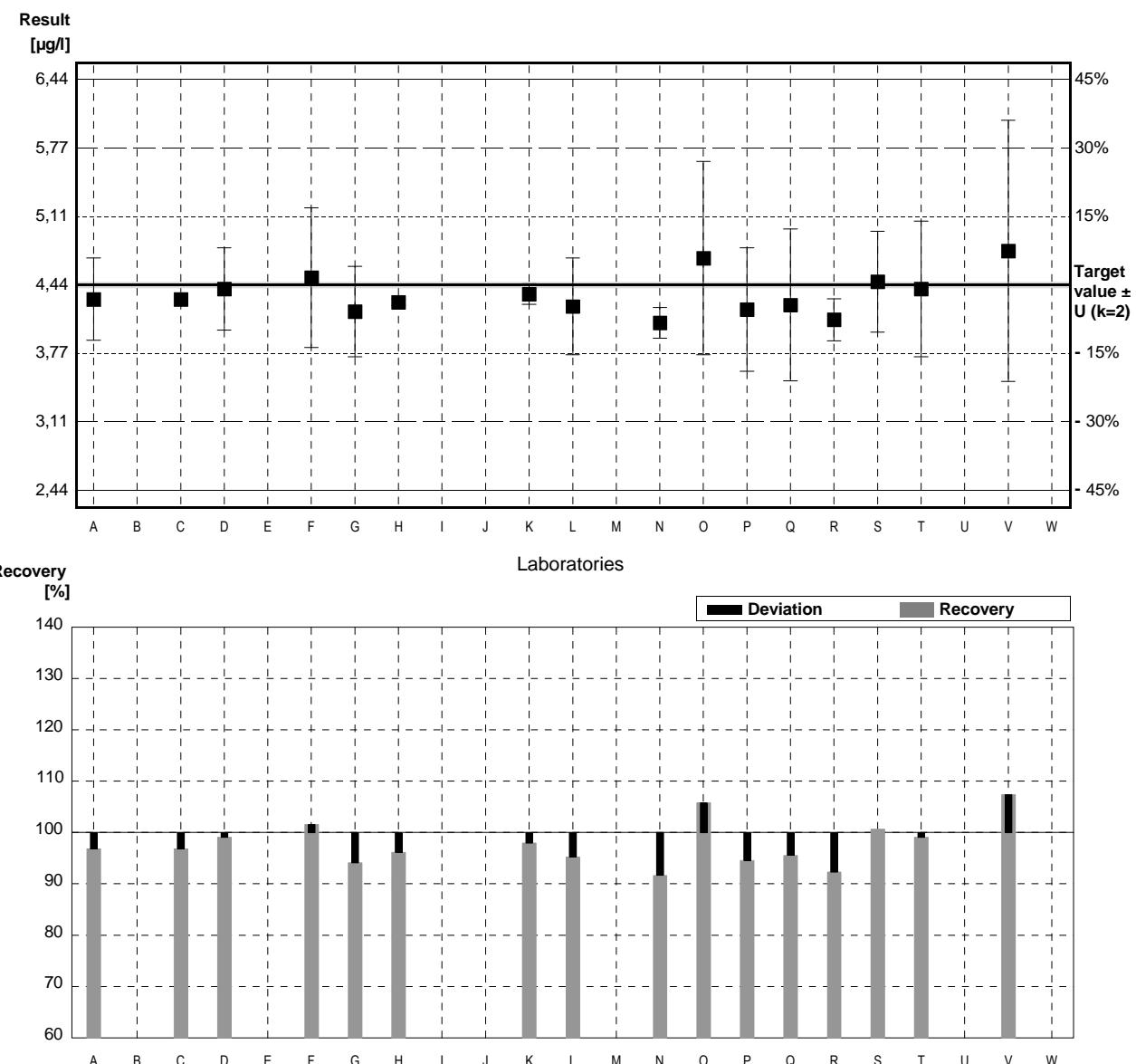
Sample M146A

Parameter Uranium

Target value \pm U (k=2) 4,44 $\mu\text{g/l}$ \pm 0,03 $\mu\text{g/l}$
 IFA result \pm U (k=2) 4,15 $\mu\text{g/l}$ \pm 0,42 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	4,3	0,4	$\mu\text{g/l}$	97%	-0,53
B			$\mu\text{g/l}$		
C	4,3		$\mu\text{g/l}$	97%	-0,53
D	4,4	0,4	$\mu\text{g/l}$	99%	-0,15
E			$\mu\text{g/l}$		
F	4,51	0,68	$\mu\text{g/l}$	102%	0,27
G	4,18	0,44	$\mu\text{g/l}$	94%	-0,99
H	4,27	0,03	$\mu\text{g/l}$	96%	-0,65
I			$\mu\text{g/l}$		
J			$\mu\text{g/l}$		
K	4,35	0,101	$\mu\text{g/l}$	98%	-0,34
L	4,23	0,47	$\mu\text{g/l}$	95%	-0,80
M			$\mu\text{g/l}$		
N	4,07	0,15	$\mu\text{g/l}$	92%	-1,41
O	4,7	0,94	$\mu\text{g/l}$	106%	0,99
P	4,2	0,6	$\mu\text{g/l}$	95%	-0,92
Q	4,244	0,738	$\mu\text{g/l}$	96%	-0,75
R	4,1	0,205	$\mu\text{g/l}$	92%	-1,30
S	4,47	0,49	$\mu\text{g/l}$	101%	0,11
T	4,40	0,66	$\mu\text{g/l}$	99%	-0,15
U			$\mu\text{g/l}$		
V	4,77	1,27	$\mu\text{g/l}$	107%	1,26
W			$\mu\text{g/l}$		

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	4,34 \pm 0,14	4,34 \pm 0,14	$\mu\text{g/l}$
Recov. \pm CI(99%)	97,8 \pm 3,2	97,8 \pm 3,2	%
SD between labs	0,20	0,20	$\mu\text{g/l}$
RSD between labs	4,5	4,5	%
n for calculation	16	16	



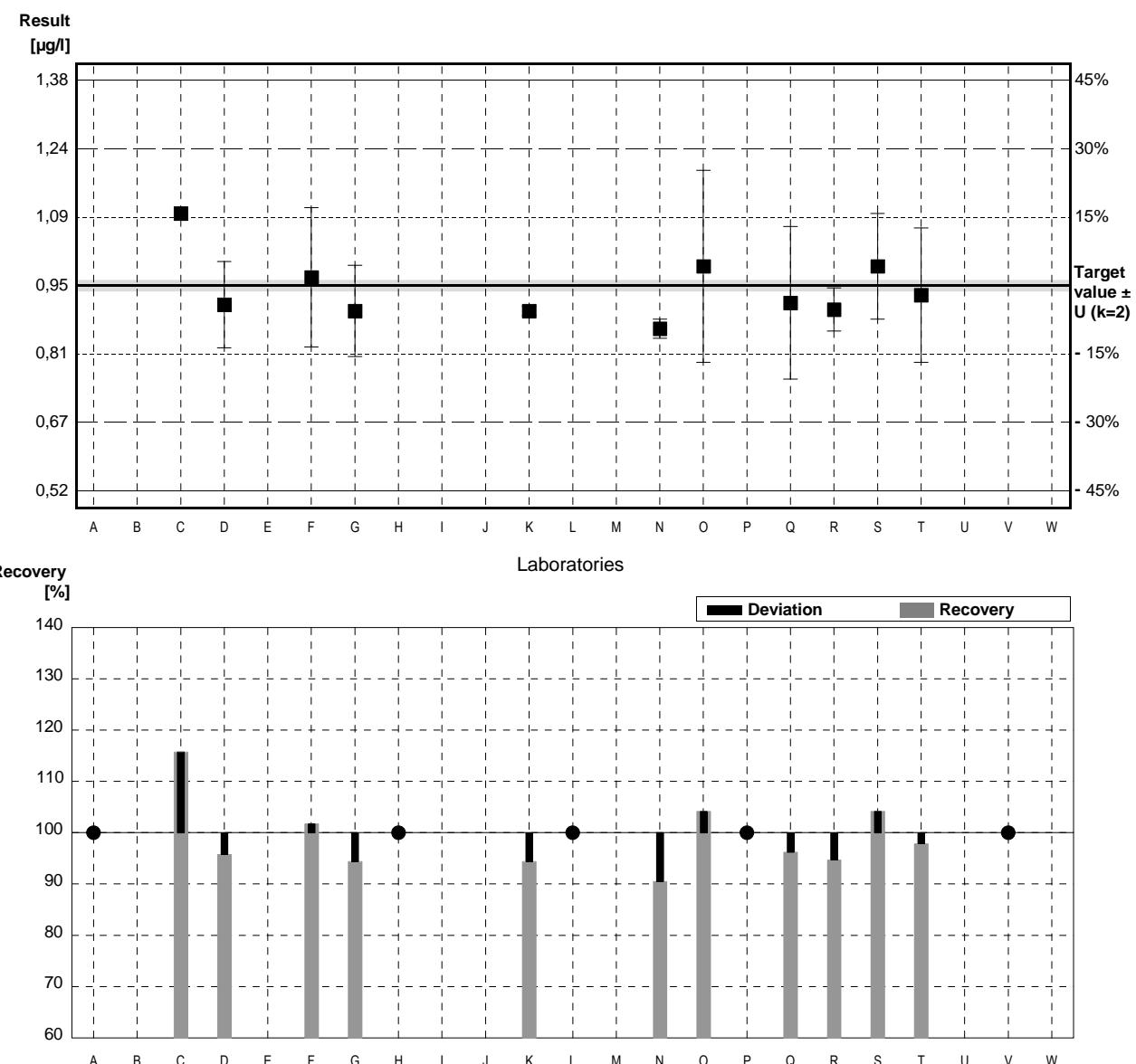
Sample M146B

Parameter Uranium

Target value \pm U (k=2) 0,95 µg/l \pm 0,01 µg/l
 IFA result \pm U (k=2) 0,85 µg/l \pm 0,09 µg/l

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	<1,0		µg/l	•	
B			µg/l		
C	1,1 *		µg/l	116%	2,68
D	0,91	0,09	µg/l	96%	-0,71
E			µg/l		
F	0,967	0,145	µg/l	102%	0,30
G	0,897	0,095	µg/l	94%	-0,95
H	<1,00		µg/l	•	
I			µg/l		
J			µg/l		
K	0,897	0,010	µg/l	94%	-0,95
L	<1,0		µg/l	•	
M			µg/l		
N	0,86	0,02	µg/l	91%	-1,61
O	0,99	0,20	µg/l	104%	0,71
P	<1,0		µg/l	•	
Q	0,914	0,159	µg/l	96%	-0,64
R	0,9	0,045	µg/l	95%	-0,89
S	0,99	0,11	µg/l	104%	0,71
T	0,93	0,14	µg/l	98%	-0,36
U			µg/l		
V	<2		µg/l	•	
W			µg/l		

	All results	Outliers excl.	Unit
Mean \pm CI(99%)	0,94 \pm 0,06	0,93 \pm 0,05	µg/l
Recov. \pm CI(99%)	99,1 \pm 6,7	97,4 \pm 4,7	%
SD between labs	0,07	0,04	µg/l
RSD between labs	7,1	4,7	%
n for calculation	11	10	



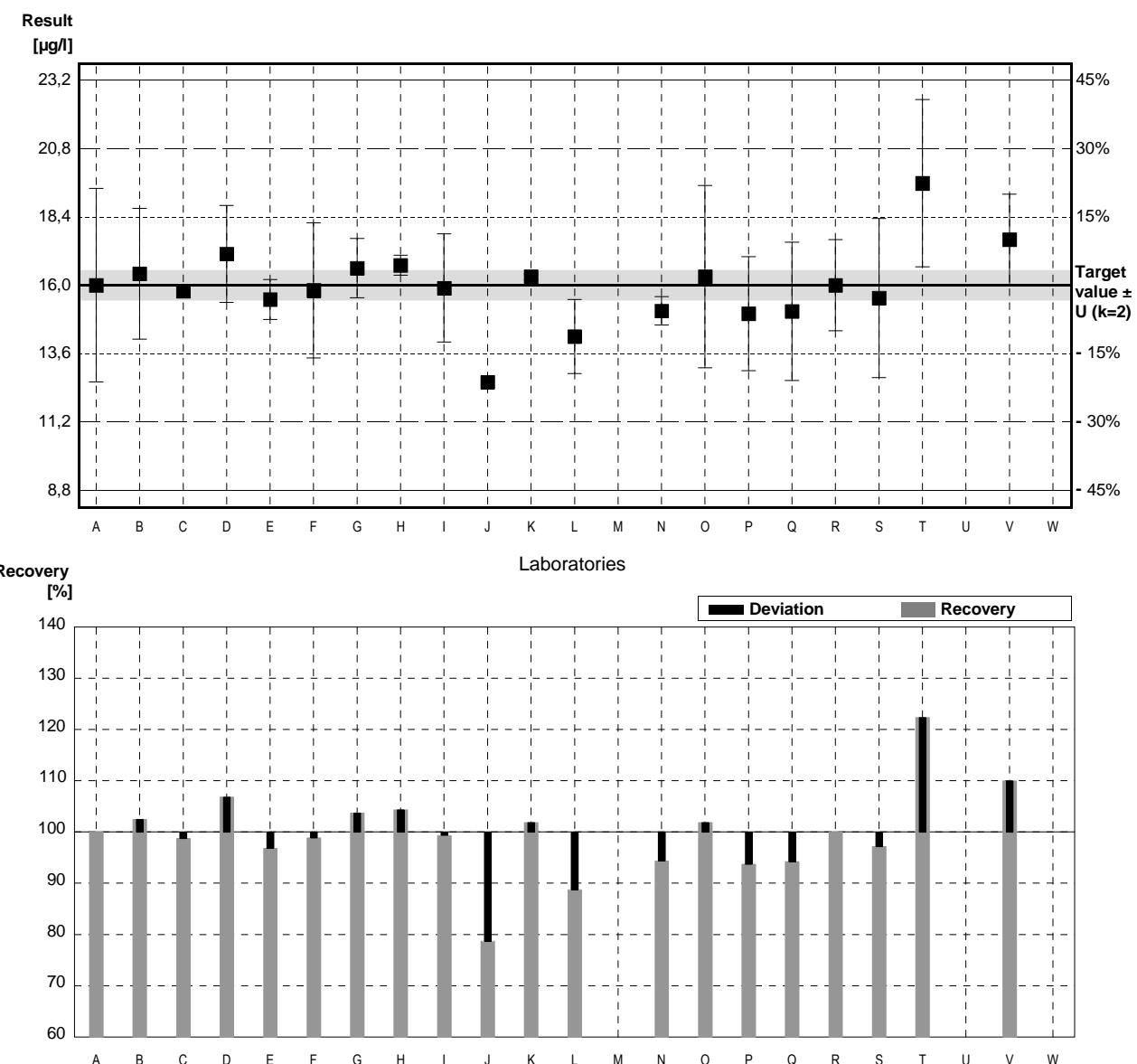
Sample M146A

Parameter Zinc

Target value $\pm U (k=2)$ 16,0 $\mu\text{g/l}$ \pm 0,5 $\mu\text{g/l}$
 IFA result $\pm U (k=2)$ 16,5 $\mu\text{g/l}$ \pm 3,8 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	16,0	3,4	$\mu\text{g/l}$	100%	0,00
B	16,4	2,3	$\mu\text{g/l}$	103%	0,28
C	15,8		$\mu\text{g/l}$	99%	-0,14
D	17,1	1,7	$\mu\text{g/l}$	107%	0,76
E	15,5	0,7	$\mu\text{g/l}$	97%	-0,35
F	15,82	2,37	$\mu\text{g/l}$	99%	-0,13
G	16,6	1,04	$\mu\text{g/l}$	104%	0,42
H	16,7	0,35	$\mu\text{g/l}$	104%	0,49
I	15,9	1,9	$\mu\text{g/l}$	99%	-0,07
J	12,6 *		$\mu\text{g/l}$	79%	-2,36
K	16,3	0,100	$\mu\text{g/l}$	102%	0,21
L	14,2	1,3	$\mu\text{g/l}$	89%	-1,25
M			$\mu\text{g/l}$		
N	15,1	0,5	$\mu\text{g/l}$	94%	-0,63
O	16,3	3,2	$\mu\text{g/l}$	102%	0,21
P	15	2	$\mu\text{g/l}$	94%	-0,69
Q	15,08	2,43	$\mu\text{g/l}$	94%	-0,64
R	16	1,6	$\mu\text{g/l}$	100%	0,00
S	15,55	2,80	$\mu\text{g/l}$	97%	-0,31
T	19,58 *	2,94	$\mu\text{g/l}$	122%	2,49
U			$\mu\text{g/l}$		
V	17,6	1,6	$\mu\text{g/l}$	110%	1,11
W			$\mu\text{g/l}$		

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	16,0 \pm 0,9	15,9 \pm 0,6	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	99,7 \pm 5,5	99,6 \pm 3,5	%
SD between labs	1,4	0,8	$\mu\text{g/l}$
RSD between labs	8,6	5,1	%
n for calculation	20	18	



Sample M146B

Parameter Zinc

Target value $\pm U (k=2)$ 23,3 $\mu\text{g/l}$ \pm 0,5 $\mu\text{g/l}$
 IFA result $\pm U (k=2)$ 23,1 $\mu\text{g/l}$ \pm 5,3 $\mu\text{g/l}$

Lab Code	Result	\pm	Unit	Recovery	z-Score
A	23,2	4,1	$\mu\text{g/l}$	100%	-0,05
B	23,3	3,3	$\mu\text{g/l}$	100%	0,00
C	22,5		$\mu\text{g/l}$	97%	-0,38
D	27,4 *	2,7	$\mu\text{g/l}$	118%	1,96
E	21,2	1	$\mu\text{g/l}$	91%	-1,00
F	22,99	3,45	$\mu\text{g/l}$	99%	-0,15
G	23,2	1,45	$\mu\text{g/l}$	100%	-0,05
H	23,4	0,36	$\mu\text{g/l}$	100%	0,05
I	23,2	2,8	$\mu\text{g/l}$	100%	-0,05
J	18,9 *		$\mu\text{g/l}$	81%	-2,10
K	23,7	0,208	$\mu\text{g/l}$	102%	0,19
L	21,0 *	1,9	$\mu\text{g/l}$	90%	-1,10
M			$\mu\text{g/l}$		
N	21,9	0,7	$\mu\text{g/l}$	94%	-0,67
O	23,2	4,6	$\mu\text{g/l}$	100%	-0,05
P	23	3	$\mu\text{g/l}$	99%	-0,14
Q	22,116	3,56	$\mu\text{g/l}$	95%	-0,56
R	23	2,3	$\mu\text{g/l}$	99%	-0,14
S	22,75	4,10	$\mu\text{g/l}$	98%	-0,26
T	28,30 *	4,25	$\mu\text{g/l}$	121%	2,38
U			$\mu\text{g/l}$		
V	22,6	0,5	$\mu\text{g/l}$	97%	-0,33
W			$\mu\text{g/l}$		

	All results	Outliers excl.	Unit
Mean $\pm \text{CI}(99\%)$	23,0 \pm 1,3	22,8 \pm 0,5	$\mu\text{g/l}$
Recov. $\pm \text{CI}(99\%)$	98,9 \pm 5,4	98,0 \pm 2,0	%
SD between labs	2,0	0,6	$\mu\text{g/l}$
RSD between labs	8,6	2,8	%
n for calculation	20	16	

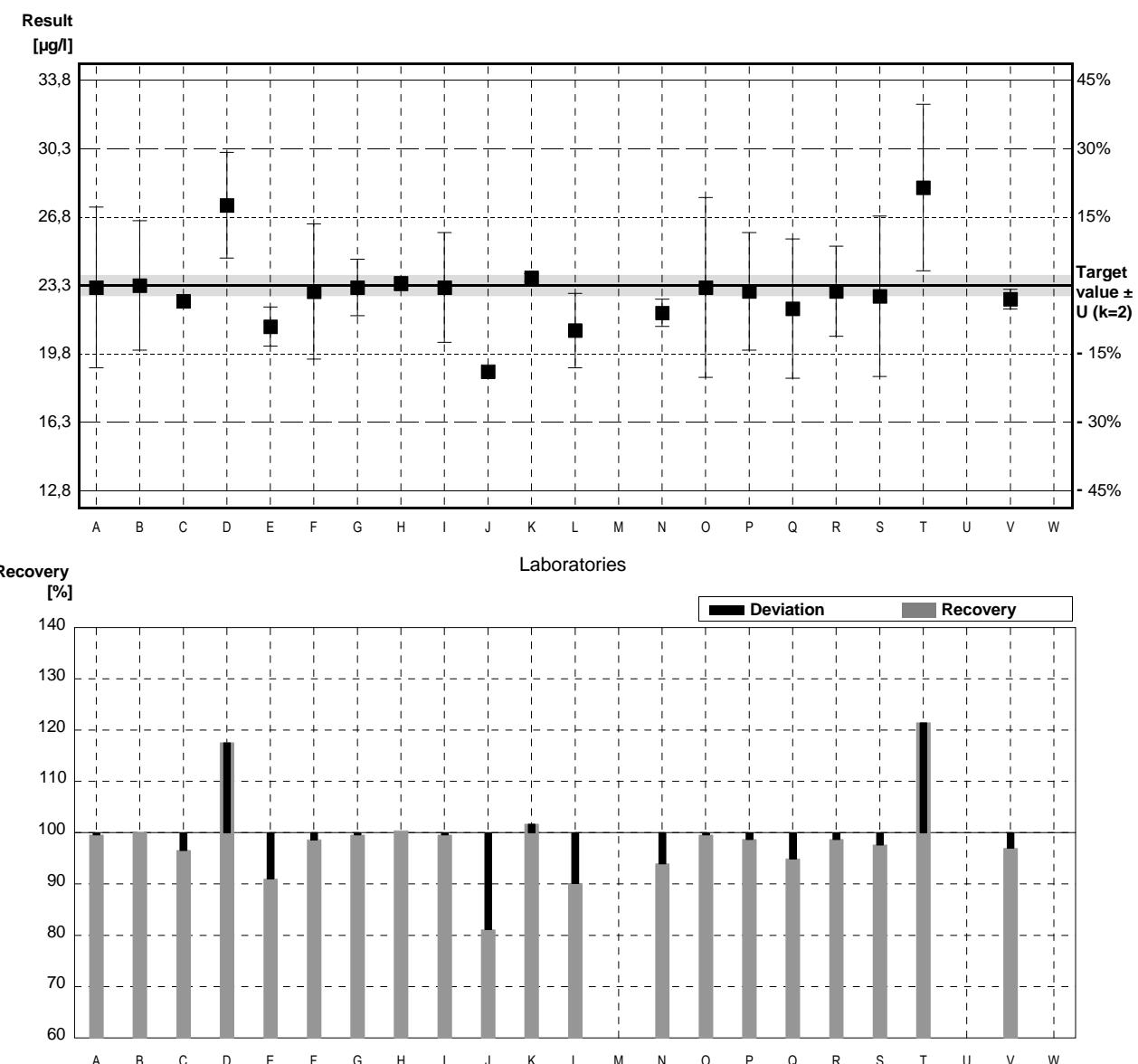


Illustration of Results Laboratory Oriented Part

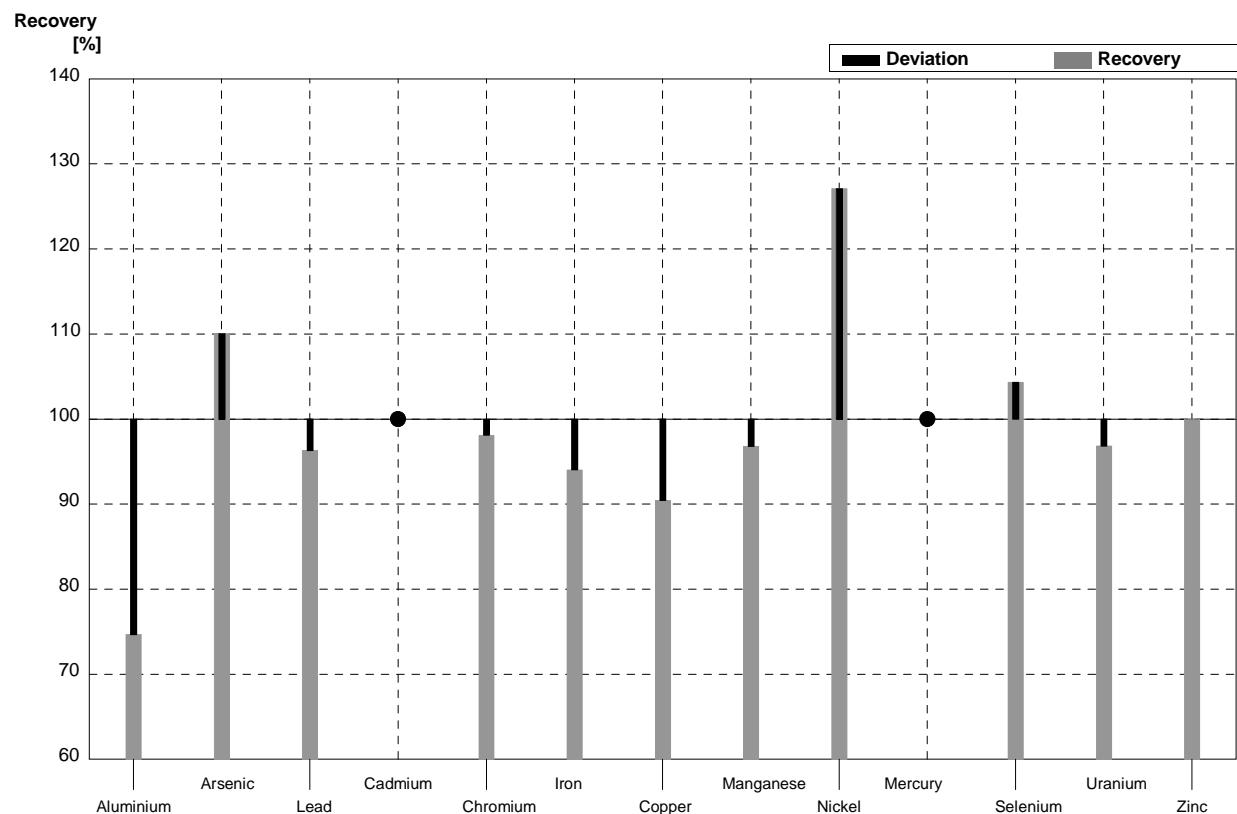
**Round M146
Metals**

Sample Dispatch: 11 March 2019



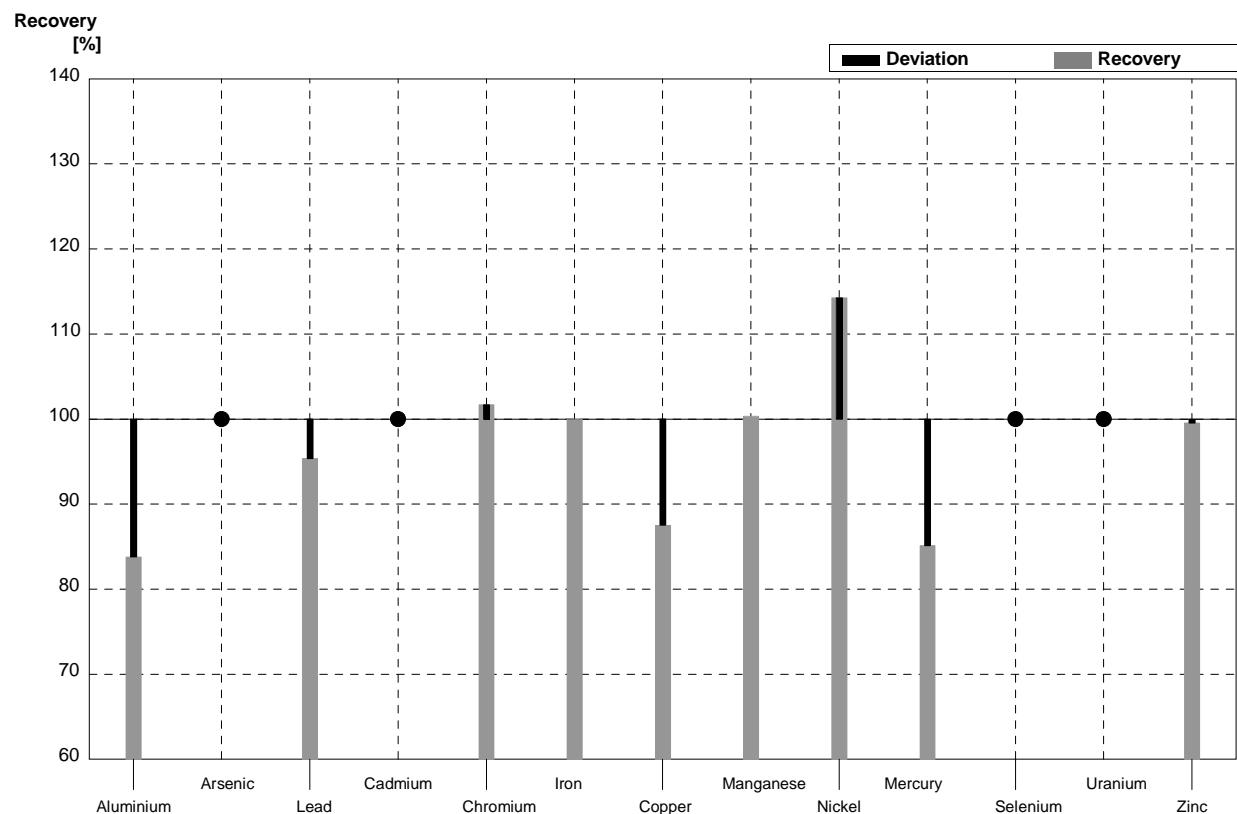
Sample M146A
Laboratory A

Parameter	Target value	\pm U (k=2)	Result	\pm	Unit	Recovery
Aluminium	16,6	0,3	12,4	2,3	$\mu\text{g/l}$	75%
Arsenic	2,18	0,02	2,4	0,4	$\mu\text{g/l}$	110%
Lead	2,18	0,02	2,1	0,3	$\mu\text{g/l}$	96%
Cadmium	0,119	0,002	<1,0		$\mu\text{g/l}$	•
Chromium	3,16	0,02	3,1	1,2	$\mu\text{g/l}$	98%
Iron	31,9	0,2	30,0	3,3	$\mu\text{g/l}$	94%
Copper	7,96	0,10	7,2	1,5	$\mu\text{g/l}$	90%
Manganese	25,1	0,2	24,3	2,6	$\mu\text{g/l}$	97%
Nickel	1,18	0,05	1,5	1,0	$\mu\text{g/l}$	127%
Mercury	<0,25		<0,20		$\mu\text{g/l}$	•
Selenium	2,30	0,06	2,4	0,3	$\mu\text{g/l}$	104%
Uranium	4,44	0,03	4,3	0,4	$\mu\text{g/l}$	97%
Zinc	16,0	0,5	16,0	3,4	$\mu\text{g/l}$	100%



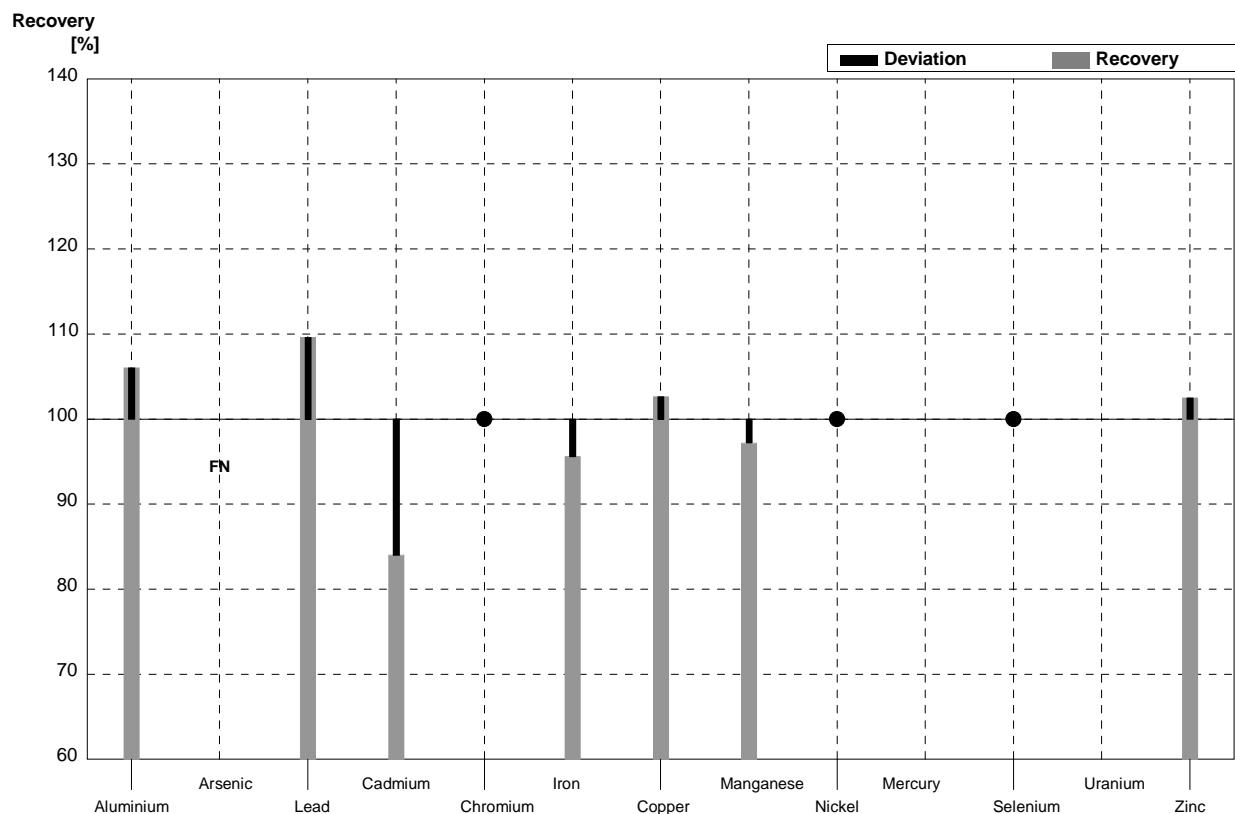
Sample M146B
Laboratory A

Parameter	Target value	\pm U (k=2)	Result	\pm	Unit	Recovery
Aluminium	27,8	0,3	23,3	3,5	$\mu\text{g/l}$	84%
Arsenic	<0,5		<1,0		$\mu\text{g/l}$	•
Lead	3,25	0,02	3,1	0,4	$\mu\text{g/l}$	95%
Cadmium	0,470	0,006	<1,0		$\mu\text{g/l}$	•
Chromium	1,18	0,01	1,2	1	$\mu\text{g/l}$	102%
Iron	11,9	0,2	11,9	1,5	$\mu\text{g/l}$	100%
Copper	2,97	0,03	2,6	1,1	$\mu\text{g/l}$	88%
Manganese	2,79	0,03	2,8	0,7	$\mu\text{g/l}$	100%
Nickel	2,45	0,05	2,8	1,2	$\mu\text{g/l}$	114%
Mercury	1,28	0,02	1,09	0,16	$\mu\text{g/l}$	85%
Selenium	0,60	0,06	<2,0		$\mu\text{g/l}$	•
Uranium	0,95	0,01	<1,0		$\mu\text{g/l}$	•
Zinc	23,3	0,5	23,2	4,1	$\mu\text{g/l}$	100%



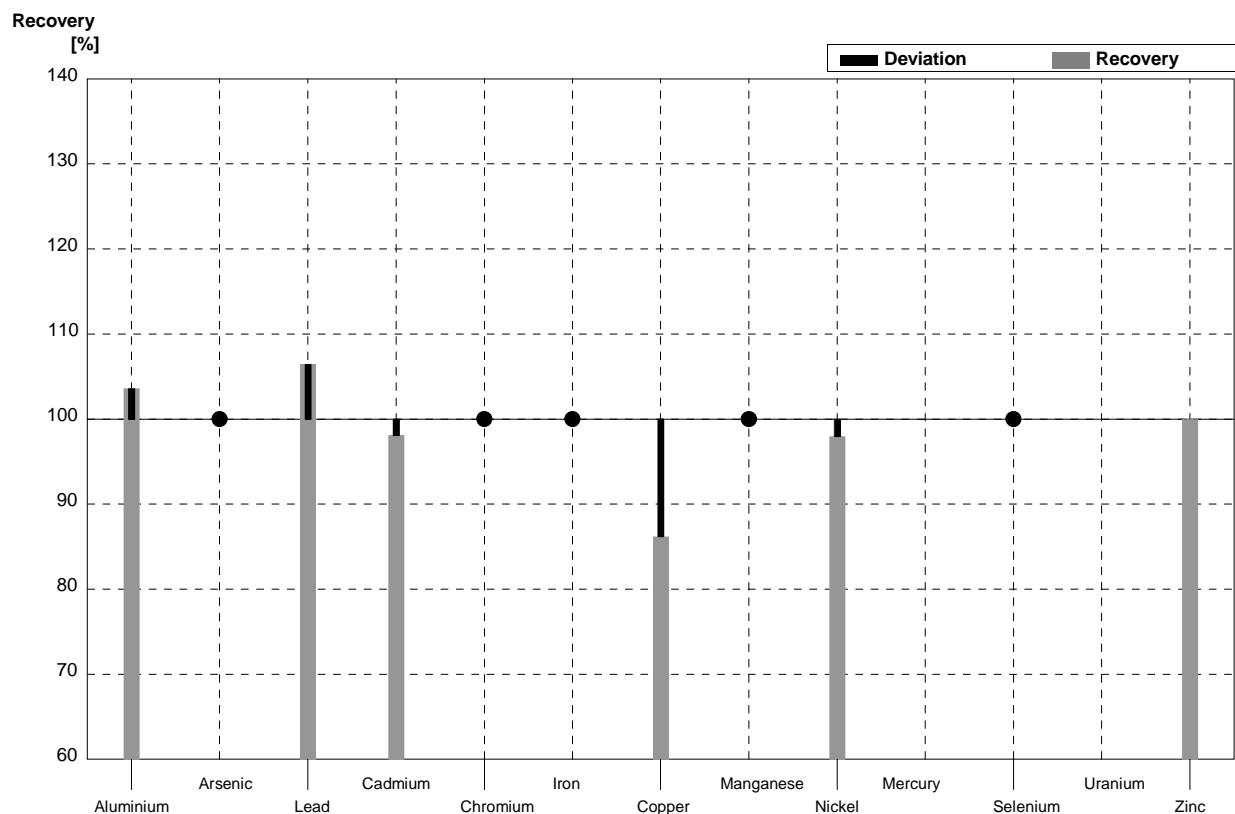
Sample M146A
Laboratory B

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	17,6	2,71	µg/l	106%
Arsenic	2,18	0,02	<2,0		µg/l	FN
Lead	2,18	0,02	2,39	0,41	µg/l	110%
Cadmium	0,119	0,002	0,100	0,007	µg/l	84%
Chromium	3,16	0,02	<5		µg/l	•
Iron	31,9	0,2	30,5	2,5	µg/l	96%
Copper	7,96	0,10	8,17	2,12	µg/l	103%
Manganese	25,1	0,2	24,4	2,3	µg/l	97%
Nickel	1,18	0,05	<2,0		µg/l	•
Mercury	<0,25				µg/l	
Selenium	2,30	0,06	<5,0		µg/l	•
Uranium	4,44	0,03			µg/l	
Zinc	16,0	0,5	16,4	2,3	µg/l	103%



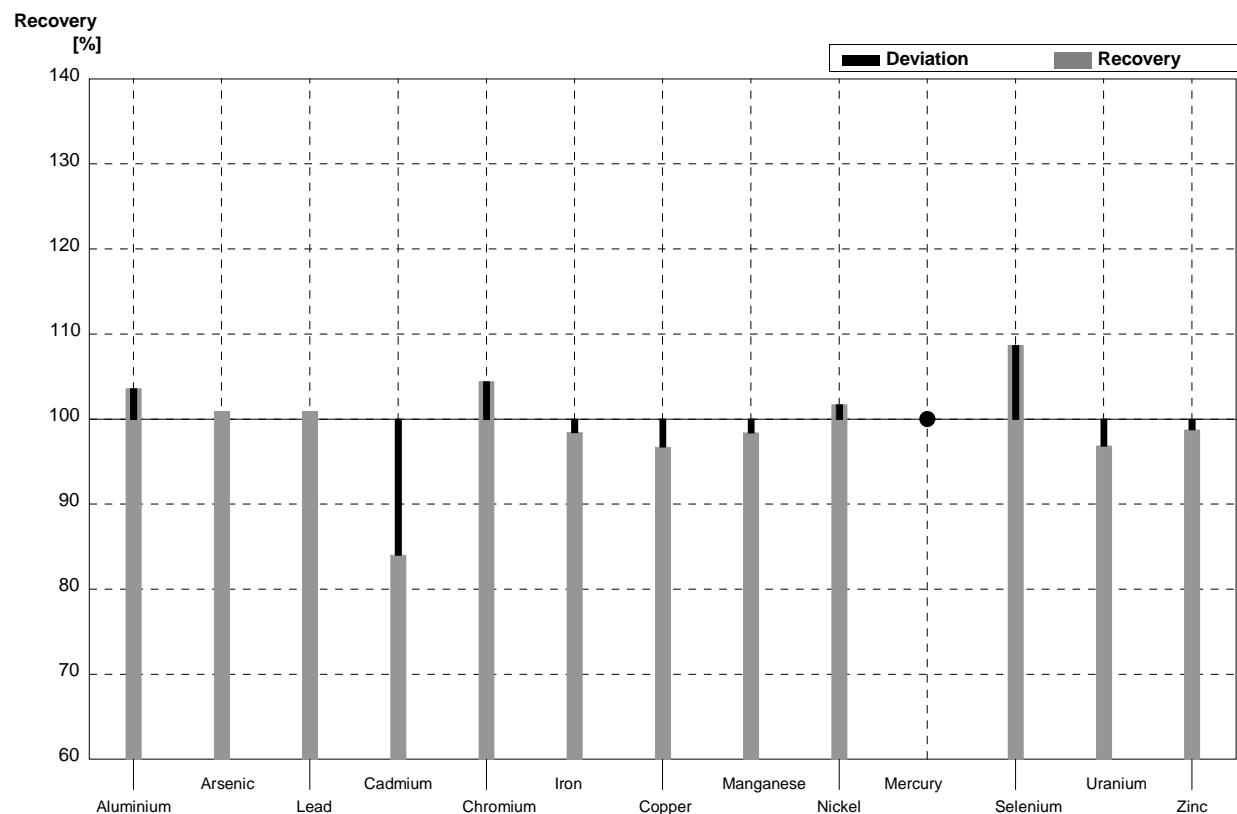
Sample M146B
Laboratory B

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	28,8	4,44	µg/l	104%
Arsenic	<0,5		<2,0		µg/l	•
Lead	3,25	0,02	3,46	0,59	µg/l	106%
Cadmium	0,470	0,006	0,461	0,032	µg/l	98%
Chromium	1,18	0,01	<5		µg/l	•
Iron	11,9	0,2	<30		µg/l	•
Copper	2,97	0,03	2,56	0,67	µg/l	86%
Manganese	2,79	0,03	<3,0		µg/l	•
Nickel	2,45	0,05	2,40	0,30	µg/l	98%
Mercury	1,28	0,02			µg/l	
Selenium	0,60	0,06	<5,0		µg/l	•
Uranium	0,95	0,01			µg/l	
Zinc	23,3	0,5	23,3	3,3	µg/l	100%



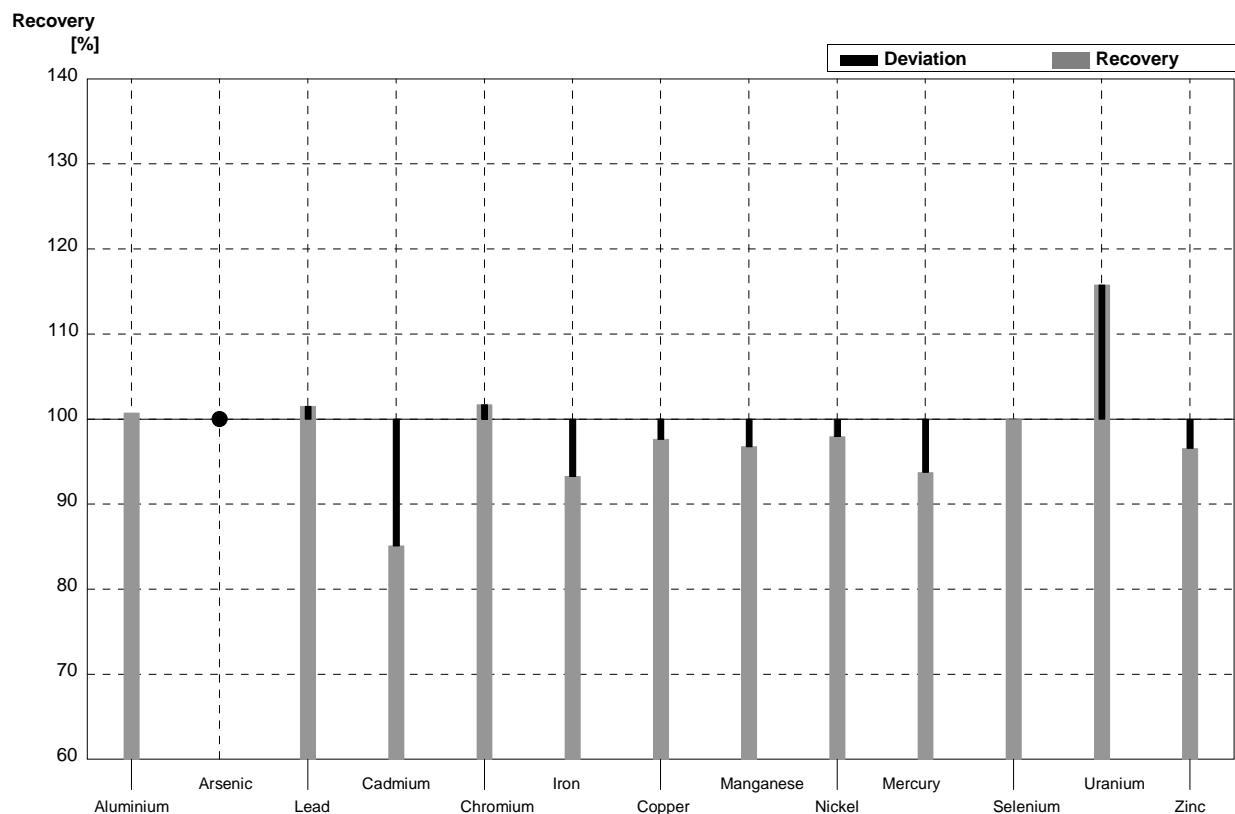
Sample M146A
Laboratory C

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	17,2		µg/l	104%
Arsenic	2,18	0,02	2,2		µg/l	101%
Lead	2,18	0,02	2,2		µg/l	101%
Cadmium	0,119	0,002	0,1		µg/l	84%
Chromium	3,16	0,02	3,3		µg/l	104%
Iron	31,9	0,2	31,4		µg/l	98%
Copper	7,96	0,10	7,7		µg/l	97%
Manganese	25,1	0,2	24,7		µg/l	98%
Nickel	1,18	0,05	1,2		µg/l	102%
Mercury	<0,25		<0,2		µg/l	•
Selenium	2,30	0,06	2,5		µg/l	109%
Uranium	4,44	0,03	4,3		µg/l	97%
Zinc	16,0	0,5	15,8		µg/l	99%



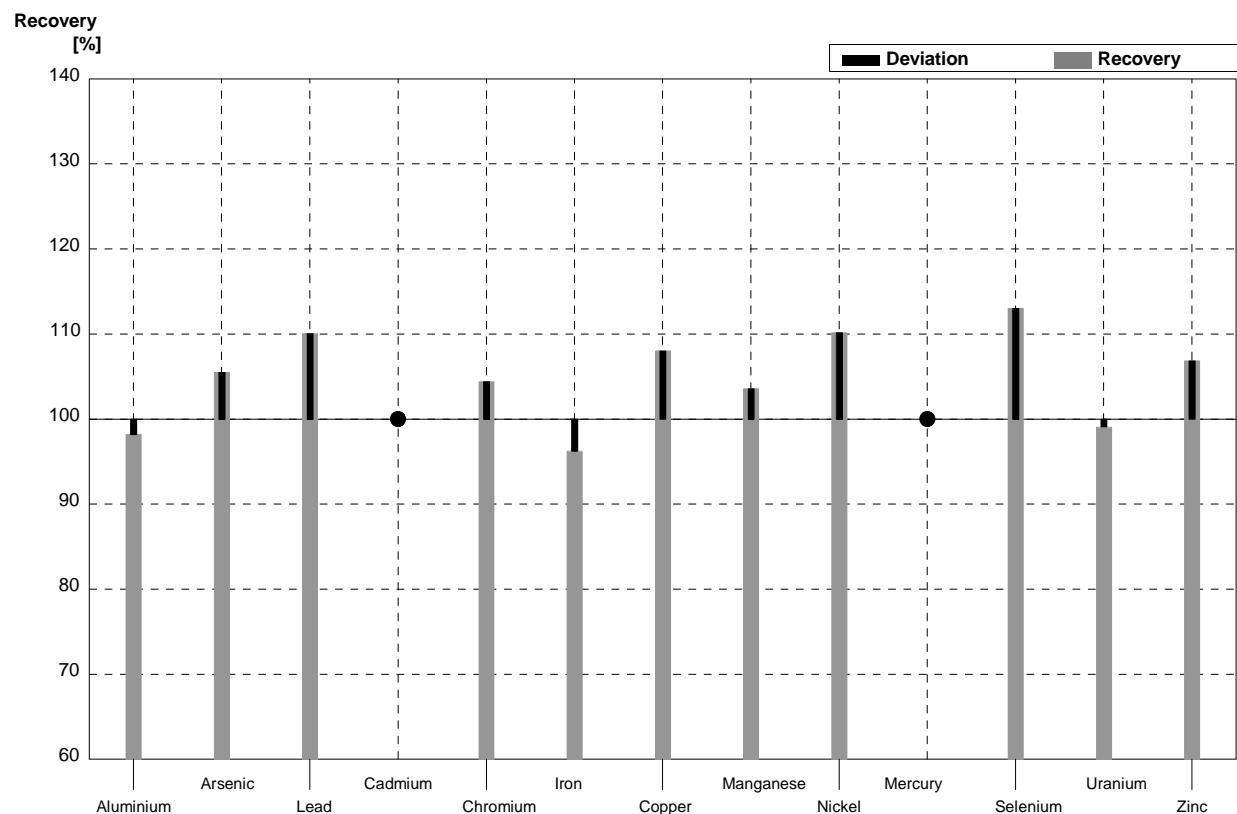
Sample M146B
Laboratory C

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	28		µg/l	101%
Arsenic	<0,5		<0,1		µg/l	•
Lead	3,25	0,02	3,3		µg/l	102%
Cadmium	0,470	0,006	0,4		µg/l	85%
Chromium	1,18	0,01	1,2		µg/l	102%
Iron	11,9	0,2	11,1		µg/l	93%
Copper	2,97	0,03	2,9		µg/l	98%
Manganese	2,79	0,03	2,7		µg/l	97%
Nickel	2,45	0,05	2,4		µg/l	98%
Mercury	1,28	0,02	1,2		µg/l	94%
Selenium	0,60	0,06	0,6		µg/l	100%
Uranium	0,95	0,01	1,1		µg/l	116%
Zinc	23,3	0,5	22,5		µg/l	97%



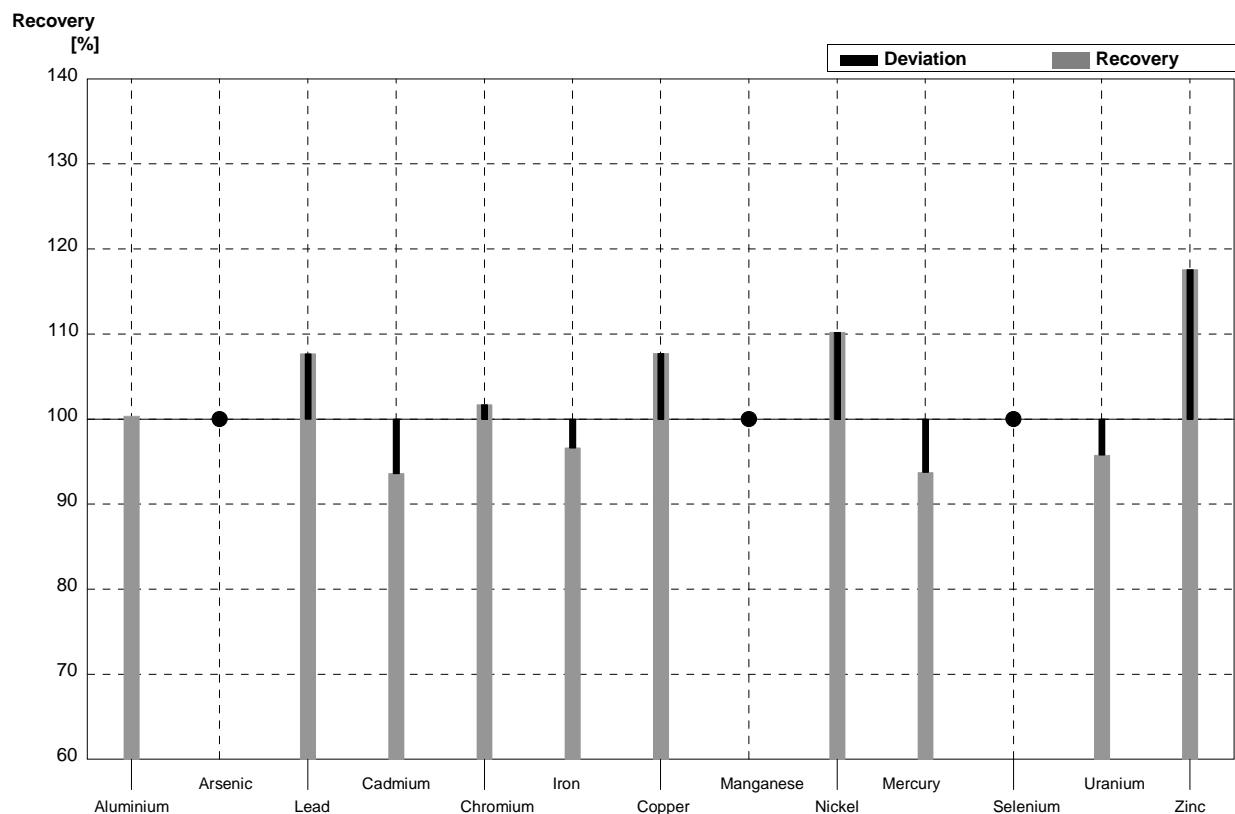
Sample M146A
Laboratory D

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	16,3	1,5	µg/l	98%
Arsenic	2,18	0,02	2,3	0,2	µg/l	106%
Lead	2,18	0,02	2,4	0,2	µg/l	110%
Cadmium	0,119	0,002	<0,2		µg/l	•
Chromium	3,16	0,02	3,3	0,3	µg/l	104%
Iron	31,9	0,2	30,7	3	µg/l	96%
Copper	7,96	0,10	8,6	0,9	µg/l	108%
Manganese	25,1	0,2	26,0	3	µg/l	104%
Nickel	1,18	0,05	1,3	0,1	µg/l	110%
Mercury	<0,25		0,1	0,01	µg/l	•
Selenium	2,30	0,06	2,6	0,3	µg/l	113%
Uranium	4,44	0,03	4,4	0,4	µg/l	99%
Zinc	16,0	0,5	17,1	1,7	µg/l	107%



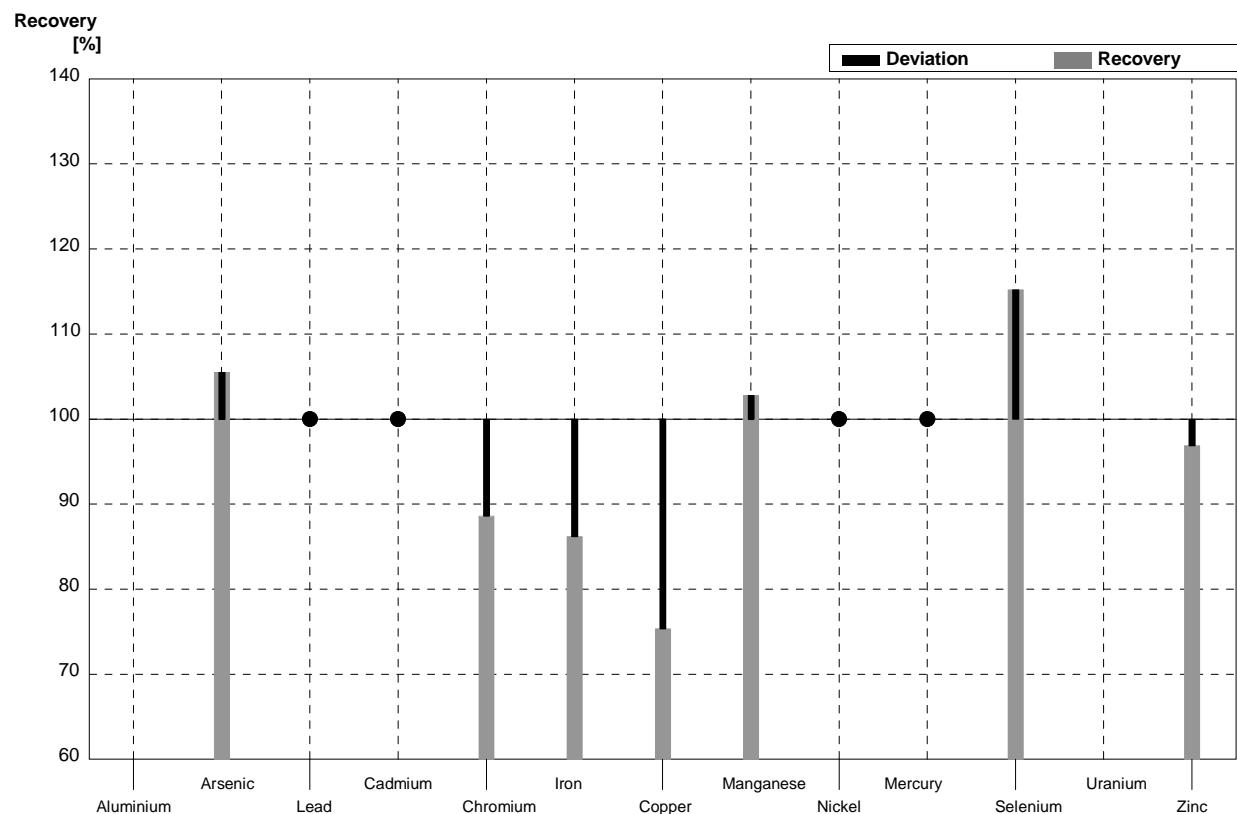
Sample M146B
Laboratory D

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	27,9	3	µg/l	100%
Arsenic	<0,5		<1		µg/l	•
Lead	3,25	0,02	3,5	0,3	µg/l	108%
Cadmium	0,470	0,006	0,44	0,04	µg/l	94%
Chromium	1,18	0,01	1,2	0,1	µg/l	102%
Iron	11,9	0,2	11,5	1	µg/l	97%
Copper	2,97	0,03	3,2	0,3	µg/l	108%
Manganese	2,79	0,03	<5		µg/l	•
Nickel	2,45	0,05	2,7	0,3	µg/l	110%
Mercury	1,28	0,02	1,2	0,1	µg/l	94%
Selenium	0,60	0,06	<1		µg/l	•
Uranium	0,95	0,01	0,91	0,09	µg/l	96%
Zinc	23,3	0,5	27,4	2,7	µg/l	118%



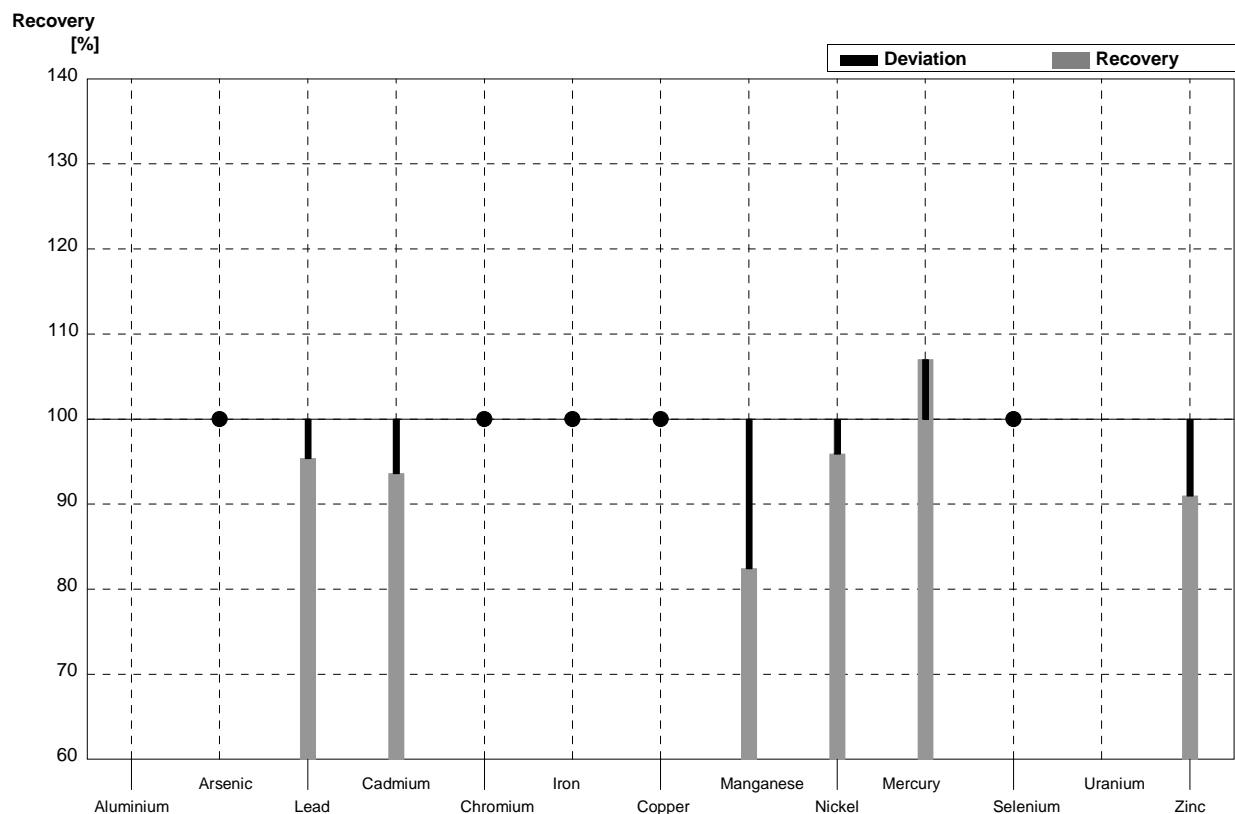
Sample M146A
Laboratory E

Parameter	Target value	\pm U (k=2)	Result	\pm	Unit	Recovery
Aluminium	16,6	0,3			$\mu\text{g/l}$	
Arsenic	2,18	0,02	2,3	0,2	$\mu\text{g/l}$	106%
Lead	2,18	0,02	<2,5		$\mu\text{g/l}$	•
Cadmium	0,119	0,002	<0,4		$\mu\text{g/l}$	•
Chromium	3,16	0,02	2,8	0,28	$\mu\text{g/l}$	89%
Iron	31,9	0,2	27,5	2	$\mu\text{g/l}$	86%
Copper	7,96	0,10	6,0	0,6	$\mu\text{g/l}$	75%
Manganese	25,1	0,2	25,8	1,2	$\mu\text{g/l}$	103%
Nickel	1,18	0,05	<2		$\mu\text{g/l}$	•
Mercury	<0,25		<0,3		$\mu\text{g/l}$	•
Selenium	2,30	0,06	2,65	0,25	$\mu\text{g/l}$	115%
Uranium	4,44	0,03			$\mu\text{g/l}$	
Zinc	16,0	0,5	15,5	0,7	$\mu\text{g/l}$	97%



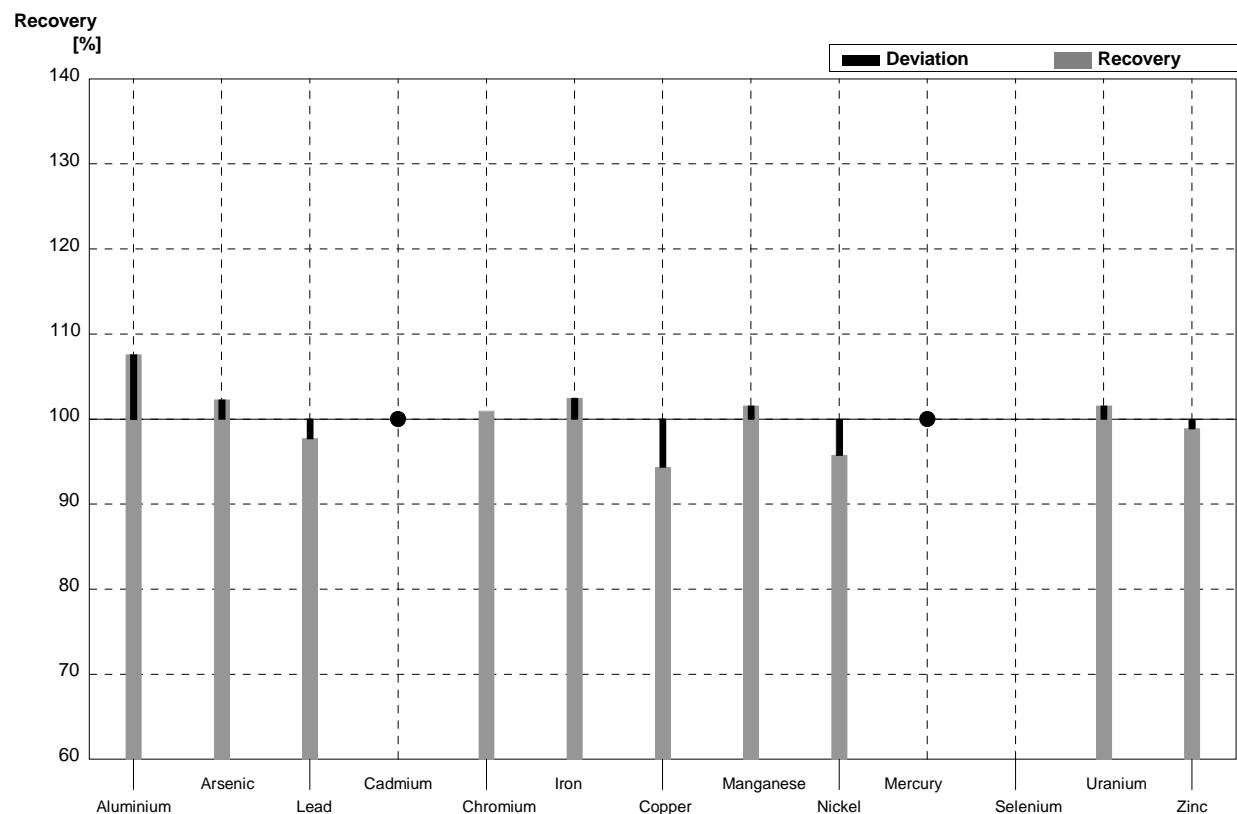
Sample M146B
Laboratory E

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3			µg/l	
Arsenic	<0,5		<2		µg/l	•
Lead	3,25	0,02	3,1	0,3	µg/l	95%
Cadmium	0,470	0,006	0,44	0,04	µg/l	94%
Chromium	1,18	0,01	<2		µg/l	•
Iron	11,9	0,2	<12		µg/l	•
Copper	2,97	0,03	<3		µg/l	•
Manganese	2,79	0,03	2,3	0,2	µg/l	82%
Nickel	2,45	0,05	2,35	0,25	µg/l	96%
Mercury	1,28	0,02	1,37	0,15	µg/l	107%
Selenium	0,60	0,06	<1,5		µg/l	•
Uranium	0,95	0,01			µg/l	
Zinc	23,3	0,5	21,2	1	µg/l	91%



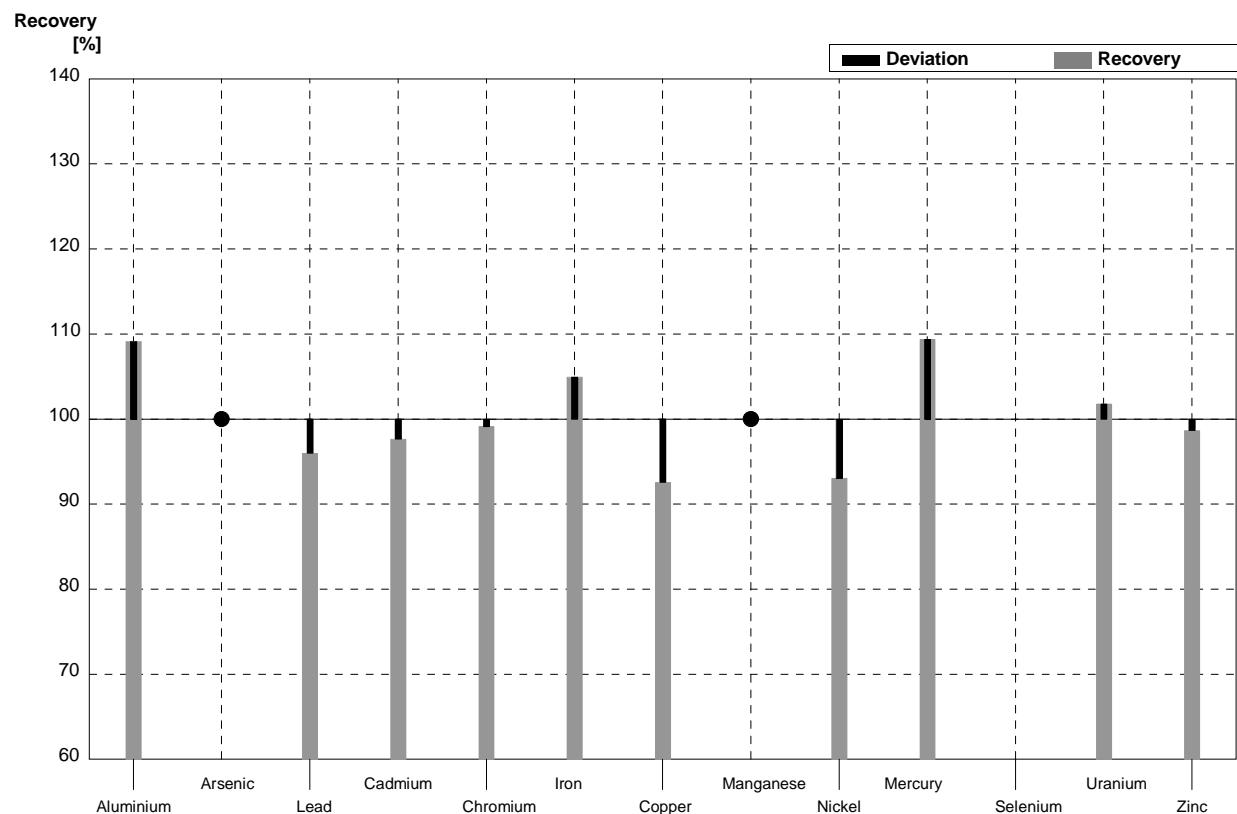
Sample M146A
Laboratory F

Parameter	Target value	\pm U (k=2)	Result	\pm	Unit	Recovery
Aluminium	16,6	0,3	17,86	2,68	$\mu\text{g/l}$	108%
Arsenic	2,18	0,02	2,23	0,34	$\mu\text{g/l}$	102%
Lead	2,18	0,02	2,13	0,32	$\mu\text{g/l}$	98%
Cadmium	0,119	0,002	<0,2		$\mu\text{g/l}$	•
Chromium	3,16	0,02	3,19	0,48	$\mu\text{g/l}$	101%
Iron	31,9	0,2	32,69	4,90	$\mu\text{g/l}$	102%
Copper	7,96	0,10	7,51	1,13	$\mu\text{g/l}$	94%
Manganese	25,1	0,2	25,49	3,82	$\mu\text{g/l}$	102%
Nickel	1,18	0,05	1,13	0,17	$\mu\text{g/l}$	96%
Mercury	<0,25		0,225	0,034	$\mu\text{g/l}$	•
Selenium	2,30	0,06			$\mu\text{g/l}$	
Uranium	4,44	0,03	4,51	0,68	$\mu\text{g/l}$	102%
Zinc	16,0	0,5	15,82	2,37	$\mu\text{g/l}$	99%



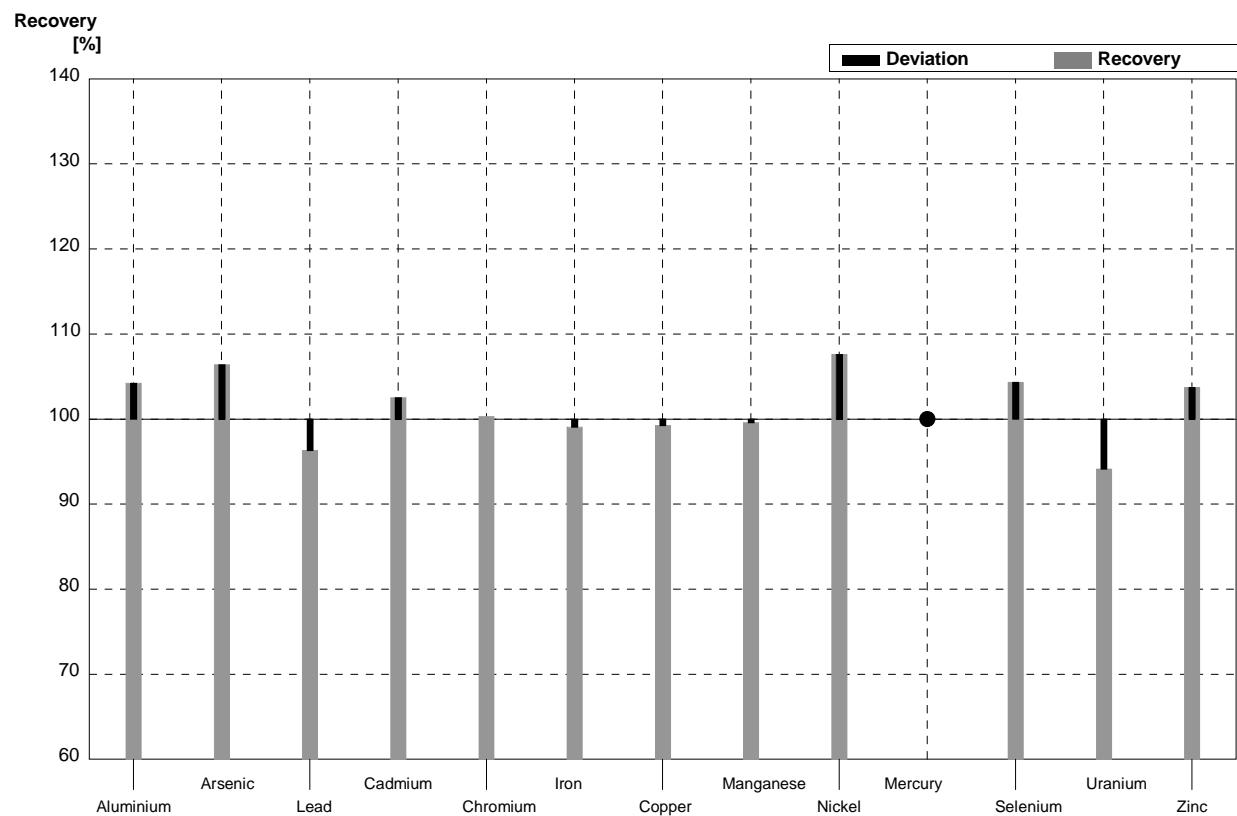
Sample M146B
Laboratory F

Parameter	Target value	\pm U (k=2)	Result	\pm	Unit	Recovery
Aluminium	27,8	0,3	30,34	4,55	$\mu\text{g/l}$	109%
Arsenic	<0,5		<1		$\mu\text{g/l}$	•
Lead	3,25	0,02	3,12	0,47	$\mu\text{g/l}$	96%
Cadmium	0,470	0,006	0,459	0,069	$\mu\text{g/l}$	98%
Chromium	1,18	0,01	1,17	0,18	$\mu\text{g/l}$	99%
Iron	11,9	0,2	12,49	1,87	$\mu\text{g/l}$	105%
Copper	2,97	0,03	2,75	0,41	$\mu\text{g/l}$	93%
Manganese	2,79	0,03	<10		$\mu\text{g/l}$	•
Nickel	2,45	0,05	2,28	0,34	$\mu\text{g/l}$	93%
Mercury	1,28	0,02	1,400	0,210	$\mu\text{g/l}$	109%
Selenium	0,60	0,06			$\mu\text{g/l}$	
Uranium	0,95	0,01	0,967	0,145	$\mu\text{g/l}$	102%
Zinc	23,3	0,5	22,99	3,45	$\mu\text{g/l}$	99%



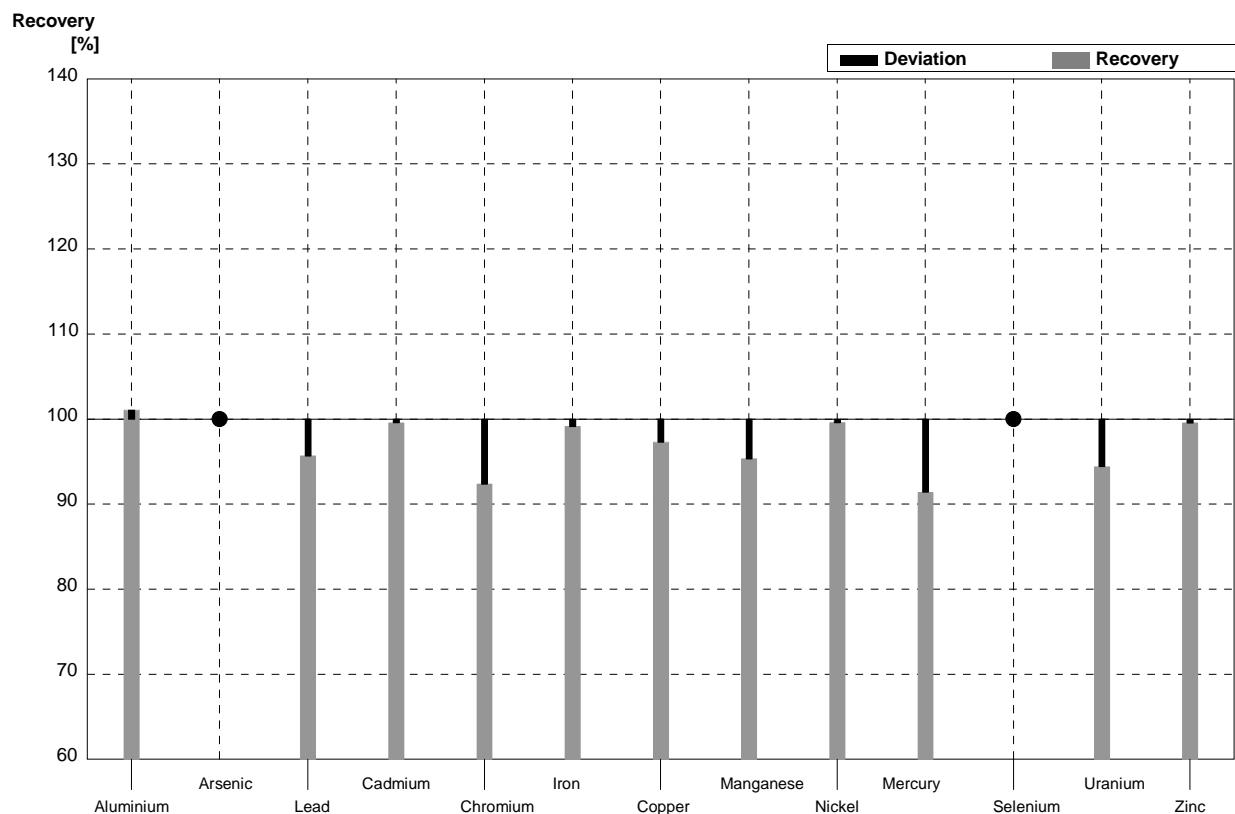
Sample M146A
Laboratory G

Parameter	Target value	\pm U (k=2)	Result	\pm	Unit	Recovery
Aluminium	16,6	0,3	17,3	1,91	$\mu\text{g/l}$	104%
Arsenic	2,18	0,02	2,32	0,13	$\mu\text{g/l}$	106%
Lead	2,18	0,02	2,10	0,22	$\mu\text{g/l}$	96%
Cadmium	0,119	0,002	0,122	0,006	$\mu\text{g/l}$	103%
Chromium	3,16	0,02	3,17	0,45	$\mu\text{g/l}$	100%
Iron	31,9	0,2	31,6	3,50	$\mu\text{g/l}$	99%
Copper	7,96	0,10	7,90	0,43	$\mu\text{g/l}$	99%
Manganese	25,1	0,2	25,0	1,36	$\mu\text{g/l}$	100%
Nickel	1,18	0,05	1,27	0,10	$\mu\text{g/l}$	108%
Mercury	<0,25		0,10	0,015	$\mu\text{g/l}$	•
Selenium	2,30	0,06	2,40	0,29	$\mu\text{g/l}$	104%
Uranium	4,44	0,03	4,18	0,44	$\mu\text{g/l}$	94%
Zinc	16,0	0,5	16,6	1,04	$\mu\text{g/l}$	104%



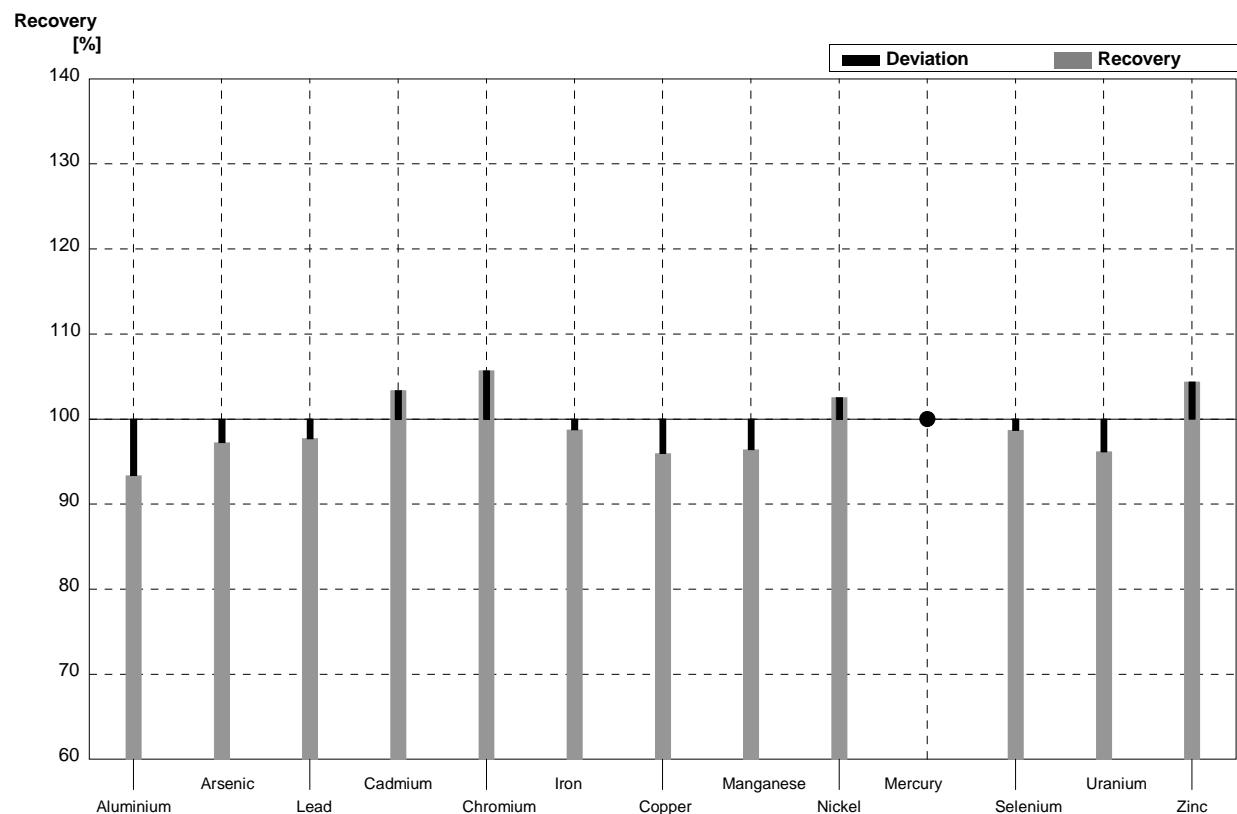
Sample M146B
Laboratory G

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	28,1	3,12	µg/l	101%
Arsenic	<0,5		<0,5		µg/l	•
Lead	3,25	0,02	3,11	0,33	µg/l	96%
Cadmium	0,470	0,006	0,468	0,022	µg/l	100%
Chromium	1,18	0,01	1,09	0,15	µg/l	92%
Iron	11,9	0,2	11,8	1,31	µg/l	99%
Copper	2,97	0,03	2,89	0,16	µg/l	97%
Manganese	2,79	0,03	2,66	0,15	µg/l	95%
Nickel	2,45	0,05	2,44	0,19	µg/l	100%
Mercury	1,28	0,02	1,17	0,18	µg/l	91%
Selenium	0,60	0,06	<1,0		µg/l	•
Uranium	0,95	0,01	0,897	0,095	µg/l	94%
Zinc	23,3	0,5	23,2	1,45	µg/l	100%



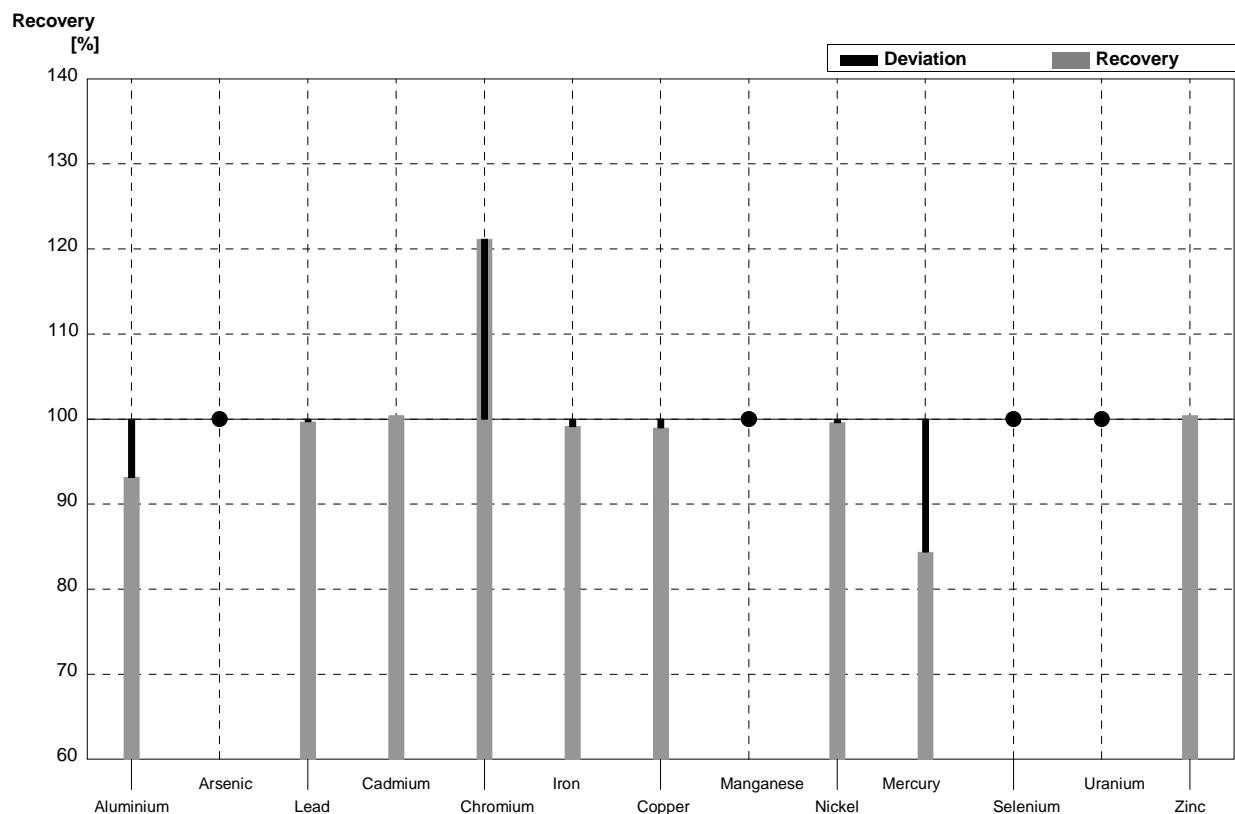
Sample M146A
Laboratory H

Parameter	Target value	\pm U (k=2)	Result	\pm	Unit	Recovery
Aluminium	16,6	0,3	15,5	0,40	$\mu\text{g/l}$	93%
Arsenic	2,18	0,02	2,12	0,09	$\mu\text{g/l}$	97%
Lead	2,18	0,02	2,13	0,05	$\mu\text{g/l}$	98%
Cadmium	0,119	0,002	0,123	0,017	$\mu\text{g/l}$	103%
Chromium	3,16	0,02	3,34	0,11	$\mu\text{g/l}$	106%
Iron	31,9	0,2	31,5	1,08	$\mu\text{g/l}$	99%
Copper	7,96	0,10	7,64	0,03	$\mu\text{g/l}$	96%
Manganese	25,1	0,2	24,2	0,68	$\mu\text{g/l}$	96%
Nickel	1,18	0,05	1,21	0,22	$\mu\text{g/l}$	103%
Mercury	<0,25		<0,050		$\mu\text{g/l}$	•
Selenium	2,30	0,06	2,27	0,23	$\mu\text{g/l}$	99%
Uranium	4,44	0,03	4,27	0,03	$\mu\text{g/l}$	96%
Zinc	16,0	0,5	16,7	0,35	$\mu\text{g/l}$	104%



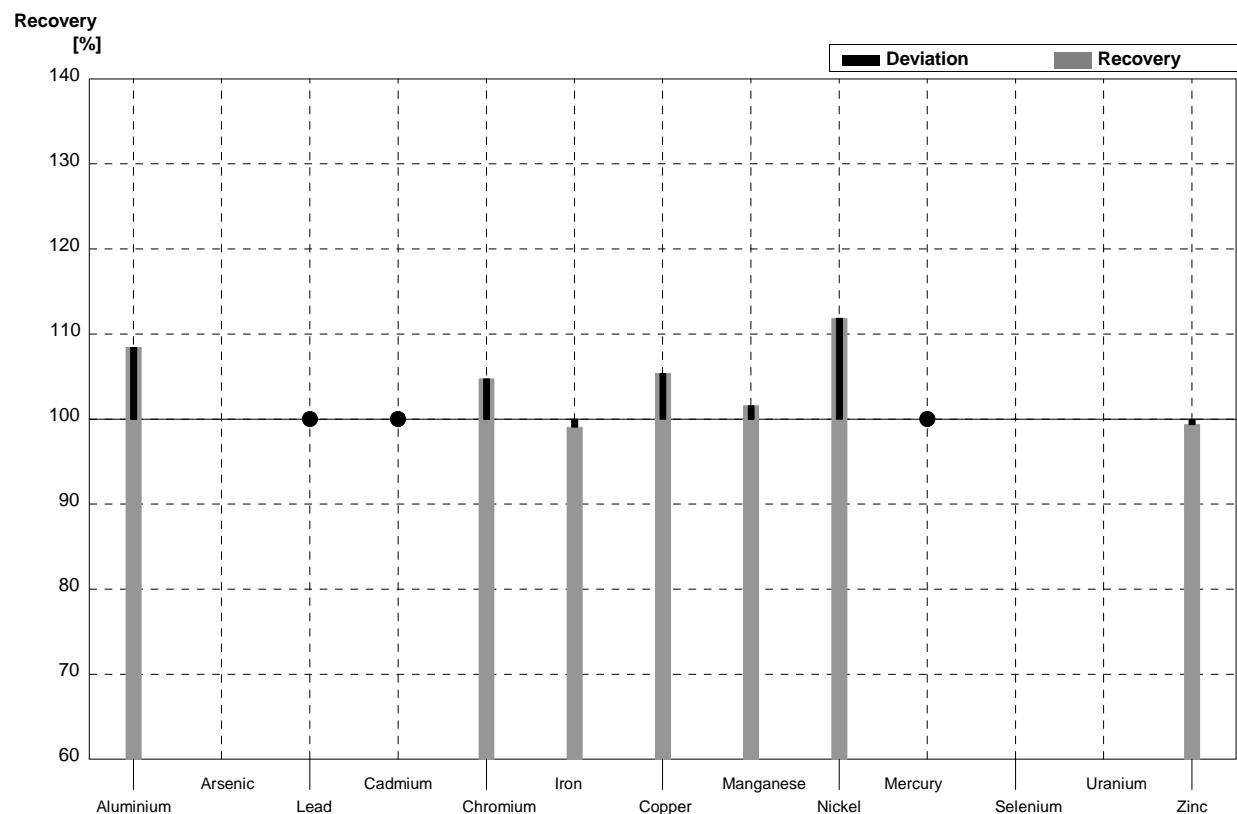
Sample M146B
Laboratory H

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	25,9	0,36	µg/l	93%
Arsenic	<0,5		[0,10]		µg/l	•
Lead	3,25	0,02	3,24	0,04	µg/l	100%
Cadmium	0,470	0,006	0,472	0,014	µg/l	100%
Chromium	1,18	0,01	1,43	0,13	µg/l	121%
Iron	11,9	0,2	11,8	1,20	µg/l	99%
Copper	2,97	0,03	2,94	0,03	µg/l	99%
Manganese	2,79	0,03	<10,0		µg/l	•
Nickel	2,45	0,05	2,44	0,20	µg/l	100%
Mercury	1,28	0,02	1,08	0,031	µg/l	84%
Selenium	0,60	0,06	<1,00		µg/l	•
Uranium	0,95	0,01	<1,00		µg/l	•
Zinc	23,3	0,5	23,4	0,36	µg/l	100%



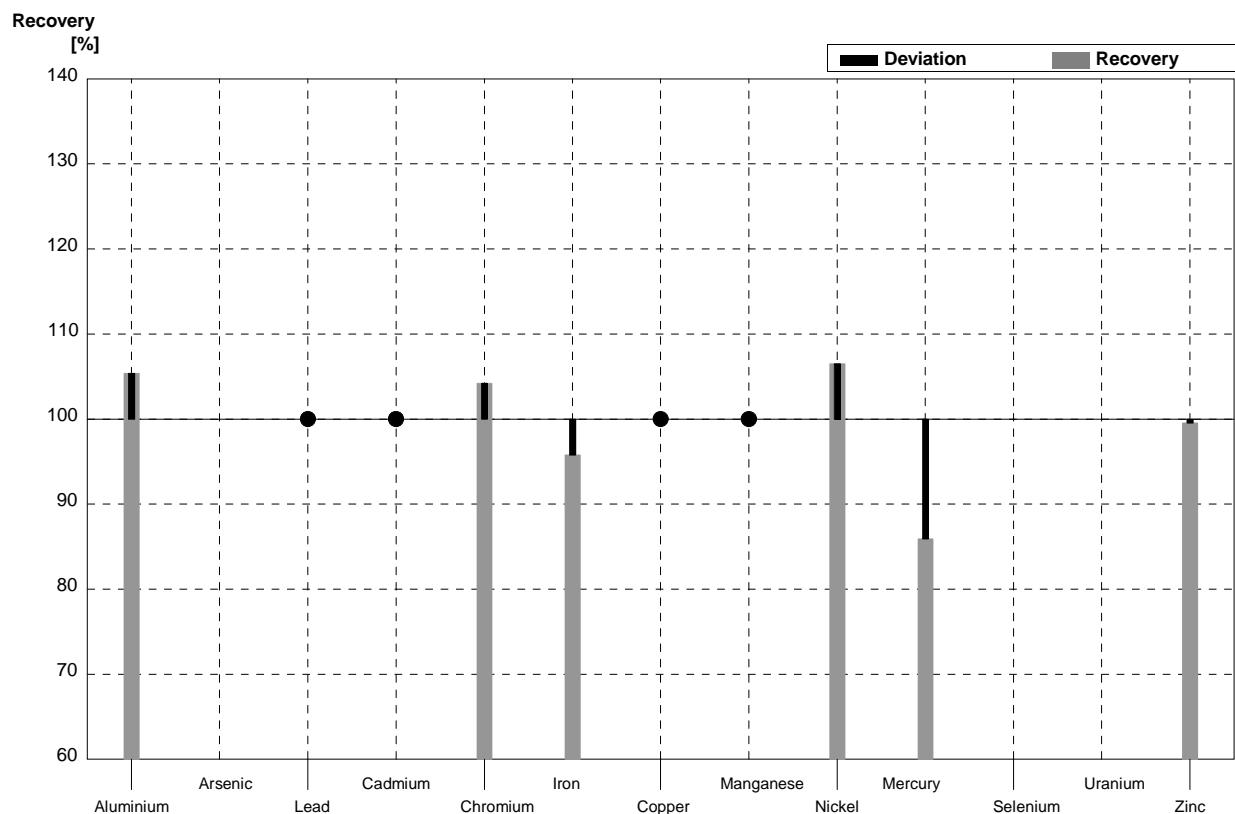
Sample M146A
Laboratory I

Parameter	Target value	\pm U ($k=2$)	Result	\pm	Unit	Recovery
Aluminium	16,6	0,3	18,0	3,3	$\mu\text{g/l}$	108%
Arsenic	2,18	0,02			$\mu\text{g/l}$	
Lead	2,18	0,02	<4,0		$\mu\text{g/l}$	•
Cadmium	0,119	0,002	<0,5		$\mu\text{g/l}$	•
Chromium	3,16	0,02	3,31	0,50	$\mu\text{g/l}$	105%
Iron	31,9	0,2	31,6	3,2	$\mu\text{g/l}$	99%
Copper	7,96	0,10	8,39	1,3	$\mu\text{g/l}$	105%
Manganese	25,1	0,2	25,5	2,6	$\mu\text{g/l}$	102%
Nickel	1,18	0,05	1,32	0,16	$\mu\text{g/l}$	112%
Mercury	<0,25		<0,2		$\mu\text{g/l}$	•
Selenium	2,30	0,06			$\mu\text{g/l}$	
Uranium	4,44	0,03			$\mu\text{g/l}$	
Zinc	16,0	0,5	15,9	1,9	$\mu\text{g/l}$	99%



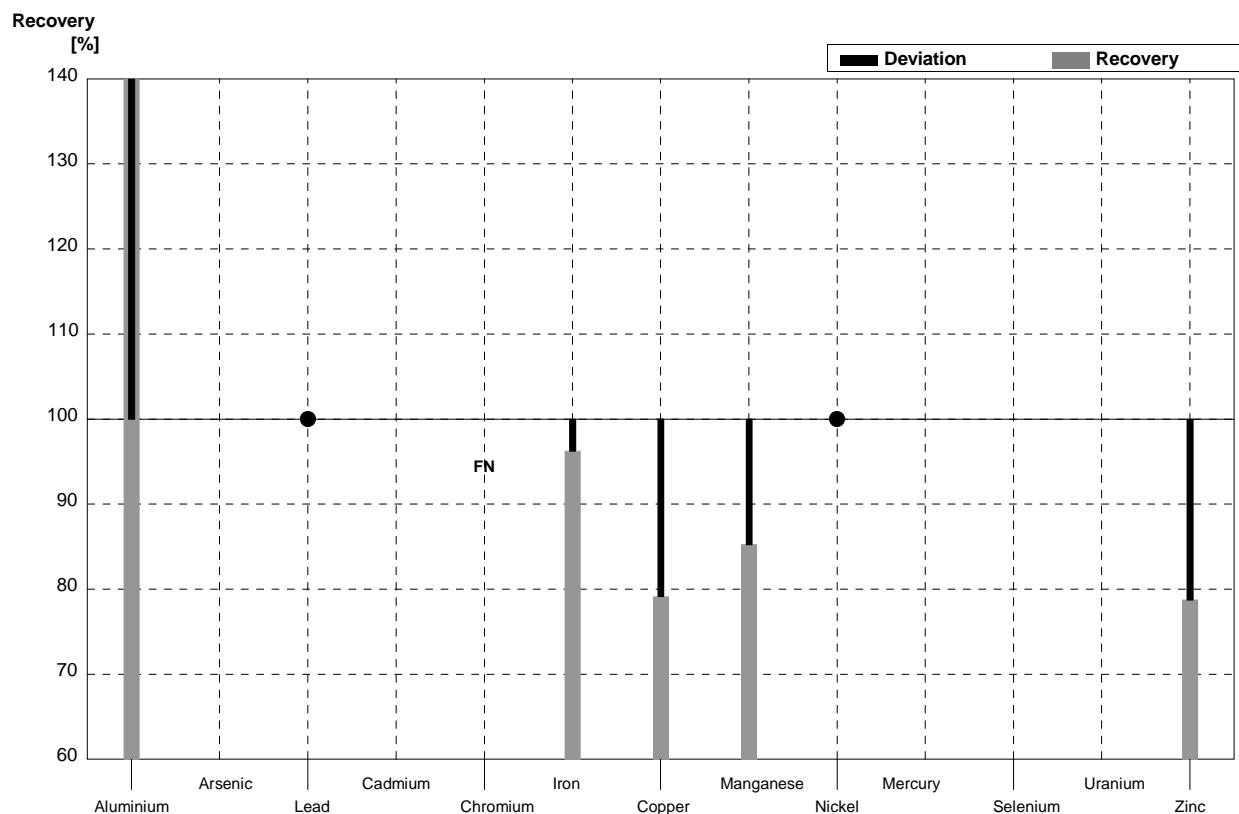
Sample M146B
Laboratory I

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	29,3	5,3	µg/l	105%
Arsenic	<0,5				µg/l	
Lead	3,25	0,02	<4,0		µg/l	•
Cadmium	0,470	0,006	<0,5		µg/l	•
Chromium	1,18	0,01	1,23	0,19	µg/l	104%
Iron	11,9	0,2	11,4	1,2	µg/l	96%
Copper	2,97	0,03	<5,0		µg/l	•
Manganese	2,79	0,03	<5,0		µg/l	•
Nickel	2,45	0,05	2,61	0,32	µg/l	107%
Mercury	1,28	0,02	1,10	0,22	µg/l	86%
Selenium	0,60	0,06			µg/l	
Uranium	0,95	0,01			µg/l	
Zinc	23,3	0,5	23,2	2,8	µg/l	100%



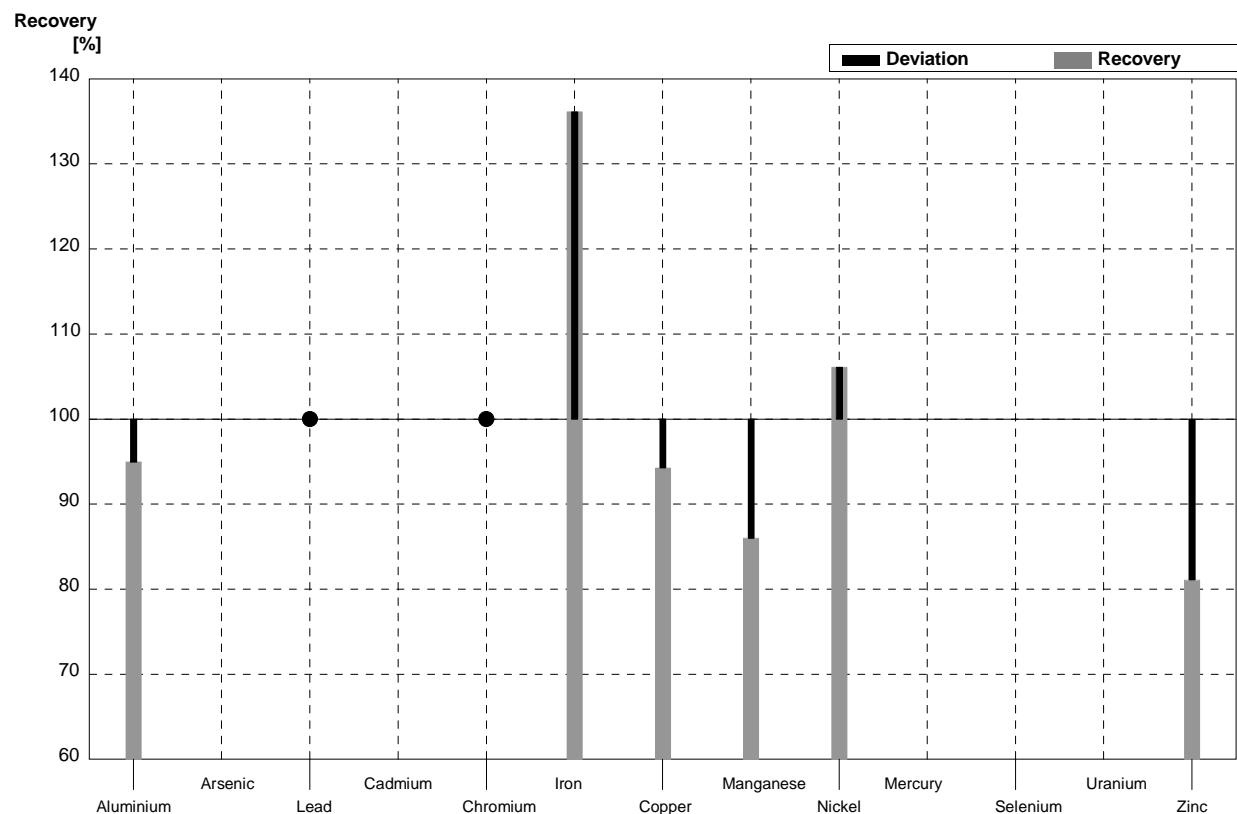
Sample M146A
Laboratory J

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	35,0	3,2	µg/l	211%
Arsenic	2,18	0,02			µg/l	
Lead	2,18	0,02	<4		µg/l	•
Cadmium	0,119	0,002			µg/l	
Chromium	3,16	0,02	<2		µg/l	FN
Iron	31,9	0,2	30,7	1,9	µg/l	96%
Copper	7,96	0,10	6,3	0,7	µg/l	79%
Manganese	25,1	0,2	21,4	1,7	µg/l	85%
Nickel	1,18	0,05	<2		µg/l	•
Mercury	<0,25				µg/l	
Selenium	2,30	0,06			µg/l	
Uranium	4,44	0,03			µg/l	
Zinc	16,0	0,5	12,6		µg/l	79%



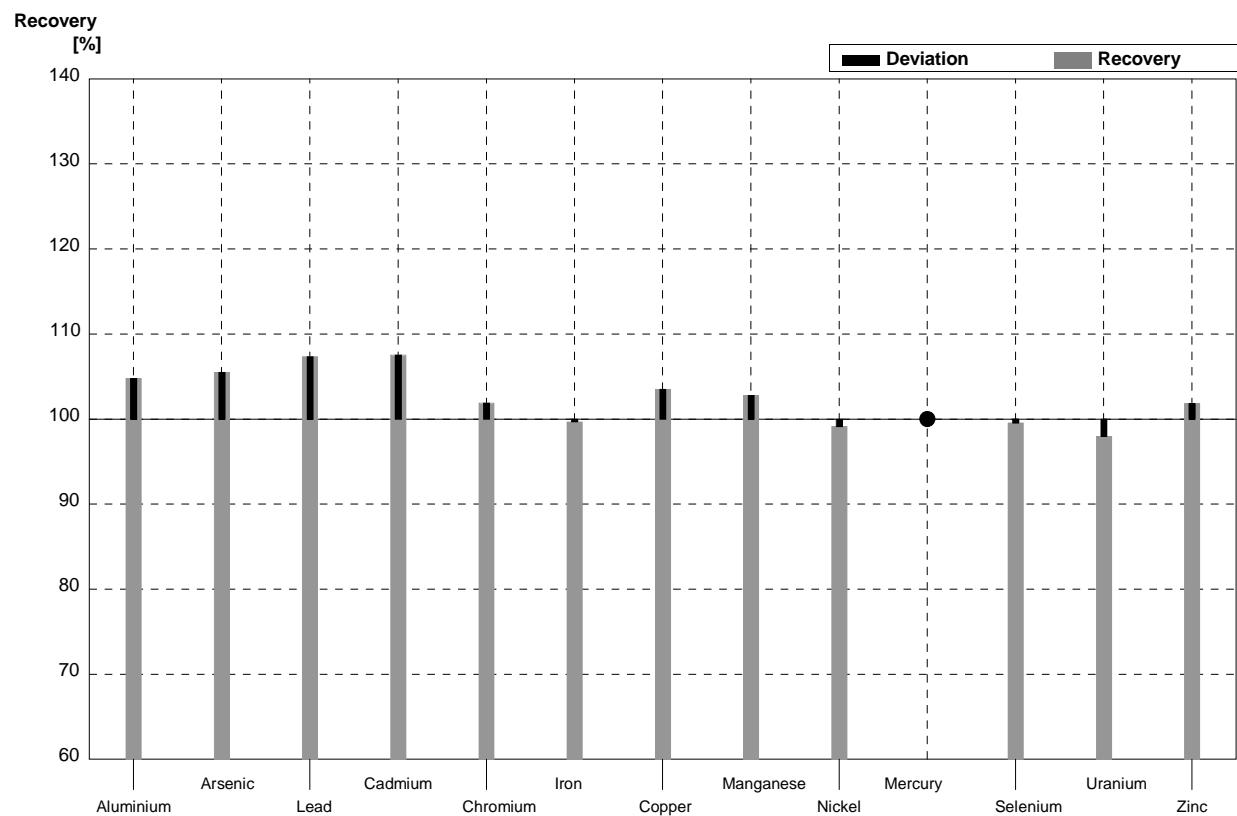
Sample M146B
Laboratory J

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	26,4	2,4	µg/l	95%
Arsenic	<0,5				µg/l	
Lead	3,25	0,02	<4		µg/l	•
Cadmium	0,470	0,006			µg/l	
Chromium	1,18	0,01	<2		µg/l	•
Iron	11,9	0,2	16,2	1,0	µg/l	136%
Copper	2,97	0,03	2,8	0,3	µg/l	94%
Manganese	2,79	0,03	2,4	0,2	µg/l	86%
Nickel	2,45	0,05	2,6	0,3	µg/l	106%
Mercury	1,28	0,02			µg/l	
Selenium	0,60	0,06			µg/l	
Uranium	0,95	0,01			µg/l	
Zinc	23,3	0,5	18,9		µg/l	81%



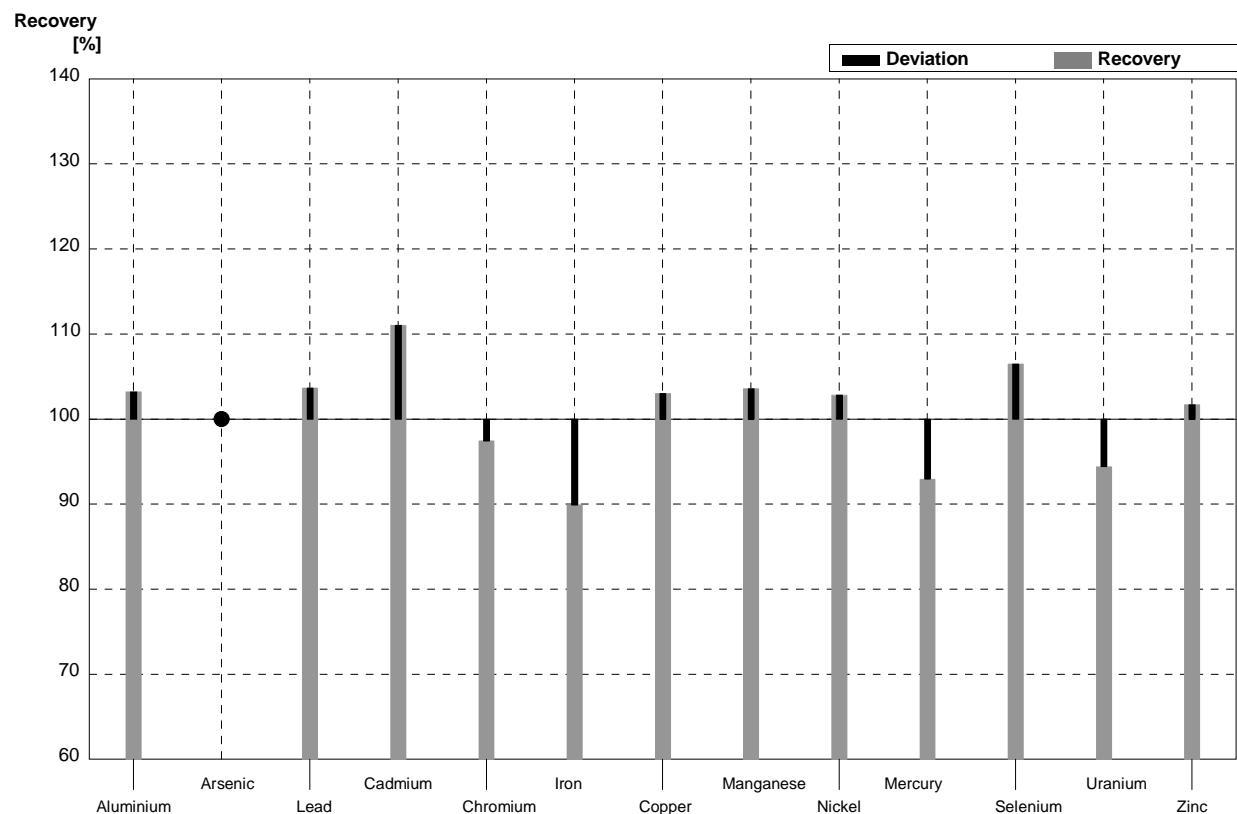
Sample M146A
Laboratory K

Parameter	Target value	\pm U (k=2)	Result	\pm	Unit	Recovery
Aluminium	16,6	0,3	17,4	0,058	$\mu\text{g/l}$	105%
Arsenic	2,18	0,02	2,30	0,072	$\mu\text{g/l}$	106%
Lead	2,18	0,02	2,34	0,050	$\mu\text{g/l}$	107%
Cadmium	0,119	0,002	0,128	0,009	$\mu\text{g/l}$	108%
Chromium	3,16	0,02	3,22	0,040	$\mu\text{g/l}$	102%
Iron	31,9	0,2	31,8	0,289	$\mu\text{g/l}$	100%
Copper	7,96	0,10	8,24	0,168	$\mu\text{g/l}$	104%
Manganese	25,1	0,2	25,8	0,265	$\mu\text{g/l}$	103%
Nickel	1,18	0,05	1,17	0,025	$\mu\text{g/l}$	99%
Mercury	<0,25		0,125	0,002	$\mu\text{g/l}$	•
Selenium	2,30	0,06	2,29	0,096	$\mu\text{g/l}$	100%
Uranium	4,44	0,03	4,35	0,101	$\mu\text{g/l}$	98%
Zinc	16,0	0,5	16,3	0,100	$\mu\text{g/l}$	102%



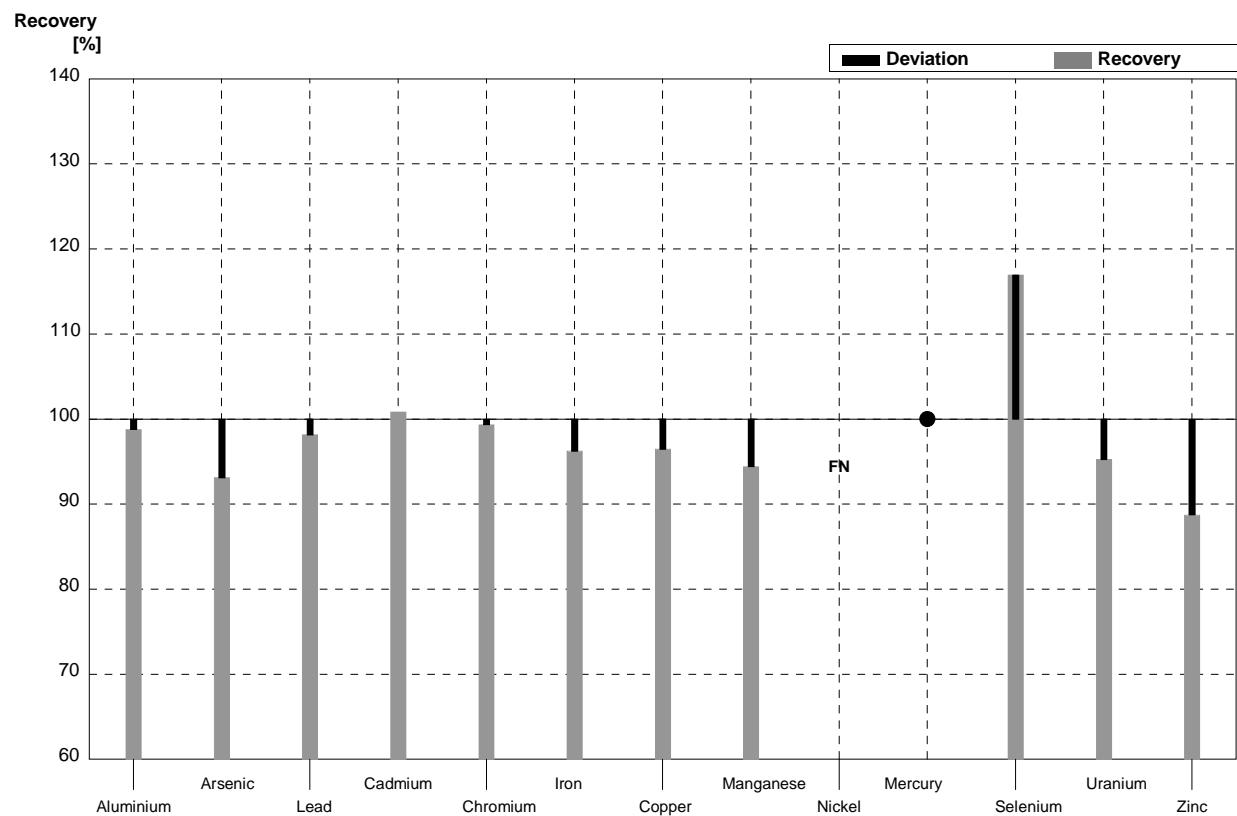
Sample M146B
Laboratory K

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	28,7	0,153	µg/l	103%
Arsenic	<0,5		<0,20		µg/l	•
Lead	3,25	0,02	3,37	0,081	µg/l	104%
Cadmium	0,470	0,006	0,522	0,047	µg/l	111%
Chromium	1,18	0,01	1,15	0,026	µg/l	97%
Iron	11,9	0,2	10,7	0,100	µg/l	90%
Copper	2,97	0,03	3,06	0,020	µg/l	103%
Manganese	2,79	0,03	2,89	0,055	µg/l	104%
Nickel	2,45	0,05	2,52	0,023	µg/l	103%
Mercury	1,28	0,02	1,19	0,057	µg/l	93%
Selenium	0,60	0,06	0,639	0,021	µg/l	107%
Uranium	0,95	0,01	0,897	0,010	µg/l	94%
Zinc	23,3	0,5	23,7	0,208	µg/l	102%



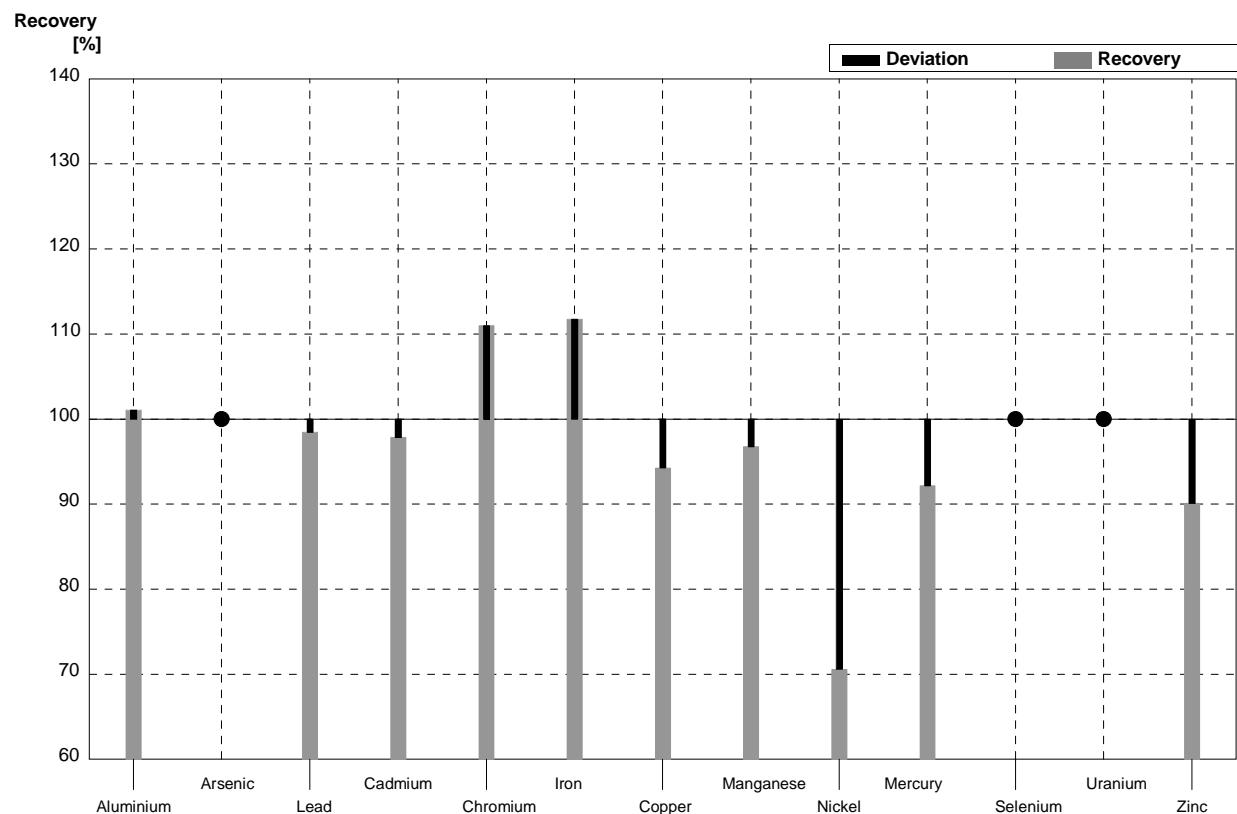
Sample M146A
Laboratory L

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	16,4	2,5	µg/l	99%
Arsenic	2,18	0,02	2,03	0,16	µg/l	93%
Lead	2,18	0,02	2,14	0,34	µg/l	98%
Cadmium	0,119	0,002	0,12	0,03	µg/l	101%
Chromium	3,16	0,02	3,14	0,38	µg/l	99%
Iron	31,9	0,2	30,7	4,3	µg/l	96%
Copper	7,96	0,10	7,68	0,92	µg/l	96%
Manganese	25,1	0,2	23,7	1,20	µg/l	94%
Nickel	1,18	0,05	<1,0		µg/l	FN
Mercury	<0,25		0,11	0,03	µg/l	•
Selenium	2,30	0,06	2,69	0,25	µg/l	117%
Uranium	4,44	0,03	4,23	0,47	µg/l	95%
Zinc	16,0	0,5	14,2	1,3	µg/l	89%



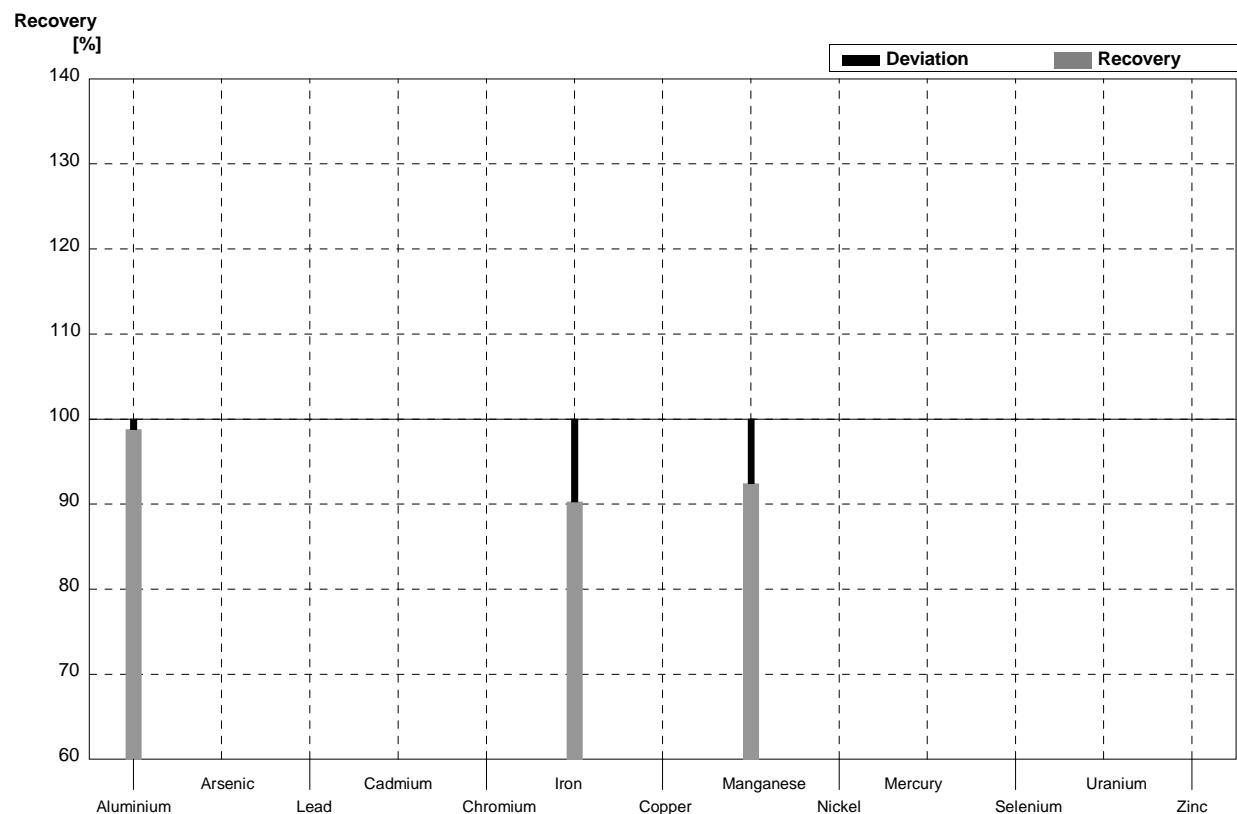
Sample M146B
Laboratory L

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	28,1	4,2	µg/l	101%
Arsenic	<0,5		<1,0		µg/l	•
Lead	3,25	0,02	3,20	0,51	µg/l	98%
Cadmium	0,470	0,006	0,46	0,10	µg/l	98%
Chromium	1,18	0,01	1,31	0,16	µg/l	111%
Iron	11,9	0,2	13,3	1,9	µg/l	112%
Copper	2,97	0,03	2,80	0,34	µg/l	94%
Manganese	2,79	0,03	2,70	0,30	µg/l	97%
Nickel	2,45	0,05	1,73	0,21	µg/l	71%
Mercury	1,28	0,02	1,18	0,15	µg/l	92%
Selenium	0,60	0,06	<1,0		µg/l	•
Uranium	0,95	0,01	<1,0		µg/l	•
Zinc	23,3	0,5	21,0	1,9	µg/l	90%



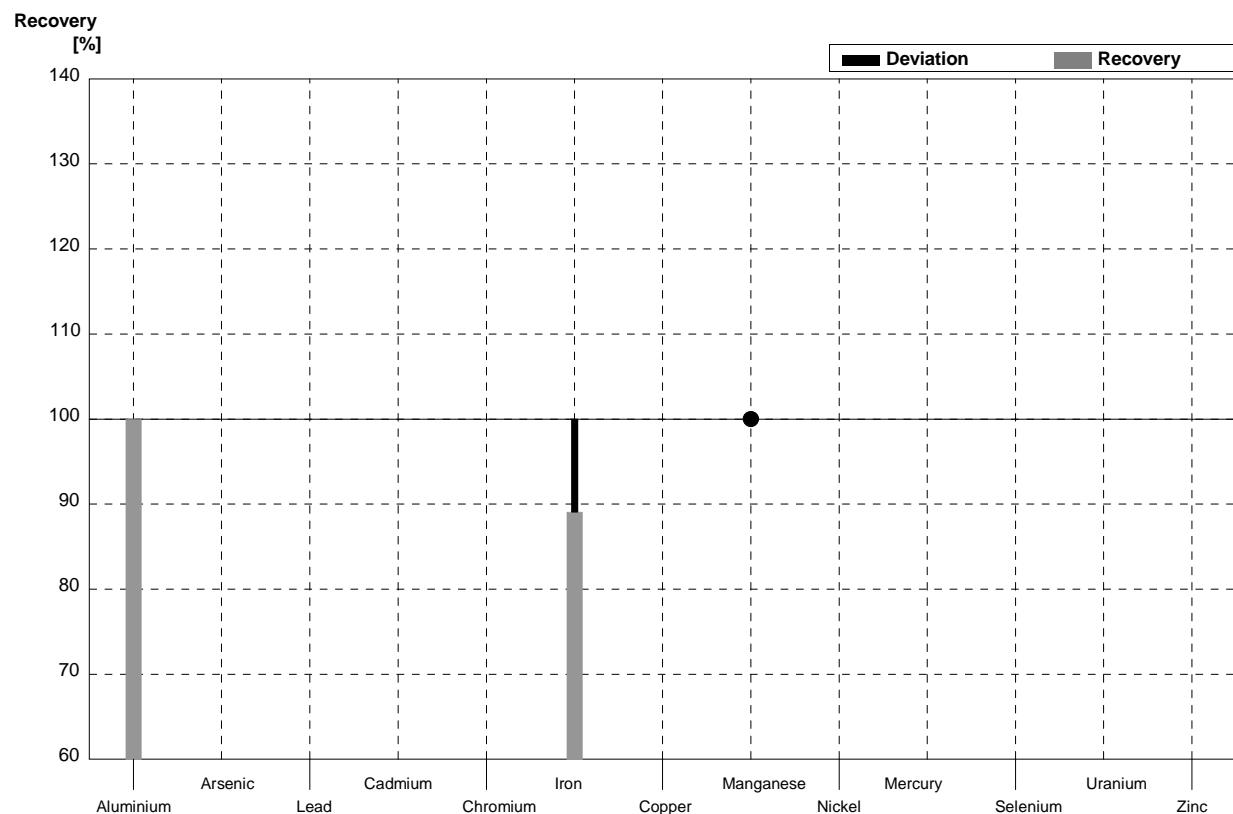
Sample M146A
Laboratory M

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	16,4	4,4	µg/l	99%
Arsenic	2,18	0,02			µg/l	
Lead	2,18	0,02			µg/l	
Cadmium	0,119	0,002			µg/l	
Chromium	3,16	0,02			µg/l	
Iron	31,9	0,2	28,8	4,3	µg/l	90%
Copper	7,96	0,10			µg/l	
Manganese	25,1	0,2	23,2	4,9	µg/l	92%
Nickel	1,18	0,05			µg/l	
Mercury	<0,25				µg/l	
Selenium	2,30	0,06			µg/l	
Uranium	4,44	0,03			µg/l	
Zinc	16,0	0,5			µg/l	



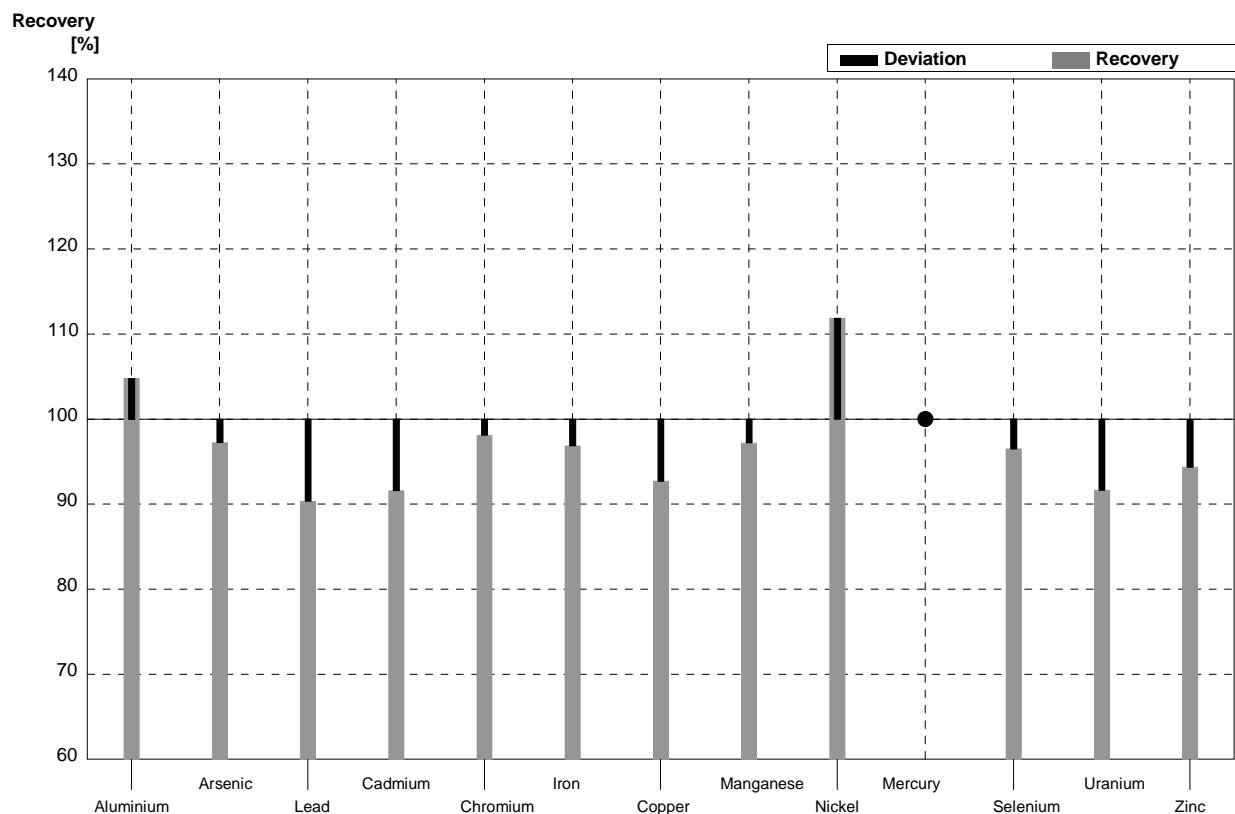
Sample M146B
Laboratory M

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	27,8	7,5	µg/l	100%
Arsenic	<0,5				µg/l	
Lead	3,25	0,02			µg/l	
Cadmium	0,470	0,006			µg/l	
Chromium	1,18	0,01			µg/l	
Iron	11,9	0,2	10,6	1,6	µg/l	89%
Copper	2,97	0,03			µg/l	
Manganese	2,79	0,03	<10	2,1	µg/l	•
Nickel	2,45	0,05			µg/l	
Mercury	1,28	0,02			µg/l	
Selenium	0,60	0,06			µg/l	
Uranium	0,95	0,01			µg/l	
Zinc	23,3	0,5			µg/l	



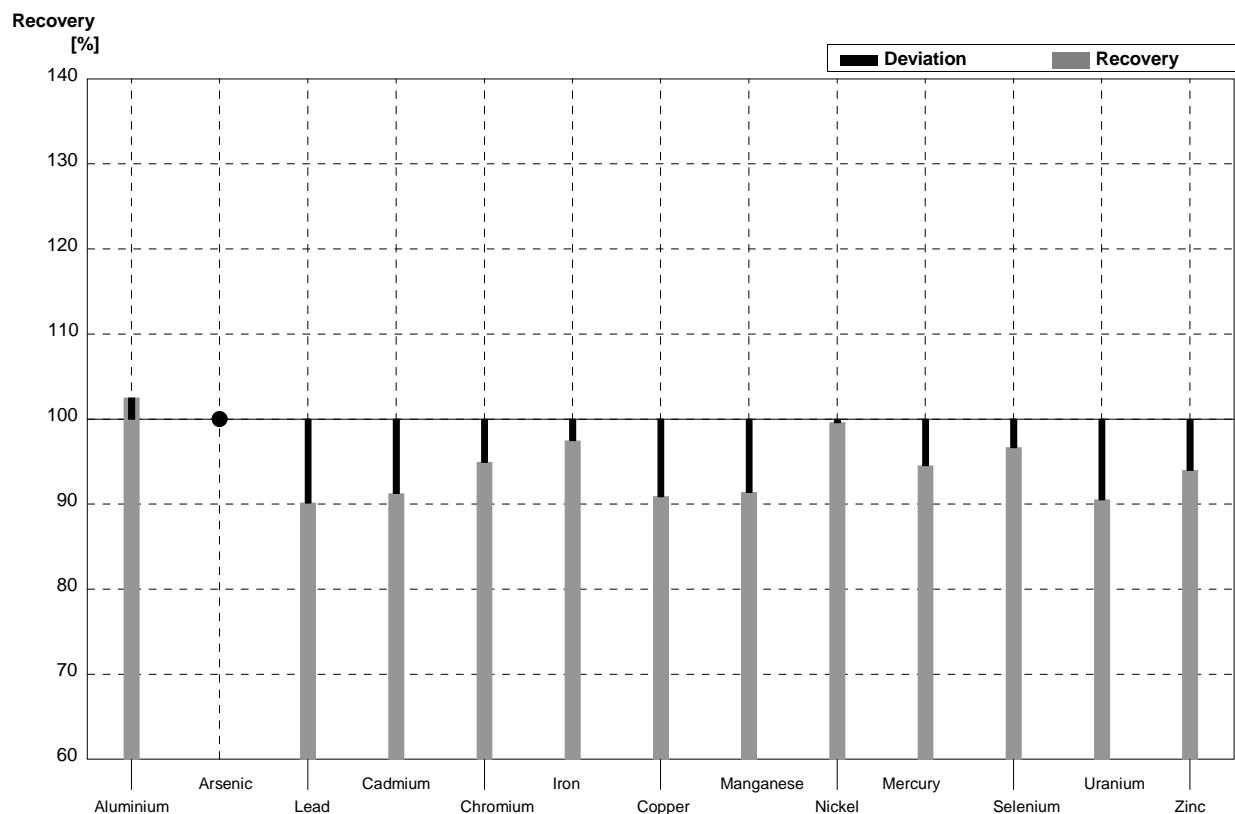
Sample M146A
Laboratory N

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	17,4	0,5	µg/l	105%
Arsenic	2,18	0,02	2,12	0,04	µg/l	97%
Lead	2,18	0,02	1,97	0,02	µg/l	90%
Cadmium	0,119	0,002	0,109	0,009	µg/l	92%
Chromium	3,16	0,02	3,10	0,06	µg/l	98%
Iron	31,9	0,2	30,9	0,4	µg/l	97%
Copper	7,96	0,10	7,38	0,14	µg/l	93%
Manganese	25,1	0,2	24,4	0,8	µg/l	97%
Nickel	1,18	0,05	1,32	0,05	µg/l	112%
Mercury	<0,25		0,115	0,003	µg/l	•
Selenium	2,30	0,06	2,22	0,03	µg/l	97%
Uranium	4,44	0,03	4,07	0,15	µg/l	92%
Zinc	16,0	0,5	15,1	0,5	µg/l	94%



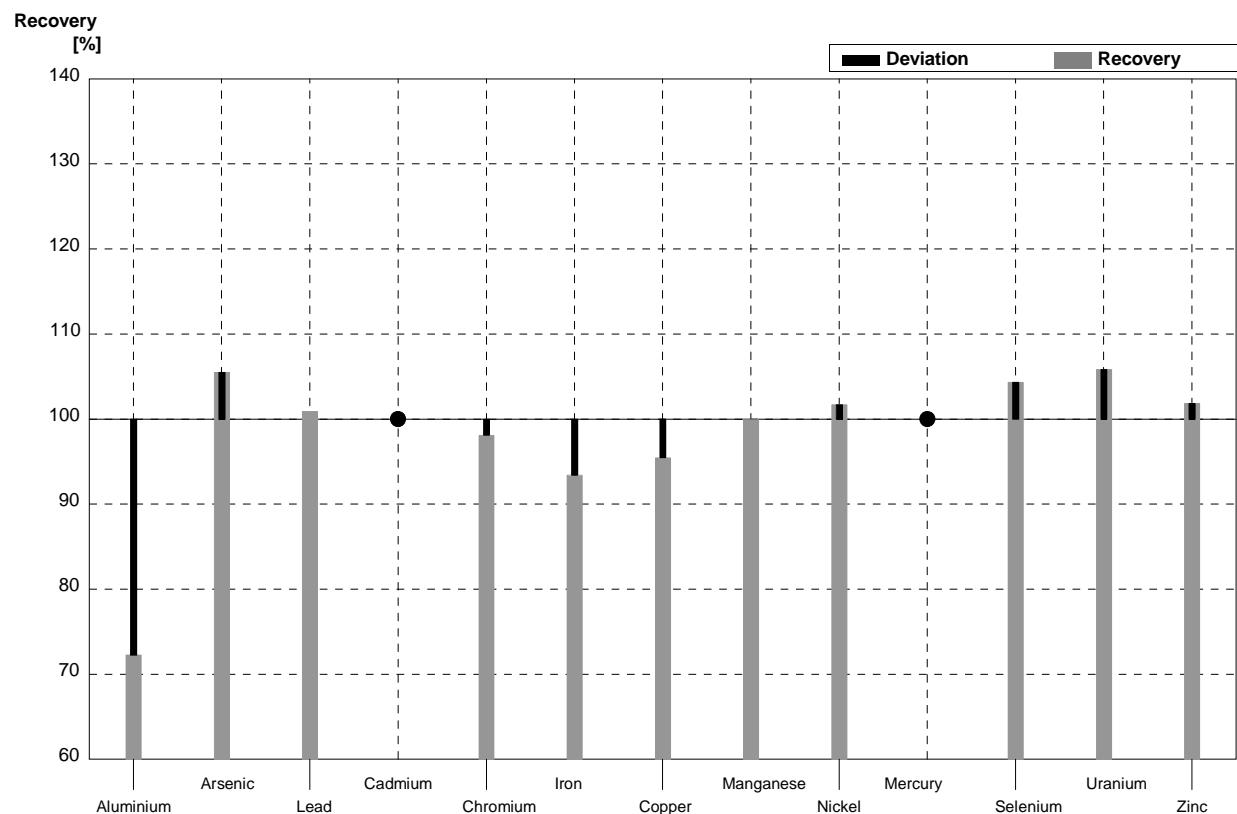
Sample M146B
Laboratory N

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	28,5	0,7	µg/l	103%
Arsenic	<0,5		<0,05		µg/l	•
Lead	3,25	0,02	2,93	0,03	µg/l	90%
Cadmium	0,470	0,006	0,429	0,011	µg/l	91%
Chromium	1,18	0,01	1,12	0,07	µg/l	95%
Iron	11,9	0,2	11,6	0,2	µg/l	97%
Copper	2,97	0,03	2,70	0,08	µg/l	91%
Manganese	2,79	0,03	2,55	0,19	µg/l	91%
Nickel	2,45	0,05	2,44	0,16	µg/l	100%
Mercury	1,28	0,02	1,21	0,04	µg/l	95%
Selenium	0,60	0,06	0,58	0,01	µg/l	97%
Uranium	0,95	0,01	0,86	0,02	µg/l	91%
Zinc	23,3	0,5	21,9	0,7	µg/l	94%



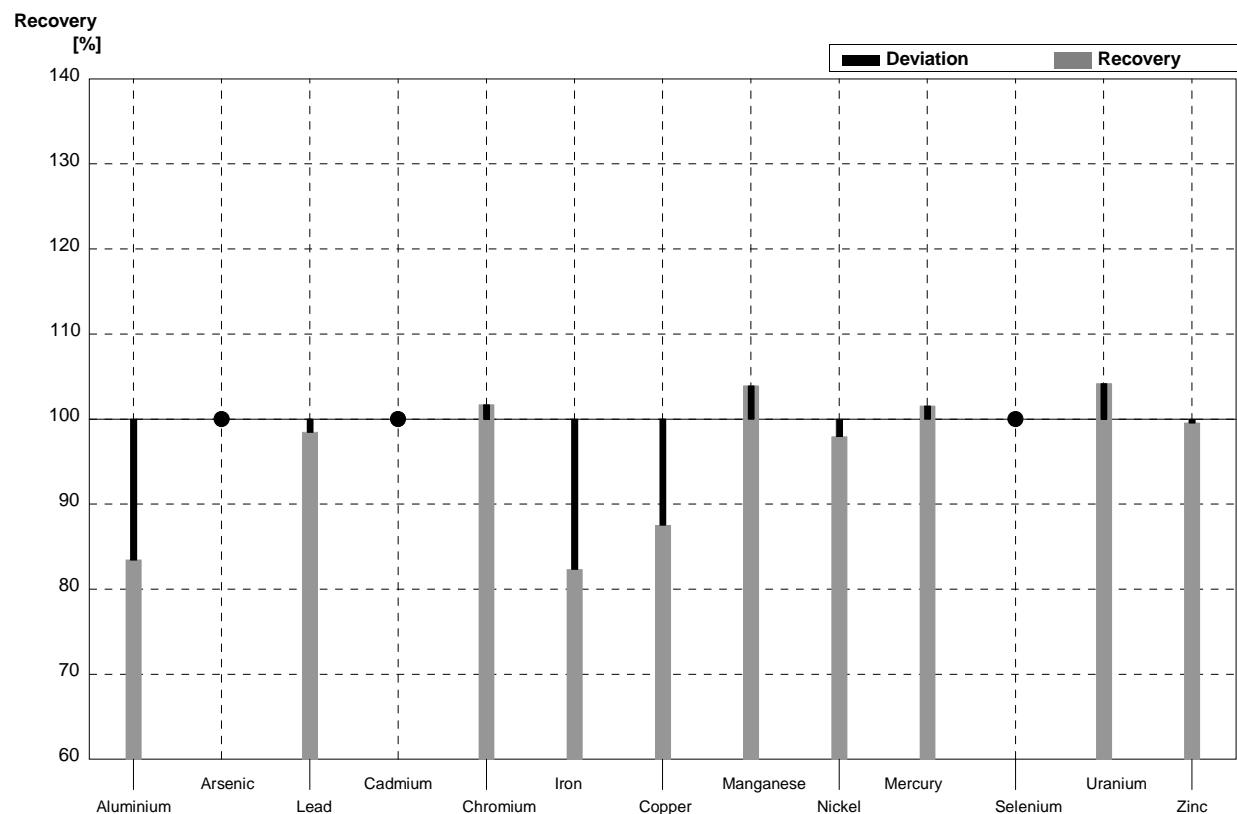
Sample M146A
Laboratory O

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	12,0	2,4	µg/l	72%
Arsenic	2,18	0,02	2,3	0,46	µg/l	106%
Lead	2,18	0,02	2,2	0,44	µg/l	101%
Cadmium	0,119	0,002	<1,0		µg/l	•
Chromium	3,16	0,02	3,1	0,62	µg/l	98%
Iron	31,9	0,2	29,8	6,0	µg/l	93%
Copper	7,96	0,10	7,6	1,52	µg/l	95%
Manganese	25,1	0,2	25,1	5,0	µg/l	100%
Nickel	1,18	0,05	1,2	0,24	µg/l	102%
Mercury	<0,25		0,12	0,024	µg/l	•
Selenium	2,30	0,06	2,4	0,48	µg/l	104%
Uranium	4,44	0,03	4,7	0,94	µg/l	106%
Zinc	16,0	0,5	16,3	3,2	µg/l	102%



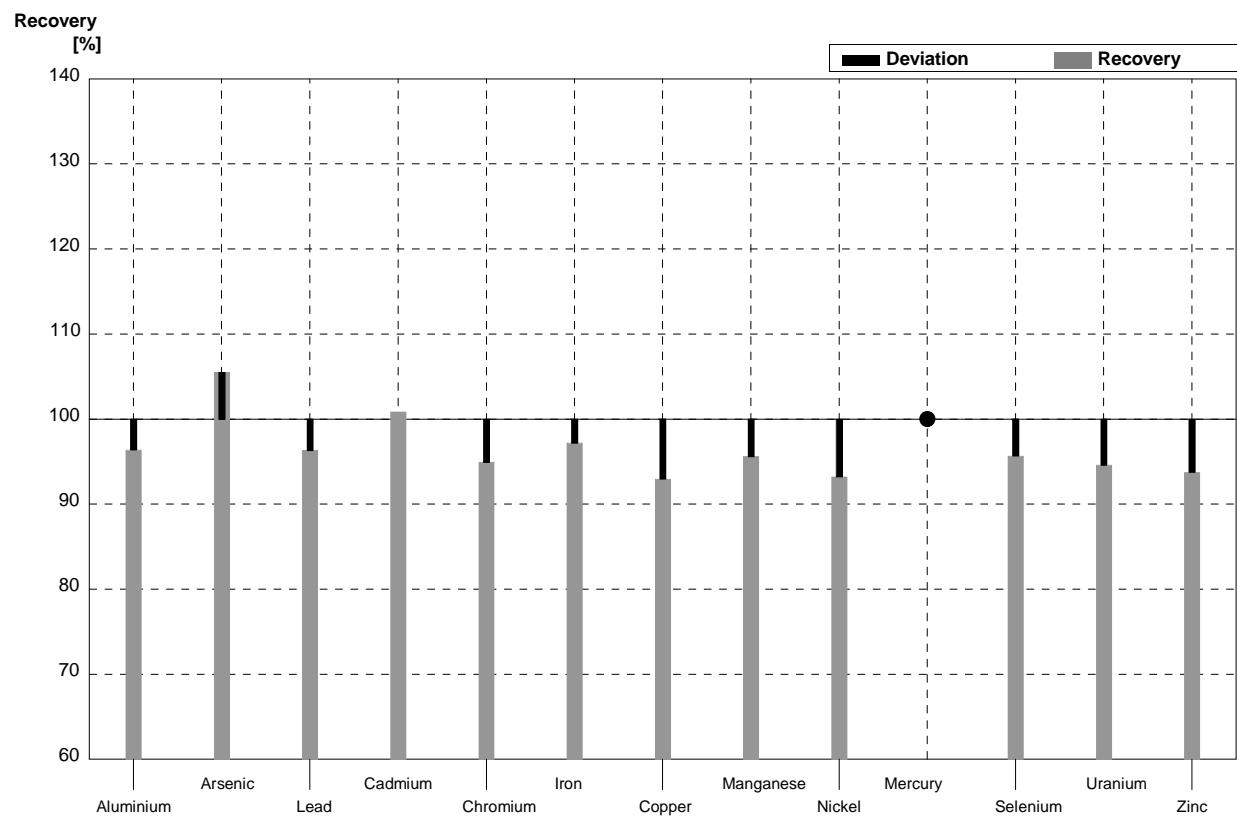
Sample M146B
Laboratory O

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	23,2	4,6	µg/l	83%
Arsenic	<0,5		<1,0		µg/l	•
Lead	3,25	0,02	3,2	0,64	µg/l	98%
Cadmium	0,470	0,006	<1,0		µg/l	•
Chromium	1,18	0,01	1,2	0,24	µg/l	102%
Iron	11,9	0,2	9,8	2,0	µg/l	82%
Copper	2,97	0,03	2,6	0,52	µg/l	88%
Manganese	2,79	0,03	2,9	0,58	µg/l	104%
Nickel	2,45	0,05	2,4	0,48	µg/l	98%
Mercury	1,28	0,02	1,3	0,26	µg/l	102%
Selenium	0,60	0,06	<1,0		µg/l	•
Uranium	0,95	0,01	0,99	0,20	µg/l	104%
Zinc	23,3	0,5	23,2	4,6	µg/l	100%



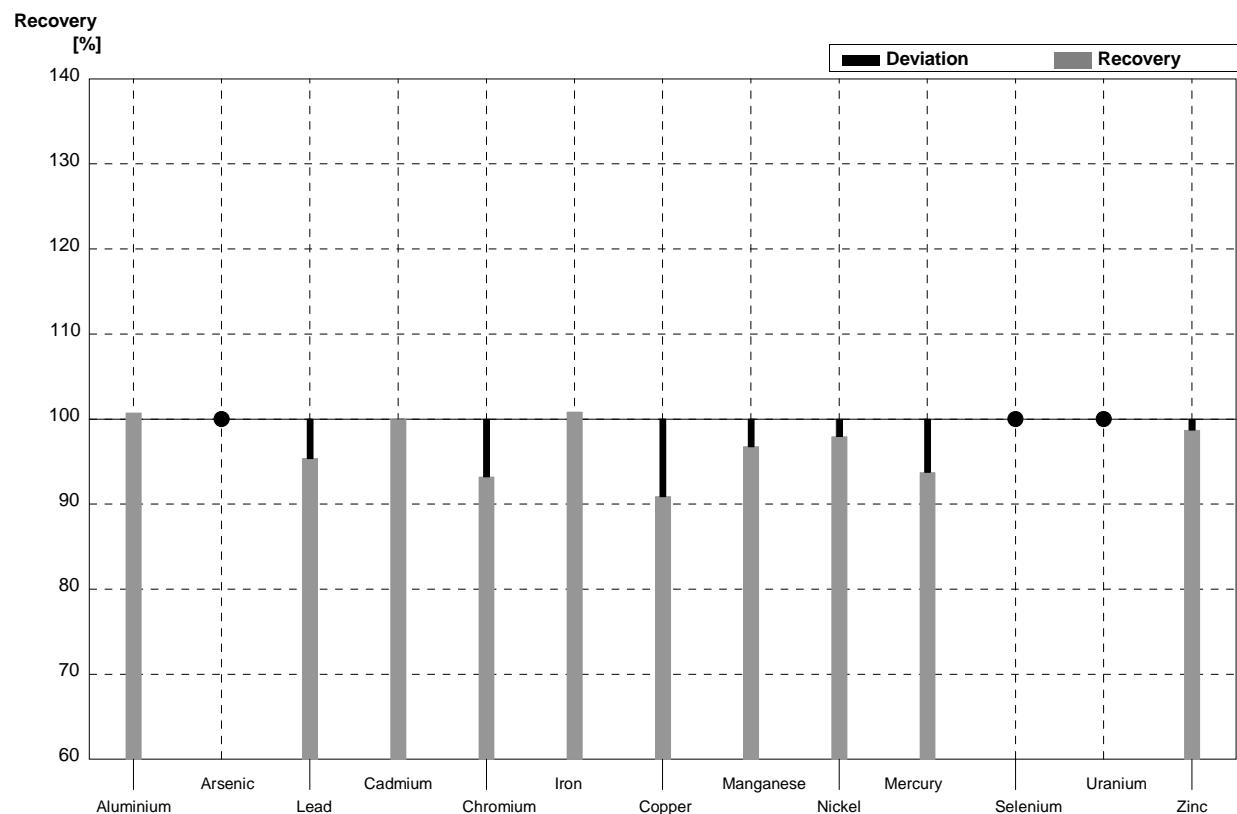
Sample M146A
Laboratory P

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	16	3	µg/l	96%
Arsenic	2,18	0,02	2,3	0,4	µg/l	106%
Lead	2,18	0,02	2,1	0,4	µg/l	96%
Cadmium	0,119	0,002	0,12	0,03	µg/l	101%
Chromium	3,16	0,02	3,0	0,4	µg/l	95%
Iron	31,9	0,2	31	3	µg/l	97%
Copper	7,96	0,10	7,4	1,0	µg/l	93%
Manganese	25,1	0,2	24	3	µg/l	96%
Nickel	1,18	0,05	1,1	0,2	µg/l	93%
Mercury	<0,25		0,14	0,03	µg/l	•
Selenium	2,30	0,06	2,2	0,4	µg/l	96%
Uranium	4,44	0,03	4,2	0,6	µg/l	95%
Zinc	16,0	0,5	15	2	µg/l	94%



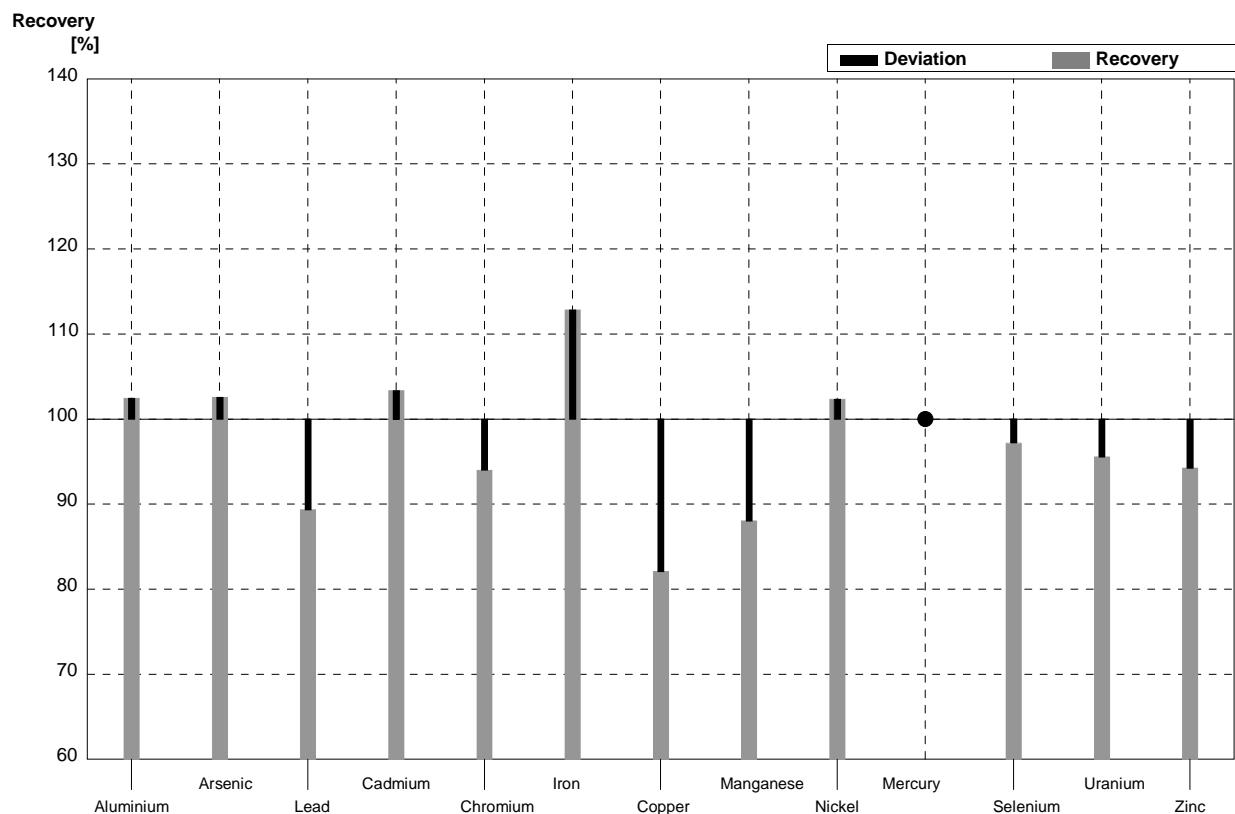
Sample M146B
Laboratory P

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	28	4	µg/l	101%
Arsenic	<0,5		<0,40		µg/l	•
Lead	3,25	0,02	3,1	0,5	µg/l	95%
Cadmium	0,470	0,006	0,47	0,07	µg/l	100%
Chromium	1,18	0,01	1,1	0,2	µg/l	93%
Iron	11,9	0,2	12	2	µg/l	101%
Copper	2,97	0,03	2,7	0,4	µg/l	91%
Manganese	2,79	0,03	2,7	0,4	µg/l	97%
Nickel	2,45	0,05	2,4	0,4	µg/l	98%
Mercury	1,28	0,02	1,2	0,2	µg/l	94%
Selenium	0,60	0,06	<1,0		µg/l	•
Uranium	0,95	0,01	<1,0		µg/l	•
Zinc	23,3	0,5	23	3	µg/l	99%



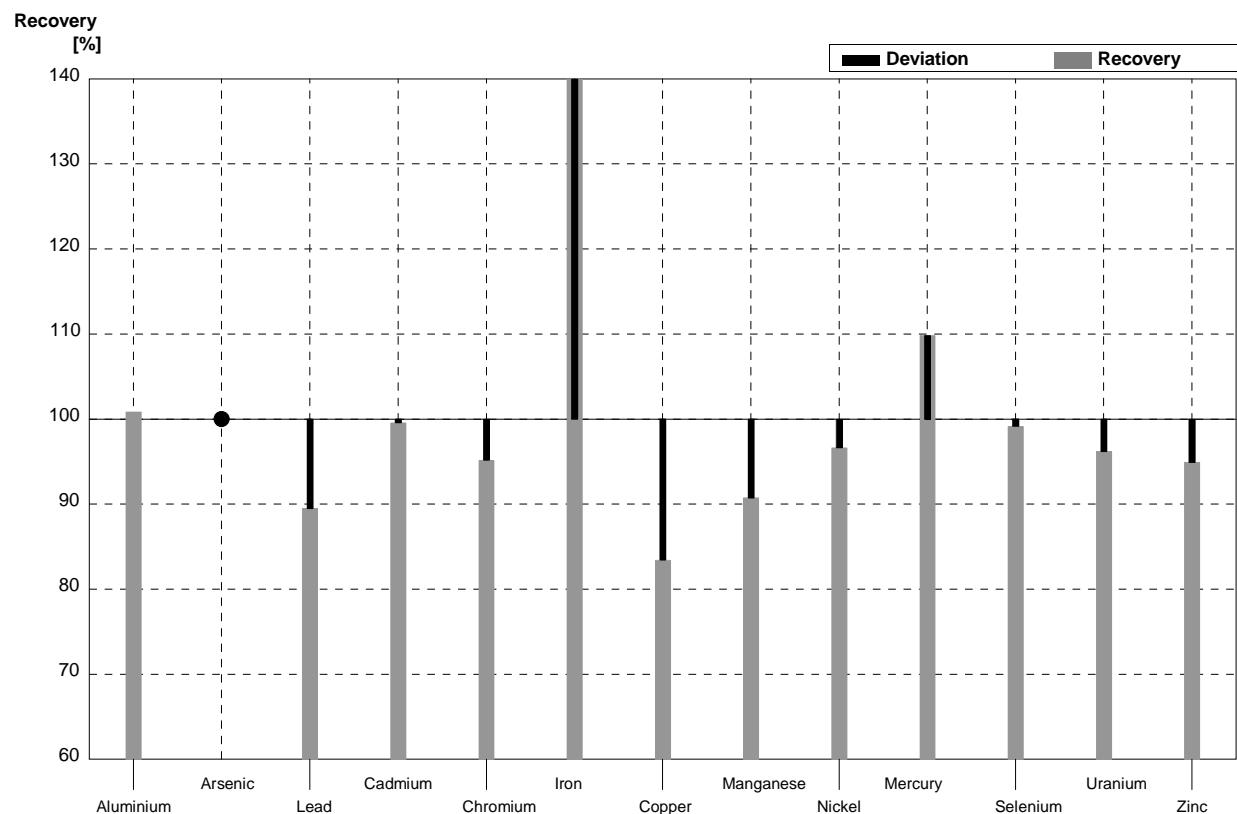
Sample M146A
Laboratory Q

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	17,01	2,30	µg/l	102%
Arsenic	2,18	0,02	2,236	0,340	µg/l	103%
Lead	2,18	0,02	1,948	0,393	µg/l	89%
Cadmium	0,119	0,002	0,123	0,0250	µg/l	103%
Chromium	3,16	0,02	2,971	0,410	µg/l	94%
Iron	31,9	0,2	36,00	5,62	µg/l	113%
Copper	7,96	0,10	6,535	0,810	µg/l	82%
Manganese	25,1	0,2	22,10	2,83	µg/l	88%
Nickel	1,18	0,05	1,208	0,135	µg/l	102%
Mercury	<0,25		0,1677	0,0434	µg/l	•
Selenium	2,30	0,06	2,236	0,501	µg/l	97%
Uranium	4,44	0,03	4,244	0,738	µg/l	96%
Zinc	16,0	0,5	15,08	2,43	µg/l	94%



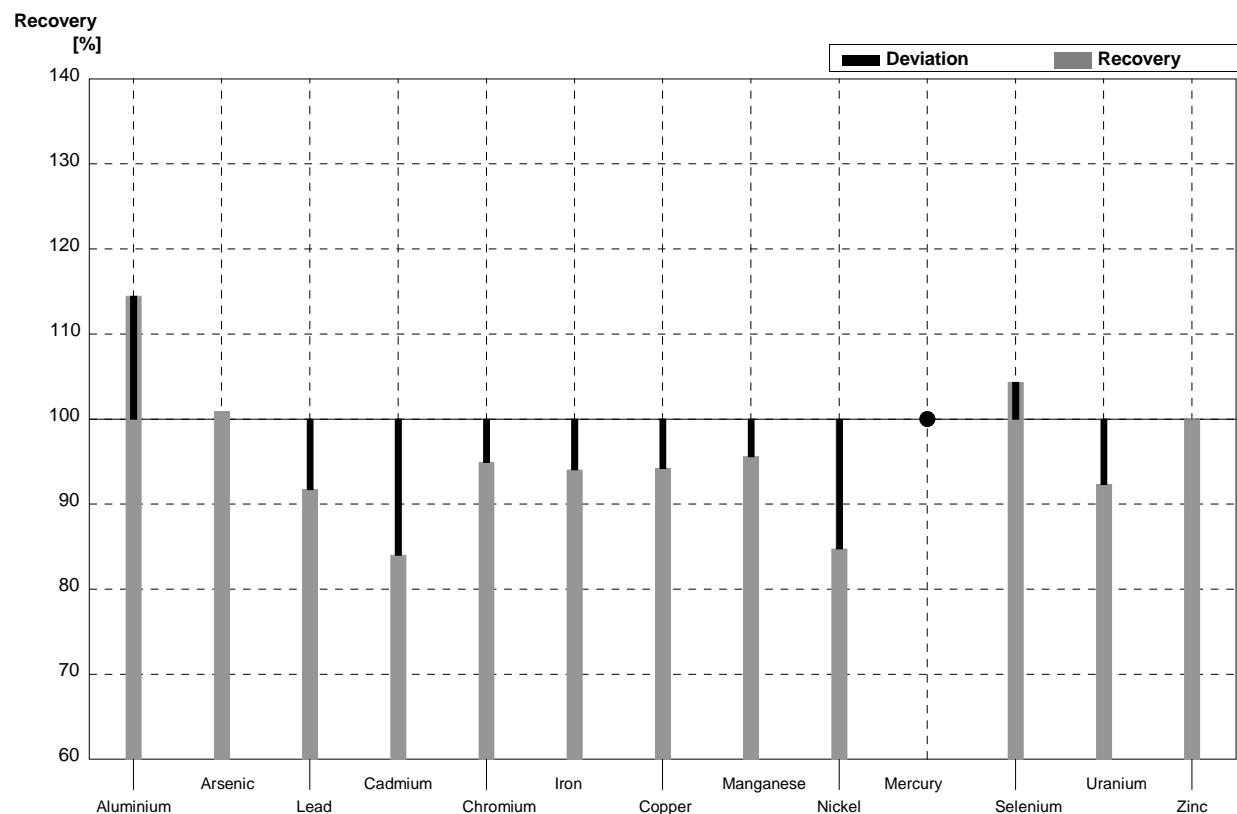
Sample M146B
Laboratory Q

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	28,03	3,79	µg/l	101%
Arsenic	<0,5		<0,5		µg/l	•
Lead	3,25	0,02	2,909	0,588	µg/l	90%
Cadmium	0,470	0,006	0,468	0,0950	µg/l	100%
Chromium	1,18	0,01	1,123	0,155	µg/l	95%
Iron	11,9	0,2	17,80	2,78	µg/l	150%
Copper	2,97	0,03	2,478	0,307	µg/l	83%
Manganese	2,79	0,03	2,532	0,324	µg/l	91%
Nickel	2,45	0,05	2,368	0,265	µg/l	97%
Mercury	1,28	0,02	1,406	0,364	µg/l	110%
Selenium	0,60	0,06	0,595	0,133	µg/l	99%
Uranium	0,95	0,01	0,914	0,159	µg/l	96%
Zinc	23,3	0,5	22,116	3,56	µg/l	95%



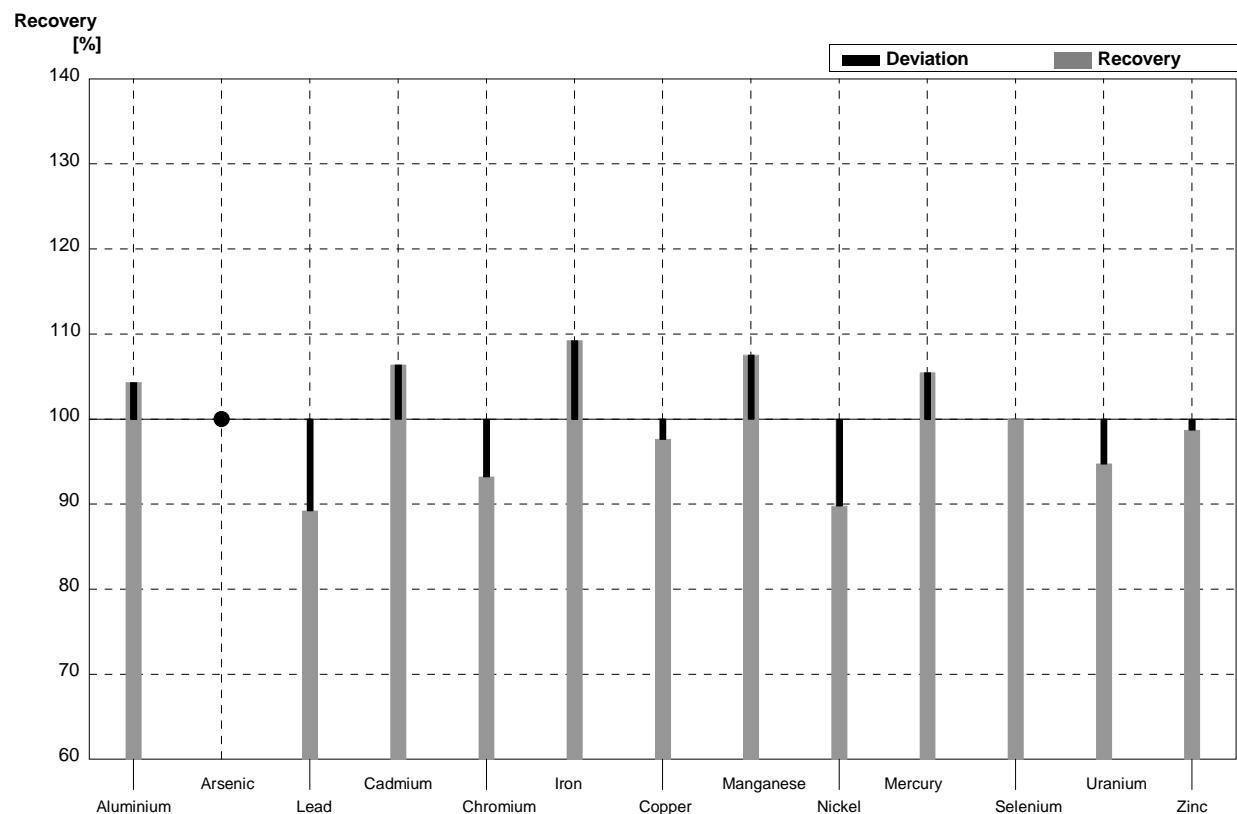
Sample M146A
Laboratory R

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	19	1,9	µg/l	114%
Arsenic	2,18	0,02	2,2	0,264	µg/l	101%
Lead	2,18	0,02	2	0,16	µg/l	92%
Cadmium	0,119	0,002	0,1	0,008	µg/l	84%
Chromium	3,16	0,02	3	0,36	µg/l	95%
Iron	31,9	0,2	30	7,8	µg/l	94%
Copper	7,96	0,10	7,5	0,6	µg/l	94%
Manganese	25,1	0,2	24	2,4	µg/l	96%
Nickel	1,18	0,05	1	0,1	µg/l	85%
Mercury	<0,25		0,14	0,0168	µg/l	•
Selenium	2,30	0,06	2,4	0,36	µg/l	104%
Uranium	4,44	0,03	4,1	0,205	µg/l	92%
Zinc	16,0	0,5	16	1,6	µg/l	100%



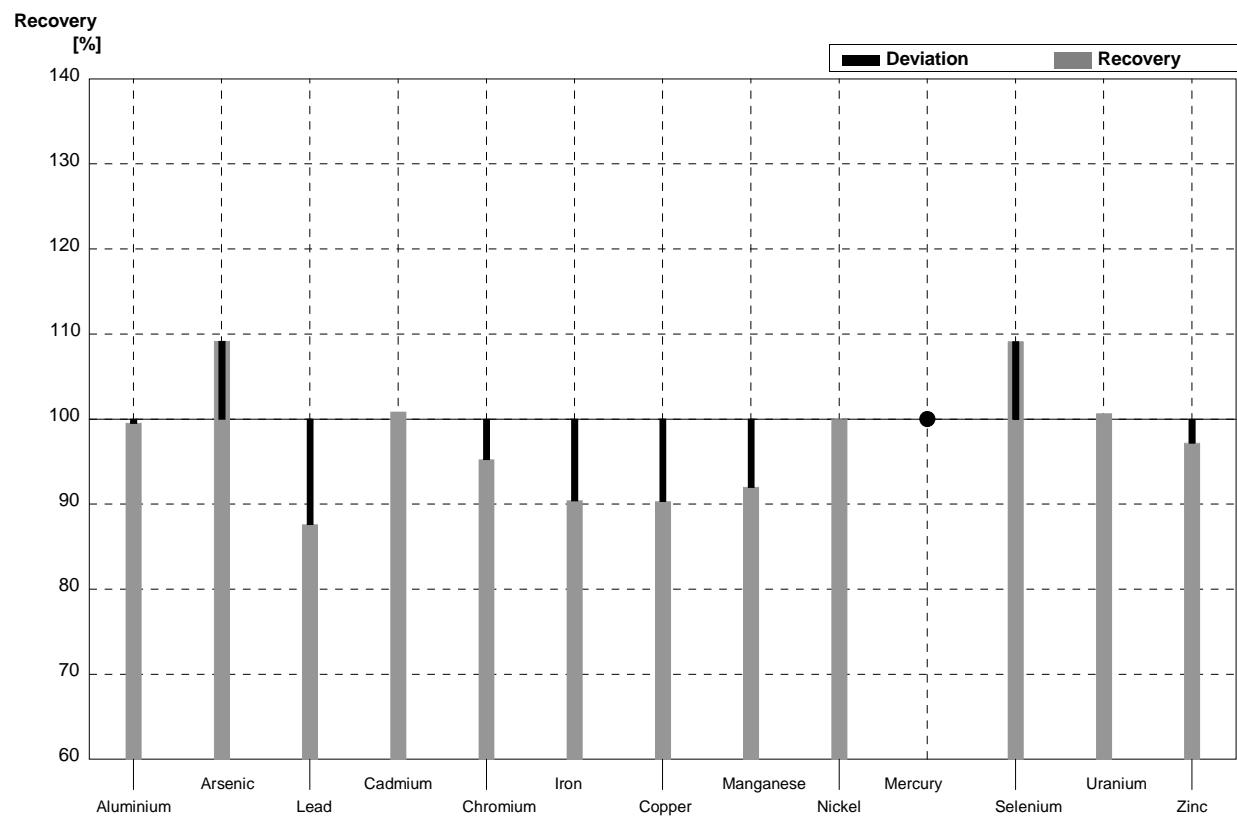
Sample M146B
Laboratory R

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	29	2,9	µg/l	104%
Arsenic	<0,5		0,02		µg/l	•
Lead	3,25	0,02	2,9	0,232	µg/l	89%
Cadmium	0,470	0,006	0,5	0,04	µg/l	106%
Chromium	1,18	0,01	1,1	0,132	µg/l	93%
Iron	11,9	0,2	13	3,38	µg/l	109%
Copper	2,97	0,03	2,9	0,232	µg/l	98%
Manganese	2,79	0,03	3	0,3	µg/l	108%
Nickel	2,45	0,05	2,2	0,22	µg/l	90%
Mercury	1,28	0,02	1,35	0,162	µg/l	105%
Selenium	0,60	0,06	0,6	0,09	µg/l	100%
Uranium	0,95	0,01	0,9	0,045	µg/l	95%
Zinc	23,3	0,5	23	2,3	µg/l	99%



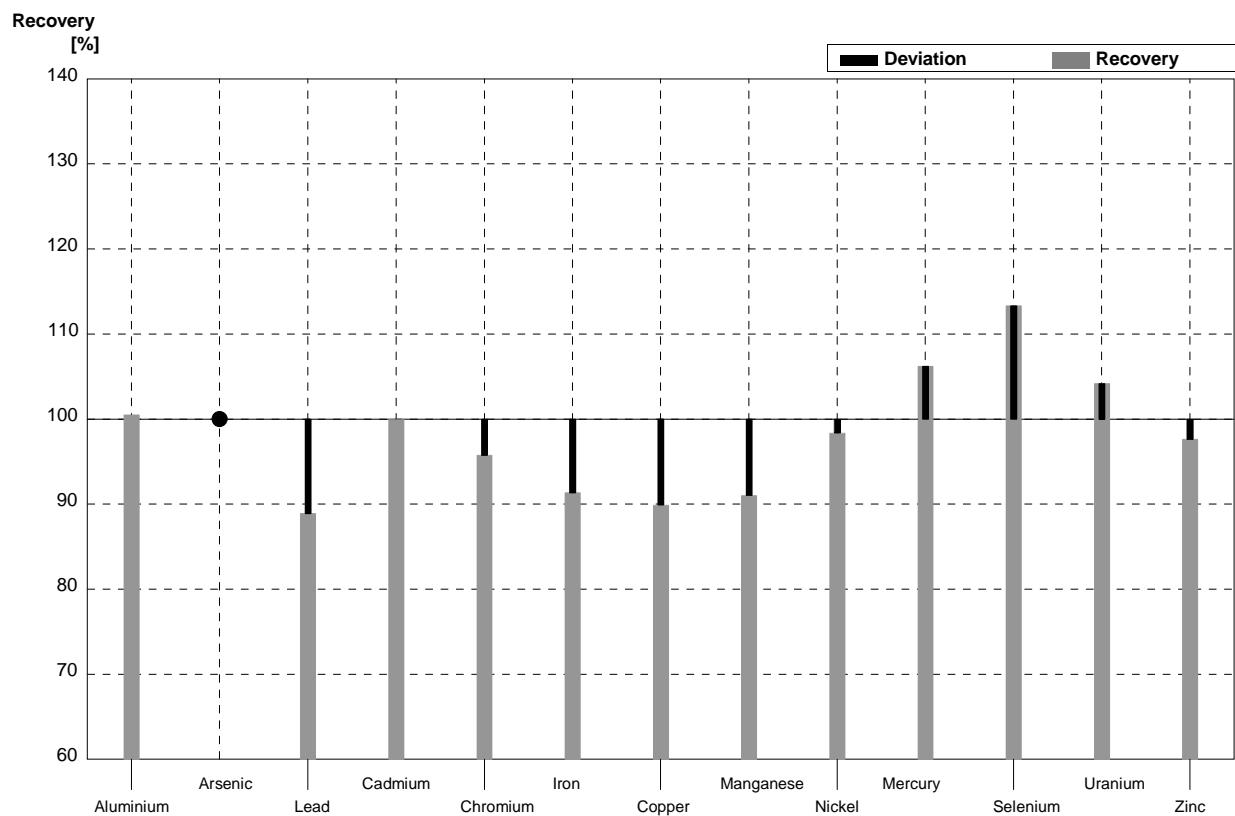
Sample M146A
Laboratory S

Parameter	Target value	\pm U (k=2)	Result	\pm	Unit	Recovery
Aluminium	16,6	0,3	16,52	3,80	$\mu\text{g/l}$	100%
Arsenic	2,18	0,02	2,38	0,64	$\mu\text{g/l}$	109%
Lead	2,18	0,02	1,91	0,19	$\mu\text{g/l}$	88%
Cadmium	0,119	0,002	0,12	0,03	$\mu\text{g/l}$	101%
Chromium	3,16	0,02	3,01	0,27	$\mu\text{g/l}$	95%
Iron	31,9	0,2	28,84	3,75	$\mu\text{g/l}$	90%
Copper	7,96	0,10	7,19	1,29	$\mu\text{g/l}$	90%
Manganese	25,1	0,2	23,09	3,23	$\mu\text{g/l}$	92%
Nickel	1,18	0,05	1,18	0,12	$\mu\text{g/l}$	100%
Mercury	<0,25		0,16	0,04	$\mu\text{g/l}$	•
Selenium	2,30	0,06	2,51	0,40	$\mu\text{g/l}$	109%
Uranium	4,44	0,03	4,47	0,49	$\mu\text{g/l}$	101%
Zinc	16,0	0,5	15,55	2,80	$\mu\text{g/l}$	97%



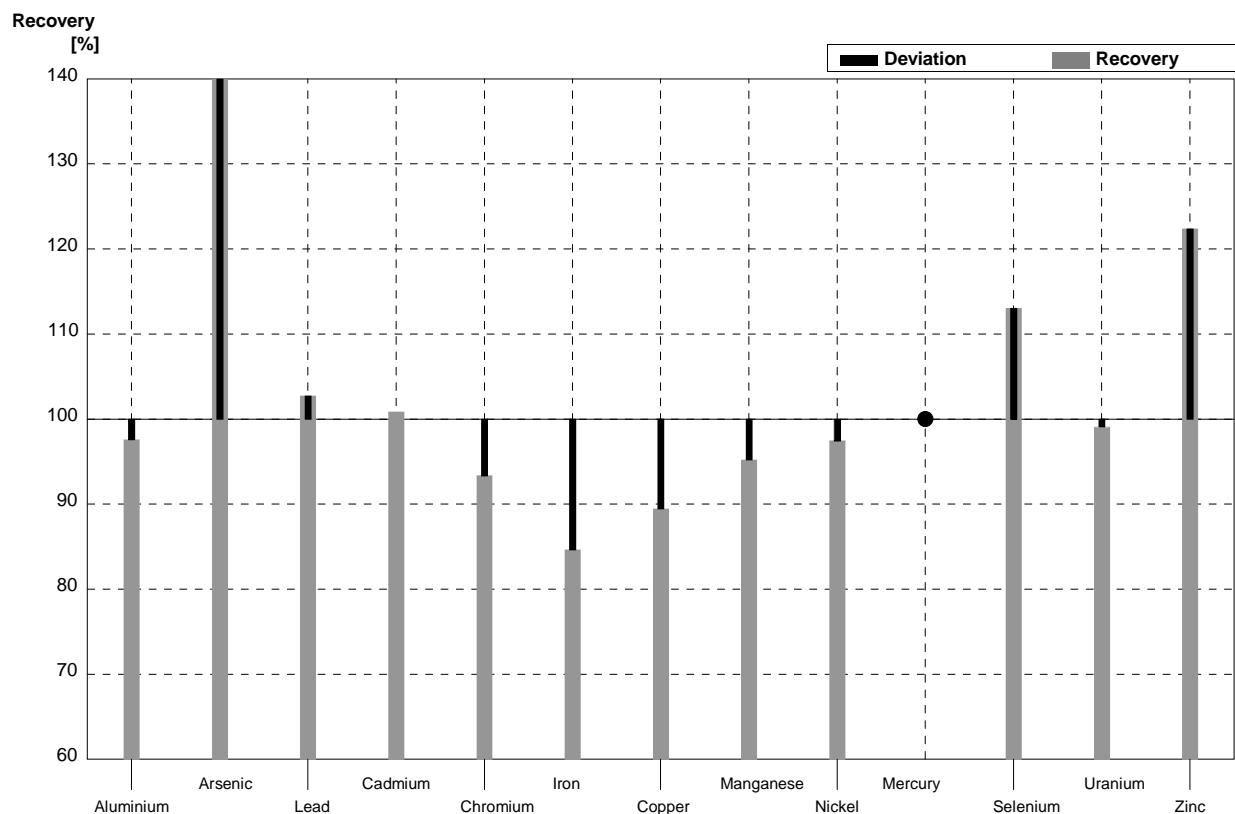
Sample M146B
Laboratory S

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	27,94	6,43	µg/l	101%
Arsenic	<0,5		<0,50		µg/l	•
Lead	3,25	0,02	2,89	0,29	µg/l	89%
Cadmium	0,470	0,006	0,47	0,10	µg/l	100%
Chromium	1,18	0,01	1,13	0,10	µg/l	96%
Iron	11,9	0,2	10,87	1,41	µg/l	91%
Copper	2,97	0,03	2,67	0,48	µg/l	90%
Manganese	2,79	0,03	2,54	0,36	µg/l	91%
Nickel	2,45	0,05	2,41	0,24	µg/l	98%
Mercury	1,28	0,02	1,36	0,34	µg/l	106%
Selenium	0,60	0,06	0,68	0,11	µg/l	113%
Uranium	0,95	0,01	0,99	0,11	µg/l	104%
Zinc	23,3	0,5	22,75	4,10	µg/l	98%



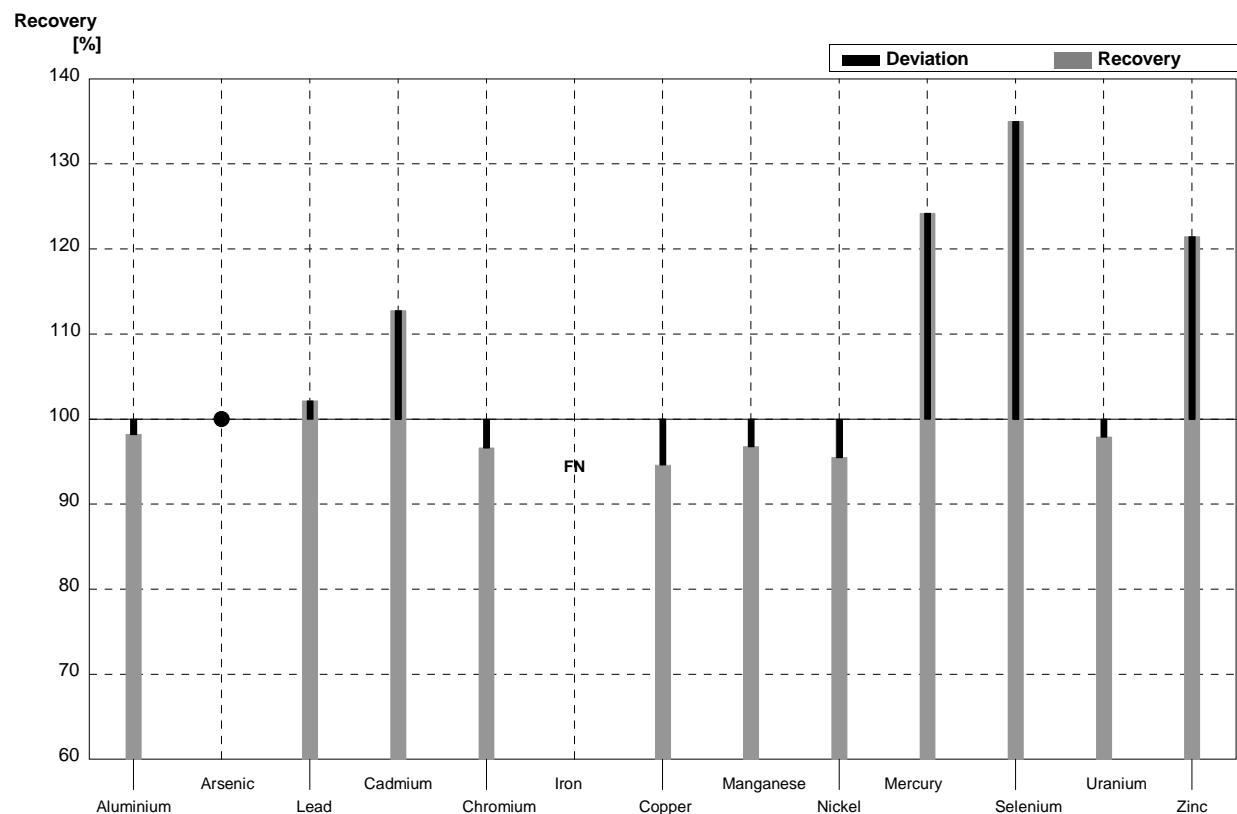
Sample M146A
Laboratory T

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	16,2	2,43	µg/l	98%
Arsenic	2,18	0,02	3,21	0,48	µg/l	147%
Lead	2,18	0,02	2,24	0,34	µg/l	103%
Cadmium	0,119	0,002	0,12	0,02	µg/l	101%
Chromium	3,16	0,02	2,95	0,44	µg/l	93%
Iron	31,9	0,2	27,0	4,04	µg/l	85%
Copper	7,96	0,10	7,12	1,07	µg/l	89%
Manganese	25,1	0,2	23,9	3,59	µg/l	95%
Nickel	1,18	0,05	1,15	0,17	µg/l	97%
Mercury	<0,25		0,20	0,03	µg/l	•
Selenium	2,30	0,06	2,60	0,39	µg/l	113%
Uranium	4,44	0,03	4,40	0,66	µg/l	99%
Zinc	16,0	0,5	19,58	2,94	µg/l	122%



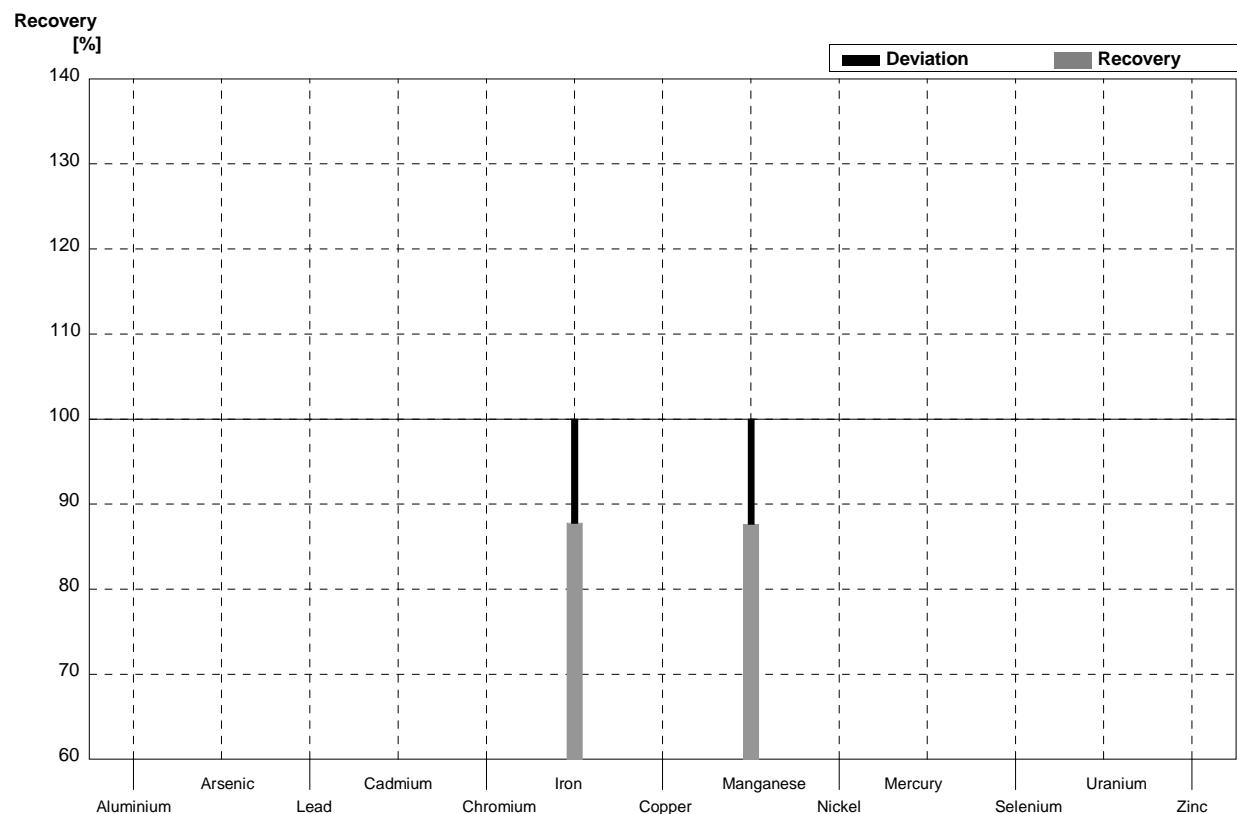
Sample M146B
Laboratory T

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	27,3	4,10	µg/l	98%
Arsenic	<0,5		<1		µg/l	•
Lead	3,25	0,02	3,32	0,50	µg/l	102%
Cadmium	0,470	0,006	0,53	0,08	µg/l	113%
Chromium	1,18	0,01	1,14	0,17	µg/l	97%
Iron	11,9	0,2	<10		µg/l	FN
Copper	2,97	0,03	2,81	0,42	µg/l	95%
Manganese	2,79	0,03	2,70	0,41	µg/l	97%
Nickel	2,45	0,05	2,34	0,35	µg/l	96%
Mercury	1,28	0,02	1,59	0,24	µg/l	124%
Selenium	0,60	0,06	0,81	0,12	µg/l	135%
Uranium	0,95	0,01	0,93	0,14	µg/l	98%
Zinc	23,3	0,5	28,30	4,25	µg/l	121%



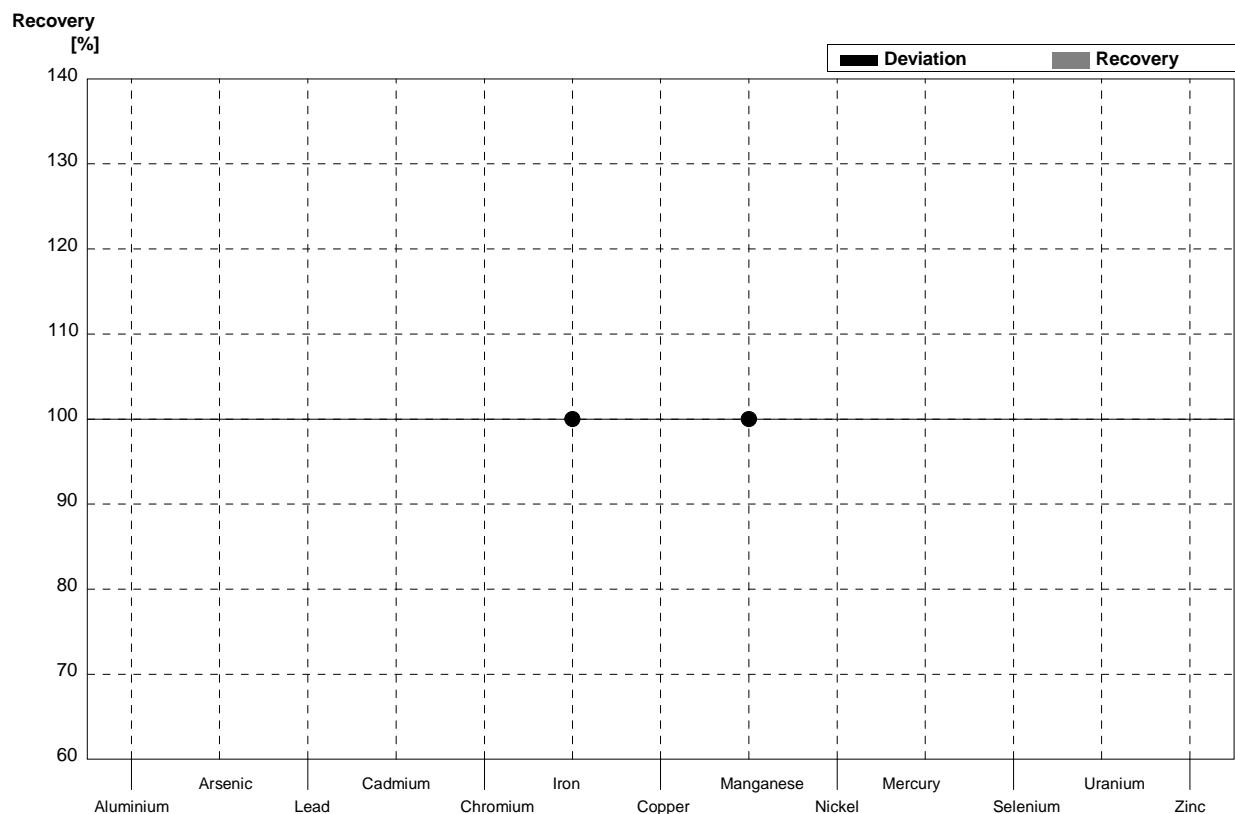
Sample M146A
Laboratory U

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3			µg/l	
Arsenic	2,18	0,02			µg/l	
Lead	2,18	0,02			µg/l	
Cadmium	0,119	0,002			µg/l	
Chromium	3,16	0,02			µg/l	
Iron	31,9	0,2	28	3	µg/l	88%
Copper	7,96	0,10			µg/l	
Manganese	25,1	0,2	22	2	µg/l	88%
Nickel	1,18	0,05			µg/l	
Mercury	<0,25				µg/l	
Selenium	2,30	0,06			µg/l	
Uranium	4,44	0,03			µg/l	
Zinc	16,0	0,5			µg/l	



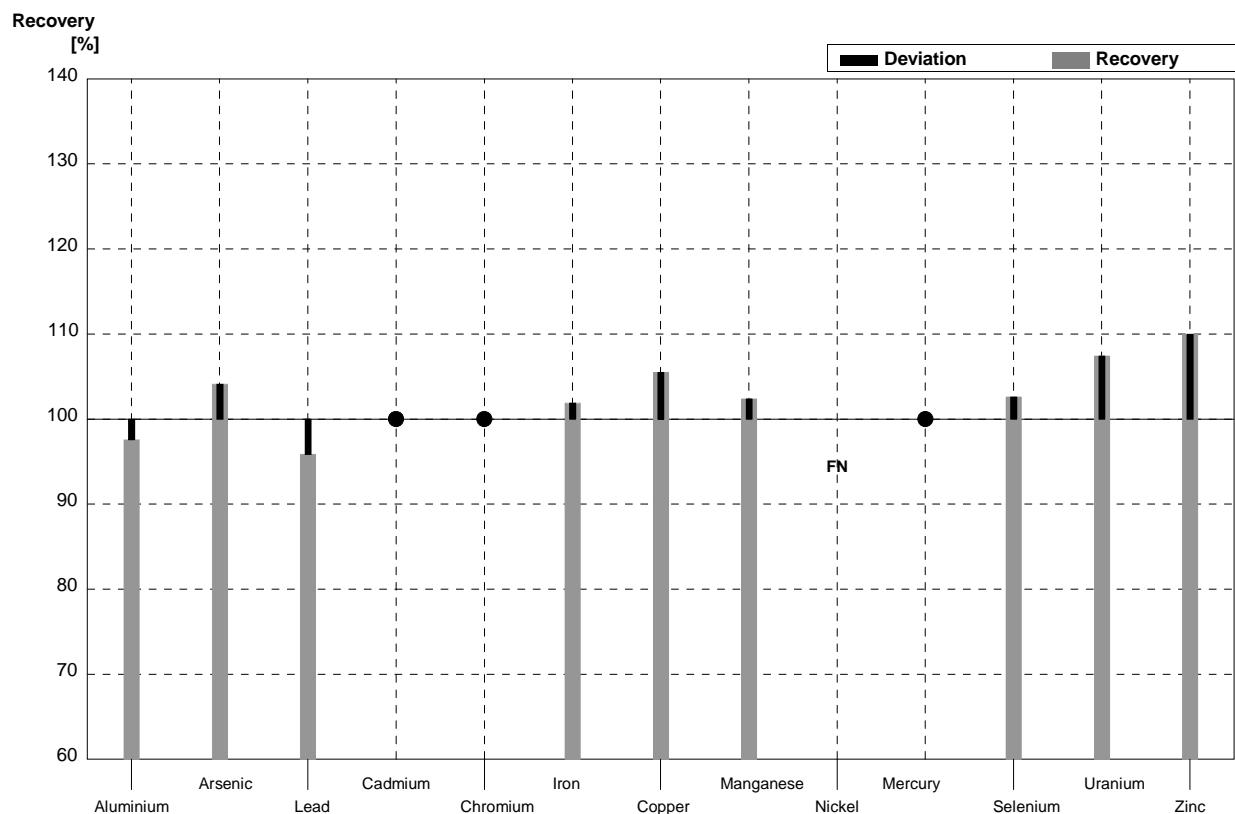
Sample M146B
Laboratory U

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3			µg/l	
Arsenic	<0,5				µg/l	
Lead	3,25	0,02			µg/l	
Cadmium	0,470	0,006			µg/l	
Chromium	1,18	0,01			µg/l	
Iron	11,9	0,2	<20		µg/l	•
Copper	2,97	0,03			µg/l	
Manganese	2,79	0,03	<5		µg/l	•
Nickel	2,45	0,05			µg/l	
Mercury	1,28	0,02			µg/l	
Selenium	0,60	0,06			µg/l	
Uranium	0,95	0,01			µg/l	
Zinc	23,3	0,5			µg/l	



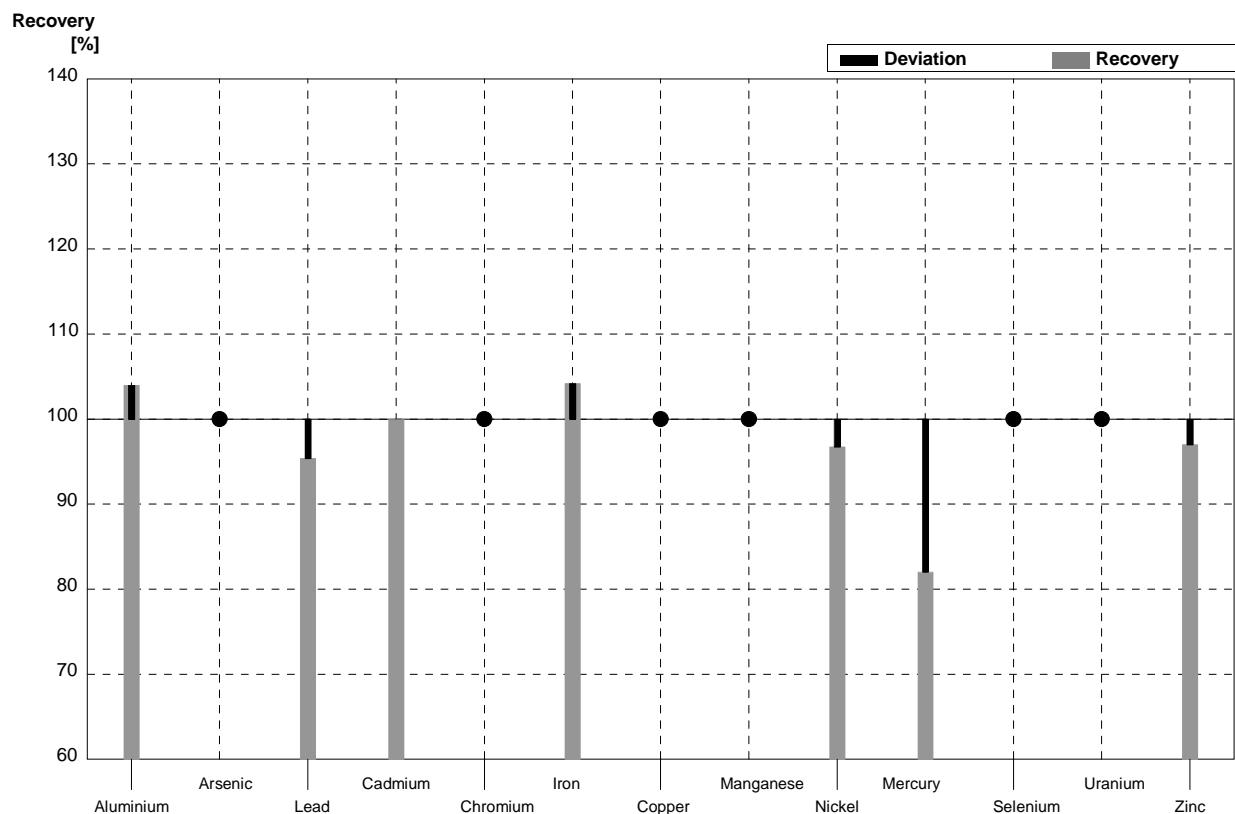
Sample M146A
Laboratory V

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	16,2	1,2	µg/l	98%
Arsenic	2,18	0,02	2,27	0,17	µg/l	104%
Lead	2,18	0,02	2,09	0,06	µg/l	96%
Cadmium	0,119	0,002	<0,4		µg/l	•
Chromium	3,16	0,02	<5		µg/l	•
Iron	31,9	0,2	32,5	1,9	µg/l	102%
Copper	7,96	0,10	8,4	1,2	µg/l	106%
Manganese	25,1	0,2	25,7	0,9	µg/l	102%
Nickel	1,18	0,05	<1		µg/l	FN
Mercury	<0,25		0,10	0,02	µg/l	•
Selenium	2,30	0,06	2,36	0,07	µg/l	103%
Uranium	4,44	0,03	4,77	1,27	µg/l	107%
Zinc	16,0	0,5	17,6	1,6	µg/l	110%



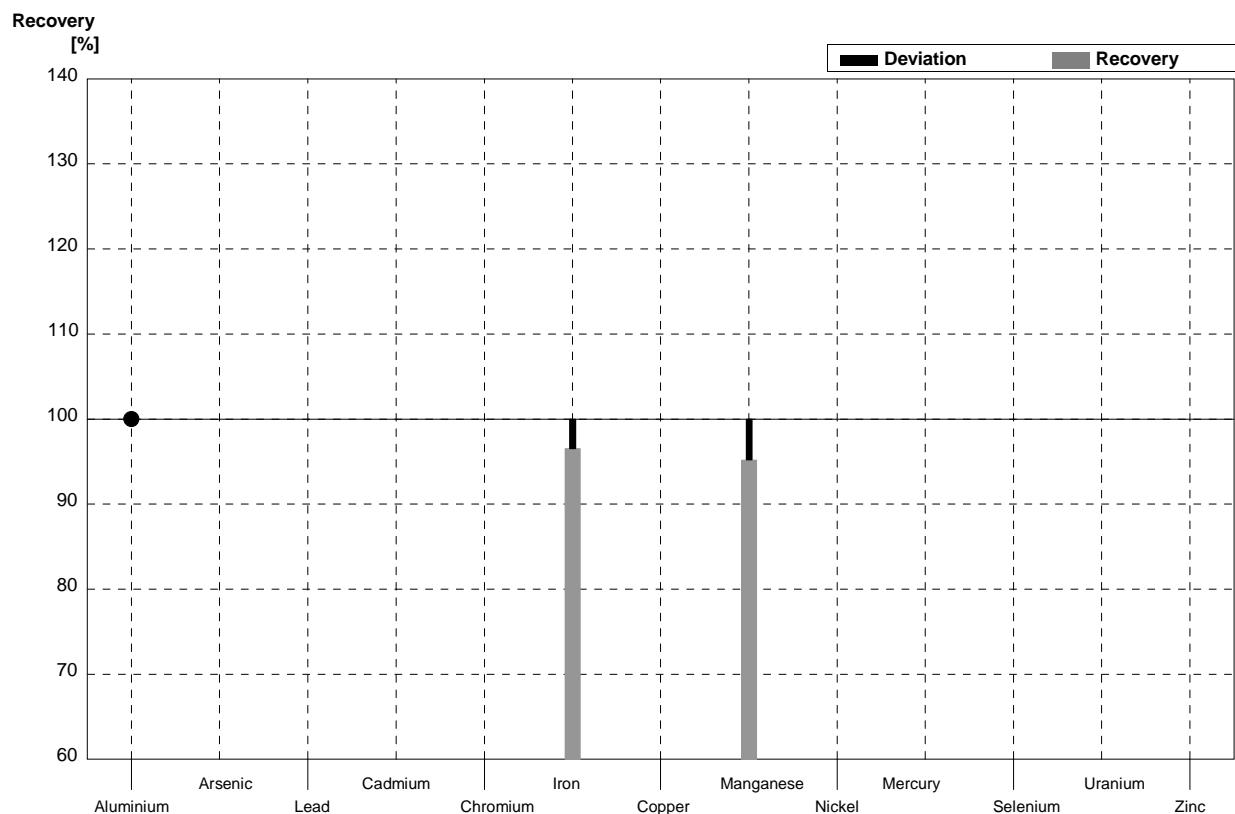
Sample M146B
Laboratory V

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	28,9	1,0	µg/l	104%
Arsenic	<0,5		[0,1]		µg/l	•
Lead	3,25	0,02	3,10	0,06	µg/l	95%
Cadmium	0,470	0,006	0,47	0,05	µg/l	100%
Chromium	1,18	0,01	<5		µg/l	•
Iron	11,9	0,2	12,4	1,0	µg/l	104%
Copper	2,97	0,03	<5		µg/l	•
Manganese	2,79	0,03	<4		µg/l	•
Nickel	2,45	0,05	2,37	0,15	µg/l	97%
Mercury	1,28	0,02	1,05	0,02	µg/l	82%
Selenium	0,60	0,06	<1		µg/l	•
Uranium	0,95	0,01	<2		µg/l	•
Zinc	23,3	0,5	22,6	0,5	µg/l	97%



Sample M146A
Laboratory W

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	16,6	0,3	<20,0		µg/l	•
Arsenic	2,18	0,02			µg/l	
Lead	2,18	0,02			µg/l	
Cadmium	0,119	0,002			µg/l	
Chromium	3,16	0,02			µg/l	
Iron	31,9	0,2	30,8	6,0	µg/l	97%
Copper	7,96	0,10			µg/l	
Manganese	25,1	0,2	23,9	5,0	µg/l	95%
Nickel	1,18	0,05			µg/l	
Mercury	<0,25				µg/l	
Selenium	2,30	0,06			µg/l	
Uranium	4,44	0,03			µg/l	
Zinc	16,0	0,5			µg/l	



Sample M146B
Laboratory W

Parameter	Target value	± U (k=2)	Result	±	Unit	Recovery
Aluminium	27,8	0,3	<20,0		µg/l	FN
Arsenic	<0,5				µg/l	
Lead	3,25	0,02			µg/l	
Cadmium	0,470	0,006			µg/l	
Chromium	1,18	0,01			µg/l	
Iron	11,9	0,2	<20,0		µg/l	•
Copper	2,97	0,03			µg/l	
Manganese	2,79	0,03	<5,0		µg/l	•
Nickel	2,45	0,05			µg/l	
Mercury	1,28	0,02			µg/l	
Selenium	0,60	0,06			µg/l	
Uranium	0,95	0,01			µg/l	
Zinc	23,3	0,5			µg/l	

